2020

Tarrant County Hazard Mitigation Action Plan

EMERGENCY MANAGEMENT
TARRANT COUNTY, TEXAS

North Central Texas Council of Governments

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Executive Summary

We cannot control when or where a tornado or other natural hazard will strike, but we can save lives and reduce property damage by understanding the risks and taking action to address those risks. In the process, we can increase resilience in our community, environment, and economy. Participating jurisdictions in the Tarrant County Hazard Mitigation Action Plan (HazMAP) are dedicated to the protection of local citizens and their property, and to the improvement of the quality of life for all residents.

Mitigation has been defined as "sustained action to reduce or eliminate long-term risk to human life and property from natural, human-caused, and technological hazards."[1] It is fundamentally a loss-prevention function characterized by planned, long-term alteration of the built environment to ensure resilience against natural and human-caused hazards. This loss-prevention function has been illustrated by the Multi-Hazard Mitigation Council study of the Federal Emergency Management Agency (FEMA) mitigation projects, which shows that for every dollar invested in mitigation, six dollars of disaster losses were avoided.[2]

Mitigation should form the foundation of every emergency management agency's plans and procedures. Emergency management agencies should adopt mitigation practices to reduce, minimize, or eliminate hazards in their community. The Tarrant County Hazard Mitigation Action Plan identifies the hazards faced by participating jurisdictions, vulnerabilities to these hazards, and mitigation strategies for the future. The plan fulfills the requirements of the Federal Disaster Mitigation Act as administered by the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA).

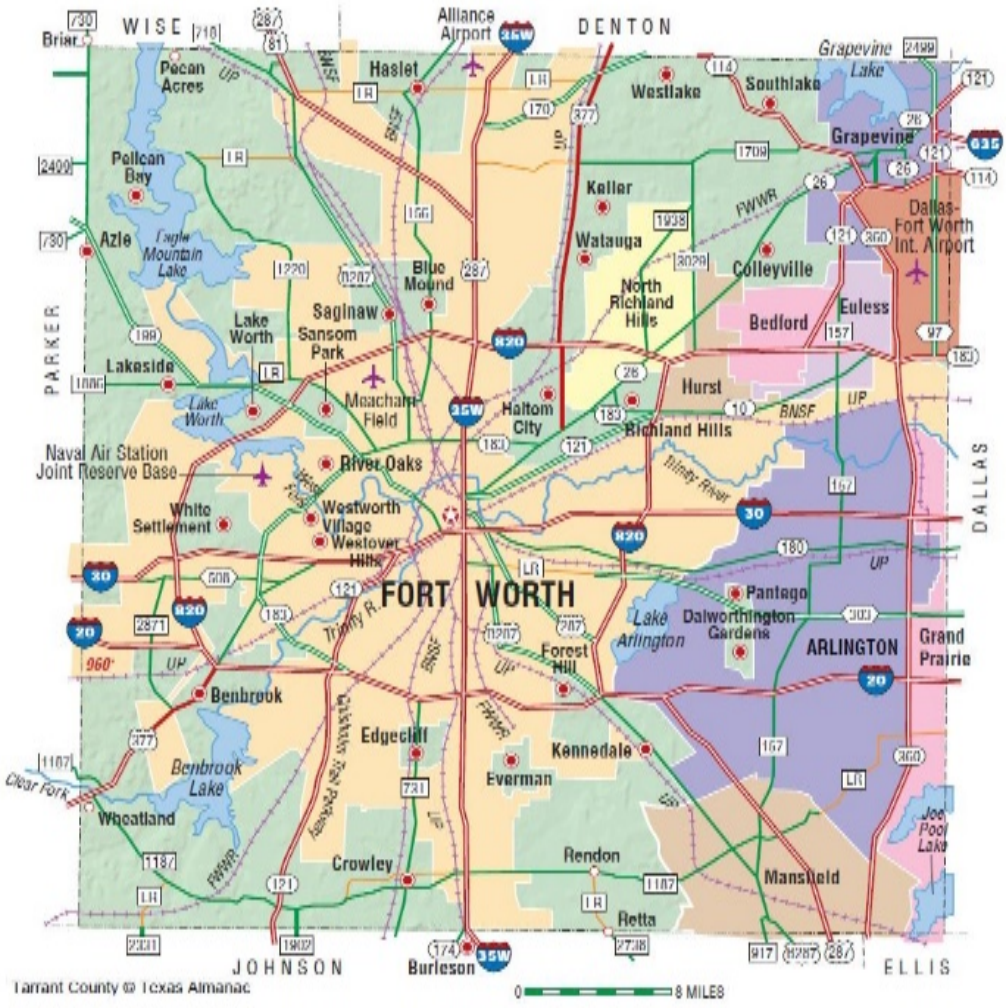
[1] State of Texas Mitigation Handbook, page 1-1.
[2] Natural Hazard Mitigation Saves: 2017 Interim Report, page 1.

The planning area for this plan is for Tarrant County, Texas (marked in red on the Texas map) and includes the following jurisdictions:

- City of Arlington
- City of Azle
- City of Bedford
- City of Blue Mound
- City of Colleyville
- City of Crowley
- City of Dalworthington Gardens*
- Town of Edgecliff Village*
- City of Euless
- City of Everman*
- City of Forest Hill
- City of Fort Worth
- City of Grapevine
- City of Haltom City
- City of Haslet
- City of Hurst
- City of Keller
- City of Kennedale
- City of Lake Worth
- Town of Lakeside
- City of Mansfield*
- North Central Texas Council of Governments (NCTCOG)
- City of North Richland Hills
- Town of Pantego*
- City of Richland Hills
- City of River Oaks*
- City of Saginaw
- City of Southlake
- Unincorporated Tarrant County
- University of North Texas Health and Science Center*
- City of Watauga
- Town of Westlake
- City of Westworth Village

**Jurisdictions that did not participate in the 2015 Tarrant County HazMAP.*

The following map shows the locations of all participating jurisdictions except the unincorporated areas of the county. A map of these areas can be found in the Unincorporated Tarrant County annex.



Source: Texas Almanac.

This HazMAP is the result of two years of study, data collection, analysis, and community feedback. Representatives and citizens from participating jurisdictions attended public meetings to discuss the hazards their communities face and the vulnerabilities those hazards present. Representatives from each participating jurisdiction reviewed drafts of the HazMAP and added input to the mitigation strategies presented in the plan. Tarrant County citizens were also active participants in the development of the plan. Citizens attended public meetings that were advertised online, on bulletin boards, and in newsletters to share their concerns about hazards faced in the community and how to mitigate the effects of these hazards.

All participants involved in this plan understand the benefits of developing and implementing mitigation plans and strategies. Elected officials, public safety organizations, planners, and many others have worked together to develop and implement this HazMAP, displaying that they have the vision to implement mitigation practices and therefore reduce the loss of life and property in their communities.

Acronyms

DFW- Dallas-Fort Worth

EMC- Emergency Management Coordinator

EOC- Emergency Operations Center

FEMA- Federal Emergency Management Agency

HazMAP- Hazard Mitigation Action Plan

HMPT- Hazard Mitigation Planning Team

LPT- Local Planning Team

N/A- Not Applicable

NCEI- National Centers for Environmental Information

NCTCOG- North Central Texas Council of Governments

NFIP- National Flood Insurance Program

NFPA- National Fire Protection Association

NWS- National Weather Service

OWS- Outdoor Warning Siren

RLP- Repetitive Loss Properties

SRLP- Severe Repetitive Loss Properties

TDEM- Texas Division of Emergency Management

TxDOT- Texas Department of Transportation

UNTHSC- University of North Texas Health and Science Center

UTA- University of Texas at Arlington

WUI- Wildland-Urban Interface

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Section 1: Introduction

1.1 Overview

The Tarrant County Hazard Mitigation Action Plan (HazMAP) as written fulfills the requirements of the Disaster Mitigation Act of 2000 (DMA 2000), which is administered by the Federal Emergency Management Agency (FEMA). The Disaster Mitigation Act provides federal assistance to state and local emergency management entities to mitigate the effects of disasters. The HazMAP also encourages cooperation among various organizations across political subdivisions.

The 2020 HazMAP is an update of the 2015 FEMA-approved HazMAP. The title was changed from the Local Mitigation Action Plan to Hazard Mitigation Action Plan to clearly specify the intent of the document. With each update, new challenges are identified, new strategies proposed, and when incorporated, the updated plan grows in complexity, but not necessarily in utility.

The content in this plan update is designed and organized to be as reader-friendly and functional as possible. The structure and format of this plan has significantly changed from the initial mitigation plan adopted in 2015; however, the quality of information has been maintained.

This update fulfills the requirements of the DMA 2000. The Tarrant County Hazard Mitigation Planning Team (HMPT) and the North Central Texas Council of Governments (NCTCOG) reviewed the evolution of its planning processes throughout the previous three years. The following plan is the result of that effort.

The information provided in Section 3 reflects the impact of the hazards on all of Tarrant County, not solely the participating jurisdictions. The results of the vulnerability analysis and risk assessment, including historical events, are documented in the individual annexes for participating jurisdictions.

The historical events documented in Section 3 reflect the events that impacted the entire county, not solely the unincorporated areas of the county. Reference to Tarrant County in Section 3 refers to the county as a whole and not solely unincorporated Tarrant County.

1.2 Authority

The purpose of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended by the Disaster Mitigation Act of 2000, is “to reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters.” Section 322 of the act specifically addresses mitigation planning and requires state and local governments to prepare multi-hazard mitigation plans as a precondition for receiving FEMA mitigation grants.

Understanding that identifying the risks within the community and working collectively toward the prevention of is vital, NCTCOG has taken the lead role in the development of the Tarrant County HazMAP.

1.3 Scope

The scope of the Tarrant County HazMAP encompasses all participating entities in Tarrant County, as noted in the Executive Summary. This plan identifies natural and, for some jurisdictions, technological hazards that could threaten life and property in the communities. Assessing technological hazards is not a requirement for this hazard mitigation action plan, but select jurisdictions have included these hazards

in this plan. The scope of this plan includes both short and long-term mitigation strategies, implementation, strategies, and possible sources of project funding to mitigate identified hazards.

1.4 Purpose

This HazMAP is intended to enhance and complement federal and state recommendations for the mitigation of natural and technological hazards in the following ways:

- Substantially reduce the risk of loss of life, injuries, and hardship from the destruction of natural and technological disasters.
- Improve public awareness of the need for individual preparedness and building safer, more disaster resilient communities.
- Develop strategies for long-term community sustainability during community disasters.
- Develop governmental and business continuity plans that will continue essential private sector and governmental operations during disasters.

Tarrant County is susceptible to a number of different natural hazards that have potential to cause property loss, loss of life, economic hardship, and threats to public health and safety. Occurrence of natural disasters cannot be prevented; however, their impact on people and property can be lessened through hazard mitigation measures.

Mitigation planning is imperative to lessen the impact of disasters in Tarrant County. This plan is an excellent method by which to organize Tarrant County's mitigation strategies. The implementation of the plan and its components is vital to preparing a community that is resilient to the effects of a disaster. The implementation of this HazMAP can reduce loss of life and property and allow the participating communities to operate with minimal disruption of vital services to citizens. This HazMAP provides a risk assessment of the hazards Tarrant County is exposed to and puts forth several mitigation goals and objectives that are based on that risk assessment.

This Tarrant County Hazard Mitigation Action Plan was developed by the Tarrant County Hazard Mitigation Planning Team (HMPT). The plan represents collective efforts of citizens, elected and appointed government officials, business leaders, non-profit organizations, and other stakeholders. This plan, and updating the plan, and timely future updates of this plan, will allow Tarrant County and participating jurisdictions to comply with the Disaster Mitigation Act of 2000 and its implementation regulations, 44 CFR Part 201.6, thus resulting in eligibility to apply for federal aid for technical assistance and post-disaster hazard mitigation project funding. The update will also prioritize potential risks and vulnerabilities in an effort to minimize the effects of disasters in the participating communities.

1.5 Mitigation Goals

The goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation. These goals are the basis of this plan and summarize what the Tarrant County Hazard Mitigation Planning Team will accomplish by implementing this plan.

1.6 Plan Organization

The 2020 Tarrant County HazMAP is organized into seven sections which satisfy the mitigation requirements in 44 CFR Part 201.6, with two appendices providing the required supporting documentation.

1. **Section 1: Introduction**
    a. Describes the purpose of the Tarrant County Hazard Mitigation Action Plan and introduces the mitigation planning process.
2. **Section 2: Planning Process**
    a. Describes the planning process and organization for each participating jurisdiction, satisfying requirements 201.6(c)(1), 201.6(b)(2), 201.6(b)(1), 201.6(b)(3), 201.6(c)(4)(iii), and 201.6(c)(4)(i).
3. **Section 3: Hazard Identification and Risk Assessment**
    a. Describes the hazards identified, location of hazards, previous events, and jurisdictional profiles, satisfying requirements 201.6(c)(2)(i) and 201.6(c)(2)(ii).
4. **Section 4: Mitigation Strategy**
    a. Reflects on the mitigation actions previously identified and examines the ability of Tarrant County and participating jurisdictions to implement and manage a comprehensive mitigation strategy, satisfying requirements 201.6(c)(1), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iii), 201.6(c)(3)(iv), 201.6(c)(4)(ii), and 201.6(b)(3).
5. **Section 5: Individual Jurisdictional Annexes**
    a. Each annex contains five *chapters.* Each participating jurisdiction has written an annex detailing the planning process, hazard analysis, capabilities, mitigation strategies and action items, and plan maintenance information, satisfying requirements 201.6(c)(1), 201.6(b)(2), 201.6(b)(1), 201.6(b)(3), 201.6(c)(4)(iii), 201.6(c)(4)(i), 201.6(c)(2)(i), and 201.6(c)(2)(ii).
    b. To clarify, any reference to “chapter” will refer to a jurisdiction’s annex, while “section” will refer to a section in the main body of this HazMAP.
6. **Section 6: Plan Maintenance**
    a. Describes plan monitoring, evaluating, and updating strategies, plan incorporation, and future public updates for each participating jurisdiction, satisfying requirements 201.6(c)(4)(i), 201.6(c)(4)(ii), and 201.6(c)(4)(iii).
7. **Section 7: Conclusion**
8. **Appendix A: Documentation from Planning and Public Meetings**
9. **Appendix B: Supporting Documentation**

1.7 Tarrant County Hazard Mitigation Strategy Maintenance Process

The Tarrant County Hazard Mitigation Planning Team, consisting of a representative from each participating jurisdiction, will continue to collaborate as a planning group in coordination with the North Central Texas Council of Governments Emergency Preparedness Department. Primary contact will be through emails and conference calls, with strategy meetings to occur at least annually. The points of contact for the county, jurisdictions, and NCTCOG will jointly lead the plan maintenance and update process by:

- Assisting jurisdictional Local Planning Teams in updating their individual contributions to the county Hazard Mitigation Action Plan.
- Assisting interested Local Planning Teams that would like to begin their mitigation planning process.
- Facilitating Tarrant County HazMAP meetings and disseminating information.
- Collaborating data for the county-wide sections.
- Requesting updates and status reports on planning mechanisms.
- Requesting updates and status reports on mitigation action projects.
- Assisting jurisdictions with mitigation grants.
- Assisting jurisdictions with implementing mitigation goals and action projects.
- Providing mitigation training opportunities.
- Maintaining documentation of local adoption resolutions for the Tarrant County Hazard Mitigation Action Plan.

1.8 Tarrant County Hazard Mitigation Action Plan Adoption

Once the Tarrant County Hazard Mitigation Action Plan has received FEMA “Approved Pending Local Adoption” each participating jurisdiction will take the Tarrant County HazMAP to their Commissioners Court or city councils for final public comment and local adoption. A copy of the resolution will be inserted into the Tarrant County HazMAP and held on file at the North Central Texas Council of Governments.

Section 2: Planning Process

Requirement	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle

2.1 Collaborative Process

During the planning process, jurisdictions were encouraged to work with neighboring jurisdictions within the county, local and regional agencies, and other mitigation partners in order to develop a unified approach to mitigation and to address situations that could affect one another.

Bringing together mitigation strategies from the unincorporated area of the county and its 33 participating jurisdictions into a unified plan is a strategy that offers a model for county-wide coordination. The Tarrant County Hazard Mitigation Planning Team (HMPT) was comprised of leaders from each participating jurisdiction's Local Planning Team (LPT), and other relevant agencies. Each LPT provided local hazard information and capabilities. Each jurisdiction's vulnerabilities and mitigation needs were explicitly recognized in the strategy, along with those of the overall county.

The following stakeholders were invited to participate in the mitigation planning process via email by participating jurisdictions and to attend public meetings via the participating jurisdictions' websites and public flyers. Stakeholders were encouraged to review the plan and provide relevant information and feedback.

Organization Represented	Position
Tarrant County	Emergency Management Coordinator
Wise County	Emergency Management Coordinator
Johnson County	Emergency Management Coordinator
Parker County	Emergency Management Coordinator
Denton County	Emergency Management Coordinator
Ellis County	Emergency Management Coordinator
Dallas County	Emergency Management Coordinator
U.S. Army Corps of Engineers	Director – Civil Works
U.S. Army Corps of Engineers	Lake Grapevine Manager
Tarrant County Environmental Services	Director
Tarrant County Community College District	Director of Emergency Management
University of Texas at Arlington	Emergency Management Coordinator
Tarrant Regional Water District	Lake Patrol
Independent School Districts of Participating Jurisdictions	Superintendents
Naval Air Station Fort Worth Joint Reserve Base	Emergency Management Coordinator
Texas Department of Transportation	Emergency Operations
Utility Providers	Emergency Operations
Local Emergency Planning Committee	Emergency Management Coordinator
Texas Division of Emergency Management	District Coordinator, Field Response
Texas Division of Emergency Management	Hazard Mitigation Planner
State Fire Marshal's Office	District 6, Inspector
National Weather Service – Fort Worth	Warning & Coordination Meteorologist
NCTCOG's Emergency Preparedness Planning Council	Chair
NCTCOG's Regional Emergency Preparedness Advisory Council	Chair
Local City and Town Councils	Local elected officials

The North Central Texas Council of Governments was responsible for plan facilitation and coordination with Tarrant County HMPT members and stakeholders throughout the process.

2.1.1 HMPT Points of Contacts

The following are members of the Tarrant County Hazard Mitigation Planning Team (HMPT). These HMPT members were also the point(s) of contact for their respective jurisdiction during this plan update. Local Planning Team (LPT) members for each jurisdiction are in their respective jurisdictional annex.

Tarrant County HMPT Members

Jurisdiction	Job Title	Role in the HMPT
Arlington	Emergency Management Administrator	Jurisdictional information
Arlington	Emergency Management Coordinator	Jurisdictional information

Jurisdiction	Job Title	Role in the HMPT
Azle	Emergency Management Coordinator	Jurisdictional information
Bedford	Deputy Chief of Emergency Operations	Jurisdictional information
Blue Mound	Fire Chief/Emergency Management Coordinator	Jurisdictional information
Colleyville	Emergency Management Coordinator	Jurisdictional information
Crowley	Emergency Management Coordinator	Jurisdictional information
Dalworthington Gardens	Deputy Emergency Management Coordinator	Jurisdictional information
Edgecliff Village	Fire Chief/Emergency Management Coordinator	Jurisdictional information
Euless	Emergency Management Coordinator	Jurisdictional information
Everman	Director of Emergency Services	Jurisdictional information
Forest Hill	Fire Chief/Emergency Management Coordinator	Jurisdictional information
Fort Worth	Emergency Management Coordinator	Jurisdictional information
Grapevine	Emergency Management Coordinator	Jurisdictional information
Haltom City	Emergency Management Coordinator	Jurisdictional information
Haslet	Emergency Management Coordinator	Jurisdictional information
Hurst	Fire Chief/Emergency Management Coordinator	Jurisdictional information
Keller	Fire Chief/Emergency Management Coordinator	Jurisdictional information
Kennedale	Fire Chief/Emergency Management Coordinator	Jurisdictional information
Lake Worth	Fire Marshal/Emergency Management Coordinator	Jurisdictional information
Lakeside	Emergency Management Coordinator	Jurisdictional information
Mansfield	Emergency Management Coordinator	Jurisdictional information
NCTCOG	Emergency Preparedness Specialist	Jurisdictional information

Jurisdiction	Job Title	Role in the HMPT
North Richland Hills	Emergency Management Coordinator	Jurisdictional information
Pantego	Police Chief/Emergency Management Coordinator	Jurisdictional information
Richland Hills	Fire Chief/Emergency Management Coordinator	Jurisdictional information
River Oaks	Emergency Management Coordinator	Jurisdictional information
Saginaw	Fire Chief/Emergency Management Coordinator	Jurisdictional information
Southlake	Emergency Management Coordinator	Jurisdictional information
University of North Texas Health Science Center (UNTHSC)	Associate Director, Emergency Management and Business Continuity	Jurisdictional information
Unincorporated Tarrant County	Emergency Management Coordinator	Jurisdictional information
Watauga	Emergency Management Coordinator	Jurisdictional information
Westlake	Fire Chief/Emergency Management Coordinator	Jurisdictional information
Westworth Village	Emergency Management Coordinator	Jurisdictional information

2.2 Public Involvement

As stated in the Executive Summary, citizens attended public meetings that were advertised online, on bulletin boards, and in newsletters to share their concerns about hazards faced in the community and how to mitigate the effects of these hazards. Some jurisdictions also used public surveys and posted the HazMAP online for citizens to view and comment on.

NCTCOG hosted a public meeting on behalf of jurisdictions on February 6, 2018 at the Tarrant County Northeast Courthouse. The jurisdictions who used this opportunity to reach the public were in attendance and advertised the meeting within their jurisdiction.

The public had the chance to learn about natural hazards in Tarrant County and why jurisdictions were developing a plan to mitigate the effects of these hazards. Citizens signed in and sat through the presentation but did not have any comments or questions at the end.

The supporting documentation, advertisements, and details of this meeting and other meetings or outreach strategies are documented within Appendix A in this HazMAP.

2.3 Existing Data and Plans

Existing hazard mitigation information and other relevant Hazard Mitigation Action Plans were reviewed during the development of this plan. Data was gathered through numerous sources, including Geographic

Information Systems (GIS). The intent of reviewing existing material was to identify existing data and information, shared objectives, and past and ongoing activities that can help inform the mitigation plan. It also helps identify the existing capabilities and planning mechanisms to implement the mitigation strategy. The table below outlines the sources used to collect data for the plan:

Data Source	Data Incorporation	Purpose
County appraisal data, census data, city land use data	Population and demographics	Population counts, parcel data, and land use data
National Centers for Environmental Information (NCEI)	Hazard occurrences	Previous event occurrences and mapping for hazards
Texas Forest Service/Texas Wildfire Risk Assessment Summary Report	Wildfire threat and urban interface	Mapping and wildfire vulnerability
National Dam Inventory	Dam information	High-hazard dam list
Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Map (DFIRM) Flood Zones, National Flood Insurance Program (NFIP) studies	Flood zone maps and NFIP information	GIS mapping of flood zones and NFIP data
October 2017 NFIP Flood Insurance Manual Change Package	NFIP Information	Repetitive Loss Properties and Community Rating System (CRS) ratings
State of Texas Hazard Mitigation Plan, 2013 and 2018	Hazards and mitigation strategy	Support the goals of the state
2015 Tarrant County HazMAP	All sections	This is an update of that plan
2017 Marion County HazMAP	Hazard profiles	Adopt FEMA-approved format of plan
Hazard Mitigation: Integrating Best Practices into Planning	Planning process	Use proven techniques in developing the HazMAP
Environmental Protection Agency (EPA) Superfund National Priority List	Protected sites	Risk assessment- identify critical areas
National Register of Historic Places	Historic districts	Risk assessment
Texas Parks & Wildlife List of Rare Species	Endangered or protected species	Risk assessment

2.4 Timeframe

The planning process for the update of the Tarrant County Hazard Mitigation Action Plan was approximately two years. The table below is the timeline followed.

Activity	Time Period
Kickoff meeting	August 17, 2017
Created planning teams	September 30, 2017
Capabilities assessment	February 15, 2018
Hazard identification & risk assessment	March 5, 2018
Public outreach completed	March 31, 2018
Mitigation strategy (goals & action items) reviewed	March 19-April 15, 2018
Reviewed HazMAP draft	May 15- June 15, 2018
Updated plan as needed	June 15- June 30, 2018
Final draft reviewed	June 30- July 6, 2018
Send HazMAP to TDEM/make revisions as needed	As Applicable
Send to FEMA/ make revisions as needed	As Applicable
Adoption & signatures	Once "Approved Pending Adoption" designated received.

Activities were either led or monitored by the North Central Texas Council of Governments (NCTCOG) and public outreach strategies were conducted by the participating jurisdictions. The details of these activities are provided in the individual annexes of the jurisdictions.

2.5 Planning Meetings

During the planning process, each Local Planning Team (LPT) met to discuss relevant information from the jurisdiction and to review objectives and progress of the plan. The goals of these meetings were to gather information and to provide guidance for the jurisdictions throughout the planning stages.

The following table is a snapshot of the meetings held by the North Central Texas Council of Governments and the HazMAP participants:

Date	Meeting	Location
August 7, 2017	Kickoff meeting	Tarrant County Northeast Courthouse
September 18, 2017	NCTCOG Program Directors meeting	NCTCOG
October 26, 2017	Capabilities (Richland Hills, White Settlement)	Richland Hills Fire Station
November 1, 2017	Capabilities (Pantego, Mansfield)	NCTCOG
November 1, 2017	Capabilities (Forest Hill, Kennedale)	NCTCOG
November 3, 2017	Capabilities (Southlake, Westlake)	Southlake Department of Public Safety Headquarters
November 7, 2017	Capabilities (Lake Worth, Lakeside, Saginaw, Azle)	Lake Worth Fire Station
November 7, 2017	Capabilities (Dalworthington Gardens)	NCTCOG
November 8, 2017	Capabilities (River Oaks)	River Oaks City Hall
November 9, 2017	Capabilities (Bedford)	Bedford Fire Station

Date	Meeting	Location
November 9, 2017	Capabilities (Blue Mound, Haslet, Watauga)	Watauga Fire Station
November 20, 2017	NCTCOG planning team	NCTCOG
January 10, 2018	Bedford planning team meeting	Bedford Fire Station
January 31, 2018	Hazard workshop	NCTCOG
February 6, 2018	Public meeting & workshop	Tarrant County Northeast Courthouse
February 8, 2018	UNTHSC hazard meeting with planning team	UNTHSC
February 9, 2018	Bedford hazard meeting with planning team	Bedford Fire Station
February 19, 2018	River Oaks hazard meeting with planning team	NCTCOG
March 15, 2018	Kennedale hazard meeting with planning team	Kennedale Fire Station
April 5, 2018	Mitigation workshop for all participants	Crowley Recreation Center
April 11, 2018	Mitigation workshop for all participants	Richland Hills Link Recreation Center
April 16, 2018	Haslet mitigation meeting with planning team	Haslet Fire Station
April 18, 2018	Southlake mitigation meeting with planning team	Southlake DPS HQ
April 18, 2018	Kennedale mitigation meeting with planning team	Kennedale Fire Station
April 19, 2018	NCTCOG mitigation meeting with planning team	NCTCOG
April 26, 2018	UNTHSC hazard meeting with planning team	UNTHSC
April 26, 2018	Dalworthington Gardens mitigation strategy meeting with planning team	Dalworthington Gardens Police Station
May 4, 2018	Fort Worth mitigation strategy meeting with planning team	Joint Emergency Operations Center
May 9, 2018	Tarrant County Unincorporated mitigation strategy meeting with planning team	NCTCOG
June 14, 2018	Lake Worth mitigation strategy meeting with planning team	Lake Worth Fire Station

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Section 3: Hazard Identification and Risk Assessment

Requirement	
§201.6(c)(2)(i)	[The risk assessment shall include a] description of the type, location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP [National Flood Insurance Program] insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	An estimate of the potential dollar losses to vulnerable structures identified in this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

3.1 Hazard Overview

Through an assessment of previous federally declared disasters in Texas, historical events and potential events in Tarrant County, and a review of available local mitigation action plans, it was determined that this Hazard Mitigation Action Plan (HazMAP) will address the risks associated with the following 9 natural hazards:

- Drought
- Earthquakes
- Expansive Soils
- Extreme Heat
- Flooding (including dam failure)
- Thunderstorms (including hail, wind, lightning)
- Tornadoes
- Wildfires
- Winter Storms

Since the adoption of the previous HazMAP, the definition of a thunderstorm now includes hail, high winds, and lightning. These individual hazards within a thunderstorm will not be listed separately.

In 2013, Tarrant County began experiencing earthquakes. It is suspected that dormant fault lines have been disturbed. Earthquakes have been added to the list of natural hazards profiled in this update for jurisdictions that feel they could be potentially impacted by them.

Because dams are man-made structures, dam failures are typically considered technological hazards. However, since most dam failures result from prolonged periods of rainfall, they are often cited as secondary or cascading effects of natural flooding disasters and are not identified as a primary hazard. This plan update incorporates the risk and vulnerabilities related to dam failure, when applicable, in the flooding section.

Due to the frequency of occurrence and high impact of hazards during this planning period, the ranking order of these hazards has changed since the 2015 plan. Each participating jurisdiction conducted a risk assessment and prioritized the hazards affecting their planning area and determined their best course of action. This information, along with historical events, vulnerabilities, future probability, and impacts are documented within the individual annexes. The definition of vulnerability is *the susceptibility of people, property, industry, resources, ecosystems, or historical buildings and artifacts to the negative impact of a disaster*.[3] The participating jurisdictions have taken into account the possible effects on population, economy, existing and future structures, improved property, critical facilities and infrastructure, and the natural environment for each hazard.

Participating jurisdictions understand that identifying technological hazards is not required for a mitigation plan and jurisdictions that chose to do so did so voluntarily. The ranking of natural hazards and technological hazards will remain separate in this HazMAP.

[3] FEMA Module 2-5 Understanding Vulnerability.

3.2 Changes in Development

Tarrant County has a vibrant and diverse economy that attracts new and relocating businesses, retail development, and new housing construction. If business is to succeed, then economic development must flourish. A collaboration of public and private agencies, along with businesses and individuals, is always ready to step forward to promote the excellent quality of life that makes the community a great place to live, work, and raise families.

Changes in development include population variability, climate variability, and various mitigation actions implemented. Individual jurisdictions have identified specific changes in development, when applicable, in their annexes.

3.2.1 Major Disaster Declarations since the 2015 HazMAP

The following table lists the recent major disaster declarations that have occurred since the approval of Tarrant County's 2015 HazMAP:

Declared Disaster Code	Incident Period	Date Declared	Description
DR-4159	October 30-31, 2013	December 29, 2013	Severe storms and flooding
DR-4136	April 17-20, 2013	August 2, 2013	West, Texas fertilizer explosion
DR-4223	May 4- June 23, 2015	May 29, 2015	Severe storms, tornadoes, straight-line winds, and flooding
DR-4245	October 22-31, 2015	November 25, 2015	Severe storms, tornadoes, straight-line winds, and flooding
DR-4255	December 26, 2015-January 21, 2016	February 9, 2016	Severe winter storms, tornadoes, strait-line winds, and flooding
DR-4266	March 7-29, 2016	March 19, 2016	Severe storms, tornadoes, and flooding
DR-4269	April 17-30, 2016	April 25, 2016	Severe storms and flooding
DR-4272	May 26-June 24, 2016	June 11, 2016	Severe storms and flooding
DR-4332	August 23-September 15, 2017	August 25, 2017	Hurricane Harvey

3.2.2 Increase in Vulnerability

Climate Variability

A key factor to an increase in vulnerability is climate variability. According to the United States Environmental Protection Agency (EPA),

> Texas's climate is changing. Most of the state has warmed between one-half and one degree Fahrenheit (°F) in the past century. In the eastern two-thirds of the state, average annual rainfall is increasing, yet the soil is becoming drier. Rainstorms are becoming more intense, and floods are becoming more severe... In the coming decades, storms are likely to become more severe, deserts may expand, and summers are likely to become increasingly hot and dry, creating problems for agriculture and possibly human health. Our climate is changing because the earth is warming. People have increased the amount of carbon dioxide in the air by 40% since the late 1700s. Other heat-trapping greenhouse gases are also increasing. These gases have warmed the surface and lower atmosphere of our planet about one degree during the last 50 years. Evaporation increases as the atmosphere warms, which increases humidity, average rainfall, and the frequency of heavy rainstorms in many places—but contributes to drought in others…[4]

The following is an article from the Dallas Morning News that describes the effects of climate change specifically in North Texas, where Tarrant County is located:

> The United States has just come off a record year for weather and climate disasters and, by most accounts, it's only going to get worse.
>
> Last year hurricanes Harvey, Irma, and Maria; the wildfires and floods in California; and tornado outbreaks in the Midwest and the South delivered $306.2 billion in damages, more than any year in history when adjusted for inflation.
>
> Texas is particularly vulnerable to a changing climate. It has had more costly weather-related disasters than any other state, and those events will happen more often as air and ocean temperatures climb, scientists say.
>
> "Climate change is not just about polar bears," said Katharine Hayhoe, a climate scientist at Texas Tech University with an impressive YouTube following. "It will affect North Texas profoundly."
>
> Between 2041 and 2050, Dallas-Fort Worth may see August temperatures rise from a mean of 86 degrees Fahrenheit at the end of the 20th century to 94 degrees, with extremes rising above 120, reports one study by scientists at the University of Texas at Arlington.
>
> Longer droughts and more extreme rainstorms will pose a challenge for those who manage drinking water supplies, those who raise cattle, and those who oversee our roads and railways.
>
> The changes may also have unexpected effects on people's daily lives, including jobs. Intense heat can imperil cars and airplanes, evaporate drinking water supplies, and halt outdoor labor such as farm work and construction.
>
> Adam Smith, a scientist with the federal government's main climate agency, the National Oceanic and Atmospheric Administration, calls Texas "the disaster capital of the United States."

[4] What Climate Change Means for Texas. August 2016. EPA 430-F-16-045. United States Environmental Protection Agency.< https://archive.epa.gov/epa/sites/production/files/2016-09/documents/climate-change-tx.pdf>

As Smith explains, Texas is susceptible to almost every kind of weather and climate hazard, from extreme cold to extreme heat, from severe drought and wildfires to torrential floods. Texas is also home to a booming population and critical infrastructure, including the petrochemical plants that were damaged in Hurricane Harvey.

"Texas is a hot-spot for a wide range of extreme natural events due to its geography," said Smith. "We expect many of these extremes to become more frequent and intense as time moves forward."

While uncertainty is built into climate models, scientists have a high degree of confidence in many of the changes they observe and predict.

The bigger, longer and more common an event is, the greater the accuracy with which scientists can project how climate change will impact it, said Hayhoe, a lead author of a November 2017 climate change report overseen by scientists at 13 federal agencies. Larger events have more data associated with them and can be easier to model.

Researchers are very confident that climate change will increase both average and extreme temperatures. They are also confident that climate change is likely to increase the risk of heavy precipitation in many areas and may bring stronger droughts to the south-central and southwestern parts of the U.S.

Projected impacts on smaller-scale events like tornadoes and hailstorms are less well understood.

One area of consensus is the cause of climate change. "It is extremely likely that human activities, especially emissions of greenhouse gases, are the dominant cause of the observed warming since the mid-20th century," note the authors of the Fourth National Climate Assessment, a Congressionally mandated review that scientists conduct every four years. They add that there are no convincing alternative explanations.

Below is how these changes will affect our area, the evidence behind the projections, and how confident scientists are in each of these findings.

Heat

More record-setting heat in North Texas is a virtual certainty. Already, we are living through the warmest period in the history of modern civilization, the federal report found, and that warming will accelerate.

Climate science contrarians often attack the models on which climate projections are based. Myron Ebell, who led President Donald Trump's transition team at the Environmental Protection Agency, accepts that humans are most likely responsible for warming, but he says models have exaggerated the outcome. Ebell is director of the Center for Energy and Environment at the Competitive Enterprise Institute, a libertarian advocacy group based in Washington, D.C. He acknowledges that he is not a scientist.

In fact, researchers have used models to predict global temperature changes for more than 50 years, and the models' projections have been fairly accurate over the long term. In the early 21st century, a discrepancy appeared between observed and modeled temperatures-a period dubbed the "global warming slowdown" or "hiatus."

Scientists have published scores of studies on the mismatch and tied it to several factors that contributed to lower-than-expected observed temperatures. Those factors include a series of small volcanic eruptions, the cooling effects of which scientists had underestimated, and lower than expected solar output.

Findings from those studies are helping to improve climate model simulations and helping scientists better understand why there are differences between simulations and observations in the early 21st century, said Ben Santer, a climate scientist at the Lawrence Livermore National Laboratory.

Global average temperatures increased about 1.8 degrees Fahrenheit in the last 115 years. In Dallas, they climbed from about 65 degrees Fahrenheit during the early part of the 20th century to 68 degrees Fahrenheit during the most recent decade. If nothing is done to reduce emissions of carbon dioxide and other greenhouse gases, average temperatures in the city may reach the low 70s by 2050 and surpass 75 degrees by the end of the century.

The Dallas area warmed twice as fast as the North Texas region as a whole due to urbanization combined with long-term warming, said John Nielsen-Gammon, Texas' state climatologist and a professor at Texas A&M University.

Rapid development in Dallas accelerates the so-called "urban heat island" effect. Man-made building materials absorb and lock in more heat than soil and natural landscapes, so urban areas are generally warmer than rural areas, especially after sunset.

While some northern areas stand to benefit from warmer weather, that is not the case for Dallas-Fort Worth. "North Texas and a lot of the southern United States are quite close to thresholds where things get really bad," said Amir Jina of the University of Chicago's Harris School of Public Policy.

Earlier this year, he and colleagues published a study in the journal *Science* that estimated economic damage from climate change in each county of the United States.

Once temperatures reach the high 90s, equal to or above body temperature, fatality rates go up.

And Jina's study predicts 24 extra deaths per 100,000 people each year in Dallas County by the end of the century if global emissions increase at the same rate they have been. That would be 600 extra deaths per year at the county's 2015 population level.

Heat also affects roads. A 2015 study by the University of Texas at Arlington (UTA) that focused on the impact of climate change on transportation predicted "an increase in wildfires along paved highways, heat-induced stress on bridges and railroads, air-conditioning problems in public transport vehicles and heat-related accidents by failure of individual vehicles and heat-related stress."

The study concluded, "These impacts can be translated into substantial mobility and economic loss."

Drought

Along with heat will come stronger drought, which "has profound economic impacts," said Hayhoe.

The prediction that North Texas will have longer and more severe droughts is based on multiple factors, including the relationship between high temperatures and soil dryness and the presence of more frequent and longer lasting high-pressure systems in summer that suppress rainfall and deflect storms away from our area.

Hayhoe points to Texas' 2010-2013 drought as a probable sign of things to come. Although this drought occurred naturally, as a result of a strong La Niña event that typically brings dry conditions to our area, it was exacerbated by extreme heat. That event created severe hay shortages for cattle farmers and led some ranchers to prematurely slaughter their herds or export them out of state.

"Cotton can be drought-resistant, but not cattle," said Hayhoe.

The 2015 UTA study predicts a reduction in soil moisture of 10% to 15%in all seasons by 2050, which can also lead to cracked pavement and the premature loss of roads, railways, and other infrastructure.

Heat and drought also pose a problem for drinking water supplies, which North Texas sources from surface reservoirs that will be increasingly prone to evaporation. Hayhoe says some water managers are considering pumping the reservoirs underground during exceptionally hot and dry conditions, or covering them with polymer "blankets."

The blankets are an invisible layer of organic molecules that can help reduce evaporation.

Floods

While it's not likely that annual precipitation totals will change in North Texas, rainfall patterns likely will. Hayhoe and Nielsen-Gammon both say we will likely see enhanced "feast or famine" cycles with torrential rainstorms in the spring followed by longer than usual dry periods.

These predictions carry a high degree of certainty, because climatologists have already recorded this trend playing out.

"Rainfall becoming more extreme is something we expect because we've observed this not just in North Texas but throughout the United States, and models consistently predict it will continue to happen," said Nielsen-Gammon.

Severe rainstorms, the UTA scientists predict, will have the capacity to flood highway exit and service roads in the Federal Emergency Management Agency (FEMA) 100-year floodplain.

"While the state highway system was built above flooding levels, the connector roads may be easily flooded," said Arne Winguth, a climate scientist at UTA who co-authored the report.

Tornadoes and hail

Two events climate scientists cannot reliably project are hailstorms and tornadoes. "A lot of the things we care about are too small-scale to predict with more confidence," said Nielsen-Gammon. "The historical record is not large enough for longer-term forecasts."

There is some evidence that tornadoes, like rainstorms, are becoming more concentrated on fewer days and that their season has become less predictable.

The same is true with hail. "One thing we expect to happen with a warming climate is that the average humidity in the lower atmosphere may decrease, and if that happens it's easier for hail

to stay frozen," said Nielsen-Gammon. "That factor might increase hailstorms, but that's just one of many factors that do affect hail."

Economy

Jina of the University of Chicago predicted in his study that climate change would decrease Dallas County's annual income by 10% to 20% in the coming decades unless emissions are reduced. "North Texas is one of the worst-affected places in the country," he said. Much of the loss comes from higher mortality rates, soaring air-conditioning costs, and reduced labor productivity.

To track labor productivity, Jina and his colleagues examined national time-use surveys, diaries kept by thousands of volunteers across the country, and compared them with local weather data. He found that on extremely hot days, people tended to stop working about 30 minutes early.

"There's direct evidence that people concentrate less well, make more mistakes and their brain just functions less efficiently if it's too hot," he said. Heat also disrupts sleep. "The general lack of productivity leads to them saying, 'No more work today.'"

The good news is that many climate-change effects are manageable. They do require local and federal authorities to plan ahead and take action, said Smith of the National Oceanic and Atmospheric Administration.

"It is important," he said, "to address where we build, how we build and also to build protections for populations already exposed in vulnerable areas."[5]

All participating jurisdictions are experiencing the effects of climate variability. The following information is part of the climatic impact vulnerability assessment conducted by the North Central Texas Council of Governments Department of Transportation and the University of Texas at Arlington (UTA) and is a compilation of historical climate data and projected future climate information for the Dallas-Fort Worth (DFW) Metropolitan Area:

- The UTA climate group gathered climate and weather data from 1900 to 2010 to interpret the historic trends in extremes and variability of temperature and precipitation suggesting an increase in temperature, particularly in the summer season, and an increase in rainfall and rainfall intensity, primarily during the spring season.
- Historic weather-related disruption of transportation is mainly related to extreme events like snow and ice storms as well as damages by severe supercell-type thunderstorms.
- Future climate prediction suggests extreme temperatures of up to 125°F by the end of 21st century, exceeding historic heat waves by 12°F.
- By 2050, soil moisture is reduced by 10-15% in all seasons compared to historic values due to increase in temperatures. This suggests a higher risk of infrastructure damage by cracking and, together with elevated temperatures, a higher-than-present risk of fires, particularly in wooded neighborhoods.
- Higher likelihood of drought will also amplify the urban heat island, particularly during summer months, that can result in up to 10°F temperature difference between downtown Dallas and adjacent rural locations.

[5] Climate change to bring North Texas longer droughts, heavy rains, 120-degree temps within 25 years. Kuchment, Anna. 2018, February 15. <https://www.dallasnews.com/news/climate-change-1/2018/02/15/climate-change-to-bring-texas-longer-droughts-heavy-rains-120-temps-august-within-25-years>

- An increase in mean rainfall by up to 10% and severe thunderstorms by up to 40% in the spring season will likely lead to a higher risk of flooding affecting the infrastructure.
- Extreme flooding events exceeding historic floods are expected as a result of more tropical storm systems occurring in the fall season.[6]

Population Increase

National forecasts of population and economic growth indicate that this region will continue to add residents and jobs well into the future. The 2030 projections produced by the North Central Texas Council of Governments (NCTCOG) use the year 2000 as a base year and project population and employment in five-year increments to 2030. Over the 30-year horizon, the 16-county North Texas region is anticipated to add 1.6 million households with a corresponding 4.1 million people and 2.3 million non-construction jobs. This represents an average annual population growth rate of 2.6% for these 30 years, a magnitude of growth never before experienced in the North Central Texas region. NCTCOG forecasts reflect only one set of growth assumptions. If circumstances change, real growth outcomes might be considerably different.[7]

The following table reflects the changes in participating jurisdictions' demographics since the adoption of the 2015 HazMAP. Red text represents an increase in population.

Jurisdiction	2015 Population Estimate	2017 Population Estimate
Arlington	379,370	382,230
Azle	11,140	11,800
Bedford	48,060	48,560
Blue Mound	2,390	2,390
Colleyville	23,760	24,630
Crowley	14,130	14,440
Euless	54,050	54,870
Forest Hill	12,380	12,500
Fort Worth	792,720	815,430
Grapevine	48,520	49,130
Haltom City	42,640	42,740
Haslet	1,660	1,720
Hurst	38,340	38,410
Keller	42,890	44,620
Kennedale	7,130	7,420
Lake Worth	4,680	4,710
Lakeside	1,330	1,690
Mansfield	56,368 (2010 population)	63,670
North Richland Hills	66,300	67,120
Richland Hills	7,920	7,920

[6] Climate Change/Extreme Weather Vulnerability and Risk Assessment for Transportation Infrastructure in Dallas and Tarrant Counties. March 24, 2015. <http://www.uta.edu/faculty/awinguth/Research/NCTCOG_FHWAClimateChangePilot_RevisedFinal_3-24-15.pdf>

[7] North Texas to 2030: Extending the Trends. Vision North Texas.

Jurisdiction	2015 Population Estimate	2017 Population Estimate
Saginaw	20,480	21,320
Southlake	27,710	28,880
Watauga	23,590	23,600
Westlake	1,120	1,310
Westworth Village	2,620	2,620
Tarrant County	1,922,470	1,966,440

Source: North Central Texas Regional Data Center.

Mansfield has a 2010 population estimate, as they had a city mitigation plan approved in 2010. There is no data available for NCTCOG population changes from 2015-2017. Change in population for Dalworthington Gardens, Edgecliff Village, Pantego, River Oaks, and the University of North Texas Health Science Center (UNTHSC) are not included, as these jurisdictions are new participants on the 2020 Tarrant County HazMAP. The following chart reflects the 2017 population estimate for these new participants:

Jurisdiction	2017 Population Estimate
Dalworthington Gardens	2,330
Edgecliff Village	3,220
Everman	6,348
NCTCOG	367 (employees)
Pantego	2,470
River Oaks	7,310
UNTHSC	5,000 (student, faculty, staff)

3.2.3 Decrease in Vulnerability

Factors that decrease vulnerability to hazards include the mitigation actions that are addressed in jurisdictional annexes and the adoption of new codes and policies. The Environment & Development Department at NCTCOG plays a major role in regional coordination and management of reports and projects that improve regional resilience to natural hazards through the following programs:

- **The Corridor Development Certificate (CDC)** – The CDC process aims to stabilize flood risk along the Trinity River. The CDC process does not prohibit floodplain development but ensures that any development that does occur in the floodplain will not raise flood water levels or reduce flood storage capacity. A CDC permit is required to develop land within a specific area of the Trinity floodplain called the Regulatory Zone, which is similar to the 100-year floodplain.
    - Under the CDC process, local governments retain ultimate control over floodplain permitting decisions, but other communities along the Trinity River Corridor are given the opportunity to review and comment on projects in their neighbor's jurisdiction. As the Metroplex economy continues to grow and develop, the CDC process will prevent increased flood risks
- **The Trinity River COMMON VISION Program**- Local governments along the Trinity River launched a regional initiative that has stimulated excitement and galvanized support for a new Trinity River **COMMON VISION**. It is composed of these elements:
    - A safe Trinity River, with stabilization and reduction of flooding risks.
    - A clean Trinity River, with fishable and swimmable waters.

  - An enjoyable Trinity River, with recreational opportunities linked by a trails system within a world-class greenway.
  - A natural Trinity River, with preservation and restoration of riparian and cultural resources
  - A diverse Trinity River, with local and regional economic, transportation and other public needs addressed.
- **NCTCOG-OneRain Contrail Flood Warning Software**- Contrail software that delivers automated real-time data collection, processing, validation, analysis, archiving and visualization of hydrometeorological and environmental sensor data.
- **The *integrated* Stormwater Management (iSWM) Program**- The iSWM™ Program for Construction and Development is a cooperative initiative that assists cities and counties to achieve their goals of water quality protection, streambank protection, and flood mitigation, while also helping communities meet their construction and post-construction obligations under state stormwater permits.
  - Development and redevelopment by their nature increase the amount of imperviousness in our surrounding environment. This increased imperviousness translates into loss of natural areas, more sources for pollution in runoff, and heightened flooding risks. To help mitigate these impacts, more than 60 local governments are cooperating to proactively create sound stormwater management guidance for the region through the *integrated* Stormwater Management (iSWM) Program.
- **16-County Watershed Management Initiative**- Communities from across the region come together to collaborate on how to reduce the risks of flooding in their communities.
- **Texas Smartscape**- Texas SmartScape™ is a landscape program crafted to be "smart" for North Central Texas. Based on water-efficient landscape principles, it promotes the use of plants suited to our region's soil, climate, and precipitation that don't require much—if any—additional irrigation, pesticides, fertilizer, or herbicides to thrive.
  - The two main goals of the program are to:
    - Improve stormwater runoff quality
    - Conserve local water supplies

The article below details a major project underway in Tarrant County and addresses smart development along the Trinity River. Typically, development in a hazard-prone area, such as a floodplain, is recognized as a factor that increases the vulnerability of an area, but this smart approach to design and development actually decreases vulnerability.

A Smart Approach to Land Development along the Trinity River

The Trinity River is a major part of Fort Worth's rich and colorful history. In 1849, an army outpost was established on the banks of the river at the confluence of the West Fork and the Clear Fork, and that convergence anchors the downtown area today.

The "Master Plan" for the Trinity River is a concept literally decades in the making. Encouraged by community volunteers in the 1980s, developed by urban designers and specialty consultants in the 1990s, and adopted by city council in 2003, the Trinity River Vision Master Plan encompasses 88 miles of the Trinity River and its greenbelts and tributaries throughout the Fort Worth area. The "vision" has always been to advocate for this natural resource, keeping the river beautiful,

accessible, enjoyable, and productive and to make sure it remains a valuable asset for the entire community.

The plan includes a major restoration of the park's ecosystem and provides numerous and diverse recreational amenities. These are secondary, however, to the flood control aspects. According to a 2006 report conducted by the Army Corps of Engineers, 86% of the levies in the project area failed flood testing. This further motivated developer to move forward with re-structuring the area.

The plan focuses on eight segments of the Trinity River and its tributaries: Clear Fork North, Clear Fork South, Marine Creek, Mary's Creek, Sycamore Creek, West Fork East, West Fork West, and the Central City area now called Trinity Uptown. It considers environmental quality, conservation, recreation facilities, trail developments, reforestation, beautification, and linkage to neighborhoods, downtown, and other special districts. The plan also addresses adjoining land uses, transportation, and how other facilities best complement and benefit from the greenways.

When completed, Gateway Park will be three times the size of Central Park in New York City, making it the largest urbanized park in the country.[8]

3.3 Profiling Natural Hazards

The Tarrant County Hazard Mitigation Action Plan (HazMAP) is a tool to assist in the identification and documentation of natural hazards faced by the county and participating jurisdictions. Hazard profiles were created by compiling data from the North Central Texas Council of Governments (NCTCOG) regional natural hazards risk assessments, damage assessments, hazard data, and geographic information.

Of the 15 hazards identified in the State of Texas Hazard Mitigation Plan, the Hazard Mitigation Planning Team (HMPT) identified nine that could affect participating jurisdictions in Tarrant County. Coastal erosion, land subsidence, and hurricane/tropical storm will not be profiled because of their extremely low risk to the participating jurisdictions. Dam failure is an accidental or unintentional collapse, breach, or other failure of an impoundment structure that results in downstream flooding. Though there are 63 dams are in the county, no jurisdiction has claimed to be at severe risk to flooding from dam failure in the next five years.

Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms have a county-wide impact, which includes all participating jurisdictions. Wildfires are most likely a threat to jurisdictions that are rural with undeveloped land. Flooding is also expected anywhere in the county, but is most likely a threat to jurisdictions containing 100-year floodplains or bodies of water.

The Tarrant County Hazard Mitigation Planning Team (HMPT) has identified the following natural hazards as having the potential to cause damage in the county and participating jurisdictions:

- Drought
- Earthquakes
- Expansive Soils
- Extreme Heat
- Flooding

[8] Trinity River Vision. <https://www.tarrantcounty.com/en/county/supermenu-contents/residents/trinity-river-vision.html>

- Thunderstorms
- Tornadoes
- Wildfires
- Winter Storms

Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

Participating jurisdictions that did not claim wildfires as a hazard did so because there has been no history of impacts, thus there is no expectation of impacts in the future. Additionally, a jurisdiction may not have claimed wildfires as a hazard due to the urban landscape of the jurisdiction as well as the swift response from the fire department. Referencing the following table, jurisdictions that are not at risk to wildfires include Bedford, Blue Mound, Forest Hill, Lake Worth, the North Central Texas Council of Governments, Pantego, Saginaw, Watauga, and Westworth Village.

Participating jurisdictions that do not claim flooding as a hazard would do so either because there are no floodplains, there are no critical assets in a floodplain, or there has been no history of impacts, thus there is no expectation of impacts in the future. This is not the case in Tarrant County, as all participants have identified flooding as a potential threat to their communities.

The table on the next page reflects the rankings of each hazard, per jurisdiction.

Jurisdiction	Drought	Earthquake	Expansive Soils	Extreme Heat	Flooding	Thunderstorms	Tornadoes	Wildfires	Winter Storms
Arlington	5	9	8	6	1	3	2	7	4
Azle	7	9	8	6	2	3	1	5	4
Bedford	6	8	2	5	4	1	3	N/A	7
Blue Mound	3	9	5	4	7	1	2	N/A	6
Colleyville	8	9	5	6	2	1	3	7	4
Crowley	5	9	8	7	3	2	1	6	4
Dalworthington Gardens	2	9	6	1	4	3	5	7	8
Edgecliff Village	8	9	7	4	5	1	2	3	6
Euless	6	9	5	4	3	1	2	8	7
Everman	7	9	5	4	1	3	2	8	6
Forest Hill	8	7	6	5	4	2	1	N/A	3
Fort Worth	7	9	8	6	2	1	4	5	3
Grapevine	5	9	8	7	3	2	1	6	4
Haltom City	6	7	5	4	1	3	2	9	8
Haslet	7	9	4	6	5	1	2	8	3
Hurst	8	9	5	4	3	2	1	7	6

Jurisdiction	Drought	Earthquake	Expansive Soils	Extreme Heat	Flooding	Thunderstorms	Tornadoes	Wildfires	Winter Storms
Keller	8	9	5	7	4	2	1	6	3
Kennedale	5	9	8	7	3	2	1	6	4
Lake Worth	7	8	4	2	5	1	3	N/A	6
Lakeside	4	9	5	3	7	1	2	6	8
Mansfield	6	9	3	7	2	1	4	8	5
NCTCOG	7	8	6	4	5	1	3	N/A	2
North Richland Hills	2	3	4	5	1	6	7	8	9
Pantego	4	8	5	3	7	1	2	N/A	6
Richland Hills	4	8	2	3	5	1	6	9	7
River Oaks	8	9	7	3	6	1	2	5	4
Saginaw	8	5	3	7	6	2	1	N/A	4
Southlake	5	9	8	4	2	3	1	7	6
Tarrant County	6	9	7	4	3	1	2	5	8
UNTHSC	6	8	5	4	7	1	2	9	3
Watauga	3	8	5	4	7	1	2	N/A	6
Westlake	7	8	9	6	5	1	2	3	4
Westworth Village	8	7	6	5	4	1	2	N/A	3

The following natural hazard profiles are listed in alphabetical order and do not represent their rank, as each jurisdiction prioritized the hazards independently. This section covers part of the requirement of 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6 (c)(2)(ii).

The information provided in this section reflects the impact of the hazards on all of Tarrant County, not solely the participating jurisdictions. The results of the vulnerability analysis and risk assessment, including historical events, are documented in the individual annexes for participating jurisdictions.

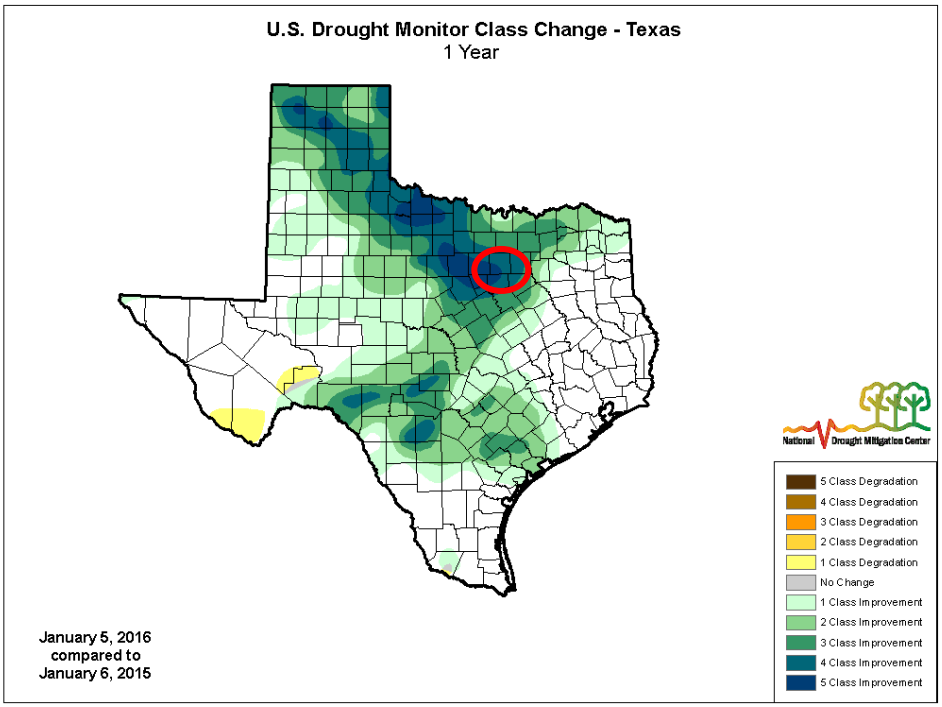
The historical events documented in this section reflect the events that impacted the entire county, not solely the unincorporated areas of the county.

Reference to Tarrant County in this section refers to the county as a whole and not solely unincorporated areas of Tarrant County.

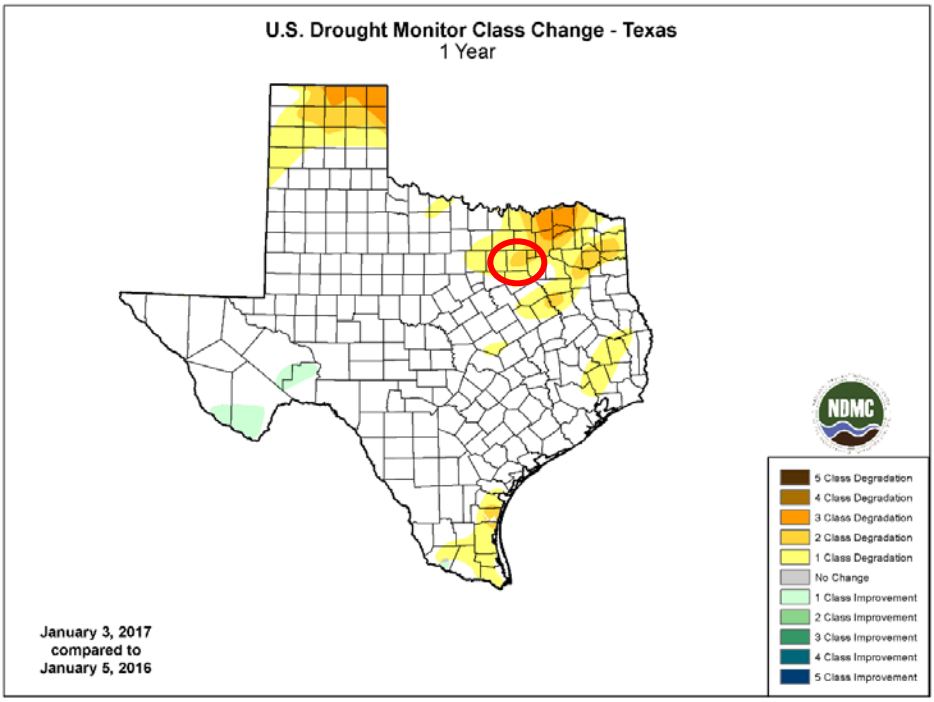
3.3.1 Drought

Drought can be defined as a water shortage caused by the natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length. It can be aggravated by other factors such as high temperatures, high winds, and low relative humidity. Tarrant County experiences a cycle of extended wet and drought conditions that can extend over a period of months even years. Extended periods of drought can have an enormous impact on an area by affecting the abundance of water supply, the agriculture economy, and foundations of structures. Drought may affect the entire Tarrant County planning area equally.

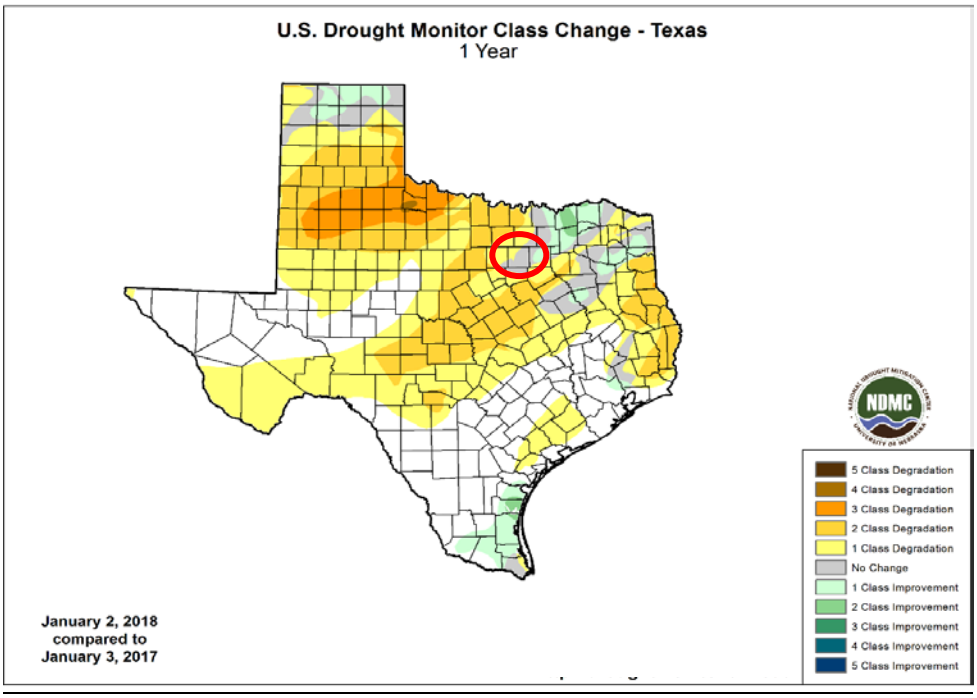
The following maps and chart reflect the annual changes in drought conditions between the years 2015 to 2018. Tarrant County has experienced an increase in drought conditions over the years, with 2016 being the wettest year during this time period.



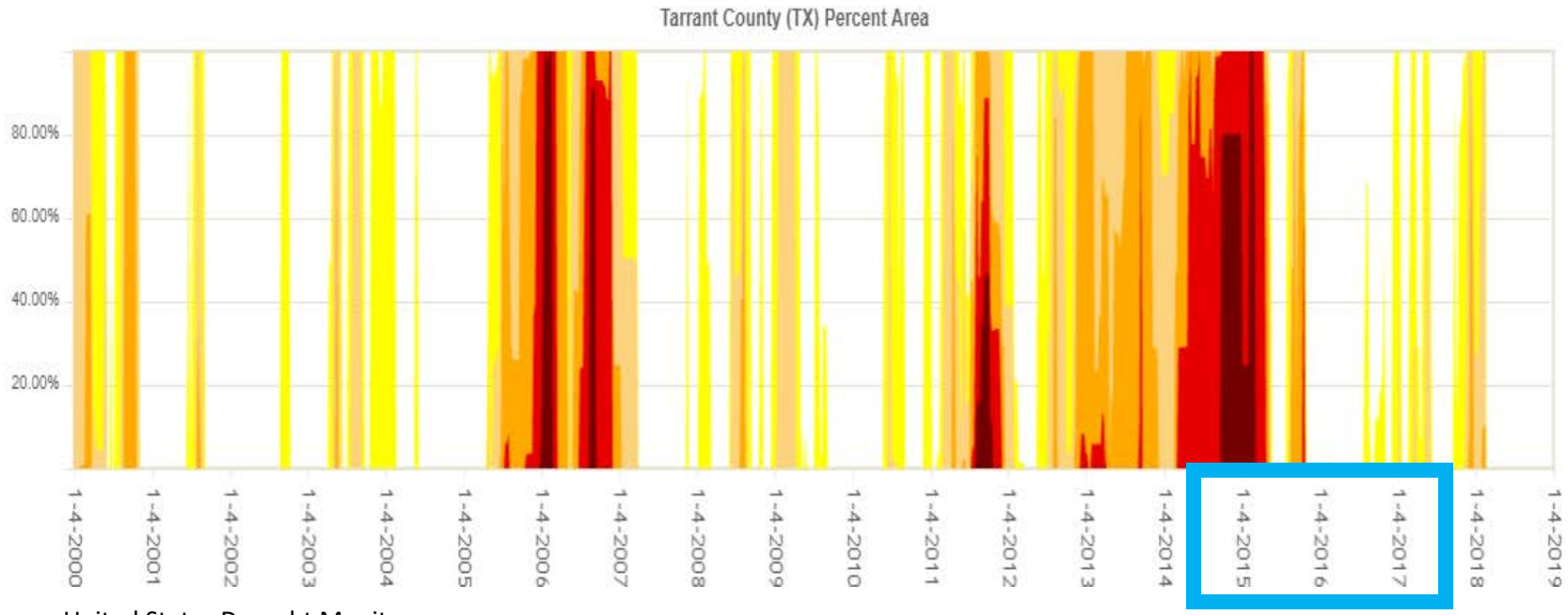
http://droughtmonitor.unl.edu



http://droughtmonitor.unl.edu



http://droughtmonitor.unl.edu



Source: United States Drought Monitor.

D0	D1	D2	D3	D4

As shown in the Percent Area graph, 2014-2015 had the greatest severity and longest time period of D3-D4 drought conditions. Besides major crop damage, these extreme drought conditions have the potential to put Tarrant County in extreme fire danger and could cause widespread water shortage and restrictions, creating a water emergency.

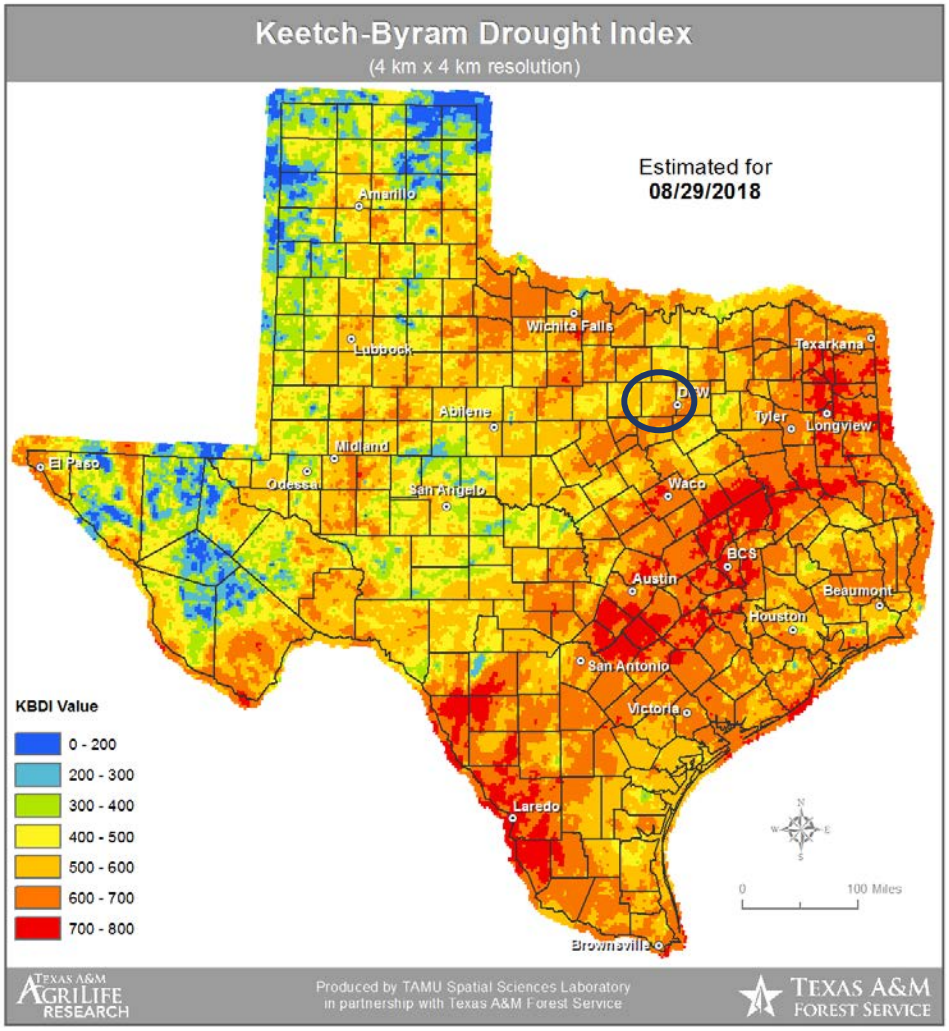
The following chart describes the drought monitoring indices along with drought severity, return period, and a description of the possible impacts of the severity of drought.

Drought Severity	Return Period (years)	Description of Possible Impacts	Drought Monitoring Indices		
			Standardized Precipitation Index (SPI)	NDMC* Drought Category	Palmer Drought Index
Minor Drought	3 to 4	Going into drought; short-term dryness slowing growth of crops or pastures; fire risk above average. Coming out of drought; some lingering water deficits; pastures or crops not fully recovered.	-0.5 to -0.7	D0	-1.0 to -1.9
Moderate Drought	5 to 9	Some damage to crops or pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing or imminent, voluntary water use restrictions requested.	-0.8 to -1.2	D1	-2.0 to -2.9
Severe Drought	10 to 17	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.	-1.3 to -1.5	D2	-3.0 to -3.9
Extreme Drought	18 to 43	Major crop and pasture losses; extreme fire danger; widespread water shortages or restrictions.	-1.6 to -1.9	D3	-4.0 to -4.9
Exceptional Drought	44+	Exceptional and widespread crop and pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells creating water emergencies.	less than -2	D4	-5.0 or less

*NDMC - National Drought Mitigation Center

The following map reflects the Keetch-Byram Drought Index (KBDI) for Tarrant County and the state of Texas. KBDI is an index used to determining forest fire potential. The drought index is based on a daily water balance, where a drought factor is balanced with precipitation and soil moisture (assumed to have a maximum storage capacity of 8-inches) and is expressed in hundredths of an inch of soil moisture depletion.

The drought index ranges from 0 to 800, where a drought index of 0 represents no moisture depletion, and an index of 800 represents absolutely dry conditions. Presently, this index is derived from ground based estimates of temperature and precipitation derived from weather stations and interpolated manually by experts at the Texas Forest Service (TFS) for counties across the state. Researchers at Texas A&M University are working with the TFS to derive this index from AVHRR satellite data and NEXRAD radar rainfall within a GIS.



Historical Events of Drought since 2015

Column Definitions: 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Location	Date	Time	Type	Dth	Inj	PrD	CrD
Totals:				0	0	2.00K	7.00K
Tarrant (Zone)	02/01/2015	00:00	Drought	0	0	0.00K	2.00K
Tarrant (Zone)	03/01/2015	00:00	Drought	0	0	0.00K	3.00K
Tarrant (Zone)	04/01/2015	00:00	Drought	0	0	0.00K	1.00K
Tarrant (Zone)	08/25/2015	00:00	Drought	0	0	0.00K	0.00K
Tarrant (Zone)	09/01/2015	00:00	Drought	0	0	0.00K	1.00K
Tarrant (Zone)	10/01/2015	00:00	Drought	0	0	2.00K	0.00K
Totals:				**0**	**0**	**2.00K**	**7.00K**

Source: National Centers for Environmental Information.

In total, property damage from drought totals $2,000 and crop damage totals $7,000. Calculations of annualized losses due to drought events were conducted using historical data obtained from the National Climatic Data Center. The annualized loss value can be interpreted as the impact expected from drought in terms of annualized human losses and human injuries, and annualized property losses. As observed in the table, Tarrant County can expect approximately an annual $667 in property losses, and $2,334 of crop losses each year as a result of drought, with no injuries or deaths expected from this event.

In Texas, local governments are empowered to take action on the behalf of those they serve. When drought conditions exist, a burn ban can be put in place by a county judge or county Commissioners Court prohibiting or restricting outdoor burning for public safety.[9]

3.3.2 Earthquake

An earthquake is a sudden motion or trembling caused by an abrupt release of accumulated strain on the tectonic plates that comprise the earth's crust. The theory of plate tectonics holds that the earth's crust is broken into several major plates. These rigid, 50- to 60- mile thick plates move slowly and continuously over the interior of the earth, meeting in some areas and separating in others. As the tectonic plates move together they bump, slide, catch, and hold. Eventually, faults along or near plate boundaries slip abruptly when the stress exceeds the elastic limit of the rock, and an earthquake occurs.

The ensuring seismic activity and ground motion provoke secondary hazards: surface faulting and ground failure. The vibration or shaking of the ground during an earthquake is referred to as ground motion. In general, the severity of ground motion increases with the amount of energy released and decreases with distance from the causative fault or epicenter. When a fault ruptures, seismic waves are propagated in all directions, causing the ground to vibrate at frequencies ranging from 0.1 to 30 Hz. Seismic waves are referred to as P waves, S waves, and surface waves. Due to the risk associated with a distant quake, earthquakes may affect the entire planning area equally. Tarrant County has a very low earthquake risk, with a total of 18 earthquakes since 1931. The United States Geological Survey (USGS) database shows that there is a 0.18% chance of a major earthquake within 30 miles of Tarrant County within the next 50 years. The largest earthquake within 30 miles of Tarrant County was a 3.6 Magnitude in 2017.[10]

[9] Fire Danger: Texas Burn Bans. Texas A&M Forest Service. 2018. <http://texasforestservice.tamu.edu/TexasBurnBans/>

[10] Homefacts. Earthquake Information for Tarrant County, Texas. 2018. <https://www.homefacts.com/earthquakes/Texas/Tarrant-County.html>

Historical Events of Earthquakes since 2015

The jurisdictions in Tarrant County are identified in blue. The remaining earthquakes occurred within 30 miles of Tarrant County, thus increasing the likelihood of a future earthquake in Tarrant County.

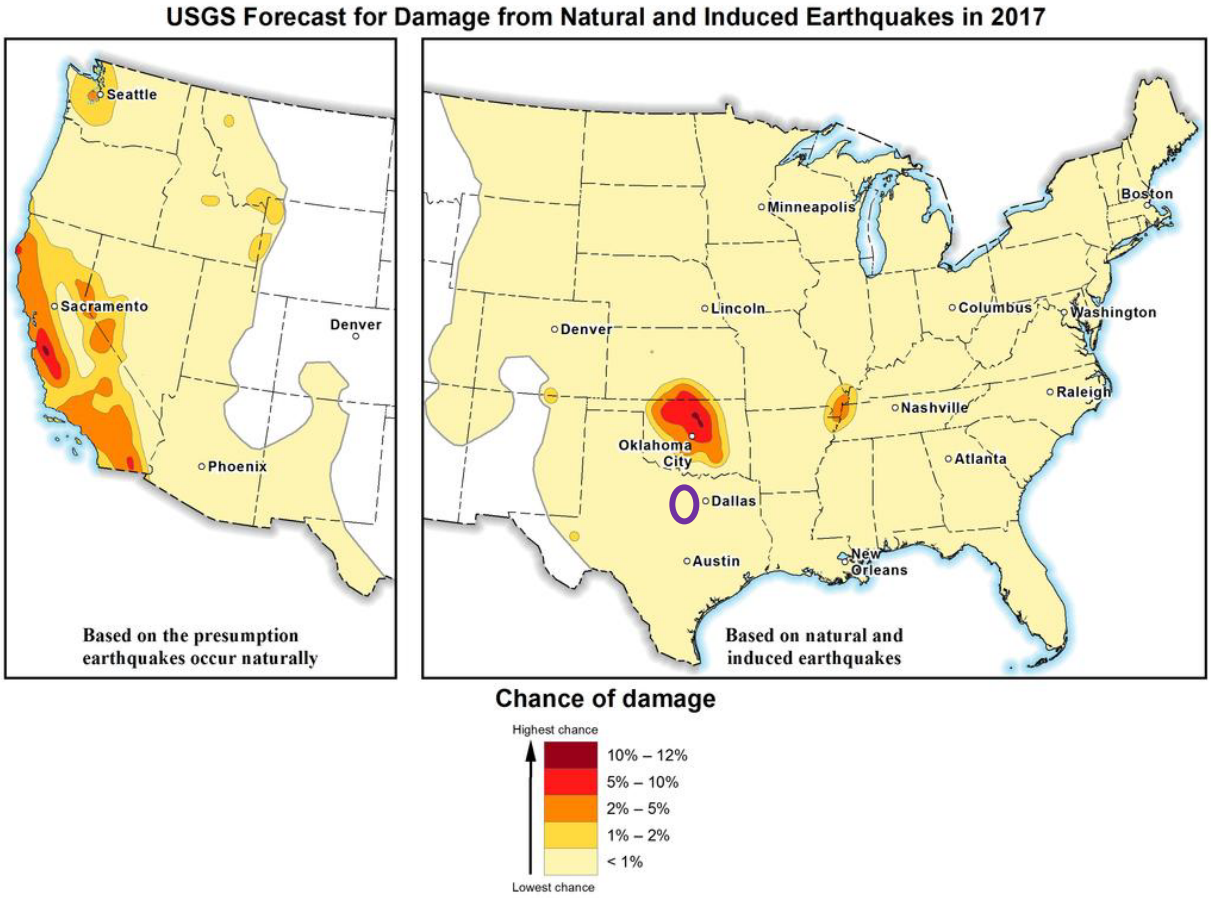
Legend							
	Tarrant County		2017		2016		2015

Time	Magnitude	Location in North Texas
2017-09-14T16:45:38.990Z	2.6	3.7 miles East-Southeast of Euless
2017-09-01T16:27:50.070Z	2.1	3.1 miles South-Southwest of Farmers Branch
2017-08-25T11:41:34.560Z	3	3.1 miles South of Farmers Branch
2017-06-21T22:52:05.320Z	2.8	1.2 miles Southwest of Reno
2017-05-01T16:10:09.410Z	2.3	1.2 miles Southwest of Fort Worth
2016-09-22T12:37:00.020Z	2.4	3.1 miles Northeast of Irving
2016-09-12T14:03:51.210Z	2.6	3.1 miles North-Northwest of Venus
2016-02-04T15:46:56.360Z	2.7	4.3 miles South-Southwest of Mansfield
2016-01-31T06:06:21.570Z	2.1	1.2 miles West of Irving
2015-12-17T22:29:55.710Z	3	0.6 miles South-Southeast of Haslet
2015-12-17T04:24:08.840Z	2.1	2.5 miles North-Northwest of Irving
2015-12-07T00:27:24.860Z	2.8	1.2 miles East of Irving
2015-12-06T00:44:08.510Z	2.1	3.7 miles South-Southwest of Farmers Branch
2015-12-04T14:22:58.700Z	2.1	3.7 miles North-Northeast of Irving
2015-12-04T06:56:03.250Z	2.6	3.7 miles South of Farmers Branch
2015-12-03T21:35:59.000Z	2.8	3.1 miles North-Northeast of Irving
2015-11-16T03:09:02.770Z	2.4	3.7 miles North of Irving
2015-11-15T22:07:51.400Z	2	2.5 miles North-Northeast of Irving
2015-11-03T02:37:41.390Z	2.2	2.5 miles North of Irving
2015-10-29T22:24:39.570Z	2.5	1.9 miles Northeast of Irving
2015-10-28T01:33:37.110Z	2.2	3.1 miles North of Irving
2015-10-27T13:01:07.520Z	2.3	3.7 miles North-Northeast of Irving
2015-10-23T12:30:04.520Z	2.6	2.5 miles Northwest of Venus
2015-10-23T12:11:07.850Z	2.1	4.3 miles Northwest of Venus
2015-10-19T23:12:03.180Z	2.3	3.1 miles North of Irving
2015-10-19T22:39:47.980Z	2.7	3.1 miles South-Southwest of Farmers Branch
2015-10-18T00:17:37.060Z	2.4	3.7 miles South-Southwest of Farmers Branch
2015-10-04T05:57:09.220Z	2.1	3.7 miles North-Northeast of Irving
2015-10-01T21:28:26.140Z	2.7	1.2 miles East of Irving
2015-09-22T10:18:43.020Z	2.4	3.1 miles South-Southwest of Farmers Branch
2015-09-20T23:25:08.930Z	2.6	0.6 miles North-Northwest of Irving
2015-09-16T21:55:24.080Z	2.1	1.9 miles North of Irving

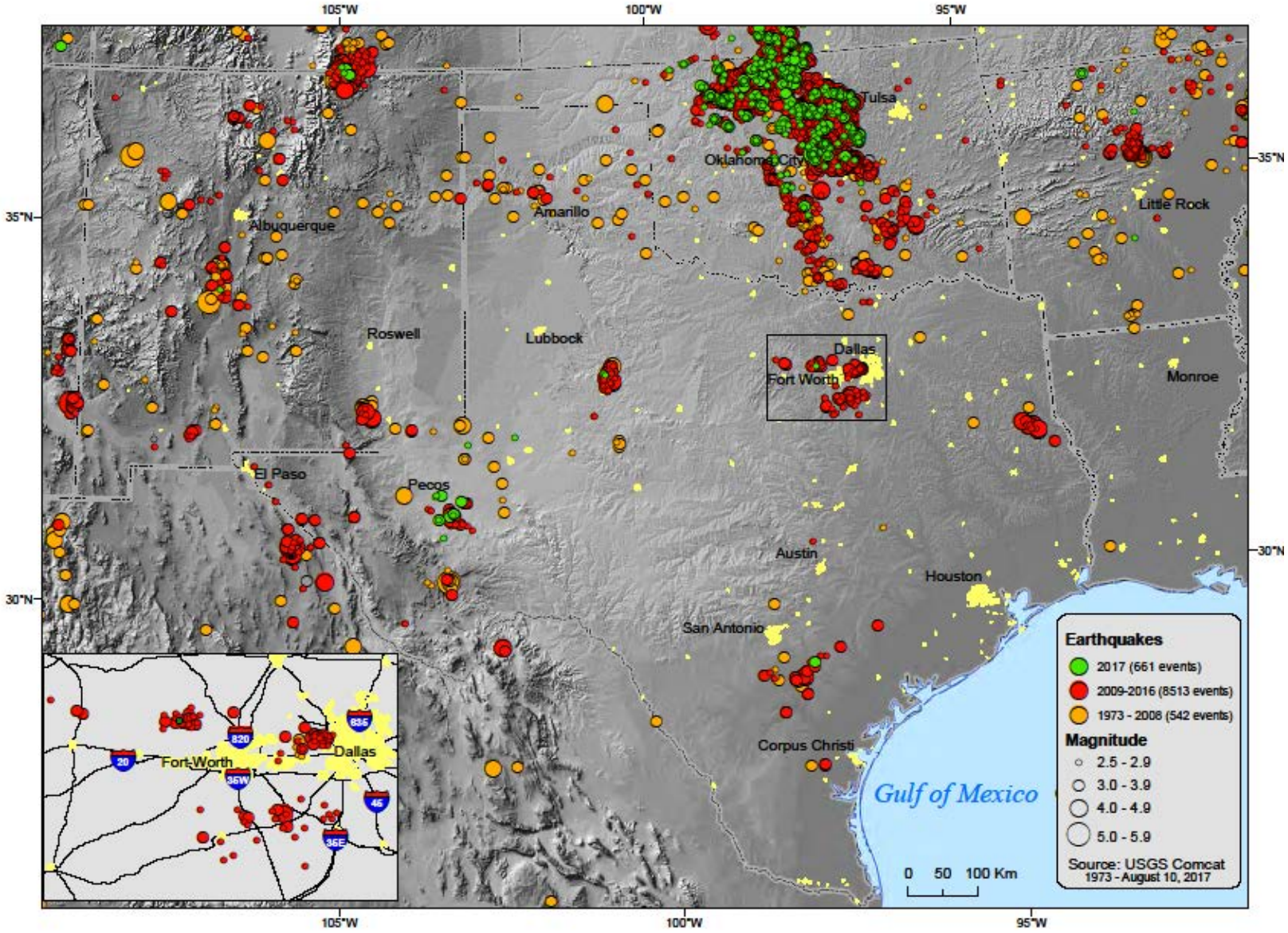
Time	Magnitude	Location in North Texas
2015-09-14T21:04:59.040Z	2	3.1 miles South of Farmers Branch
2015-09-12T12:16:16.840Z	2.2	1.2 miles Northeast of Irving
2015-09-12T09:34:20.660Z	2.5	2.5 miles Northeast of Irving
2015-08-31T08:15:37.160Z	1.8	2.5 miles East-Northeast of Irving
2015-08-25T20:59:47.930Z	2.2	2.5 miles North of Irving
2015-08-25T20:18:31.760Z	2.1	1.2 miles North of Irving
2015-08-12T11:13:28.340Z	2.7	2.5 miles Northeast of Irving
2015-07-18T15:30:09.260Z	2.6	2.5 miles Northeast of Irving
2015-07-16T00:17:49.460Z	1.8	2.5 miles North of Irving
2015-07-13T11:03:56.270Z	2.4	1.2 miles North-Northeast of Irving
2015-06-28T05:40:35.630Z	2.1	3.7 miles Northwest of Irving
2015-06-27T10:19:02.930Z	2.3	3.7 miles South of Farmers Branch
2015-06-15T09:37:14.520Z	2.4	3.1 miles Southeast of Mansfield
2015-06-13T13:34:47.480Z	2.3	3.7 miles South of Farmers Branch
2015-05-18T18:14:29.920Z	3.3	3.1 miles North of Irving
2015-05-10T01:59:31.750Z	2.4	4.3 miles North of Venus
2015-05-09T16:12:38.390Z	2.7	4.3 miles Northeast of Irving
2015-05-07T22:58:05.200Z	4	3.1 miles North of Venus
2015-05-04T13:57:59.870Z	2.7	3.7 miles West of University Park
2015-05-04T08:49:27.750Z	2.1	2.5 miles West-Northwest of University Park
2015-05-03T16:12:04.480Z	2.5	4.3 miles Northeast of Irving
2015-05-03T15:11:16.150Z	3.2	2.5 miles North of Irving
2015-04-03T08:58:11.070Z	2.2	3.1 miles South-Southeast of Farmers Branch
2015-04-03T04:28:37.020Z	2.3	3.7 miles North-Northeast of Irving
2015-04-03T03:04:49.640Z	2.5	3.7 miles Northeast of Irving
2015-04-02T22:36:21.040Z	3.3	3.1 miles North-Northeast of Irving
2015-04-02T10:38:06.000Z	2.7	2.5 miles North-Northeast of Irving
2015-03-25T04:57:14.320Z	2.6	3.1 miles Northwest of Venus
2015-03-14T07:31:16.290Z	2.7	3.1 miles North-Northeast of Irving
2015-03-12T14:41:14.790Z	2	2.5 miles South-Southwest of Farmers Branch
2015-03-12T01:55:02.270Z	2.4	3.1 miles South-Southwest of Farmers Branch
2015-03-08T03:12:22.340Z	2.2	2.5 miles East-Northeast of Irving
2015-02-27T12:18:21.710Z	3.1	2.5 miles East-Northeast of Irving

Source: U.S. Geological Survey.

Tarrant County and participating jurisdictions experienced a few earthquakes during the time period analyzed for this plan. There is the potential for future earthquake events, as Azle and Irving faults were recently discovered. Earthquakes from surrounding areas can also affect the participating jurisdictions. Though no dollar-amount of destruction was found, it is expected that all county and jurisdictional assets are considered vulnerable and can be exposed to this hazard. Assets near the Azle and Irving fault lines are most vulnerable to an earthquake event. Loss estimates are based on total amount over a period of time. The Tarrant County Hazard Mitigation Action Plan reports no loss estimates.

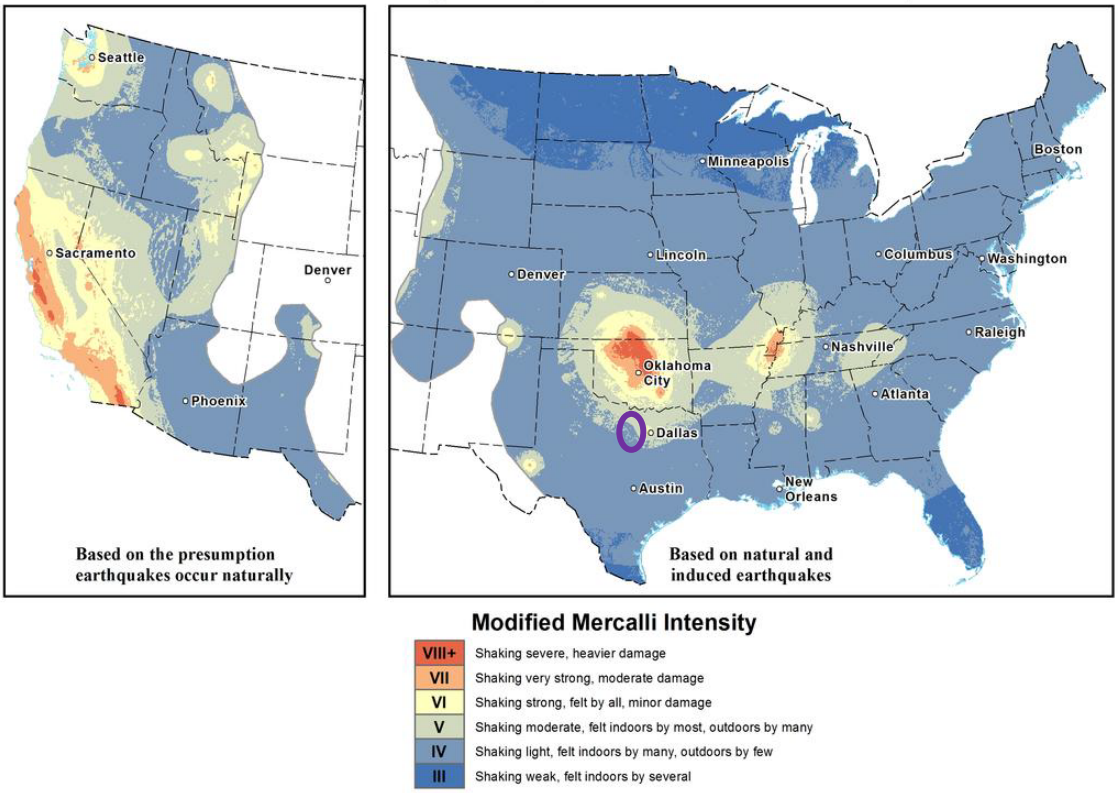


USGS map displaying potential to experience damage from natural or human-induced earthquakes in 2017. Chances range from less than 1 percent to 12 percent.


105°W
100°W
95°W
35°N
30°N
Albuquerque
Amarillo
Oklahoma City
Tulsa
Little Rock
Roswell
Lubbock
Dallas
Fort Worth
Monroe
El Paso
Pecos
Austin
Houston
San Antonio
Corpus Christi
Gulf of Mexico
Fort-Worth
Dallas
820
635
20
35W
45
35E
Earthquakes
2017 (661 events)
2009-2016 (8513 events)
1973 - 2008 (542 events)
Magnitude
2.5 - 2.9
3.0 - 3.9
4.0 - 4.9
5.0 - 5.9
Source: USGS Comcat
1973 - August 10, 2017
0 50 100 Km

In the picture above, it shows that most earthquakes since 1973 have occurred in the neighboring state of Oklahoma. If an Oklahoma earthquake is large enough, participating jurisdictions in Tarrant County can feel the shake, as Oklahoma is about 180 miles north. Jurisdictions in Tarrant County have experienced multiple earthquakes since 2009.

USGS Forecast for Ground Shaking Intensity from Natural and Induced Earthquakes in 2017

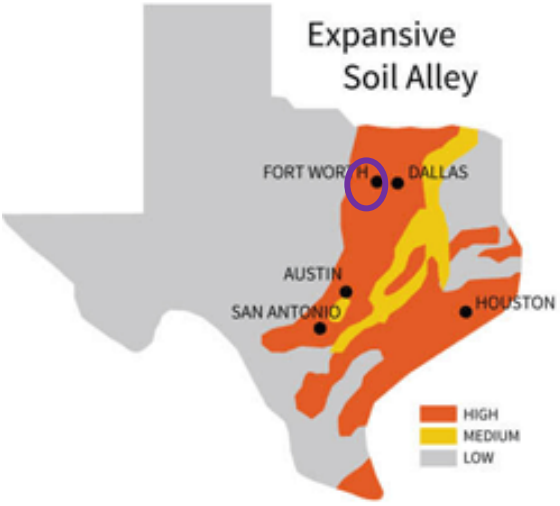


USGS map displaying intensity of potential ground shaking from natural and human-induced earthquakes. There is a small chance (one percent) that ground shaking intensity will occur at this level or higher. There is a greater chance (99 percent) that ground shaking will be lower than what is displayed in these maps.

The picture above reflects the level of ground shaking from earthquakes in 2017. Tarrant County is at a Level V or VI on the Modified Marcelli Intensity Chart, with shaking being moderate to strong.

3.3.3 Expansive Soils

Expansive soils are soils that contain large percentages of swelling clays that may experience volume changes of up to 40% in the absence or presence of water. This type of plastic deformation is common in Tarrant County. Homes built on expanding smectite clays without due precautions will likely will be structurally damaged as the clay takes up water. Cracks will appear in walls and floors. Damage can be minor, but it also can be severe enough for the home to be structurally unsafe. Expansive soil is considered one of the most common causes of pavement distresses in roadways. Depending upon the moisture level, expansive soils will experience changes in volume due to moisture fluctuations from seasonal variations. Expansive soils may affect the entire Tarrant County planning area equally.



Expansive soils is a condition that is native to Texas soil characteristics, and cannot be documented as a time-specific event, except when it leads to structural and infrastructure damage. The great increase in damages in Texas caused by problems with expansive soils can be traced to the rise in residential slab-on-grade construction which began to accelerate in the 1960s. Prior to that time, most residential construction in Texas was pier and beam, with wood siding or other non-masonry covering. Affected homes will be heavily influenced by their proximity to a large body of water, such as homes on Eagle Mountain Lake, whereas older pier and beam foundations will behave in an entirely different manner.

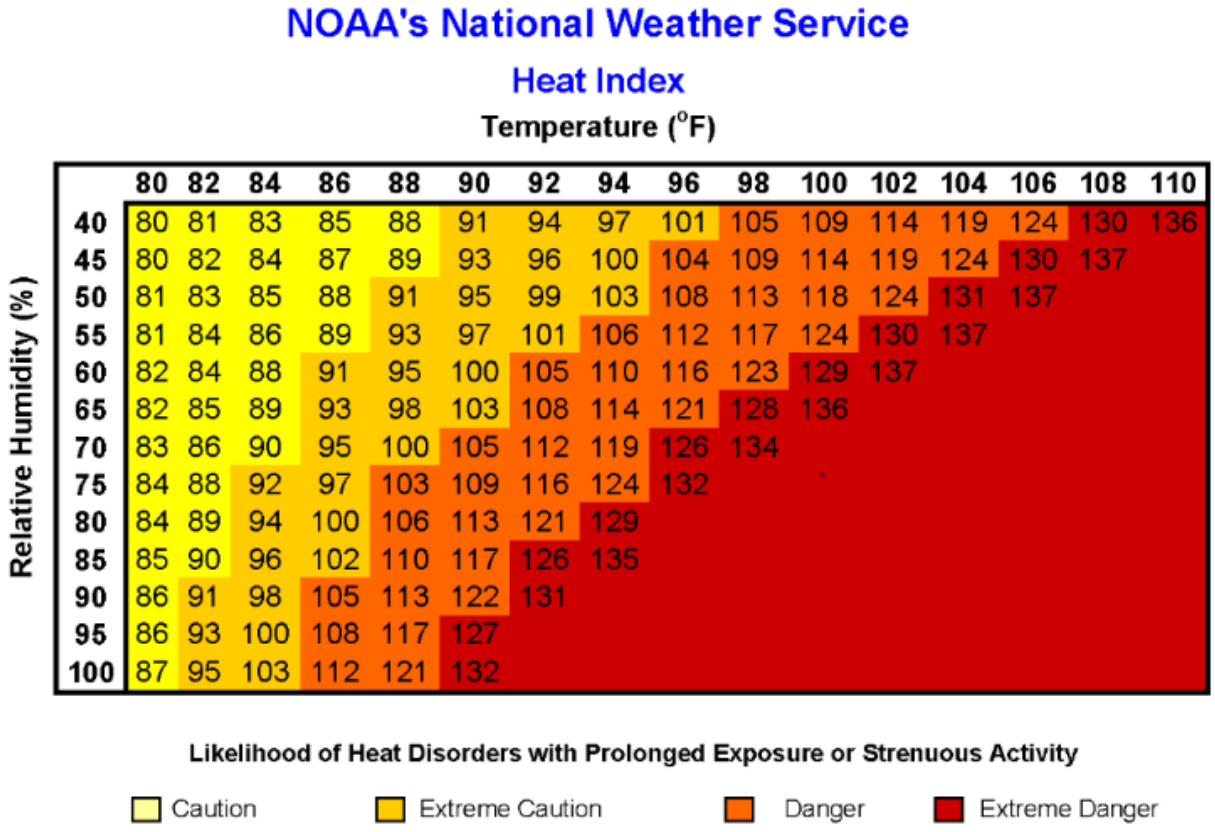
Western and Central Tarrant County consists of several different limestone formations (the **Washita group**) made up of limestone and shale that produce a variety of clay-rich soils with rocky shallow soil horizons. Eastern Tarrant County is supported by **Woodbine sandstone**, a picturesque rolling topography dominated by sandy loams and clay-rich soils. These sandier soils allow for subsurface water movement and require special consideration. This propensity for water movement can easily compromise the foundations of homes in Tarrant County.[11]

[11] Fort Worth Foundation Repair. Perma Pier Foundation Repair of Texas. 2018. <https://www.permapier.com/service-areas/fort-worth-foundation-repair/>

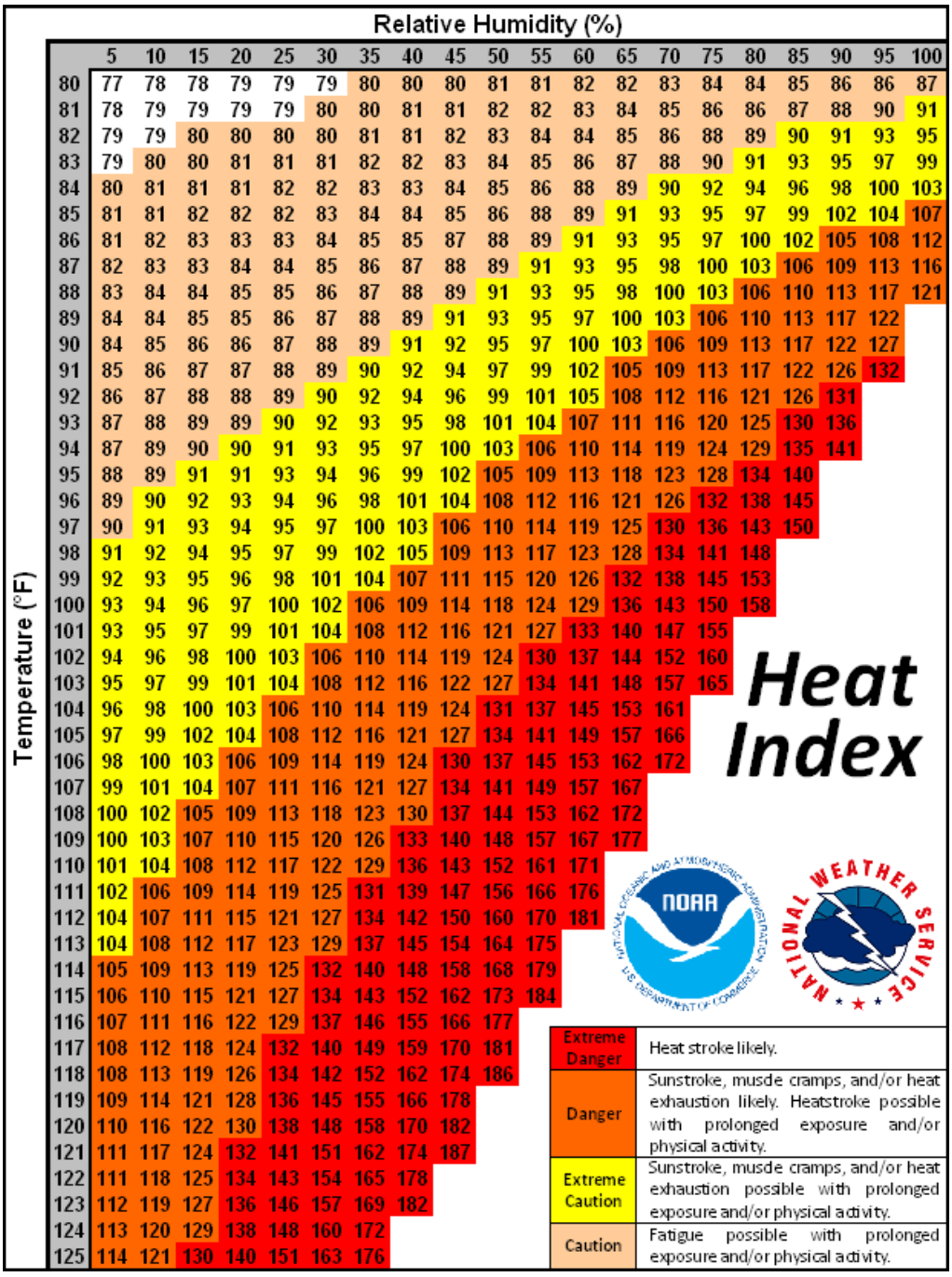
3.3.4 Extreme Heat

Extreme heat is characterized by a combination of very high temperatures and exceptionally humid conditions. When persisting over a period of time, it is called a heat wave. Extreme heat can also be a factor that drastically impacts drought conditions, as high temperatures lead to an increased rate of evaporation. Extreme heat can also lead to heat stroke and even death in vulnerable populations, such as the elderly and the very young, if exposed to the high temperatures for an extended period of time. Extreme heat may affect the entire Tarrant County planning area equally.

The following scale was used to determine the extent of extreme heat in Tarrant County and participating jurisdictions. The Heat Index is a measure of how hot it really feels when relative humidity is factored in with the actual air temperature. To find the Heat Index temperature, look at the Heat Index Chart below. As an example, if the air temperature is 96°F and the relative humidity is 65%, the heat index-how hot it feels-is 121°F. The red area without numbers indicates extreme danger. The National Weather Service (NWS) will initiate alert procedures when the Heat Index is expected to exceed 105°-110°F (depending on local climate) for at least 2 consecutive days.



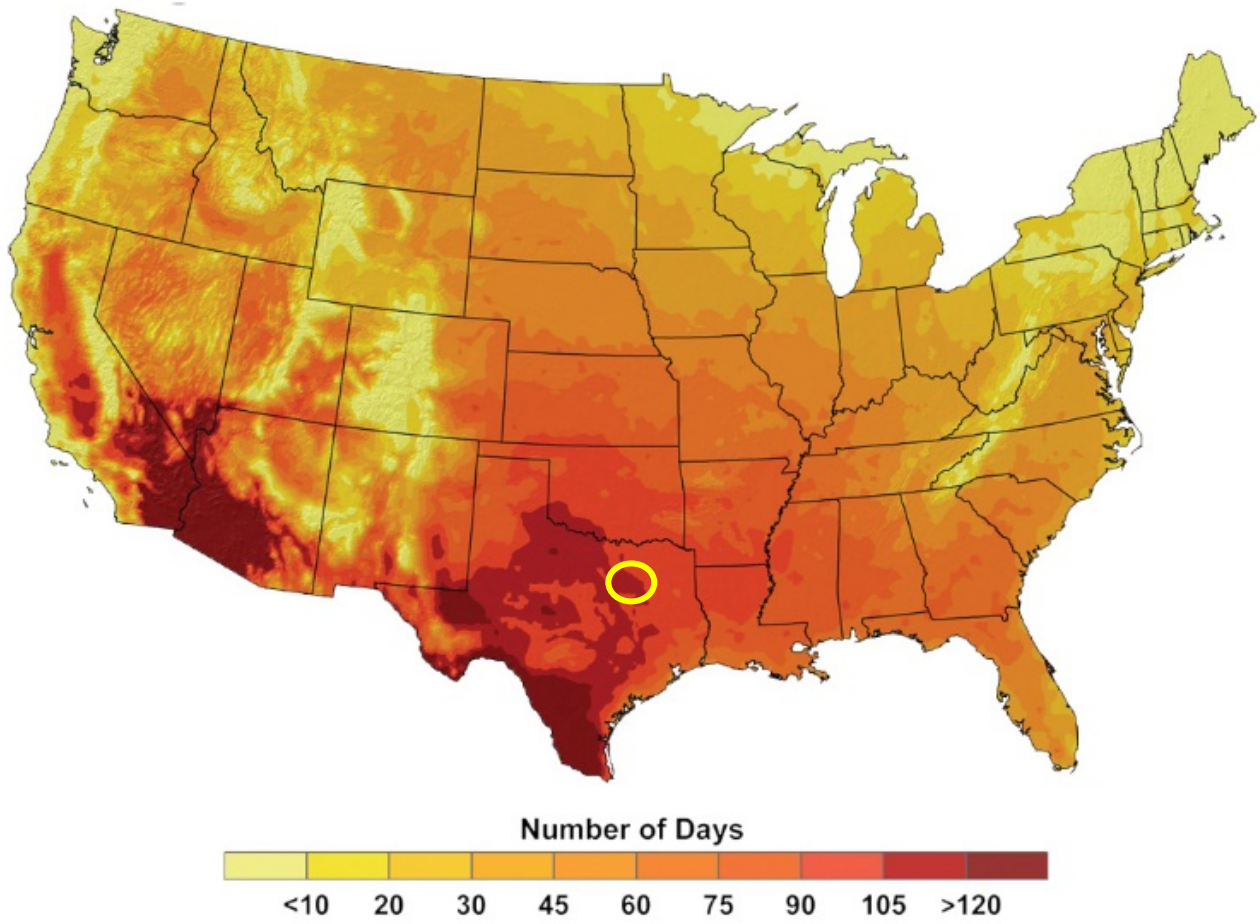
NWS also offers a Heat Index chart, below, for areas with high heat but low relative humidity. Since heat index values were devised for shady, light wind conditions, exposure to full sunshine can increase heat index values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.



Temp (°F) \ RH (%)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
80	77	78	78	79	79	79	80	80	80	81	81	82	82	83	84	84	85	86	86	87
81	78	79	79	79	79	80	80	81	81	82	82	83	84	85	86	86	87	88	90	91
82	79	79	80	80	80	80	81	81	82	83	84	84	85	86	88	89	90	91	93	95
83	79	80	80	81	81	81	82	82	83	84	85	86	87	88	90	91	93	95	97	99
84	80	81	81	81	82	82	83	83	84	85	86	88	89	90	92	94	96	98	100	103
85	81	81	82	82	82	83	84	84	85	86	88	89	91	93	95	97	99	102	104	107
86	81	82	83	83	83	84	85	85	87	88	89	91	93	95	97	100	102	105	108	112
87	82	83	83	84	84	85	86	87	88	89	91	93	95	98	100	103	106	109	113	116
88	83	84	84	85	85	86	87	88	89	91	93	95	98	100	103	106	110	113	117	121
89	84	84	85	85	86	87	88	89	91	93	95	97	100	103	106	110	113	117	122	
90	84	85	86	86	87	88	89	91	92	95	97	100	103	106	109	113	117	122	127	
91	85	86	87	87	88	89	90	92	94	97	99	102	105	109	113	117	122	126	132	
92	86	87	88	88	89	90	92	94	96	99	101	105	108	112	116	121	126	131		
93	87	88	89	89	90	92	93	95	98	101	104	107	111	116	120	125	130	136		
94	87	89	90	90	91	93	95	97	100	103	106	110	114	119	124	129	135	141		
95	88	89	91	91	93	94	96	99	102	105	109	113	118	123	128	134	140			
96	89	90	92	93	94	96	98	101	104	108	112	116	121	126	132	138	145			
97	90	91	93	94	95	97	100	103	106	110	114	119	125	130	136	143	150			
98	91	92	94	95	97	99	102	105	109	113	117	123	128	134	141	148				
99	92	93	95	96	98	101	104	107	111	115	120	126	132	138	145	153				
100	93	94	96	97	100	102	106	109	114	118	124	129	136	143	150	158				
101	93	95	97	99	101	104	108	112	116	121	127	133	140	147	155					
102	94	96	98	100	103	106	110	114	119	124	130	137	144	152	160					
103	95	97	99	101	104	108	112	116	122	127	134	141	148	157	165					
104	96	98	100	103	106	110	114	119	124	131	137	145	153	161						
105	97	99	102	104	108	112	116	121	127	134	141	149	157	166						
106	98	100	103	106	109	114	119	124	130	137	145	153	162	172						
107	99	101	104	107	111	116	121	127	134	141	149	157	167							
108	100	102	105	109	113	118	123	130	137	144	153	162	172							
109	100	103	107	110	115	120	126	133	140	148	157	167	177							
110	101	104	108	112	117	122	129	136	143	152	161	171								
111	102	106	109	114	119	125	131	139	147	156	166	176								
112	104	107	111	115	121	127	134	142	150	160	170	181								
113	104	108	112	117	123	129	137	145	154	164	175									
114	105	109	113	119	125	132	140	148	158	168	179									
115	106	110	115	121	127	134	143	152	162	173	184									
116	107	111	116	122	129	137	146	155	166	177										
117	108	112	118	124	132	140	149	159	170	181										
118	108	113	119	126	134	142	152	162	174	186										
119	109	114	121	128	136	145	155	166	178											
120	110	116	122	130	138	148	158	170	182											
121	111	117	124	132	141	151	162	174	187											
122	111	118	125	134	143	154	165	178												
123	112	119	127	136	146	157	169	182												
124	113	120	129	138	148	160	172													
125	114	121	130	140	151	163	176													

Extreme Danger	Heat stroke likely.
Danger	Sunstroke, musde cramps, and/or heat exhaustion likely. Heatstroke possible with prolonged exposure and/or physical activity.
Extreme Caution	Sunstroke, musde cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Caution	Fatigue possible with prolonged exposure and/or physical activity.

The map below shows the average number of days per year locations can expect to exceed 100°F by the end of this century, if greenhouse gas emissions continue to increase. Based on this information, parts of Texas that experienced 10 to 20 days of 100°F weather per year in recent decades may experience more than 100 days over 100°F by the end of the century. This includes Tarrant County.



Source: National Oceanic and Atmospheric Administration, United States Climate Resilience Toolkit.

Historical Events of Extreme Heat since 2015

Column Definitions: 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Location	Date	Time	Type	Dth	Inj	PrD	CrD
Tarrant (Zone)	06/23/2017	16:00	Heat	1	0	0.00K	0.00K
Totals:				**1**	**0**	**0.00K**	**0.00K**

Source: National Centers for Environmental Information.

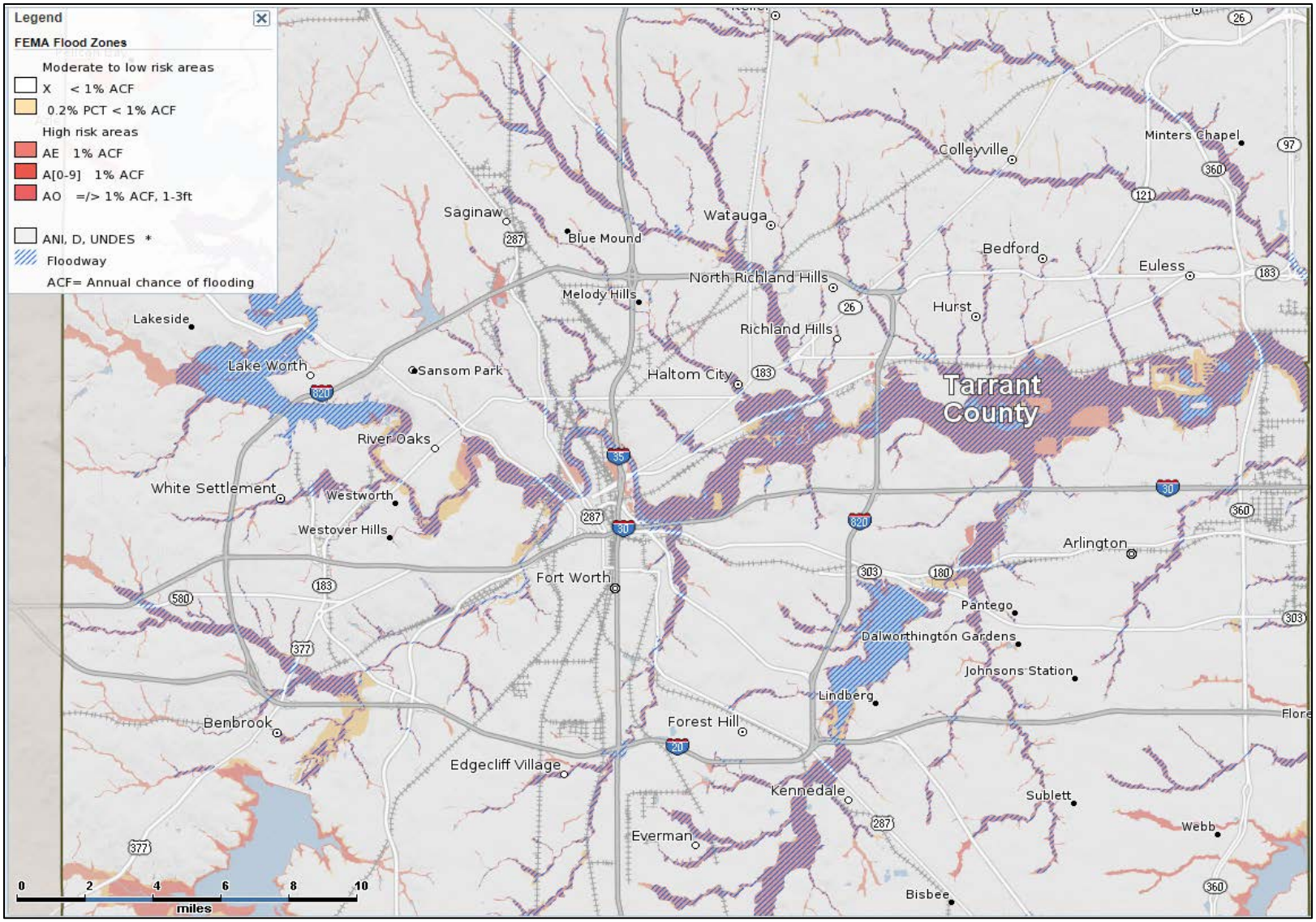
Extreme heat impacts large areas and cross jurisdictional boundaries; therefore, all of Tarrant County is exposed to this hazard.

3.3.5 Flooding

Flooding is defined as the accumulation of water within a water body and the overflow of excess water onto adjacent floodplain lands. The floodplain is the land adjoining the channel of a river, stream, ocean, lake, or other watercourse or water body that is susceptible to flooding. The statistical meaning of terms like “100-year flood” can be confusing. Simply stated, a floodplain can be located anywhere; it just depends on how large and how often a flood event occurs. Floodplains are those areas that are subject to inundation from flooding. Floods and the floodplains associated with them are often described in terms of the percent chance of a flood event happening in any given year. As a community management or planning term, “floodplain” most often refers to an area that is subject to inundation by a flood that has a 1% chance of occurring in any given year (commonly referred to as the 100-year floodplain).

Common flooding hazards within the planning area include flood hazards from flash flooding and new development. Floodwater can disguise many dangerous obstacles, like uncovered manholes or debris that can cause someone to fall over. Standing water, or water that isn't flowing, can also become a breeding ground for bugs that can make people very ill. Another risk can be downed power lines which may still be live.

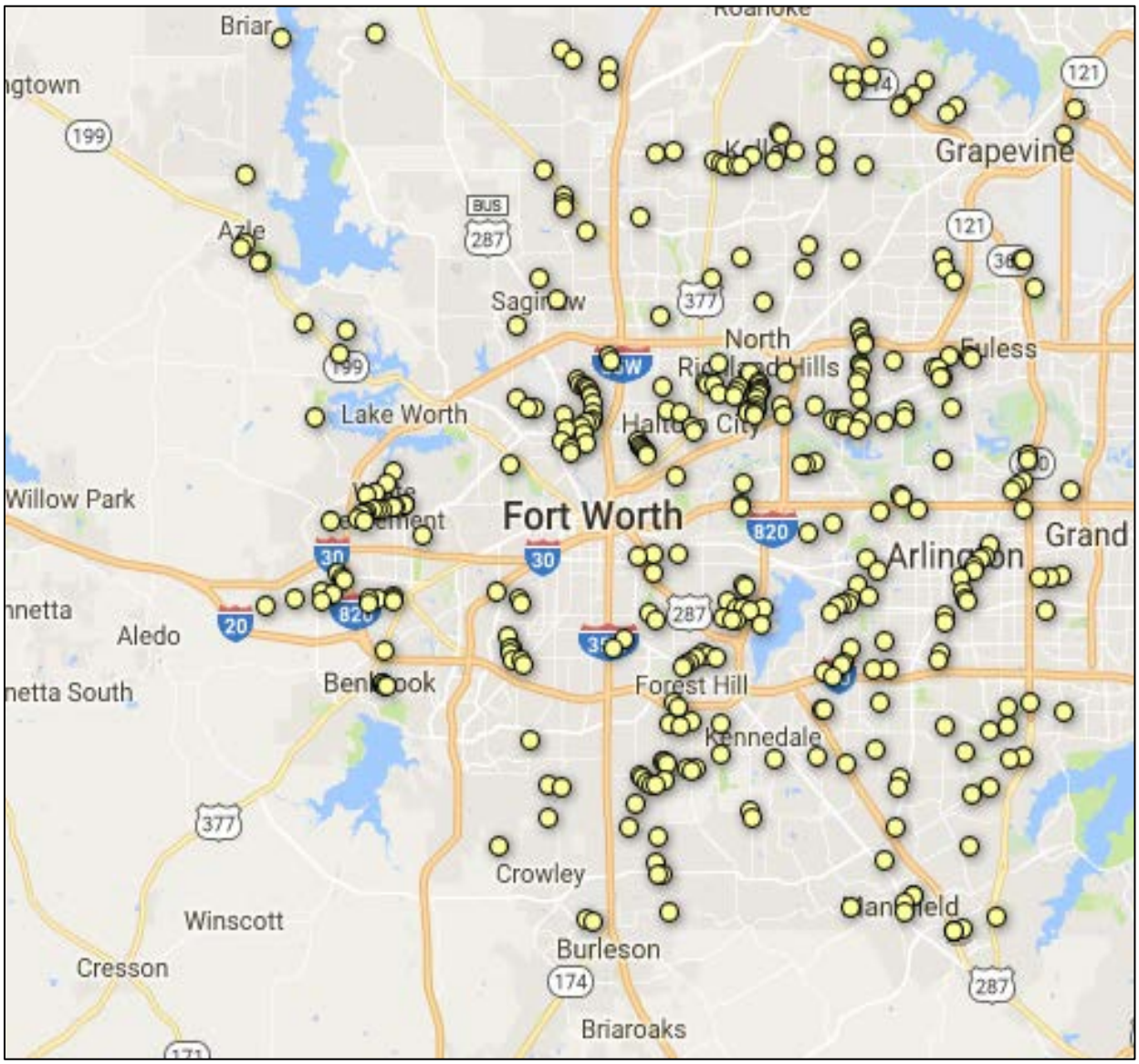
On the following map, the floodway and 100-year floodplain are identified along the rivers and creeks in Tarrant County.



Source: Property Shark

A flash flood is a rapid flood that inundates low-lying areas in less than six hours. This is caused by intense rainfall from a thunderstorm or several thunderstorms. Flash floods can also occur from the collapse of a man-made structure or ice dam. Construction and development can change the natural drainage and create brand new flood risks as the concrete that comes with new buildings, parking lots, and roads create less land that can absorb excess precipitation from heavy rains. Flash floods are a high risk hazard since they can tear out trees and destroy buildings and bridges.

Below is a map of low water crossings in Tarrant County as of 2012, identified by yellow circles. A low water crossing provides a bridge or overpass when water flow is low. Under high-flow conditions, water runs over the roadway and impedes vehicular traffic. Texas leads the nation in flash flood deaths and most are due to people crossing these low areas in times of flooding. Additional details on flooding are provided in the jurisdictional annexes.



Source: Texas Low Water Crossing Inventory_032312;

There are 15 major river basins within Texas and eight coastal basins, each with varying hydrological regimes and water supply capabilities. Each of the basins has several unique features, both climatic (such as precipitation and evaporation), as well as physiographic (geology, slope, soil type, vegetation and land use practices) which contribute to the nature of runoff from the basins. The West Fork Trinity River is the only major river in Tarrant County and can affect some of the participating jurisdictions. There are a total of four branches of the Trinity River: the West Fork, Clear Fork, Elm Fork, and East Fork. The Trinity is a slow, meandering river with many twists and turns from its headwaters to its mouth. Dams have been erected to create Lake Bridgeport, Eagle Mountain Lake and Lake Worth, the latter two being in or on the outskirts of Fort Worth. The West Fork Trinity River has its headwaters in Archer County. From there it flows southeast, through the man-made reservoirs Lake Bridgeport and Eagle Mountain Lake then flowing eastward through Lake Worth and then the city of Fort Worth.

Features of Major River Basins in Tarrant County					
River Basin	**Total Area (square miles)**	**Area in Texas (square miles)**	**River Length (miles)**	**Length in Texas (miles)**	**Average Flow (acre-feet per year)**
Trinity	17,913	17,913	550	550	5,727,000

Tarrant County has of a few major lakes that are used for surface water and recreation. Their current water levels are listed below. Currently, these lakes have recovered from previous drought periods and are close to or at capacity.

Recent Conditions of Lakes in Tarrant County							
Reservoir	**Percent Full**	**Water Level (feet)**	**Height Above Conservation Pool (feet)**	**Reservoir Storage (acre-feet)**	**Conservation Storage (acre-feet)**	**Conservation Capacity (acre-feet)**	**Surface Area (acres)**
Arlington	99.2	549.83	-0.17	39,862	39,862	40,188	1,919
Benbrook	100.0	694.48	0.48	87,439	85,648	85,648	N/A
Cedar Creek	100.0	322.06	0.06	646,750	644,686	644,686	N/A
Eagle Mountain	100.0	649.42	0.32	182,650	179,880	179,880	N/A
Grapevine	100.0	537.08	2.08	179,459	164,703	164,703	7,273
Richland-Chambers	97.6	314.38	-0.62	1,086,376	1,061,452	1,087,839	42,287
Worth	99.2	593.92	-0.08	33,221	33,221	33,495	3,423

Source: Water Data for Texas, https://waterdatafortexas.org/reservoirs/statewide.

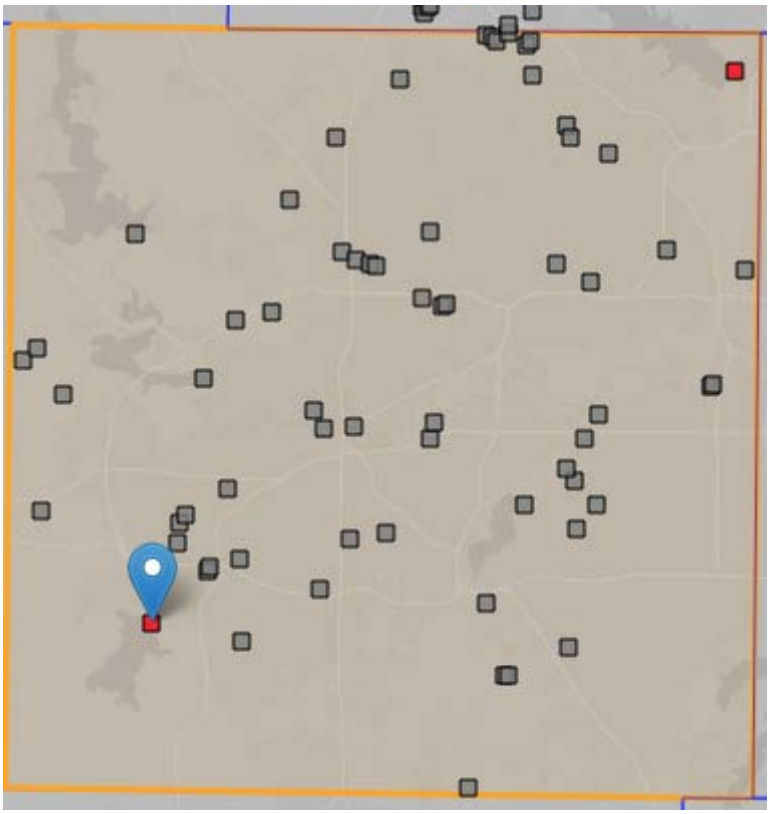
Dam Failure

A dam is defined as a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. Dams typically are constructed of earth, rock, concrete, or mine tailings. A dam failure is an accidental or unintentional collapse, breach, or other failure of an impoundment structure that results in downstream flooding. Because dams are man-made structures, dam failures are usually considered technological hazards.

The hazard extent rating scale for dam failure is based on the amount of potential damage that can be caused by a failure. For the purposes of this hazard analysis, damage from dam failure only takes into account areas where developed property is affected. Although dam failures can cause extensive damage, there has been no recorded failures in Tarrant County as a wide array of measures, including maintenance, are taken to ensure structural integrity. Ninety-five percent of dams in Tarrant County are regulated by a state agency and 3% are regulated by a federal agency. The average age for the 63 dams is 53 years old.

At the time this plan was written, specific inundation data for dams in Tarrant County was unavailable; however, it can be said that all people, property, and environments located in an inundation area would be affected by dam failure. One of the two high hazard federal dams shown in red on the following map is in a participating jurisdiction. It is owned by the United States Army Corps of Engineers, Fort Worth District (CESF).

Dam Name	City	Owner
Benbrook Lake	Fort Worth	U.S. Army Corps of Engineers, Fort Worth District (CESF)



According to the Texas Commission on Environmental Quality (TCEQ), there are 33 state regulated dams in Tarrant County that are high hazard and there are 8 dams that are significant hazard. Twenty-five of the high hazard dams have an emergency action plan (EAP), and all 8 of the significant hazard dams have an EAP.

Below is a list of the dams in Tarrant County provided by the U.S. Army Corps of Engineers. Those without a city name can be presumed to be located in the unincorporated Tarrant County. The list reflects the most current 2018 National Inventory of Dams (NID) database. State and federal dam regulators provided their data from May to November 2018 for inclusion in the 2018 database. Please contact the respective state or federal regulatory authority for the most up-to-date information. The NID consists of dams meeting at least one of the following criteria;

1. High hazard potential classification - loss of human life is likely if the dam fails.

2. Significant hazard potential classification - no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.
3. Height is equal to or exceeds 25 feet and storage exceeds 15 acre-feet.
4. Height exceeds 6 feet and storage is equal to or exceeds 50 acre-feet.

Dam Name	Jurisdiction	Owner	EAP
Benbrook Lake	Fort Worth	U.S. Army Corps of Engineers, Fort Worth District (CESF)	Yes
Grapevine Lake	Grapevine	CESF	Yes
Lake Arlington Dam	Arlington	City of Arlington	Yes
Lake Como Dam	Fort Worth	City of Fort Worth	Yes
Luther Lake Dam	Fort Worth	City of Fort Worth	Yes
Eagle Mountain Dam	Fort Worth	Tarrant Regional Water District	Yes
Haywire Lake Number 2 Dam	Lake Worth	David Leonard	Not Required
Haywire Lake Number 1 Dam	Lake Worth	David Leonard	Not Required
Knapp Lake Dam	Haltom City	Texas Department of Transportation	No
White Lake Dam	Fort Worth	Catholic Diocese of Fort Worth, Nolan High School	Yes
Marine Creek Dam	Fort Worth	Tarrant Regional Water District	Yes
Lake Worth Dam	Fort Worth	City of Fort Worth	Yes
Loughridge Lake Dam		City of Fort Worth	Not Required
Millbrook Addition Dam	Fort Worth	Millbrook Addition Homeowners Association	Not Required
Fosdic Lake Dam	Fort Worth	City of Fort Worth	Yes
Echo Lake Dam	Fort Worth	Tarrant County	Yes
Prestonwood Lake Dam	Arlington	Eddie Cheatham	Not Required
Cement Creek Dam	Fort Worth	Tarrant Regional Water District	Yes
Willow Creek Lake Dam	Fort Worth	City of Fort Worth	Yes
Nutt Dam	Fort Worth	Tarrant Regional Water District	Not Required
East Balancing Reservoir Dam	*Bisbee*	*Tarrant Regional Water District*	*Yes*
West Balancing Reservoir Dam	*Bisbee*	*Tarrant Regional Water District*	*Yes*
Western Training Lagoon Dam	Haltom City	Western Company of North America	Not Required
Rush Creek Lake Dam	Arlington	Lake Interlochen Homeowners Association	Not Required

Dam Name	Jurisdiction	Owner	EAP
Meadows Lakes East Lake Dam	Richland Hills	Meadow Lakes Community Improvement Association, Skylark Circle Community Improvement Association	No
Trigg Lake Dam	*Irving*	*Dallas-Fort Worth International Airport Board*	*Yes*
Woodland West Lake Dam	Pantego	Woodland West Lake Association	Yes
North Side Drive Dam Number 3	Fort Worth	City of Fort Worth	Not Required
Cityview Lakes Dam 2		Cityview Owners Association	Not Required
Cityview Lakes Dam 3		Cityview Owners Association	Not Required
Arbor Dam 1		Arbor Development Company	Not Required
Arbor Dam 2		Arbor Development Company	Not Required
Stoneglen Dam Number 1		Hunt Resources Inc.	Not Required
Stoneglen Dam Number 2		Hunt Resources Inc.	Not Required
Stoneglen Dam Number 8		Hunt Resources Inc.	Not Required
Lakewood Dams 1-3		Lakewood Addition Homeowners Association	Not Required
Capp Smith Park Retention Lake Dam		City of Watauga	Yes
Fourth Street Low Water Dam	Fort Worth	Tarrant Regional Water District	Not Required
Timarrow Lake Iv Dam		Timarrow Land Corporation	Not Required
Glen Garden Golf and Country Club Dam		Glen Garden Golf and Country Club	Yes
Lake Mb 3a Dam		Hillwood Properties Corporation	No
French Lake Dam	Fort Worth	City of Fort Worth	Yes
Bal Lake Dam	Fort Worth	Jearl Walker	Yes
Fidelity South Lake Dam	*Trophy Club*	*FMR Texas Limited Partnership*	*Yes*
Fidelity North Lake Dam	*Trophy Club*	*FMR Texas Limited Partnership*	*Yes*
Pd3 1 East Lake Dam 1		The Vaquero Club Inc.	Yes
Eden Lake Dam	Fort Worth	The Landing at Eden Lake Homeowners Association	No
Dow Lake Dam		Robert Dow	Not Required

Dam Name	Jurisdiction	Owner	EAP
Arlington Southwest Nature Preserve Dam	Arlington	City of Arlington	Yes
Elkins Lake Dam		City of Dalworthington Gardens	Yes
Boys Ranch Activity Center Dam		City of Bedford Parks Department	Yes
Mansfield ISD Ron Whitson Agricultural Center Dam		Mansfield Independent School District (ISD)	No
Stone Lake Dam		Stone Lake Homeowners Association	Yes
Ridglea Country Club Estates Dam		David Smith, Mark Gerrick, Shawn Smith	No
Timberlake Phase 5		Timber Lake Residential Association Inc, City of Southlake	Yes
Lake Mb3 Dam		Hillwood Properties Corporation	No
Lost Creek Golf Club Dam	*Benbrook*	*Somerset Lost Creek Golf Limited*	*Yes*
McPherson Ranch Dam	Fort Worth	McPherson Ranch Owners Association	Yes
Alan Saxe Pond	Arlington	City of Arlington	Yes
Tehama Ridge Dam		DR Horton-Texas Limited	Yes
Meadows Lakes West Lake Dam	North Richland Hills	Meadow Lakes Community Improvement Association, Skylark Circle Community Improvement Association	No
Chisholm Park Lake Dam		City of Hurst	Yes
Greenbriar Dam		City of Fort Worth	Yes

Source: National Inventory of Dams, https://nid-test.sec.usace.army.mil/ords/f?p=105:1
Italicized dams are not in the participating jurisdictions of this plan.

The hazard classification of dams and inundation maps are not available to the public, per Homeland Security regulations. If specific information is needed for a dam, please contact the dam owners or the Dam Safety Section of the TCEQ via the Tarrant County Emergency Management Coordinator.

The extent of dam failure in the planning area has not yet been determined as a result of a lack of data regarding inundation levels. It is believed that all census blocks within a 5-mile radius are at risk to failure from the dams with the largest water capacity. The cities of Arlington, Fort Worth, Grapevine, Haltom City, Lake Worth, North Richland Hills, Pantego, and the unincorporated county are the only jurisdictions with dams listed in their area. Due to the lack of data, in the next five years these jurisdictions will have a goal to work with the state to conduct a study to fill the data deficiency, including inundation zones, vulnerability to, and potential impacts of a dam failure.

NFIP

As a participating member in the **National Flood Insurance Program (NFIP),** Tarrant County is required to regulate any development in designated flood prone areas. All work within a Federal Emergency Management Agency (FEMA) designated floodplain requires a floodplain permit. The floodplain permit is free; however, it may require additional information indicating that adjacent property owners will not be adversely impacted due to the development.

Additional information may include, but is not limited to, an elevation certificate, a flood study, a topographical survey of before and after conditions, Conditional Letter of Map Revision (CLOMR), Letter of Map Revision (LOMR), and Letter of Map Amendment (LOMA).

A property owner is required to obtain a floodplain permit prior to performing any type of work in the floodplain, including the placement of fill. The finished floor elevation of new homes constructed in a floodplain must be located at least one foot above the base flood elevation.

Prior to the submittal of any documents to FEMA, the county floodplain administrator will review the documents to ensure they are in compliance with the county's floodplain regulations

A permit will only be issued after it is determined that the proposed work will not have an adverse impact on adjacent property owners, will not decrease the flood carrying capacity of the watercourse and will not create a situation that is dangerous during flooding events.

As development occurs along with growth, more property is exposed. In fact, due to the rapid development in the area, the planners have experienced problems determining building footprints within the floodplain and are working to accurately identify the number and types of buildings vulnerable to flooding.

Among the NFIP's policyholders are thousands whose properties have flooded multiple times. Called "repetitive loss properties," these are buildings and/or contents for which the NFIP has paid at least two claims of more than $1,000 in any 10-year period since 1978. "Severe repetitive loss properties" are those for which the program has either made at least four payments for buildings and/or contents of more than $5,000 or at least two building-only payments that exceeded the value of the property.

These two kinds of properties are the biggest draw on the NFIP Fund. They not only increase the NFIP's annual losses and the need for borrowing; but they drain funds needed to prepare for catastrophic events. Community leaders and residents are also concerned with the Repetitive Loss problem because residents' lives are disrupted and may be threatened by the continual flooding.

The primary objective of identifying these properties is to eliminate or reduce the damage to property and the disruption to life caused by repeated flooding of the same properties.

The following table reflects the loss statistics for repetitive loss properties in participating jurisdictions. In summary, there was over $35,184,127.07 in payments made to the jurisdictions and over 2,000 losses.

Loss Statistics as of 05/31/2018					
Loss Statistics: from January 1, 1978 through report "as of" date above					
Jurisdiction	**Total Losses**	**Closed Losses**	**Open Losses**	**Closed Without Payment (CWOP) Losses**	**Total Payments**
Arlington	888	669	1	219	$18,679,502.23
Azle	53	39	0	14	$1,114,627.32
Bedford	59	33	0	26	$175,230.99
Blue Mound	3	2	0	1	$21,810.93
Colleyville	54	36	0	18	$652,382.45

Loss Statistics as of 05/31/2018					
Loss Statistics: from January 1, 1978 through report "as of" date above					
Jurisdiction	**Total Losses**	**Closed Losses**	**Open Losses**	**Closed Without Payment (CWOP) Losses**	**Total Payments**
Crowley	2	2	0	0	$10,676,72
Dalworthington Gardens	9	5	0	4	$38,738.70
Edgecliff Village	15	10	0	5	$72,918.51
Euless	109	91	0	18	$2,876,085.49
Everman	75	42	21	12	$646,802.08
Forest Hill	20	12	0	8	$145,600.40
Fort Worth	584	425	3	156	$4,651,310.81
Grapevine	50	39	0	11	$1,020,289.91
Haltom City	122	88	0	34	$3,349,909.45
Haslet	2	1	0	1	$2,645.94
Hurst	115	86	0	29	$1,235,231.11
Keller	52	42	0	10	$1,137,017.37
Kennedale	20	17	0	3	$118,404.88
Lake Worth	1	1	0	0	$3,951.81
Lakeside	1	0	0	1	$0
North Richland Hills	111	87	0	24	$718,857.87
Pantego	12	8	0	4	$39,574.45
Richland Hills	100	79	0	21	$1,140,570.00
River Oaks	4	4	0	0	$67,027.56
Saginaw	7	7	0	0	$111,199.79
Southlake	24	19	1	4	$434,383.78
Tarrant County (unincorporated)	242	192	1	49	$4,066,415.57
Watauga	85	68	0	17	$533,697.51
Total	**2,029**	**1,537**	**2**	**491**	**$35,184,127.07**
Total losses – All losses submitted regardless of the status.					
Closed losses –Losses that have been paid.					
Open losses – Losses that have not been paid in full.					
CWOP losses – Losses that have been closed without payment.					
Total Payments – Total amount paid on losses.					

Source: Claim Information by State, https://bsa.nfipstat.fema.gov/reports/1040.htm#48.

The tables below provide information about the repetitive loss and severe repetitive loss properties within the participating jurisdictions as of January 31, 2019. The types of properties are identified in the individual annexes, as applicable

Repetitive Loss Properties					
Community name	**CID**	**Total Payments**	**Avg. Payment**	**Losses**	**Properties**
Arlington	485454	$3,889,452.43	$34,118.00	114	46
Azle	480584	$21,535.92	$10,767.96	2	1
Bedford	480585	$58,571.22	$5,857.12	10	5
Colleyville	480590	$599,369.37	$27,244.06	22	8
Crowley	480591	$220430.81	$55107.7	4	1
Dalworthington Gardens	481013	$36,535.65	$6,089.28	6	3
Edgecliff Village	480592	$41,616.15	$20,808.08	2	1
Euless	480593	$824,603.42	$24,253.04	34	14
Everman	480594	$59,488.23	$11,897.65	5	2
Forest Hill	480595	$94,672.35	$47,336.18	2	1
Fort Worth	480596	1,889,511.41	12,681.28	149	50
Grapevine	480598	479,318.89	22,824.71	21	10
Haltom City	480599	$2,769,530.21	$57,698.55	48	13
Keller	480602	$591,093.51	$23,643.74	25	8
Kennedale	480603	$24,266.13	$6,066.53	4	2
North Richland Hills	480607	$111,736.97	$11,173.70	10	4
Pantego	481116	$67,512.77	$13,502.55	5	2
Richland Hills	480608	$512,929.49	$15,543.32	33	9
Saginaw	480610	$10,825.99	$2,706.50	4	1
Southlake	480612	$142,182.06	$35,545.52	4	2
Tarrant County (unincorporated)	480582	$1,176,586.27	$21,392.48	55	16
Watauga	480613	$250,061.33	$8,622.80	29	12

Severe Repetitive Loss Properties					
Community name	**CID**	**Total Payments**	**Avg. Payment**	**Losses**	**Properties**
Arlington	485454	$102,089.39	$25,522.35	4	1
Euless	480593	$67,429.34	$16,857.33	4	1
Keller	480602	$297,060.09	$59,412.02	5	1
Tarrant County (unincorporated)	480582	$380,296.75	$27,164.05	14	2

The **Community Rating System (CRS)** is a voluntary program for communities that participate in the National Flood Insurance Program (NFIP). The goals of the CRS are to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. The CRS has been developed to provide incentives in the form of premium discounts for communities to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding. For a community to be eligible, it must be in full compliance with the NFIP.

All communities start out with a Class 10 rating, which provides no discount. There are 10 CRS classes: Class 1 requires the most credit points and gives the greatest premium discount; Class 10 identifies a

community that does not apply for the CRS or does not obtain a minimum number of credit points and receives no discount. There are 18 activities recognized as measures for eliminating exposure to floods. Credit points are assigned to each activity. The activities are organized under 4 main categories:

- Public Information
- Mapping and Regulation
- Flood Damage Reduction
- Flood Preparedness

Premium discounts ranging from 5% to a maximum of 45% are applied to eligible policies written in a community as recognition of the floodplain management activities instituted.

All CRS communities must maintain completed FEMA elevation and floodproofing certificates for all new and substantially improved construction in the Special Flood Hazard Area (SFHA) after the date of application for CRS classification. These certificates must be available upon request. Therefore, in writing a policy, an agent/producer should be able to get these certificates from any CRS community. In addition, some CRS communities receive credit for having completed certificates for Post-Flood Insurance Rate Map (FIRM) buildings constructed prior to the CRS application date. If they do receive this credit, these certificates should also be available to agents/producers writing flood insurance.

The following participating jurisdictions in Tarrant County have CRS ratings. All other participating jurisdictions are not ranked.

Community Rating System Eligible Communities Effective May 1, 2018							
Community Number	**Community Name**	**CRS Entry Date**	**Current Effective Date**	**Current Class**	**% Discount for SFHA***	**% Discount for Non-SFHA**	**Status****
485454	Arlington	10/1/91	05/1/18	6	20	10	C
480596	Fort Worth	10/1/12	10/1/12	8	10	5	C
480599	Haltom City	10/1/12	10/1/12	7	15	5	C
480601	Hurst	10/1/92	10/1/17	8	10	5	C
480607	North Richland Hills	10/1/91	10/1/16	7	15	5	C
480608	Richland Hills	05/1/14	05/1/14	8	10	5	C

Source: October 2017 NFIP Flood Insurance Manual.
For the purpose of determining CRS discounts, all AR and A99 zones are treated as non-SFHAs.
*SFHA: Special Flood Hazard Area
**Status: C = Current, R = Rescinded

Participating jurisdictions describe details of their NFIP participation within their jurisdictional annex.

3.3.6 Thunderstorms

A thunderstorm is a storm that consists of rain-bearing clouds and has the potential to produce hail, high winds, and lightning.

Hail

Hail occurs when, at the outgrowth of a severe thunderstorm, balls or irregularly shaped lumps of ice greater than 0.75 inches in diameter fall with rain. Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to warm air rising rapidly into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until, having developed sufficient weight, they fall as precipitation.

The TORRO scale for hail extends from H0 to H10 with its increments of intensity or damage potential related to hail size (distribution and maximum), texture, fall speed, speed of storm translation, and strength of the accompanying wind.

An indication of equivalent hail kinetic energy ranges (in joules per square meter) has now been added to the first six increments on the scale, and this may be derived from radar reflectivity or from hail pads. The International Hailstorm Intensity Scale recognizes that hail size alone is insufficient to accurately categorize the intensity and damage potential of a hailstorm, especially towards the lower end of the scale. For example, without additional information, an event in which hail of up to walnut size is reported (hail size code 3: hail diameter of 21-30 mm) would be graded as a hailstorm with a minimum intensity of H2-H3. Additional information, such as the ground wind speed or the nature of the damage the hail caused, would help to clarify the intensity of the event. For instance, a fall of walnut-sized hail with little or no wind may scar fruit and sever the stems of crops but would not break vertical glass and so would be ranked H2-H3. However, if accompanied by strong winds, the same hail may smash many windows in a house and dent the bodywork of a car, and so be graded an intensity as high as H5.

However, evidence indicates maximum hailstone size is the most important parameter relating to structural damage, especially towards the more severe end of the scale. It must be noted that hailstone shapes are also an important feature, especially as the "effective" diameter of non-spheroidal specimens should ideally be an average of the coordinates. Spiked or jagged hail can also increase some aspects of damage.

Below is the TORRO Hailstorm Intensity Scale (H0 to H10) in relation to typical damage and hail size codes.

TORRO Hailstorm Intensity Scale				
Size Code	**Intensity Category**	**Typical Hail Diameter (mm)***	**Probable Kinetic Energy, J-m²**	**Typical Damage Impacts**
H0	Hard Hail	5	0-20	No damage
H1	Potentially Damaging	5-**15**	>20	Slight general damage to plants, crops

TORRO Hailstorm Intensity Scale				
Size Code	**Intensity Category**	**Typical Hail Diameter (mm)***	**Probable Kinetic Energy, J-m²**	**Typical Damage Impacts**
H2	Significant	10-**20**	>100	Significant damage to fruit, crops, vegetation
H3	Severe	20-**30**	>300	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-**40**	>500	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-**50**	>800	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-**60**		Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	50-**75**		Severe roof damage, risk of serious injuries
H8	Destructive	60-**90**		Severe damage to aircraft bodywork
H9	Super Hailstorms	75-**100**		Extensive structural damage, risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100		Extensive structural damage, risk of severe or even fatal injuries to persons caught in the open

* *Approximate range (typical maximum size in bold), since other factors (e.g. number and density of hailstones, hail fall speed, and surface wind speeds) affect severity.*

Wind

Straight-line winds are often responsible for the wind damage associated with a thunderstorm. These winds are often confused with tornadoes because of similar damage and wind speeds. However, the strong and gusty winds associated with straight-line winds blow roughly in a straight line, unlike the rotating winds of a tornado. Downbursts or micro-bursts are examples of damaging straight-line winds. A downburst is a small area of rapidly descending rain and rain-cooled air beneath a thunderstorm that produces a violent, localized downdraft covering 2.5 miles or less. Wind speeds in some of the stronger downbursts can reach 100 to 150 miles per hour, which is similar to that of a strong tornado. The winds

produced from a downburst often occur in one direction and the worst damage is usually on the forward side of the downburst.

The following Beaufort Wind Chart shows the description and scale used to classify the wind intensity in a thunderstorm. The scale is now rarely used by professional meteorologists, having been largely replaced by more objective methods of determining wind speeds—such as using anemometers, tracking wind echoes with Doppler radar, and monitoring the deflection of rising weather balloons and radiosondes from their points of release. Nevertheless, it is still useful in estimating the wind characteristics over a large area, and it may be used to estimate the wind where there are no wind instruments. The Beaufort scale also can be used to measure and describe the effects of different wind velocities on objects on land or at sea.

The Beaufort Scale of Wind (Nautical)			
Beaufort Number	**Name of Wind**	**Wind Speed**	
		knots	**kph**
0	Calm	<1	<1
1	Light air	1–3	1–5
2	Light breeze	4–6	6–11
3	Gentle breeze	7–10	12–19
4	Moderate breeze	11–16	20–28
5	Fresh breeze	17–21	29–38
6	Strong breeze	22–27	39–49
7	Moderate gale (or near gale)	28–33	50–61
8	Fresh gale (or gale)	34–40	62–74
9	Strong gale	41–47	75–88
10	Whole gale (or storm)	48–55	89–102
11	Storm (or violent storm)	56–63	103–114
12–17	Hurricane	64 and above	117 and above

Lightning

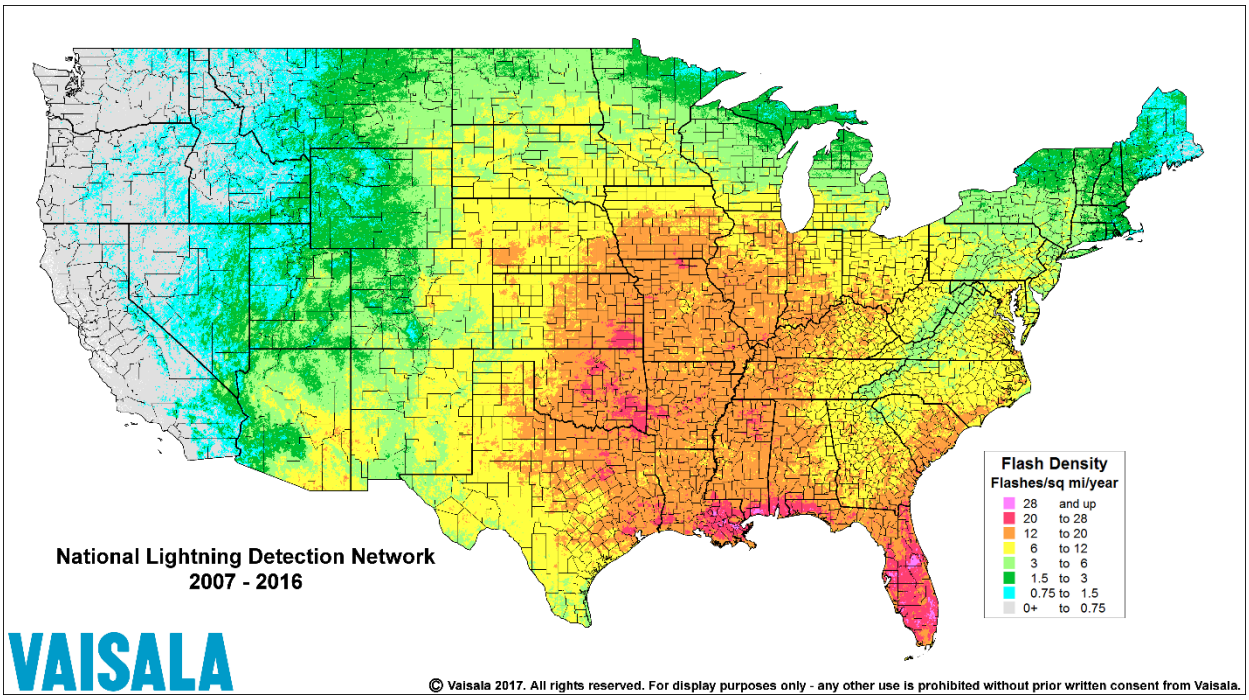
Lightning results from the buildup and discharge of electrical energy between positively and negatively charged areas within thunderstorms. A “bolt” or brilliant flash of light is created when the buildup becomes strong enough. These bolts of lightning can be seen in cloud-to-cloud or cloud-to-ground strikes. Bolts of lightning can reach temperatures approaching 50,000°F. While lightning is mostly affiliated with

thunderstorms, lightning often strikes outside of these storms, as far as 10 miles away from any rainfall. FEMA states that an average of 300 people are injured and 80 people are killed in the United States each year by lighting. Direct strikes have the power to cause significant damage to buildings, critical facilities, infrastructure, and the ignition of wildfires which can result in widespread damages to property and persons. Lightning is the most significant natural contributor to fires affecting the built environment.

The lightning activity level (LAL) is a common parameter that is part of fire weather forecasts nationwide. LAL is a measure of the amount of lightning activity using values 1 to 6 where:

LAL	Cloud and Storm Development	Lightning Strikes Per 15 Minutes
1	No thunderstorms	-
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground and lightning is infrequent	9-15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense	>25
6	Similar to LAL 3 except thunderstorms are dry	

According to the following map from the National Lightning Detection Network, jurisdictions in Tarrant County experience a flash density of 12-20 flashes per square mile, per year.


National Lightning Detection Network
2007 - 2016
Flash Density
Flashes/sq mi/year
28 and up
20 to 28
12 to 20
6 to 12
3 to 6
1.5 to 3
0.75 to 1.5
0+ to 0.75
VAISALA
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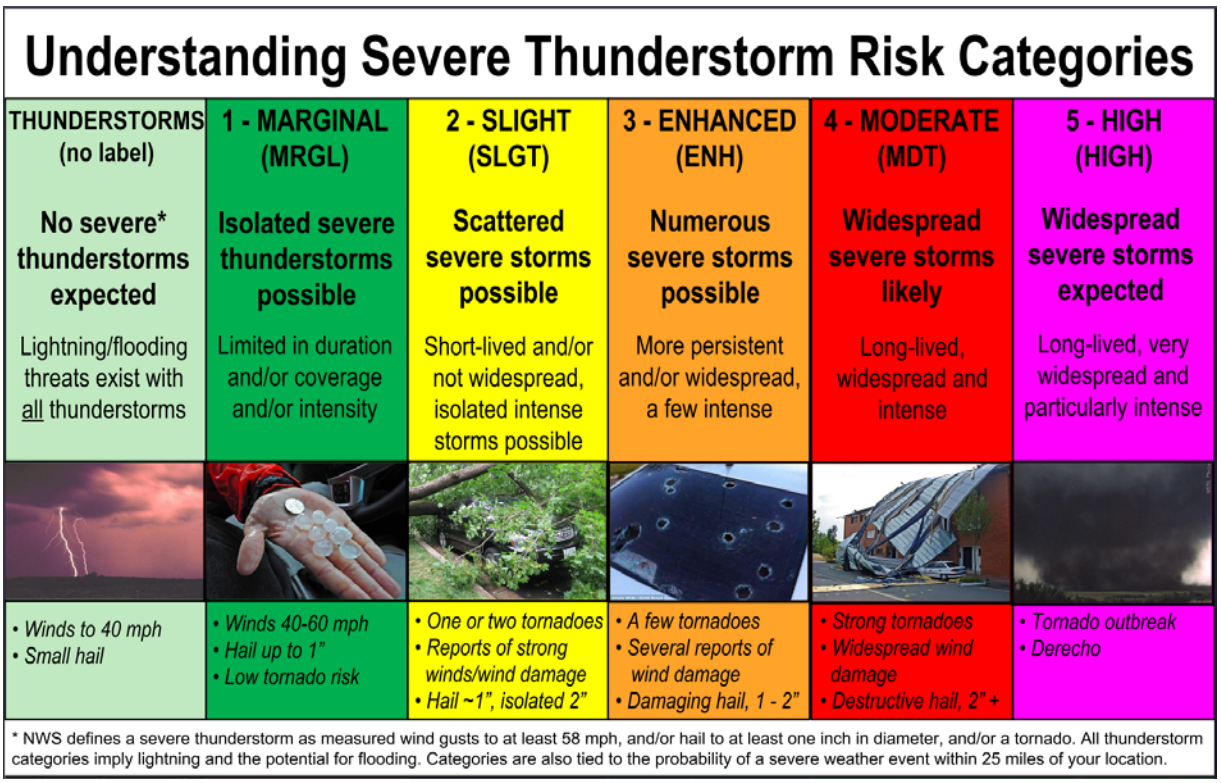
The National Weather Service uses the following Storm Prediction Center (SPC) activity levels to represent severe weather outlooks.



Tarrant County averages approximately 11 significant thunderstorm events (with hail and high winds) per year, according to National Weather Service (NWS) records. Though most new homes and buildings in participating jurisdictions are built to resist the effects of all but the strongest thunderstorms, a number of mobile and manufactured home parks and vehicles remain vulnerable. Thousands of homes and vehicles can be damaged in a single storm, causing millions of dollars in damages.[12]

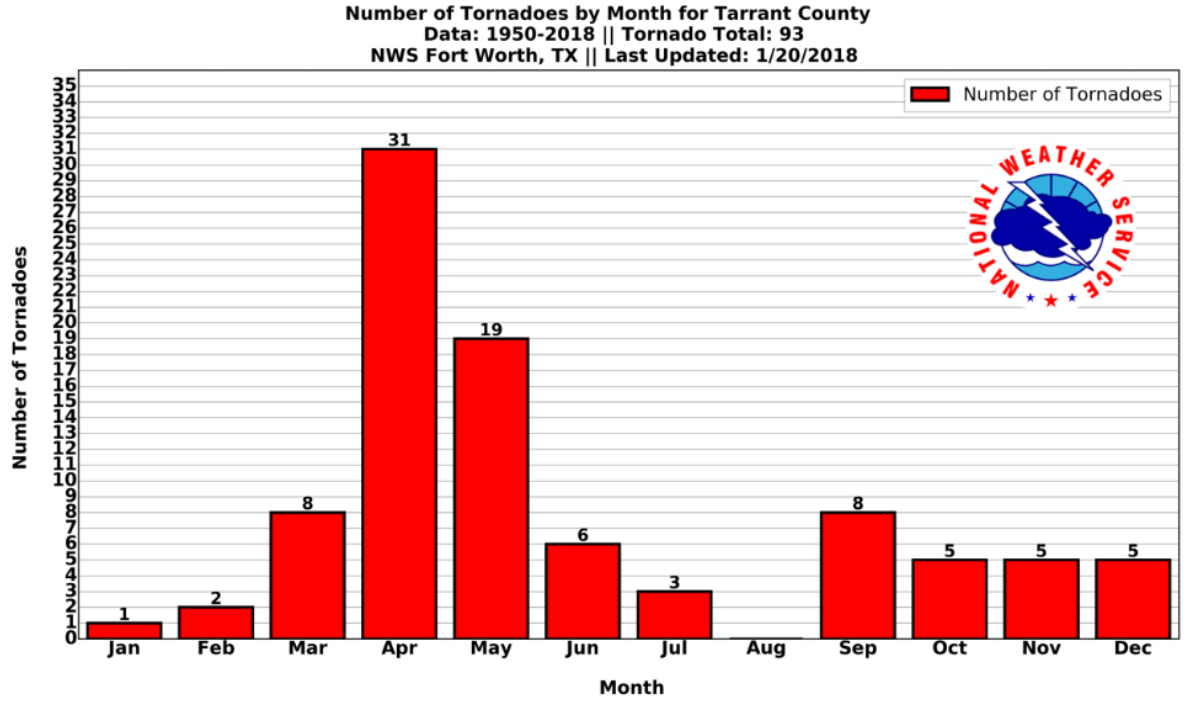
[12] State of Texas Mitigation Plan. 2013, page 72.

3.3.7 Tornadoes

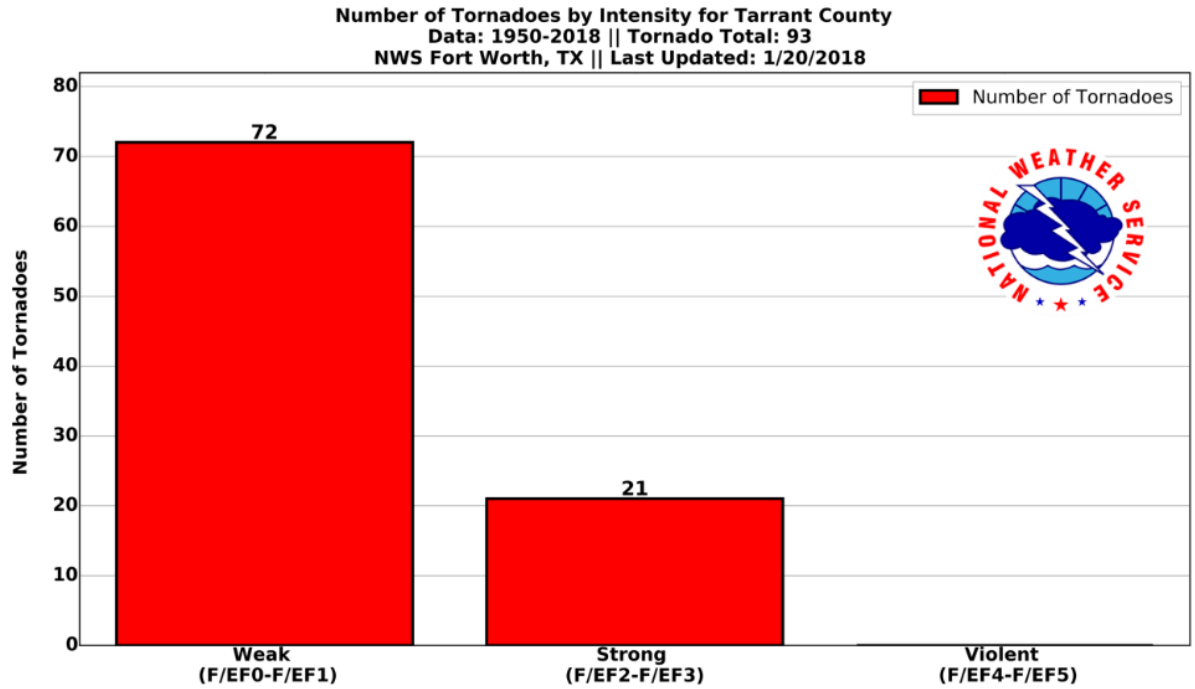
A tornado is a violently rotating column of air that comes in contact with the ground. A tornado can either be suspended from, or occur underneath, a cumuliform cloud. It is often, but not always, visible as a condensation funnel.

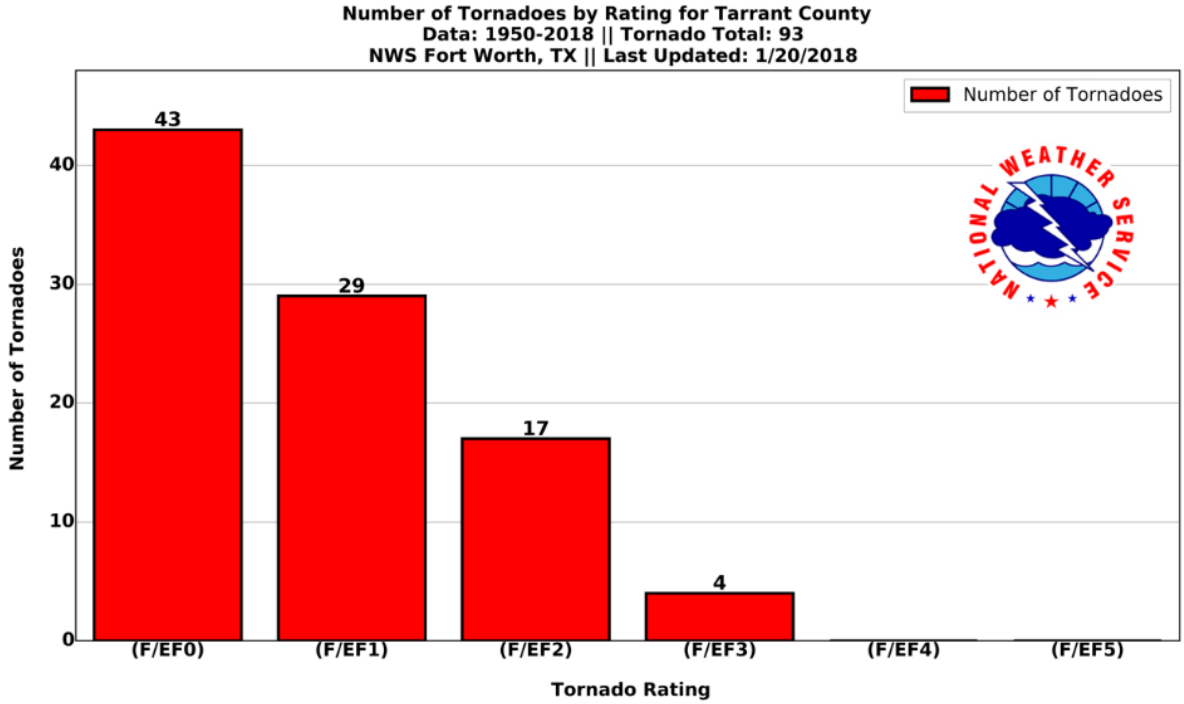
The Enhanced Fujita Scale, or EF Scale, is the scale for rating the strength of tornadoes during the observed time period via the damage they cause. Six categories from EF0 to EF5 represent increasing degrees of damage. The scale takes into account how most structures are designed and is thought to be an accurate representation of the surface wind speeds in the most violent tornadoes.

Enhanced Fujita Scale		
Enhanced Fujita Category	**Wind Speed in Miles Per Hour (MPH)**	**Potential Damage**
EF0	**65-85**	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	**86-110**	Moderate damage. Roofs severely stripped; manufactured homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	**111-135**	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; manufactured homes completely destroyed; large trees snapped or uprooted; light object become projectiles; cars lifted off ground.
EF3	**136-165**	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	**166-200**	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small projectiles generated.
EF5	**>200**	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized projectiles fly through the air in excess of 300 feet.

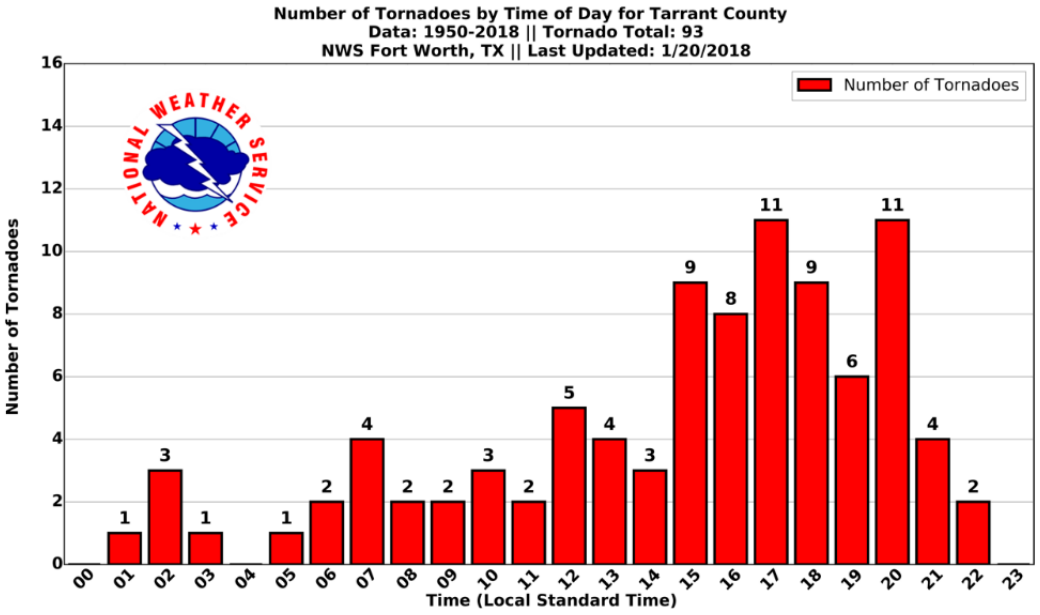


The highest likelihood of tornadoes can be expected in the spring season, from March-May. The previous chart shows 58 tornadoes during the spring season over the 1950-2018 time period.

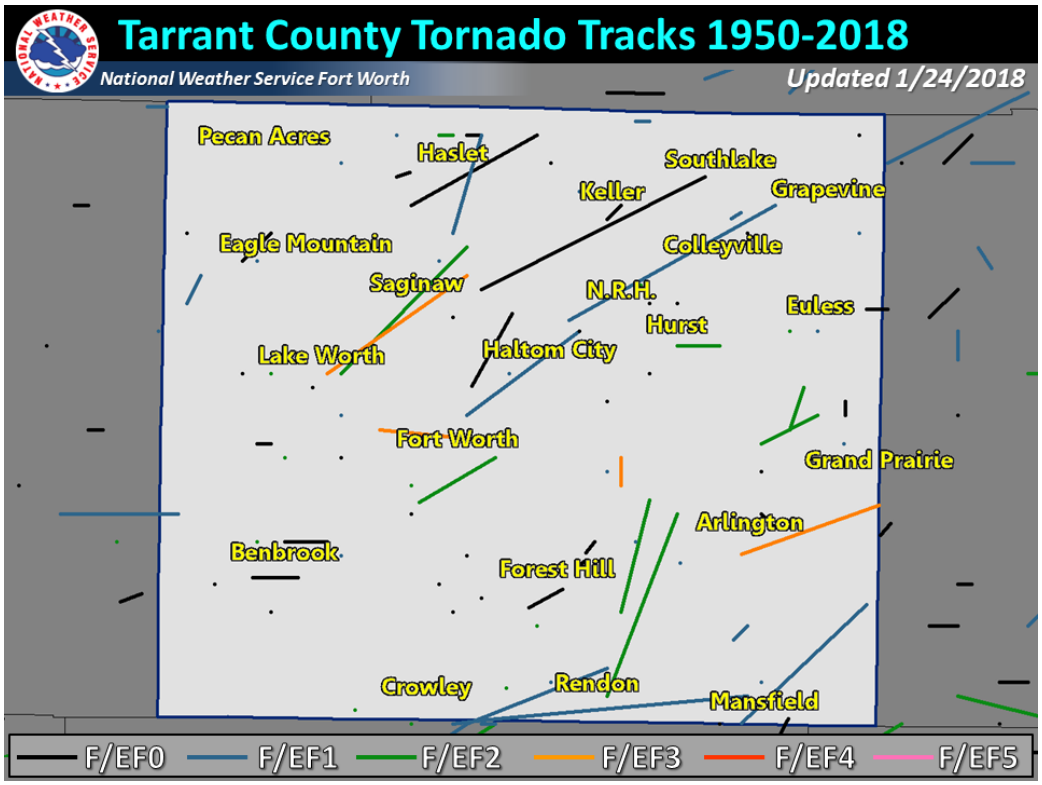




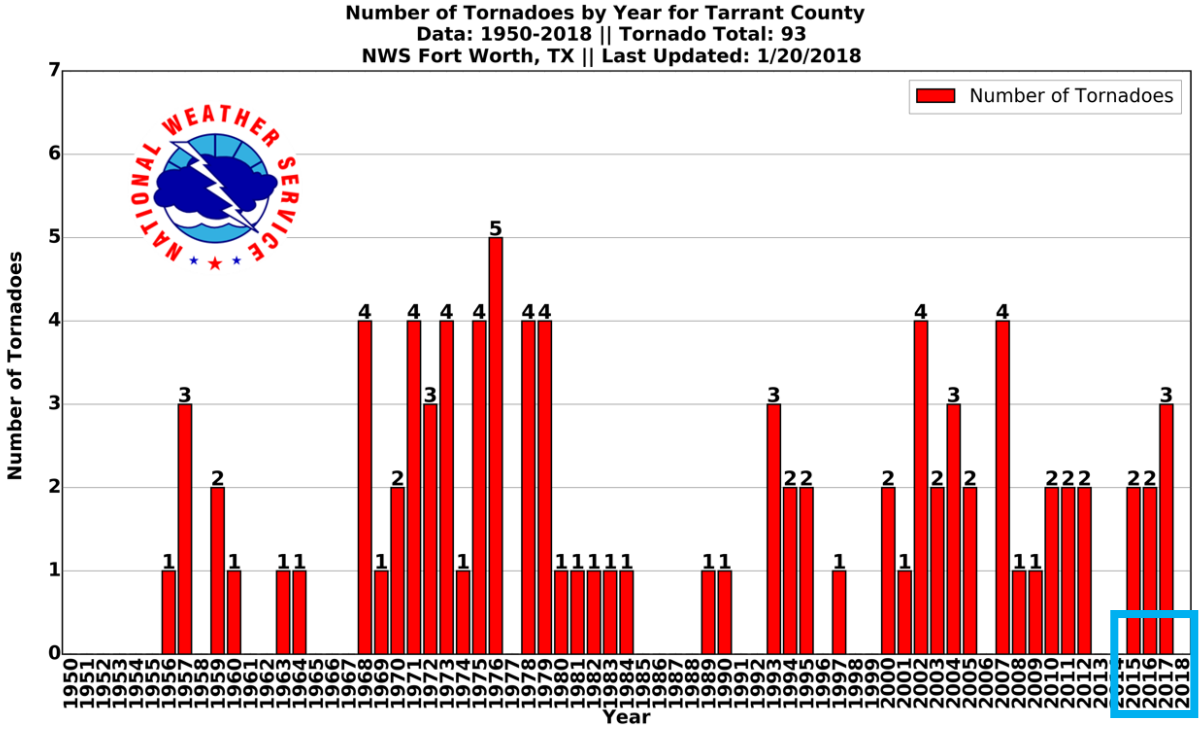
According to the charts above, most of the tornadoes in Tarrant County are classified as weak on the intensity scale and are rated as an EF0, but could escalate to an EF3 or potentially stronger.



Most tornadoes occur in the afternoon to evening hours of the day, the chart above reflects a high amount of tornado occurences between the hours of 1200-2000 (12PM-8PM).



The picture above illustrates tornado tracks between 1950-2018. The strongest tornadoes in Tarrant County have been an EF3.



Between 2015 and 2018, there have been 7 recorded tornadoes in Tarrant County, according to the chart above. According to the National Climatic Data Center, there has been over $1 million dollars of property damage from tornadoes in Tarrant County, with zero crop damage reported.

Historical Events of Tornadoes since 2015

Column Definitions: 'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Location	County	Date	Time	Mag	Dth	Inj	PrD	CrD
Hodge (non-participant)	Tarrant	11/05/2015	16:08	EF0	0	0	120.00K	0.00K
Keller	Tarrant	11/17/2015	03:28	EF0	0	0	210.00K	0.00K
Benbrook Lake (non-participant)	Tarrant	03/08/2016	08:03	EF0	0	0	330.00K	0.00K
Hicks (non-participant)	Tarrant	03/23/2016	20:08	EF0	0	0	90.00K	0.00K
Mansfield	Tarrant	01/15/2017	20:13	EF0	0	0	75.00K	0.00K
Hicks (non-participant)	Tarrant	03/29/2017	01:08	EF0	0	0	300.00K	0.00K
Fort Worth Blue Mound Airport	Tarrant	03/29/2017	01:10	EF0	0	0	100.00K	0.00K
Totals:					**0**	**0**	**1.225M**	**0.00K**

Source: National Centers for Environmental Information.

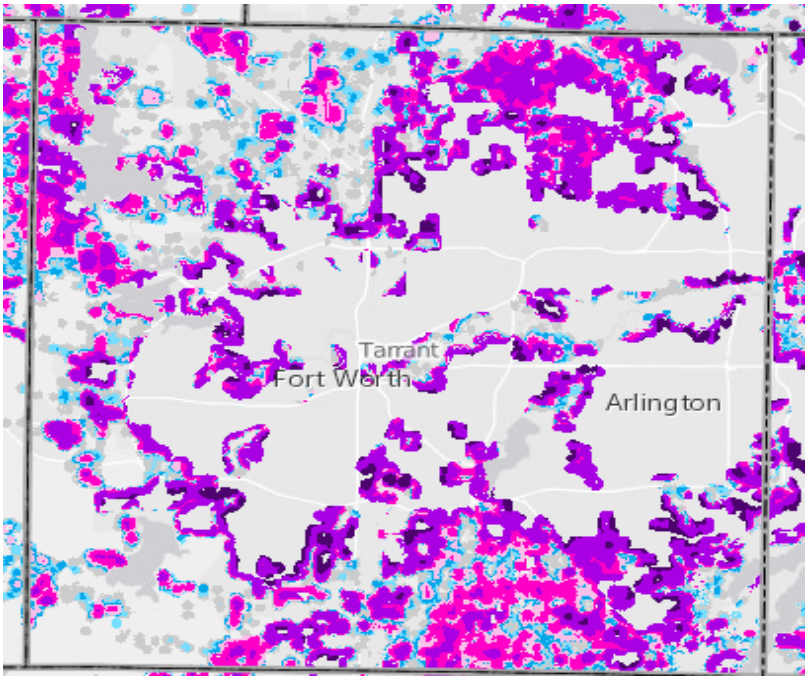
3.3.8 Wildfire

Wildfire, or wildland fire, is any fire occurring on grassland, forest, or prairie, regardless of ignition source, damages, or benefits. Wildfires are fueled almost exclusively by natural vegetation. Interface or intermix fires are urban/wildland fires in which vegetation and the built environment provide fuel. Firestorms are events of such extreme intensity that effective suppression is virtually impossible. Firestorms occur during extreme weather and generally burn until conditions change or the available fuel is exhausted.

Note: Though there have been numerous ignitions, Tarrant County does not classify wildfires as a hazard until they are 25 acres or larger. This is the point at which additional outside help may need to be called in through the use of mutual aid agreements.

For the purposes of this hazard analysis, wildfires are assessed under what is known as the wildland-urban interface (WUI). The WUI is an area of development that is susceptible to wildfires due to the amount of structures located in an area with vegetation that can act a fuel for a wildfire. The WUI creates an environment in which fire can move readily between structural and vegetation fuels. The expansion of these areas has increased the likelihood that wildfires will threaten structures and people.

Wildland Urban Interface (WUI)

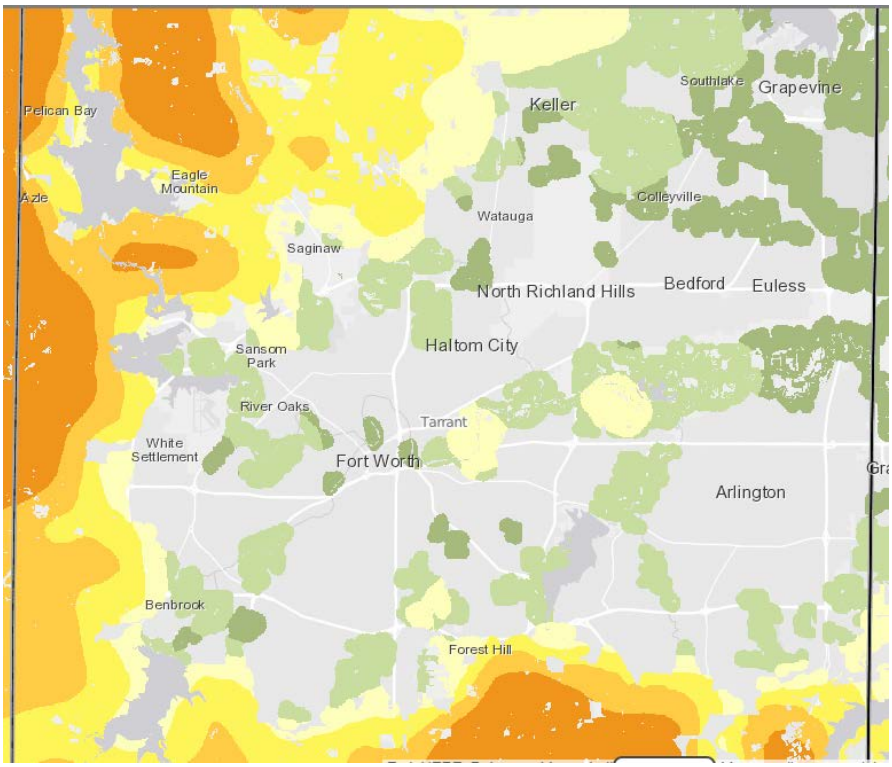


	No Data
	1-LT 1 hs/40 ac
	2-1 hs/40 to 1 hs/20 ac
	3-1 hs/20 to 1 hs/10 ac
	4-1 hs/10 to 1 hs/5 ac
	5-1 hs/5 to 1 hs/2 ac
	6-1 hs/2 to 3 hs/ac
	7-GT 3 hs/ac
*hs- house *ac- acre	

Source: Texas Wildfire Risk.

Wildfires can cause significant damage to property and threatens the lives of people who are unable to evacuate WUI areas. All improved property, critical facilities, and critical structures and infrastructure located in these wildfire-prone areas are considered vulnerable and can be exposed to this hazard. Jurisdictions that are not at risk to wildfires include Bedford, Blud Mound, Forest Hill, Lake Worth, the North Central Texas Council of Governments, Pantego, Saginaw, Watauga, and Westworth Village due to their urbanized landscape and quick fire department response time.

Wildfire Threat



	No Data
	1-Low
	2
	3-Moderate
	4
	5-High
	6
	7-Very High

Source: Texas Wildfire Risk.

There were no reports of a wildfire event in Tarrant County from February 1, 2015 to November 1, 2017, according to the National Climatic Data Center. Data from the Texas Forest Service ends at 2015.

3.3.9 Winter Storms

Winter storms originate as mid-latitude depressions or cyclonic weather systems, sometimes following the path of the jet stream. A winter storm or blizzard combines heavy snowfall, high winds, extreme cold, and ice storms. Many winter depressions give rise to exceptionally heavy rain and widespread flooding and conditions worsen if the precipitation falls in the form of snow. The winter storm season varies widely, depending on latitude, altitude, and proximity to moderating influences. The time period of most winter weather is expected to be during the winter season, between November and March. Winter storms affect the entire planning area equally.

During periods of extreme cold and freezing temperatures, water pipes can freeze and crack, and ice can build up on power lines, causing them to break under the weight or causing tree limbs to fall on the lines. These events can disrupt electric service for long periods of time.

An economic impact may occur due to increased consumption of heating fuel, which can lead to energy shortages and higher prices. Schools often close when severe winter weather is forecasted, and it becomes a logistics burden for parents who then have to miss work or find alternative child care. House fires and resulting deaths tend to occur more frequently from increased and improper use of alternate heating sources. Fires during winter storms also present a greater danger because water supplies may freeze and impede firefighting efforts.

Cold snaps in which temperatures fall below the freezing point of 32°F do happen on an annual basis in the Tarrant County and are highlighted in the table below.

Dallas/Fort Worth Freeze Data and Cold Season Temperatures								
Season	**First Occurrence Equal or Less Than:**			**Low for Winter (°F)**	**Last Occurrence Equal or Less Than:**			**Number of Freezes**
	32°F	**20°F**	**10°F**		**10°F**	**20°F**	**32°F**	
2017-2018	December 07	January 01	-	13	-	January 18	February 12	25
2016-2017	December 08	December 18	-	14	-	January 08	January 08	11
2015-2016	November 22	-	-	27	-	-	February 26	17
2014-2015	November 12	January 08	-	16	-	January 08	March 07	40

Source: National Weather Service- Dallas/Fort Worth- Freeze Data and Cold Season Temperatures.

The following article highlights the severe impacts of winter weather in North Central Texas and Tarrant County. Though this article is from the 2013 storm, it describes what Tarrant County could experience again.

National Weather Service: North Texas Snowfall Events

December 5-6, 2013

A winter storm affected much of North and Central Texas for an extended period from December 5th through the 10th. A combination of freezing rain, sleet, and a little snow began falling during the day on the 5th and continued through the morning hours of the 6th. As the ice and sleet settled on the 6th, a thick layer of ice paralyzed most of the area north of a line from Goldthwaite to Cleburne to Ennis to Sulphur Springs. In this area, accumulations of sleet and ice measured up to 5" with the highest amounts from Denton to Sherman to Bonham.

Temperatures remained below freezing until the 9th and 10th resulting in a prolonged winter event. Most residents were forced to remain at home for several days. A new term, coined "cobblestone ice," was used to describe the condition of the ice on the interstates and highways due to the compaction of ice and sleet.

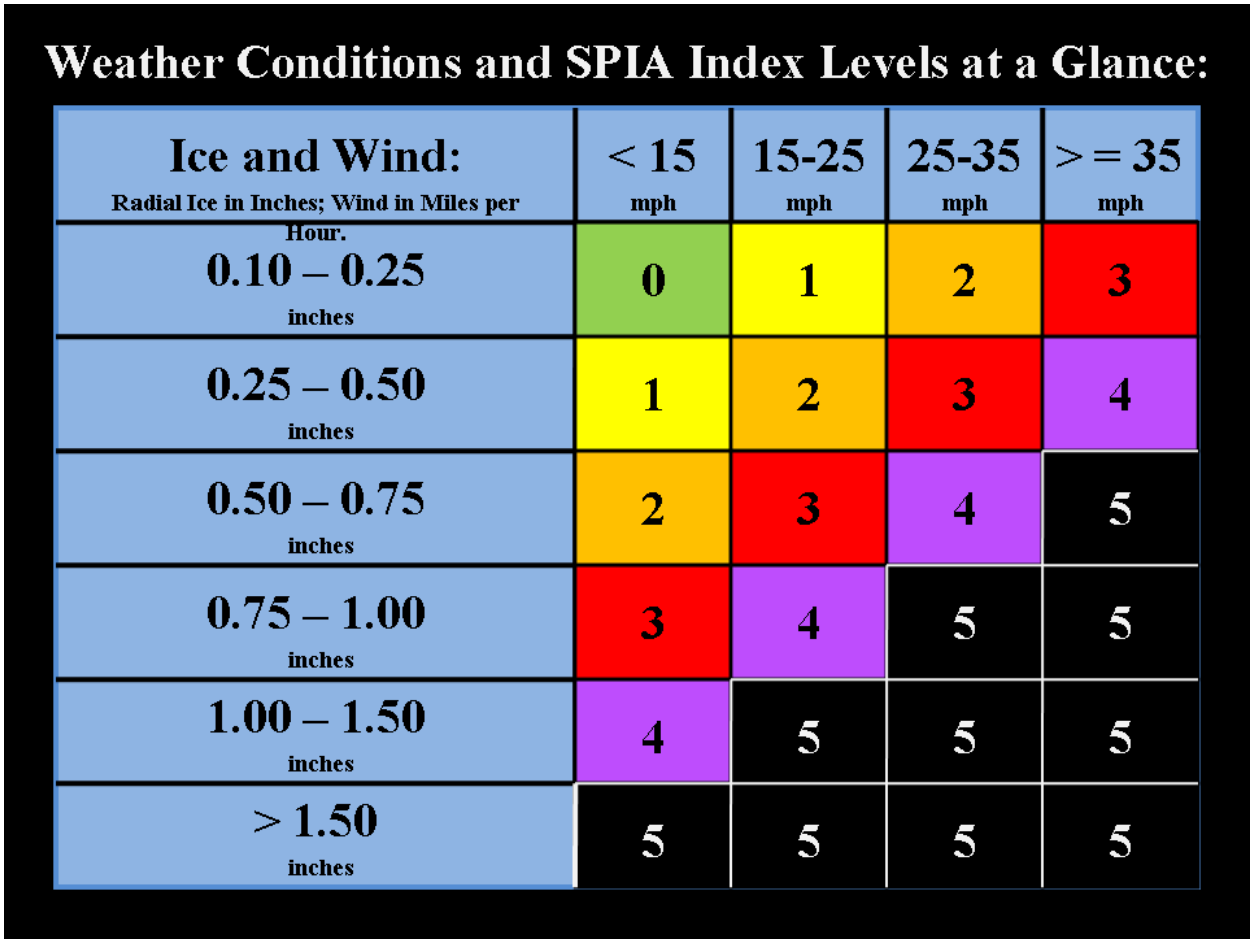
NBC 5 News captured "cobblestone ice" on North Texas roads.

South of this area, lighter amounts of icing occurred producing mainly icy bridges, overpasses, and elevated surfaces. As a result of the ice storm, significant tree damage occurred with thousands of tree branches falling under the weight of the ice. Power lines were also brought down, and at the peak of the storm, 275,000 customers were without power in the North Texas region. Most schools, especially in the hardest hit areas, were closed for several days. Some businesses were forced to close for a day or two also. Hundreds of injuries were reported due to falls on the ice but exact numbers were not available. Seven fatalities occurred during this event; 4 in vehicles, 2 from exposure, and 1 from a fall on the ice. Early estimates from the insurance council estimated $30 million in residential insured loses. The estimate did not include damage to vehicles or roads. Many roads and bridges were damaged from the ice and/or from attempts by Texas Department of Transportation to remove the ice using plows and graders. Hundreds of people and semi-trucks were stranded for long periods on many of the main highways and interstates including I-35 from Fort Worth to the Oklahoma border and Interstate 20 from Fort Worth going west in Tarrant County. The clean-up from this event took weeks and even a few months is some places.[13]

[13] North Texas Snowfall Events 2013-1879, National Weather Service.
<https://www.weather.gov/fwd/snowevents>

Though there has not been a major winter event recorded since this 2013 example, a severe winter storm happening in the next five years cannot be ruled out, as weather patterns have been evolving along with the change in climate, mentioned earlier.

The following scale was used to determine the extent of winter conditions:



Historical Events of Winter Weather since 2015

Column Definitions: 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Location	Date	Time	Type	Dth	Inj	PrD	CrD
Tarrant (Zone)	02/28/2015	21:30	Winter Weather	0	0	15.00K	0.00K
Tarrant (Zone)	03/04/2015	20:26	Winter Weather	0	0	0.00K	0.00K
Tarrant (Zone)	03/05/2015	00:30	Winter Weather	0	0	0.00K	0.00K
Totals:				**0**	**0**	**15.00K**	**0.00K**

Source: National Centers for Environmental Information.

Historical Events of Winter Storm since 2015

Column Definitions: 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Location	Date	Time	Type	Dth	Inj	PrD	CrD
Tarrant (Zone)	02/22/2015	18:30	Winter Storm	0	0	25.00K	0.00K
Totals:				**0**	**0**	**25.00K**	**0.00K**

Source: National Centers for Environmental Information.

Historical Events of Sleet since 2015

Column Definitions: 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Location	Date	Time	Type	Dth	Inj	PrD	CrD
Tarrant (Zone)	03/04/2015	19:00	Sleet	0	0	0.00K	0.00K
Tarrant (Zone)	03/04/2015	20:00	Sleet	0	0	10.00K	0.00K
Totals:				**0**	**0**	**10.00K**	**0.00K**

Source: National Centers for Environmental Information.

In total, property damage from the various hazards within a winter storm totals $50,000 since 2015.

3.4 Technological Hazards

Some participating jurisdictions have chosen to analyze technological hazards that impact them. Technological hazards are an increasing source of risk to people and their environment. This is an effect of the globalization of production, an increase of industrialization and a certain level of risk related to accidents connected with production, processes, transportation, and waste management. These risks are associated with the release of substances in accident conditions or with the production of such substances under certain conditions as fire. These substances could affect human health or the environment by contamination and their effects on animals and plants.[14] Examples of technological hazards include hazardous material events, infectious disease outbreaks, national security hazards, nuclear accidents, power failure, and telecommunication failure.

The jurisdictions that chose to profile technological hazards identified and described technological hazards within their individual annex.

[14] Technological Hazard. American Red Cross. 2017. <https://www.preparecenter.org/topics/technological-hazard>

3.5 Vulnerabilities

Vulnerabilities can be social, environmental, economic, or political in nature. These vulnerabilities in turn have various impacts. We know that, by definition, disasters are capable of causing death and injury. We also know that housing and schools may be destroyed. These particular losses may be considered to be social impacts, as they affect the ability of individuals and families to function. With regard to negative environmental impacts, if a community contains important ecological sites (e.g., the site of a unique flora or fauna habitat), then these areas may be extremely vulnerable to almost any sort of disaster. There is monetary loss, or negative economic impact, whenever buildings, non-structural property, or infrastructure is damaged or destroyed. These losses can also result in loss of jobs, loss of economic stability, and loss of services (e.g., power). The more vulnerable the community is to these types of losses, the greater the economic vulnerability to a disaster. The ability of the community to influence policy makers to reduce vulnerabilities is critical. A disaster entails political impacts. After a disaster has struck, a community often turns to its politicians when looking for guidance. Vulnerabilities may be considered in terms of the individual, the location, the capacity to respond, and the time of day, week, or year.

The definition of vulnerability is "the susceptibility of people, property, industry, resources, ecosystems, or historic buildings and artifacts to the negative impact of a disaster." The Tarrant County Hazard Mitigation Planning Team (HMPT) conducted a risk assessment to determine vulnerabilities in their jurisdictions. Vulnerabilities within each participating jurisdiction are specified in the individual annexes.

Below is an overview of vulnerabilities within Tarrant County, including national critical facilities, federally protected species, historic properties, and local critical facilities and infrastructure.

3.5.1 National Critical Facilities and Infrastructure

A critical facilities and infrastructure provides services and functions essential to a community, especially during and after a disaster. For a critical facility to function, building systems and equipment must remain operational. Furthermore, it must be supplied with essential utilities (typically power, water, waste disposal, and communications, but occasionally natural gas and steam).

According to the Department of Homeland Security, there are 16 critical infrastructure sectors whose assets, systems, and networks, whether physical or virtual, are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof.

- Chemical Sector
- Commercial Facilities Sector
- Communication Sector
- Critical Manufacturing Sector
- Dams Sector
- Defense Industrial Base Sector
- Emergency Services Sector
- Energy Sector
- Financial Services Sector
- Food and Agriculture Sector
- Government Facilities Sector
- Healthcare and Public Health Sector
- Information Technology Sector
- Nuclear Reactors, Materials, and Waste Sector
- Transportation Sector
- Water and Wastewater Systems Sector

Critical facilities and infrastructure on a national scale impact the participating jurisdictions in Tarrant County and the entire United States. While many of these facilities and infrastructure are documented in the regional Threat and Hazard Identification and Risk Assessment (THIRA), the following sites are unique national critical facilities located in a few of the participating jurisdictions.

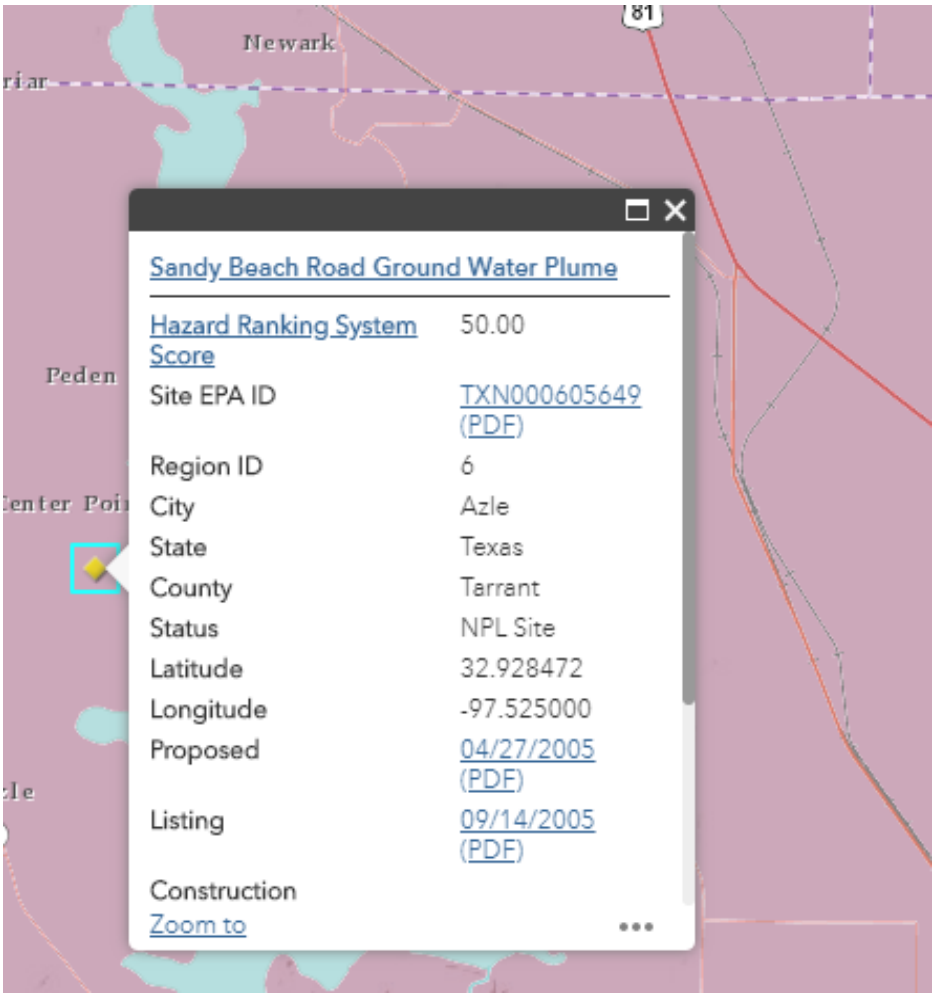
EPA National Priorities List of Superfund Sites

The Environmental Protection Agency's (EPA's) Superfund program is responsible for cleaning up some of the nation's most contaminated land and responding to environmental emergencies, oil spills, and natural disasters. To protect public health and the environment, the Superfund program focuses on making a visible and lasting difference in communities, ensuring that people can live and work in healthy, vibrant places. The EPA National Priorities List (NPL) is the list of sites of national priority among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation.[15] According to the list, there are two superfund sites in Tarrant County. They are identified by yellow diamonds in the map below:

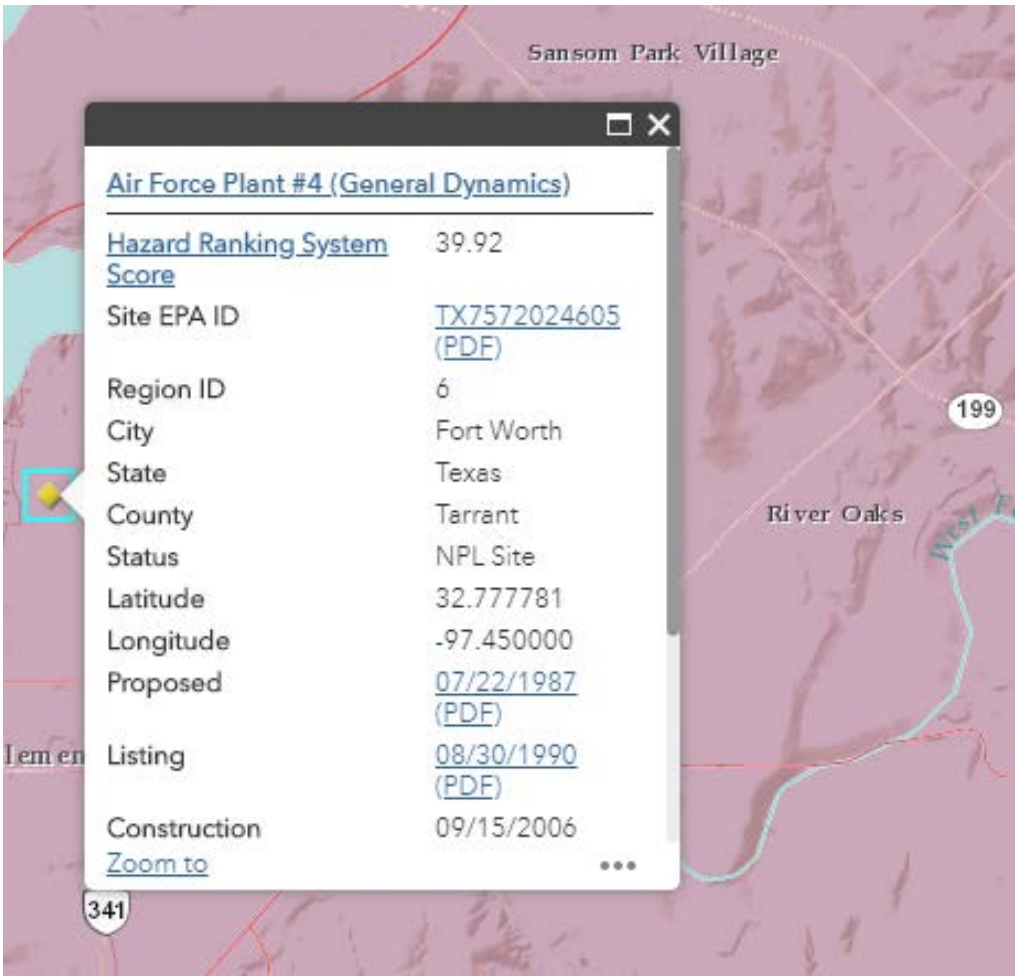
The following pictures reflect the details of the two superfund sites in Tarrant County.

[15] Superfund: National Priority List (NPL). United States Environmental Protection Agency. <https://www.epa.gov/superfund/superfund-national-priorities-list-npl>

1. Sandy Beach Road Ground Water Plume, Azle, Texas



2. Air Force Plant #4 (General Dynamics), Fort Worth, Texas



3.5.2 Natural Environment- Federally Protected Species

Texas Parks & Wildlife established a list of federally and state protected species within Tarrant County. All species on the county list are tracked in the Texas Natural Diversity Database (TXNDD). Species include birds, fishes, mammals, mollusks, and reptiles.[16] This list is provided in Appendix B.

Currently, there are no regional plans related to the future of North Texas' natural assets of habitat, plants, animals, open space areas and corridors, tree canopy or carbon footprint. This includes Tarrant County. There are studies of particular topics that have been conducted for other purposes. For example, the Environmental Impact Statement of an individual project considers the project's impact on endangered species. Also, there are studies underway on particular topics but for smaller areas within the North Texas region.[17]

Under Section 12.0011 of the Texas Parks and Wildlife Code, Texas Parks and Wildlife Department (TPWD) is charged with "providing recommendations that will protect fish and wildlife resources to local, state, and federal agencies that approve, permit, license, or construct developmental projects" and "providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources." Project types reviewed by TPWD include reservoirs, highway projects, pipelines, urban infrastructure, utility construction, renewable energy, and residential and commercial construction, as well as many others.

3.5.3 Historic Buildings and Districts

Historic landmarks and districts are important to consider when evaluating vulnerabilities to hazards. What is historic, and worth saving, varies with the beholder. "Historic" applies to a building that's part of a community's tangible past. Creating and expanding historic districts can increase property values, strengthen neighborhoods, provide an incentive for rehabilitating historic buildings, and promote a sense of neighborhood and community pride.

According to the Texas Historic Sites Atlas, Tarrant County has 124 cemeteries, 32 museums, and 392 historical markers listed in the atlas. There are also 6 state antiquities landmarks, 115 national register properties, and 6 courthouses on the list.[18]

There is a list of historic sites in Tarrant County from the National Register of Historic Places located in Appendix B.

3.5.4 Local Critical Facilities and Infrastructure

This hazard mitigation action plan (HazMAP) provides enough information regarding critical facilities to enable the jurisdiction to identify and prioritize appropriate mitigation actions. However, some information may be deemed highly sensitive and should not be made available to the public. Information jurisdictions consider sensitive should be treated as an addendum to the mitigation plan so that it is still a part of the plan, but access can be controlled.

[16] Texas Parks and Wildlife Department, Wildlife Division, Diversity and Habitat Assessment Programs. TPWD County Lists of Protected Species and Species of Greatest Conservation Need. Tarrant County 30 December 2016.
[17] North Texas to 2030: Extending the Trends. Vision North Texas.
[18] Texas Historical Sites Atlas. 2015. Texas Historical Commission. <https://atlas.thc.state.tx.us/>

Jurisdictional annexes provide this information and/or instructions regarding how this information can be obtained.

3.6 Extent

The scale used to determine the maximum probably extent of each hazard is described below. The extent for each natural hazard, defined as the maximum strength of the hazard, in the jurisdictions is documented within the individual annexes.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

Section 4: Mitigation Strategy

Requirement	
§201.6(c)(3)	[The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(iii)	[The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA [Federal Emergency Management Agency] after October 1, 2008, must also address the jurisdiction's participation in the NFIP [National Flood Insurance Program], and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iv)	[The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(4)(ii)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
	[The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.

4.1 Mitigation Strategy

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs hazard mitigation plans to describe hazard mitigation actions and establish a strategy to implement those actions. Therefore, all other requirements for a hazard mitigation plan lead to and support the mitigation strategy.

Individual jurisdictions adopted specific goals and strategies based on the needs of the jurisdiction. The following mitigation action items have been ranked by the Tarrant County Hazard Mitigation Planning Team (HMPT). The HMPT went through a ranking process to determine which strategies they would prioritize for completion. To identify priorities, jurisdictions considered the scope and impact of action and completed a cost-benefit analysis for each action. Each participating jurisdiction recommended strategies that would benefit either the jurisdiction or the county as a whole.

All project cost estimations are based on agency expertise by those submitting mitigation actions as well as previous project costs; however, many projects provided have not yet undergone the official benefit-cost analysis provided by FEMA. In these cases, jurisdictions derived the benefit cost per project based on a study conducted by the National Institute of Building Science. This study estimates that past 23 years of federally funded natural hazard mitigation has prevented approximately one million nonfatal injuries, 600 deaths, and 4,000 cases of post-traumatic stress disorder (PTSD), a total cost savings of $68 billion. The key findings of the report included that $1 spent on mitigation saves society an average of $6, with positive benefit-cost ratios for all hazard types studied.[19] Therefore, to reflect the benefits of future projects, each estimated project was multiplied by 6 to represent the benefit of each mitigation strategy. Utilizing this information, in addition to their jurisdiction's priorities, jurisdictions ranked their mitigation strategies and submitted them to the HMPT.

4.2 Funding Priorities

As necessary, Tarrant County and participating jurisdictions will seek outside funding sources to implement mitigation projects in both the pre-disaster and post-disaster environments. When applicable, potential funding sources have been identified for proposed actions listed in the mitigation strategies.

Funding priority will go toward action items with the high positive impact on community resilience as measured by the action's scope and cost-benefit analysis.

4.3 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team reviewed the previous Tarrant County mitigation goals and unanimously agreed to forego these goals and adopt the following hazard mitigation goals:

"Our goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation."

[19] Multihazard Mitigation Council (2017) Natural Hazard Mitigation Saves 2017 Interim Report: An Independent Study. Principal Investigator Porter, K.; Co-Principal Investigators Scawthorn, C.; Dash, N.; Santos, J.; Investigators: Eguchi, M., Ghosh., S., Huyck, C., Isteita, M., Mickey, K., Rashed, T.;P. Schneider, Director, MMC. National Institute of Building Sciences, Washington.

4.4 Action Items

A list of action items was identified by each jurisdictional Local Planning Team (LPT) and is located in the jurisdiction's annex. Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Previous action items are also recorded in these annexes.

Section 5: Jurisdictional Annexes

Section 5 contains the individual jurisdictional annexes. The annexes were developed by each individual jurisdiction in order to provide a greater level of detail specific to the jurisdiction. Each annex contains five chapters.

1. **Chapter 1** provides a brief introduction to the jurisdiction and contents of the annex.
2. **Chapter 2** covers the planning process and those involved. Elements included in this chapter are the plan development and adoption process and the organization of the planning effort, including Local Planning Team (LPT) members. This fulfills requirements §201.6(c)(1)), §201.6(b)(2)), §201.6(b)(1)), §201.6(b)(3)), §201.6(c)(4)(iii)), and §201.6(c)(4)(i).
3. **Chapter 3** provides the hazard identification and risk assessment. The assessment includes: the geographic area effected; future probability of occurrence; maximum probable extent; and vulnerability narratives, which identifies points of vulnerability in each jurisdiction for each hazard. Additionally, chapter three includes the National Flood Insurance Program (NFIP) compliance information. This fulfills requirements §201.6(c)(2)(i)), §201.6(c)(2)(ii)), §201.6(c)(2)(ii)(A)), §201.6(c)(2)(ii)(B)), §201.6(c)(2)(ii)(C)), and §201.6(c)(2)(iii).
4. **Chapter 4** provides a summary of jurisdictional capabilities. Elements in this chapter include: legal and regulatory capabilities; administrative and technical capabilities; fiscal capabilities; and implementation capabilities, which fulfill requirement §201.6(c)(3).
5. **Chapter 5** provides the jurisdictional mitigation strategies and action items. The elements included are mitigation goals and the action items associated with those goals, which fulfill requirements §201.6(c)(3)(ii)), §201.6(c)(3)(i)), §201.6(c)(3)(iv)), and §201.6(c)(3)(iii).

Jurisdictional annexes start on the following pages:

A-1 City of Arlington
B-1 City of Azle
C-1 City of Bedford
D-1 City of Blue Mound
E-1 City of Colleyville
F-1 City of Crowley
G-1 City of Dalworthington Gardens*
H-1 Town of Edgecliff Village*
I-1 City of Euless
J-1 City of Everman
K-1 City of Forest Hill
L-1 City of Fort Worth
M-1 City of Grapevine
N-1 City of Haltom City
O-1 City of Haslet
P-1 City of Hurst
Q-1 City of Keller
R-1 City of Kennedale
S-1 City of Lake Worth
T-1 Town of Lakeside
U-1 City of Mansfield*
V-1 North Central Texas Council of Governments
W-1 City of North Richland Hills
X-1 Town of Pantego*
Y-1 City of Richland Hills
Z-1 City of River Oaks*
AA-1 City of Saginaw
BB-1 City of Southlake
CC-1 Unincorporated Tarrant County
DD-1 University of North Texas Health and Science Center*
EE-1 City of Watauga
FF-1 Town of Westlake
GG-1 City of Westworth Village

**Jurisdictions that did not participate in the 2015 Tarrant County HazMAP.*

City of Arlington

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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1.2 Annex Organization ..... - A-5 -
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption ..... - A-5 -
1.4 Supporting Maps ..... - A-5 -
Chapter 2: Planning Process ..... - A-9 -
2.1 Development and Adoption Process ..... - A-9 -
2.2 Organizing the Planning Effort ..... - A-9 -
Chapter 3: Hazard Identification and Risk Assessment ..... - A-11 -
3.1 Changes in Development since 2015 ..... - A-11 -
3.2 Community Profile ..... - A-12 -
3.3 Hazard Profiles ..... - A-14 -
3.4 Historical Events ..... - A-37 -
3.5 Man-made Hazards Profiles ..... - A-38 -
3.6 Overall Vulnerability ..... - A-44 -
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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Arlington was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Arlington alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

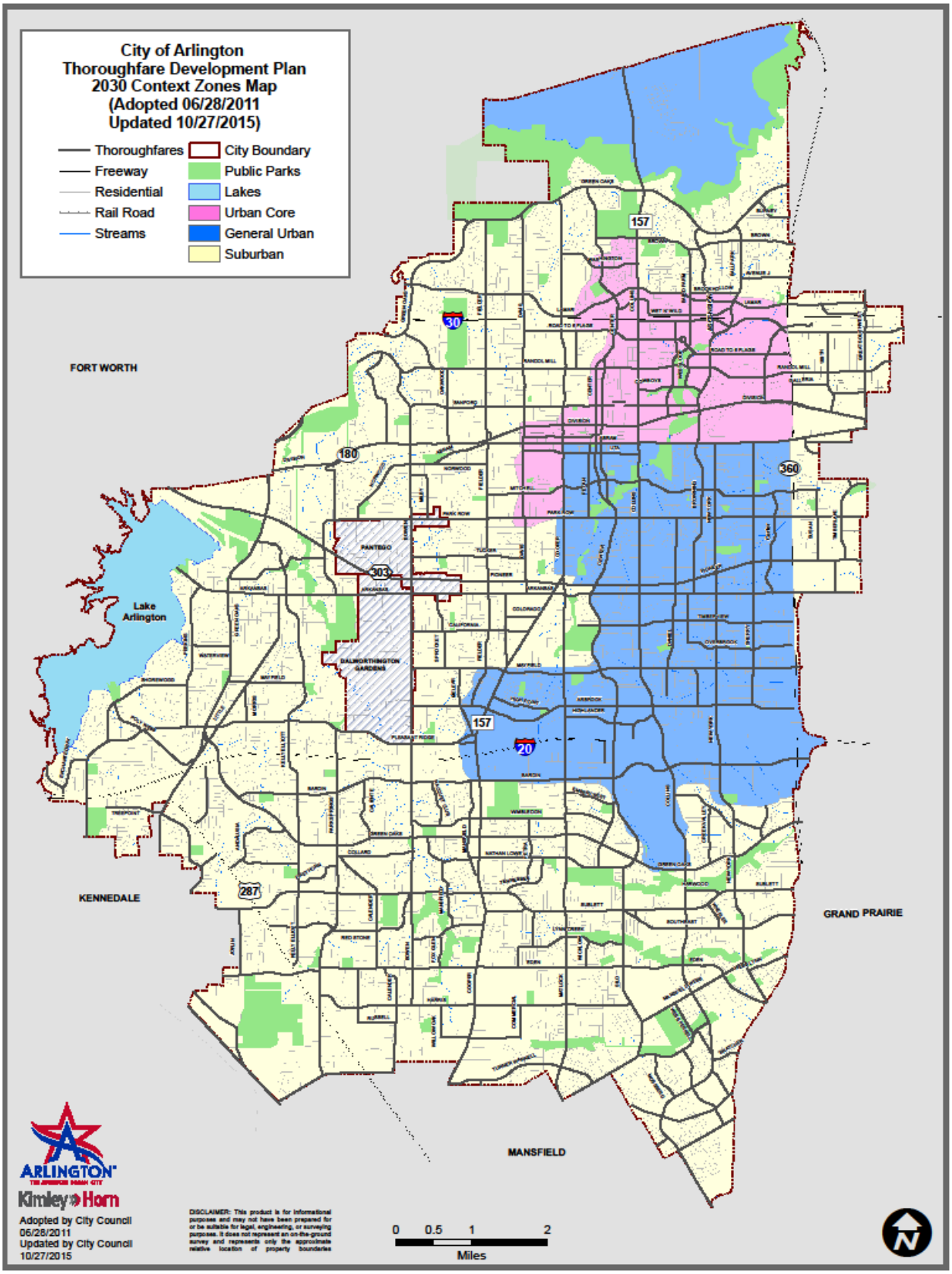
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

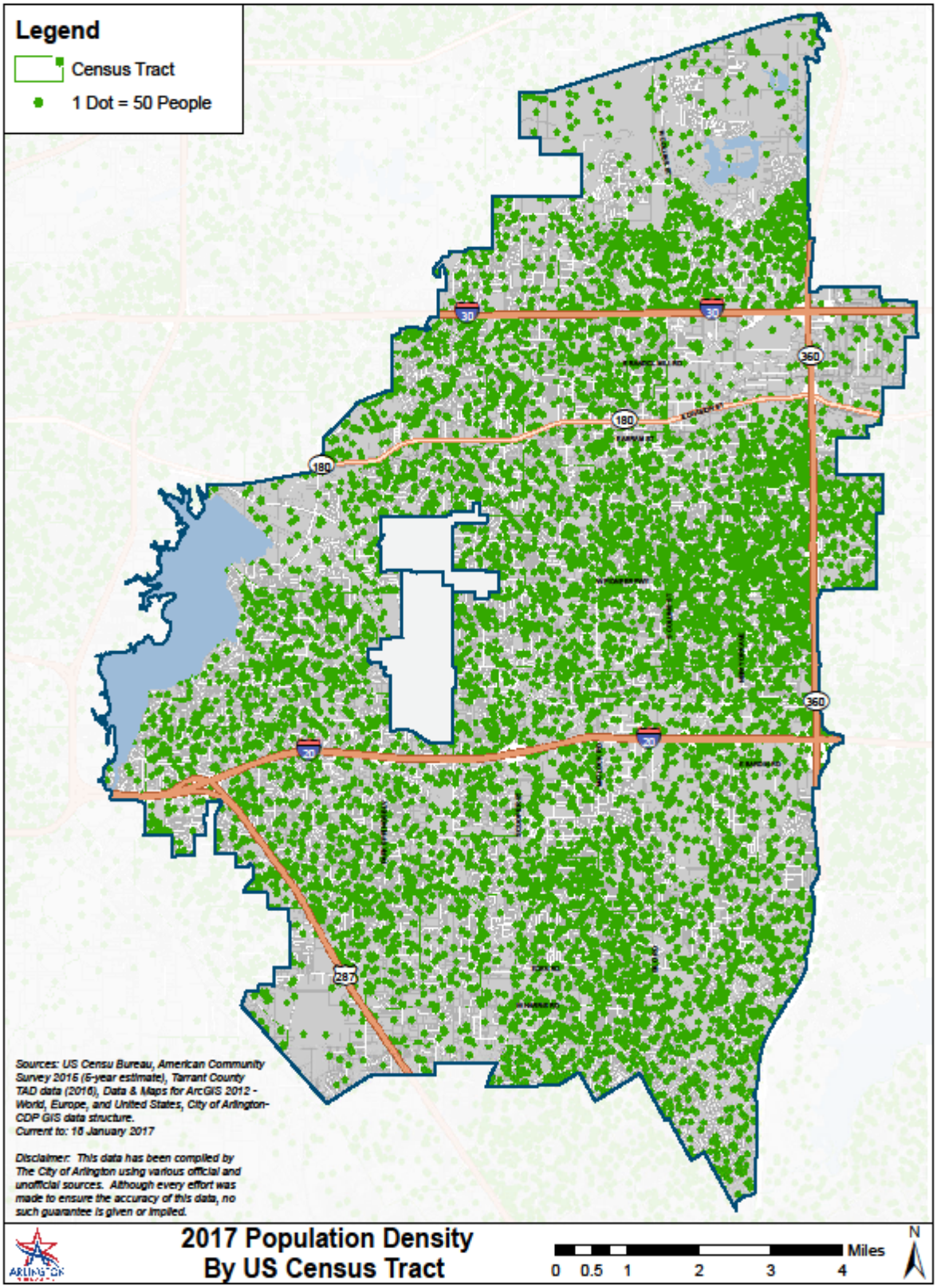
Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Arlington will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

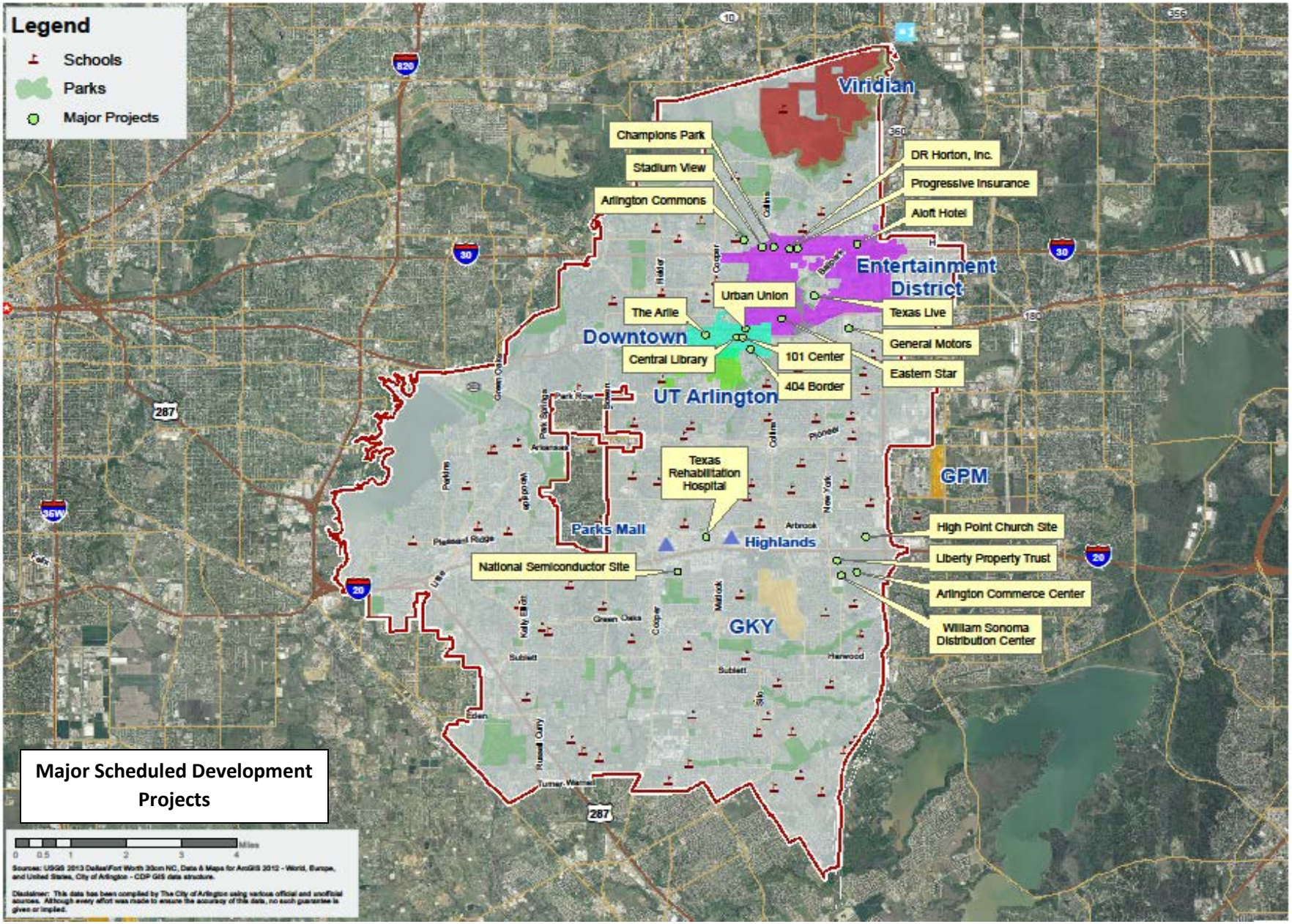
1.4 Supporting Maps

The following maps provide an overview of the City of Arlington:

- Thoroughfare Development Plan 2030 Context Zones Map
- Population Density Map
- Major Projects Map


City of Arlington
Thoroughfare Development Plan
2030 Context Zones Map
(Adopted 06/28/2011
Updated 10/27/2015)
Thoroughfares
Freeway
Residential
Rail Road
Streams
City Boundary
Public Parks
Lakes
Urban Core
General Urban
Suburban
FORT WORTH
Lake Arlington
KENNEDALE
MANSFIELD
GRAND PRAIRIE
ARLINGTON
Kimley»Horn
Adopted by City Council
06/28/2011
Updated by City Council
10/27/2015
DISCLAIMER: This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries
0 0.5 1 2
Miles


Legend
Census Tract
1 Dot = 50 People
30
360
180
287
Sources: US Censu Bureau, American Community Survey 2015 (5-year estimate), Tarrant County TAD data (2016), Data & Maps for ArcGIS 2012 - World, Europe, and United States, City of Arlington-CDP GIS data structure.
Current to: 16 January 2017
Disclaimer: This data has been compiled by The City of Arlington using various official and unofficial sources. Although every effort was made to ensure the accuracy of this data, no such guarantee is given or implied.
2017 Population Density
By US Census Tract
0 0.5 1 2 3 4
Miles
N


Legend
Schools
Parks
Major Projects
Viridian
Champions Park
Stadium View
Arlington Commons
DR Horton, Inc.
Progressive Insurance
Aloft Hotel
Entertainment District
Urban Union
Texas Live
The Arlie
Downtown
General Motors
Central Library
101 Center
Eastern Star
404 Border
UT Arlington
Texas Rehabilitation Hospital
GPM
Parks Mall
Highlands
High Point Church Site
Liberty Property Trust
National Semiconductor Site
Arlington Commerce Center
William Sonoma Distribution Center
GKY
Major Scheduled Development Projects

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Arlington has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Arlington's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Arlington. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Arlington Local Planning Team (LPT) Members for the HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Arlington	Fire / Office of Emergency Management	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Arlington	Public Works and Transportation Department	Director	Hazard identification and plan development
City of Arlington	Community Development and Planning Department	Director	Hazard identification and plan development
City of Arlington	Water Utilities Department	Director	Hazard identification and plan development
City of Arlington	Police Department	Chief	Hazard identification and plan development
City of Arlington	Environmental Services Department	Director	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There is new development across the city as more residents, students, employers, and entertainment move to the city. Although none of these developments are in particularly hazard-prone areas, they are susceptible to identified city wide hazards such as tornadoes/severe weather.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: A full list of completed mitigation action items are described in Chapter 5 of this annex. The City of Arlington adopted a strategy that would either prevent development in flood zones or require adequate mitigation activities on the part of the developer. The overall intent was to improve the city's Community Rating and, therefore, reduce National Flood Insurance Program (NFIP) premiums. The strategy has resulted in continuous improvement in Arlington's NFIP rating.

Declared Disaster Code	Incident Period	Date Declared	Description	Impact
DR-4223	May 4-June 23, 2015	May 29, 2015	Severe storms, tornadoes, straight-line winds, and flooding.	The City of Arlington sustained over $3,000,000 in damages to public property that were submitted to the state for public assistance.

FEMA Floodplain Insurance Rate Map Revisions

The City of Arlington submitted the Fish Creek and Cottonwood Creek watershed study to Federal Emergency Management Agency (FEMA) in 2014 in order to incorporate the new technical data into the Flood Insurance Rate Map (FIRM) and the Flood Insurance Study (FIS) data. FEMA has developed preliminary FIRM and FIS data for the Fish Creek and Cottonwood Creek watersheds using the information developed in the city's study of those creeks.

Changes to the floodplain maps will include:

- Addition or modification of Base Flood Elevations
- Special Flood Hazard Area boundary changes
- Changes to flood zone designations
- Revisions to the floodway boundaries

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Arlington.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	392,772
Persons under 5 years (%)	7.2
Persons 65 years and over (%)	9.6
Language other than English spoken at home (%)	32.8
With a disability, under age 65 (%)	7.7
Persons without health insurance, under age 65 (%)	22.3
Persons in poverty (%)	16.6
Median household income	$53,574
Households, 2012-2016	134,846
Median value of owner-occupied housing units, 2012-2016	$137,900

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Arlington.

City of Arlington Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**
U.S. Fish and Wildlife Service	Government Facility	500 people	Unknown	Unknown
Texas Health Resource (THR)	Medical	10,000 employees 3,800 beds	Unknown	Unknown
General Motors Processing Plant	Transportation	2,900 employees	3,750,000	Unknown
The Parks at Arlington	Retail Facility (Mall)	7,000+ people	1,500,000	Unknown
Entertainment District	Commercial (Public Assembly)	20,000 people	3,700,000	Unknown
AT&T Stadium	Commercial (Public Assembly)	4,000 employees 100,000 seats	2,300,000	$1,600,000,000

Facility/Asset Name or Description and Address	Type of Asset	Capacity	Square Feet	Structure Value
Nuclear Regulatory Commission (NRC) Region (IV)	Government Facility	Unknown	Unknown	Unknown
Lake Arlington Dam (Village Creek Supplying Lake Arlington)	Dams	N/A	6,482	$5,000,000
Arlington Public Safety Building	Emergency Services (Law Enforcement, Fire, Emergency Services command and control)	500 people	88,000	$4,800,000
Arlington City Hall	Government Facility	200 employees 800 occupants	48,600	$3,700,000
Social Security Administration	Government Facility	300 people	Unknown	Unknown
National Transportation and Safety Board	Government Facility	500 people	Unknown	Unknown
Department of Agriculture	Government Facility	300 people	Unknown	Unknown
United States Government Probation Office	Government Facility	Unknown	Unknown	Unknown
U.S. Southwest Field Office of Defense Criminal Investigation	Government Facility	Unknown	Unknown	Unknown
U.S. Department of Commerce	Government Facility	Unknown	Unknown	Unknown
Office of Inspector General	Government Facility	Unknown	Unknown	Unknown
National Semiconductor Corporation	Commercial-IT	Unknown	Unknown	Unknown

Facility/Asset Name or Description and Address	Type of Asset	Capacity	Square Feet	Structure Value
Arlington Independent School District	Education	8,000 employees 65,000 students	Unknown	Unknown
Globe Life Park	Commercial (Public Assembly)	1,881 staff 49,170 seats	1,400,000	Unknown
University of Arlington (UTA)	Education	40,000 people	1,900,000	Unknown
Six Flags Over Texas	Commercial (Public Assembly)	3,800 people 35,000 max capacity	9,280,000	Unknown

City of Arlington Fire Stations	
Station #1 – 401 West Main Street	Station #10 – 3205 Southwest Green Oaks Boulevard
Station #2 – 1727 Sherry Street	Station #11 – 2204 Ball Park Way
Station #3 – 1820 South Fielder Road	Station #12 – 5050 South Collins Street
Station #4 – 1733 West Randol Mill Road	Station #13 – 7100 Russell Curry Road
Station #5 – 2921 East Randol Mill Road	Station #14 – 5501 Ron McAndrew Drive
Station #6 – 2620 South Collins Street	Station #15 – 906 Eden Road
Station #7 – 4000 Little Road	Station #16 – 1503 Mansfield Webb Road
Station #8 – 2020 Madison Drive	Station #17 – 4016 North Collins
Station #9 – 909 Wimbledon Drive	

3.3 Hazard Profiles

In addition to identifying hazards, both natural and man-made, the city conducted a risk assessment to determine the potential impacts of the hazards. A risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from potential hazards. The focus of the risk assessment process is to identify what hazards are present in the city and the potential impacts of those hazards and threats.

For the Emergency Management Accreditation Program:

Each hazard was evaluated individually and given a weighted numerical value to assess and quantify the hazard as part of the hazard mitigation planning process. The parameters and numerical value for each response is listed below.

To meet requirements for the Emergency Management Accreditation Program, natural hazards and man-made hazards must be ranked in a combined scale.

Parameter	Definition	One (1)	Two (2)	Three (3)	Four (4)	Five (5)
Frequency	How often has the hazard occurred in the past?	Never occurred locally	Once in past thousand years	Once in past hundred years	Once in past 50 years	Nearly every decade
Geographic Extent	Size of the affected area. Includes areas not damaged, but strongly affected by the incidents. For example, areas backed up by a transportation accident.	Single site. One or two blocks.	Single site/ multiple blocks	Community specific (ex. Downtown)	City-wide	Regional
Duration	How long does the acute crisis part of the disaster last?	Less than 24 hours	1-3 days	4-7 days	7-30 days	30+ days
Environment	How damaging is the disaster for the natural environment?	No damage/ temporary minor damage	Degradation of the ecosystem that will repair itself	Degradation of ecosystem that requires intervention	Functional loss of ecosystem, but restoration possible	Permanent loss of ecosystem
Heath Effects	How dangerous is the hazard to human health and safety?	No deaths or injuries	1-10 deaths and/or 1-100 injuries	11-50 deaths and/or 101-500 injuries	51-500 deaths and/or 501-1500 injuries	over 501 deaths and/or 1501 injuries
Displacement	How likely is the hazard to negatively impact the exposed population in terms of displacement and personal property loss?	No displaced people/ minor inconveniences	Displaced people. Vulnerable populations begin to have problems with access to essential supplies	Displaced people. Vulnerable populations have serious difficulties. General population starting to have problems	251-1000 people displaced. 5-30% of population experiencing acute shortages of supplies	1000+ displaced people. More than 30% of population facing acute shortages of basic supplies and access to services

Parameter	Definition	One (1)	Two (2)	Three (3)	Four (4)	Five (5)
Economic Impacts	How does the hazard affect the local economy?	No measurable impacts	No impacts to overall economy, but isolated businesses experience hardships	Entire sectors experiencing loss of revenue and capital	Sectors of economic base affected & unable to generate revenue; Losses range between 1-10% of assessed value.	Physical losses equal to 10% of assessed value. Loss of ability to generate revenue.
Built Environment (Property, Facilities, and Infrastructure)	How does the hazard affect buildings and physical infrastructure this includes utilities?	No effects.	1-10 structures damaged. Up to 25% loss of one utility	11-250 structures damaged. Multiple utilities affected up to 25% loss	251-1000 structures damaged. Multiple utilities affected 25-50% loss	1000+ structures damaged. At least two major utilities degraded by 50%+loss
Transportation	How does the hazard affect the ability of residents and workers to access the resources they need?	No effects on mobility	All critical services accessible, but delays reaching work or non-essential services	One critical service inaccessible. Major corridors open, but minor streets depredated or impassable	Many critical services inaccessible. One major corridor inoperable	Most critical services inaccessible. Most major corridors impassible
Critical Services (Includes COOP and Responders)	How likely is the hazard to reduce the ability of government business to provide critical services?	Little impairment on critical services	Temporary degradation of 1 critical service	Temporary degradation of multiple critical services. Long-term degradation of 1 critical service	Temporary degradation of most critical services. Long-term degradation of multiple services	Unable to deliver the most critical services

Parameter	Definition	One (1)	Two (2)	Three (3)	Four (4)	Five (5)
Confidence in Government	Would public's confidence in government be shaken?	No		Somewhat		Yes
Cascading Effects	How severe and complex will the secondary effects be?	Hazard unlikely to cause secondary hazards, and if they occur are minor	Secondary hazards may occur, but are likely to be minor compared to primary hazard	Secondary hazards occur that extend the impact of the disaster and hamper response, but are not considered disasters	Secondary effects generated that significantly increase the magnitude of the disaster. Secondary impacts would be considered disasters if they occurred by themselves	Secondary effects generated and rival or exceed primary hazard. Secondary impacts would be disasters if they occurred by themselves
Future Emphasis	How much is the level of emphasis in mitigating, planning for, and preparing for this hazard changed based on trends, increasing understanding of the hazard, and changing underlying conditions that give rise to the hazard?	Decreasing Emphasis		Emphasis Unchanged		Increasing Emphasis

Hazard Identification and Risk Assessment (HIRA)															
Identified Hazards	**Geographic Scope**	**Duration**	**Heath Effects**	**Displacement**	**Economy**	**Environment**	**Built Environment**	**Transportation**	**Critical Services**	**Confidence in Government**	**Base Score**	**Frequency**	**Cascading Effects**	**Multiplier**	**Subtotal**
Tornado	5	1	4	4	4	3	5	4	5	5	4	5	5	10	40
Flooding	5	4	2	5	4	3	4	4	4	3	3.8	5	5	10	38
Thunderstorm (Includes Hail, Wind, Lightning)	5	2	5	3	3	3	5	3	3	5	3.7	5	5	10	37
Infectious Disease Outbreak	5	5	5	5	5	2	1	1	5	5	3.9	5	3	8	31.2
Wildfire	4	3	3	4	3	4	5	3	3	5	3.7	5	3	8	29.6
National Security Hazard	4	4	5	5	5	5	5	4	5	5	4.7	1	5	6	28.2
Winter Storms	5	4	3	3	3	2	4	4	3	3	3.4	5	3	8	27.2
Hazardous Materials (HAZMAT) Event	3	3	3	5	3	3	2	3	2	5	3.2	5	3	8	25.6
Power Failure	5	4	2	4	3	1	2	3	4	3	3.1	5	3	8	24.8
Extreme Heat	5	5	3	3	2	3	1	1	1	1	2.5	5	2	7	17.5
Drought	5	5	1	1	3	3	1	1	1	1	2.2	5	2	7	15.4
Nuclear Accident	5	2	2	5	3	5	1	1	3	3	3	1	2	3	9
Expansive Soils	4	1	3	1	2	1	1	3	3	5	2.4	1	2	3	7.2
Telecommunications Failure	4	3	1	1	3	1	2	1	3	5	2.4	1	2	3	7.2
Earthquake	2	1	1	2	2	1	2	1	1	1	1.4	1	2	3	4.2

Impact Rating

Substantial	**35+**	**Minor**	**21-29**
Major	**30-34**	**Limited**	**20-**

The City of Arlington's Local Planning Team (LPT) ranked Tarrant County hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of hazards with community assets.

Rank of Risk	Hazard
1	Tornado
2	Flooding
3	Thunderstorm (Includes Hail, Wind, Lightning)
4	Infectious Disease Outbreak
5	Wildfire
6	National Security Hazard
7	Winter Storms
8	Hazardous Materials (HAZMAT) Event
9	Power Failure
10	Extreme Heat
11	Drought
12	Nuclear Accident
13	Expansive Soils
14	Telecommunications Failure
15	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent of the hazards.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Arlington.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order, separated by natural hazards and man-made hazards, and describe the extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	11
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	There is no historical data for drought damage in the city. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal overall. The city is home to a large water park and a natural grass professional baseball field that would be affected. The water park already has measures in place to reduce water consumption to the greatest extent possible. However, a severe drought may cause more drastic measures to be implemented which could result in a significant economic impact on the venue and the Arlington tourist industry.

Jurisdiction's ground-water supply: Lake Arlington.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No parcels zoned as D2 (Farm and Ranch Improvements on Qualified Open-space Land) in Arlington.

Describe any water restrictions used in your jurisdiction: Lawn watering is restricted when available water resources reach established thresholds.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	15
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	13
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures as most legacy structures eventually require maintenance to foundations to remain habitable. Approximately 220,000 city residents live in owner occupied residents and will likely have to implement individual mitigation strategies aimed at countering the effects of expansive soils.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Unknown. The Department of Public Works does not track road damage caused by expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	10
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, the elderly, homeless, and outdoor laborers need to take proper precautions. People should stay indoors to prevent heatstroke; the elderly who cannot afford air conditioning are at greatest risk.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: Elderly populations and those with medical conditions that are complicated by extreme heat. The city only has access to the potential locations of these individuals through the State of Texas Emergency Assistance (STEAR) program. Spectators and visitors to our outdoor entertainment venues and sporting events need to take proper precautions during the summer months.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? The City of Arlington Fire and Police Departments provide service to the Texas Rangers Organization during home games. The primary service provided during support to Texas Rangers home games is medical attention related to heat exposure. Six Flags over Texas and Hurricane Harbor staff their own response teams, thus we do not have data from their activities.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Commuters and any buildings in a floodplain are considered most at risk.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: Though various flooding occurs within the city, there has been no damage reported since 2015. Flooding is more of a threat to the population, as there was one fatality reported in 2017 due to flooded roads. According to the National Weather Service, flash flooding after a severe thunderstorm led to a man being swept away near the railroad tracks.

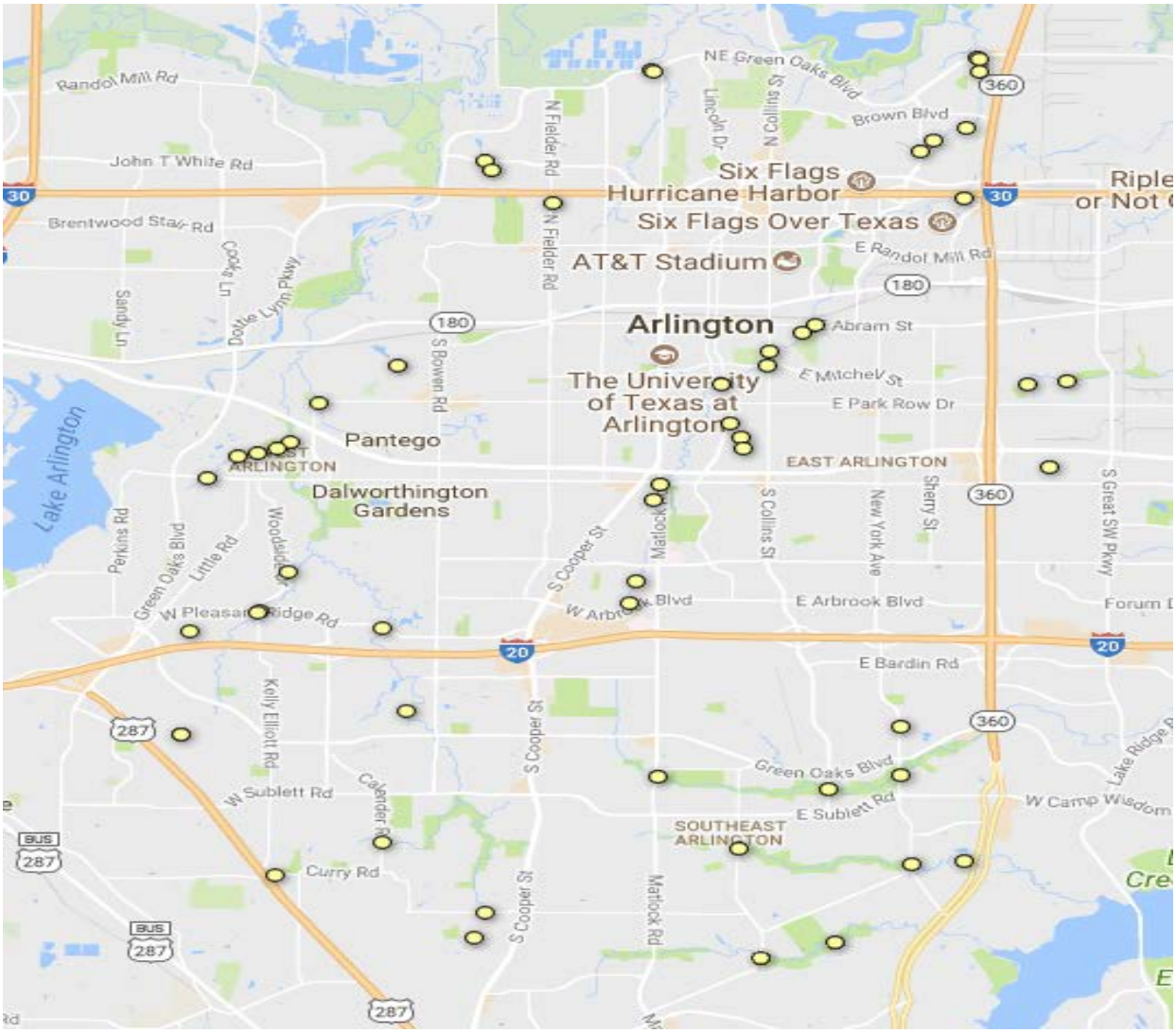
Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Rush Creek.

Names of any dams within the city: Lake Arlington Dam, Prestonwood Lake Dam, Rush Creek Lake Dam, Arlington Southwest Nature Preserve Dam, and Alan Saxe Pond. Details are described in Section 3.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Pleasant Ridge Road (0.5 miles east of Park Springs Drive)	Rush Creek	Bridge Class
Hidden Oaks Lane (0.5 miles south of Green Oaks Boulevard)	Kee Branch	Bridge Class
Webb Ferrell Road	Bowman Branch	Vented Ford
Mansfield-Webb Road	Bowman Branch	Vented Ford

Road	Flooding Source	Low Water Crossing Type
Timberlake Drive	Cottonwood Creek	Vented Ford
Susan Drive	Cottonwood Creek	Vented Ford
Forum Drive	Cottonwood Creek South Fork	Vented Ford
New York Avenue	Fish Creek	Bridge Class
South Collins Street	Fish Creek	Bridge Class
Matlock Road	Fish Creek	Vented Ford
New York Avenue	Fish Creek, TRIB Stream F-1	Vented Ford
Copeland Road	Johnson Creek	Bridge Class
East Abram Street	Johnson Creek	Vented Ford
Dugan Street	Johnson Creek	Bridge Class
Collins Street	Johnson Creek	Bridge Class
East Mitchell Street	Johnson Creek	Vented Ford
Center Street	Johnson Creek	Bridge Class
Waverly Drive	Johnson Creek	Vented Ford
High Point Road	Johnson Creek	Vented Ford
South Center Street	Johnson Creek, TRIB Stream JC-2	Vented Ford
Inwood Drive	Johnson Creek, TRIB Stream JC-2	Vented Ford
East Tucker Boulevard	Johnson Creek, TRIB Stream JC-2	Vented Ford
Matlock Rd And Arkansas Lane	Johnson Creek, TRIB Stream JC-2	Vented Ford
Secretary Drive	Johnson Creek, TRIB Stream JC-2	Vented Ford
Mayfield Road	Kee Branch	Bridge Class
Woodside Drive	Kee Branch	Bridge Class
Pleasant Ridge Road	Kee Branch	Bridge Class
Hidden Oaks Lane	Kee Branch	Vented Ford
Oak Springs Drive	Kee Branch, TRIB Stream KB-1	Vented Ford
Webb Lynn Road	Lynn Creek	Vented Ford
Arlington Webb Britton Road (New York Avenue)	Lynn Creek	Vented Ford
Silo Road	Lynn Creek	Vented Ford
Park Row Drive	Pantego Branch	Vented Ford
Mandy Way	Rush Creek	Vented Ford
Woodland Park Boulevard	Rush Creek	Bridge Class
Harris Road	Rush Creek	Vented Ford
Willow Oak Lane	Rush Creek	Vented Ford
Norwood Lane	Rush Creek, TRIB Stream RC-1	Vented Ford
Creekside Drive	Rush Creek, TRIB Stream RC-2	Vented Ford
Woodside Drive	Rush Creek, TRIB Stream RC-2	Vented Ford
Creekside Drive	Rush Creek, TRIB Stream RC-2	Vented Ford
Arkansas Lane	Rush Creek, TRIB Stream RC-2	Vented Ford
Calender Road	Sublett Creek	Vented Ford

Road	Flooding Source	Low Water Crossing Type
Eden Road	Sublett Creek	Vented Ford
West Lamar Boulevard	Village Creek, TRIB Stream VC(A)-1	Vented Ford
Parkhill Drive	Village Creek, TRIB Stream VC(A)-1	Vented Ford
Fielder Road	Village Creek, TRIB Stream VC(A)-1	Vented Ford
Green Oaks Boulevard West Bound	Trinity River West Fork, TRIB Stream WF(A)-1	Vented Ford
Green Oaks Boulevard East Bound	Trinity River West Fork, TRIB Stream WF (A)-1	Vented Ford
Heather Ridge Lane	Trinity River West Fork, TRIB Stream WF (A)-1	Vented Ford
Forest Oak Lane	Trinity River West Fork, TRIB Stream WF (A)-1	Vented Ford
Friendly Village Drive	Trinity River West Fork, TRIB Stream WF (A)-1	Vented Ford
Ball Park Way	Trinity River West Fork, TRIB Stream WF (A)-1	Vented Ford
Green Oaks Boulevard East Bound	Trinity River West Fork, TRIB Stream WF (A)-2	Vented Ford
Green Oaks Boulevard West Bound	Trinity River West Fork, TRIB Stream WF (A)-2	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

According to Arlington's Office of Emergency Management, there are five dams, one water treatment facility, and one wastewater treatment facility in the 100-year floodplain.

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Commercial	15,082.82	4,464.79[1]	29.6%
Industrial	686.53	24.53	3.57%
Residential	45,833.08	8,149.6	17.78%
Total	**61,602.43**	**12,638.92**	**20.5%**

Source: Arlington Office of Emergency Management.

[1] Most of commercial acreage located in the 100 year floodplain is comprised of golf courses.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Arlington is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	485454#
Community Name	City of Arlington
County	Tarrant County
Initial FHBM Identified	08/07/70
Initial FIRM Identified	12/31/74
Current Effective Map Date	09/25/09
Reg-Emer Date	12/30/70
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Director of Public Works.

What specific flooding ordinances and plans does your jurisdiction have? Flood Damage Prevention Ordnance last revised January 12, 2010 by Ordinance No. 10-011.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? New construction must conform to the standards outlined in Section 5.01 of the above-mentioned Ordinance.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? A permit is required prior to commencing construction. Prior to the issuance of a permit, building engineers must show conformity with the standards outlined on Section 5.01. Variances may be approved by the City Council based on a case by case basis when extraordinary situations exist.

Repetitive and Severe Repetitive Loss Properties: There are currently 40 residential and 6 non-residential repetitive loss properties and 1 residential severe repetitive loss property within the City of Arlington. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
4,082	4.37%	4,400	7.36%

Source: Arlington Office of Emergency Management.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Arlington's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 1,539 Insurance in-force: $450,219,300 Written premium in-force: $973,990
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 888 claims have been filed, but 219 of the claims closed without payment. $18,679,502.23 have been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	Approximately 47 properties.
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	Data not available.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, GIS, education or outreach, inspections, and engineering capability.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Community buy-in. NFIP premiums must be paid in full and cannot be split into monthly payments.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.

Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Data not available.
Is a CAV or CAC scheduled or needed?		Data not available.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	1991
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative	(1) Application for a Floodplain Development Permit shall be presented to the Floodplain Administrator on forms furnished by him/her and may include, but not be limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to areas of special flood hazard. Additionally, the following information is required: (a) After forms are set for the lowest floor, a letter completed by a licensed engineer or

	CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	surveyor indicating the proposed lowest floor elevation (in relation to mean sea level), including basement and finished garage of all new and substantially improved structures; (b) After construction and before final inspection, an elevation certificate completed by a licensed engineer or surveyor; (c) Elevation in relation to mean sea level to which any nonresidential structure shall be floodproofed; (d) A certificate from a registered professional engineer or architect that the nonresidential floodproofed structure shall meet the floodproofing criteria of Section 5.02 (2); (e) Description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of proposed development; (f) Maintain a record of all such information in accordance with Section 4.02(1).
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	Yes.
What is the community's CRS Class Ranking?	Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual	7.
Does your flood management plan or hazard mitigation plan include CRS planning requirements?	Community FPA, FEMA CRS Coordinator, ISO representative. CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Yes.

The City of Arlington will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Since 2015, the city experienced around $1.5 million in damages related to high winds and hail in thunderstorms, including roof, vehicle, and tree damage.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. The economic impact on the City of Arlington could reach billions of dollars if a large tornado impacted critical facilities and major entertainment district venues.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Most vulnerable location (North, East, South, West) of your jurisdiction? Northeast and north side of town is most vulnerable due to the greenbelt.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard. Winter storms tend to have a severe impact on both local and intrastate commerce as two major interstates as well as several major highways traverse the city that would likely be significantly impacted.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: No bridges or overpasses are impacted by winter storms, as sanding techniques are adequate.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Arlington between 2015 and 2017. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Arlington	5/24/2015	Flash Flood		0	0	$0	$0	
Arlington	5/24/2015	Flash Flood		0	0	$0	$0	
Arlington	5/26/2015	Thunderstorm Wind	60	0	0	$10,000	$0	MG
Arlington	5/28/2015	Flash Flood		0	0	$0	$0	
Arlington	12/27/2015	Hail	1	0	0	$0	$0	
Arlington	3/17/2016	Hail	2.5	0	0	$400,000	$0	
Arlington	3/17/2016	Hail	0.75	0	0	$0	$0	
Arlington	1/15/2017	Flood		1	0	$0	$0	
Arlington	5/19/2017	Thunderstorm Wind	39	0	0	$5,000	$0	EG
Arlington Municipal Airport	4/24/2015	Thunderstorm Wind	56	0	0	$15,000	$0	EG
Arlington Municipal Airport	5/26/2015	Hail	1	0	0	$0	$0	
Arlington Municipal Airport	11/17/2015	Thunderstorm Wind	51	0	0	$5,000	$0	MG
Arlington Municipal Airport	3/17/2016	Hail	1.75	0	0	$1,000,000	$0	
Arlington Municipal Airport	3/17/2016	Hail	1	0	0	$0	$0	
Arlington Municipal Airport	3/29/2017	Thunderstorm Wind	60	0	0	$5,000	$0	EG
Arlington Municipal Airport	3/29/2017	Thunderstorm Wind	65	0	0	$10,000	$0	EG
Arlington Pylon Airport	3/17/2016	Hail	1.5	0	0	$2,000	$0	
Total				**1**	**0**	**$1,452,000**	**$0**	

*MG- Measured Wind Gusts

*EG-Wind Estimated Gusts

3.5 Man-made Hazards Profiles

The City of Arlington has identified the following man-made hazards that have affected or could affect the local planning area.

3.5.1 Hazardous Materials (HAZMAT) Event

Hazard Profile: Hazardous Materials Event	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Significant
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from spills Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Misplaced residents
Vulnerabilities	Because of the several highways that pass through Arlington, as well as the many industrial organizations that use hazardous materials in their processes, the entire city can be considered to be vulnerable to a hazardous materials release or spill. However, the exact vulnerability is largely dependent on the chemical, weather, and location of the release.

What type of hazardous materials affect your jurisdiction, and how much of that type? The City of Arlington is the subject of several interstate and intrastate thoroughfares that transport an incalculable amount of hazardous materials ranging from precursors to household chemicals to nuclear waste.

What types of HAZMAT releases could happen? The vulnerability to hazardous materials release comes from traffic accidents, train derailments, and end-user accidents at industrial facilities.

What are the health effects from the exposure to each material? The health threats that would arise from a hazardous materials release runs the full spectrum of possibilities and is highly dependent on the hazards presented in the material released. Effects could range from respiratory problems to death.

How current is your jurisdiction's Tier 2 reports? The City of Arlington Tier 2 reports are updated annually.

Where are Tier 2 reports stored? The City of Arlington Tier 2 reports are stored at Fire Station #6 which is home to the HAZMAT response team for the Arlington Fire Department.

How is HAZMAT routed throughout your jurisdiction? Hazardous materials are continuously moving through the various thoroughfares including Interstate 20, Interstate 30, State Highway 360, and the major rail line that runs through the town.

Historical Events: No hazardous materials event has been recorded since 2015.

3.5.2 Infectious Disease Outbreak

Hazard Profile: Infectious Disease Outbreak	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Hospitals are overwhelmed Short supply of medical resources
Vulnerabilities	The entire human and animal population is at risk to an infectious disease outbreak, but children, the elderly, and those with immune system disorders are at a greater risk.

What types of infectious disease are a concern in your jurisdiction and why? Influenza remains the most significant concern to the City of Arlington. As was witnessed during the last "flu season," an influx of influenza patients not only presents a significant threat to the health of citizens, it also presents a dangerous stressor to the ability of the hospitals in the City to provide services in response to other emergencies.

What are the health effects from each infectious disease exposure? The two most realistic infectious disease sources are influenza and West Nile Virus. Both initially present as "flu like" symptoms. West Nile Virus is particularly dangerous to those with preexisting health issues which makes discerning between influenza and West Nile Virus more important.

What are potential sources of an infectious disease outbreak in your jurisdiction? As with most infectious diseases, contact with other humans is a significant factor in the spread of the disease. This concern becomes exacerbated in Arlington due to the multiple major athletic and entertainment venues within the city. Additionally, the lakes and streams in Arlington present possible breeding sites for West Nile Virus particularly where stagnant water exists.

Historical Events:

Date	Location within Jurisdiction	Type of Disease	Deaths	Cases
2017	Throughout	Influenza	0	288

3.5.3 National Security Hazard

Hazard Profile: National Security Hazard	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Limited
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Transportation disruption Loss of property Structure and infrastructure damage
Vulnerabilities	Approximately 100,000 spectators could be affected by an attack on AT&T Stadium. Many thousands more would be indirectly affected. AT&T Stadium, Globe Life Park, and Texas Live are the largest sporting venues in the city. Interstate 30 runs nearly adjacent to the most likely terrorist targets. An attack may affect traffic along this thoroughfare, resulting in the disruption of interstate commerce.

What types of national security hazards does your jurisdiction face? Arlington is a member of the Urban Area Security Initiative due to the presence of two major sporting venues and two major amusement parks.

Past damage done to your jurisdiction's critical infrastructure and facilities due to a national security hazard, including where the damage occurred: None

Historical Events: No national security event has been recorded since 2015.

3.5.4 Nuclear Accident

Hazard Profile: Nuclear Accident	
Category	**Response**
Risk Ranking	12
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Power outage Transportation disruption Loss of property Structure and infrastructure damage Misplaced residents and livestock
Vulnerabilities	Due to lack of historical data and the many variables involved, there is not enough information to determine the effect on the population due to a nuclear accident. The entire city is potentially exposed to this hazard.

What type of radioactive material is in your jurisdiction and how much of each type? Nuclear waste, in the form of garments and safety equipment used in the production of nuclear material, is transported through Arlington to the facility where the waste will be processed. Radioactive material in the form of construction and medical equipment is also located within the city at hospitals and construction sites.

Where is the nearest source of nuclear power? Comanche Peak Nuclear Power Plant in Glen Rose, Texas (75 miles south).

What are the shipping/transportation routes for nuclear material in your jurisdiction? Interstate 30 and Interstate 20.

Historical Events: No nuclear accident event has been recorded since 2015.

3.5.5 Power Failure

Hazard Profile: Power Failure	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Transportation disruption Loss of critical services Loss of communications
Vulnerabilities	Due to the extensive need for electricity by all sectors of society, it is reasonable to estimate that the entire city is vulnerable to this hazard.

What are the potential sources of power failure? Downed power lines, damaged transformers, and cut power lines from digging.

How many people have been impacted by power failure, including any populations that are specifically vulnerable? As many as 40,000 homes were impacted by the most recent power failure. Failures of this nature place people of advanced age, compromised health, and social vulnerability at increased risk due to their inability to react appropriately to power failures.

How many people could be impacted by power failure? The entire city population is vulnerable to power failure.

Historical Events:

Date	Location within Jurisdiction	Time	Magnitude	Deaths	Injuries
3/19/2017	Citywide	0215	38,783 Customers	0	0

3.5.6 Telecommunications Failure

Hazard Profile: Telecommunications Failure	
Category	**Response**
Risk Ranking	14
Geographic Area Affected	Significant
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Medium
Potential Impact	Disruption in emergency services Loss of communication for all critical entities
Vulnerabilities	The entire city is vulnerable to this hazard, but critical services would be impacted the most.

What are the potential sources of telecommunication failure? Damage to cell towers. Extremely high call volumes in the aftermath of a disaster that would overwhelm the network and render it unusable.

Who has been impacted by telecommunication failure? The City of Arlington has not experienced a significant telecommunications failure.

What has been impacted by telecommunication failure? The City of Arlington has not experienced a significant telecommunications failure.

Historical Events: No telecommunication failure event has been recorded since 2015.

3.6 Overall Vulnerability

The City of Arlington identified their greatest vulnerabilities and concerns:

- The Village Creek Waste Water Treatment Plan lies in the 100-year floodplain. While there is no record of previous damage due to flooding, it remains a concern.
- Lake Arlington Dam presents a continuous vulnerability that would cost nearly $5 billion in damages to improved property and displace nearly 500,000 people throughout the Metroplex if it were to fail.
- The entertainment district of Arlington is home to the Dallas Cowboys, the Texas Rangers, Six Flags over Texas, and Six Flags Hurricane Harbor and is a significant target for terrorism and is vulnerable to natural hazards. As Globe Life Park is upgraded and Texas Live is completed, this threat is expected to increase.

The City of Arlington continues to monitor the mitigation strategies that were implemented during the construction of the Viridian housing development. The site was previously within the 100-year floodplain. However, mitigation actions were undertaken to divert the flow of water and modify the floodplain in that area.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Arlington's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; Yes; Yes
Capital Improvement Plan (CIP)	Yes	No; No; Yes
Economic Development Plan	Yes	Yes; Yes; Yes
Local Emergency Operations Plan	Yes	Yes ; Yes; Yes
Continuity of Operations Plan	Yes	Yes; Yes; Yes
Transportation Plan	Yes	Yes; Yes; Yes
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	Yes	Yes; Yes; Yes
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Yes; Yes

Acquisition of land for open space and public recreation uses	Yes	Yes; Yes
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year: ICC 2013**
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 1**
Site Plan Review Requirements	Yes	Type(s) of requirement: Based on four criteria in the city's building code.
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Commission is appointed by the Mayor and Council and serve two-year terms; Yes
Mitigation Planning Committee	Yes	Planning and Hazard Assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Members of the Public Works and Transportation Department are tasked with this mission; Yes
Mutual Aid Agreements	Yes	Arlington has adopted the statewide mutual aid system; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor Warning System, Mass Notification System (Everbridge); Yes
Hazard data and information	Yes	Mapping; Yes
Grant writing	Yes	Use outside contractor; No
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or Non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Community Emergency Response Team (CERT), Arlington Christian Disaster Network (nationally awarded) - citizens are trained on local hazards. Yes, but these organizations would Not likely be used for mitigation activities.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	CERT continuing education, social media posts, and public presentations about local hazards; Yes
Natural disaster or safety related school programs	Yes	Programs managed by Arlington Independent School District; Yes
StormReady certification	Yes	StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education and awareness. To be officially StormReady, a community must: • Establish a 24-hour warning point and emergency operations center. • Have more than one way to receive severe weather warnings and forecasts and to alert the public. • Create a system that monitors weather conditions locally. • Promote the importance of public readiness through community seminars. • Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises. Yes
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	We have initiatives with several of the gas-well operators in the city for hazard mitigation activities; Yes
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If Yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	No
Authority to levy taxes for specific purposes	Yes	No
Fees for water, sewer, gas, and/or electric services	Yes	No
Impact fees for new development	Yes	No
Stormwater utility fee	Yes	Yes, for installation and maintenance of stormwater mitigation activities; Yes.
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	No
Incur debt through private activities	No	No
Community Development Block Grant	Yes	No
Other federal funding programs	Yes	Yes, many of Arlington's public safety programs are funded through federally administered grants; Yes.
State funding programs	No	No
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates, and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[2] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Arlington's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[2] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Continue to test the emergency warning system in the City of Arlington regularly and upgrade equipment as appropriate.	Perform a sound reflective study on the emergency siren system. Upgrade and expand the siren system.	Within 2 years	Office of Emergency Management	$100,000 for the sound reflective study plus $300,000 for 12 to 15 additional sirens (including installation).	Unknown	General funds, grants
		STATUS: Deferred to 2020 HzMAP					
		Develop a program to distribute weather radios at a reduced rate.	3-4 years	Office of Emergency Management	Unknown	Unknown	General funds, grants
		STATUS: Completed and ongoing					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding	Mitigate damage to existing structures as a result of natural hazards using cost effective approaches in the City of Arlington.	Provide awnings as a cover for emergency response vehicles located outside.	5 or more years	Public Safety	Unknown	Unknown	To be determined

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
Flooding	Educate the public regarding the natural hazards present in the City of Arlington.	Continue to promote public education/hazard mitigation programs, including: • flood insurance through the National Flood Insurance Program (NFIP) • flood hazard information • potential mitigation measures • "KnoWhat2Do" campaign • other information related to flood hazard	Currently implementing	Office of Emergency Management, Public Works and Transportation Department	$10,000	$40,000	General fund, grants
		STATUS: Completed and ongoing					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	Enact and enforce City of Arlington ordinances to minimize the impact of natural threats to people or property.	Review, update, and enforce city ordinances, as appropriate, to address wind damage.	3-4 years	Community Development and Planning Department, Building Inspection Department, Code Compliance	Unknown	Unknown	General fund, grants
		STATUS: Completed and ongoing					
Flooding	Maximize flood insurance coverage of property owners as a mitigation measure in the City of Arlington.	Continue to implement programs and take action to improve the city's Community Rating System (CRS) rating, including opportunities to reduce flood insurance premiums through NFIP activities.	3 or more years	Public Works and Transportation Department	Unknown	Unknown	To be determined, grants
		STATUS: In progress					
Flooding	Continue to reduce repetitive flooding losses	Identify the most appropriate mitigation measure, structural or non-structural, for each	Within 2 years	Public Works and Transportation Department	$6,000,000 (assuming $75,000 per structure and	$24,000,000	Hazard Mitigation Grant Program (HMGP),

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	in the City of Arlington.	repetitive flood loss structure. Establish a priority system that ranks each repetitive loss structure in order of priority for mitigation activity. Address each structure in the order in which it was ranked.			80 known structures).		stormwater utility fees for the 25% match, grants
		STATUS: In progress					
Dam Failure	Protect critical facilities and services in the City of Arlington from flooding.	Undertake a comprehensive facility review of Lake Arlington Dam and implement recommend improvements.	3-4 years	Public Works and Transportation Department	Approximately $10,000	$40,000	To be determined
		STATUS: Completed					
		Address infrastructure in developing/updating roadways.	3-4 years	Public Works and Transportation Department	Unknown	Unknown	To be determined
		STATUS: Completed and ongoing					
Flooding	Incorporate hazard	Develop, review, update and enforce					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	mitigation in long-range planning and development in the City of Arlington.	city ordinances to address activities that impact flooding, including:					
		• Runoff associated with construction projects.	3-4 years	Public Works and Transportation Department	Unknown	Unknown	General fund, grants
		STATUS: Completed and ongoing					
		• Wet-flood proofing in existing commercial structures.	3-4 years	Public Works and Transportation Department	Unknown	Unknown	General fund, grants
		STATUS: In progress					
		• Compensation for partial rights, such as an easement, to prevent property from being developed contrary to a community's plan to maintain open spaces.	3-4 years	Public Works and Transportation Department	Unknown	Unknown	General fund, grants
		STATUS: Deferred to 2020 HazMAP					
Terrorism	Train first responders to locate	Train officers who locate suspicious devices.	Complete	Police Department	Unknown	Unknown	General funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	suspicious devices in the City of Arlington.						
		STATUS: Completed and ongoing					
Terrorism	Preserve crime scene integrity in the City of Arlington.	Train all officers on importance of scene management for further criminal investigation.	Complete	Police Department	Unknown	Unknown	General funds
		STATUS: Completed and ongoing					
Terrorism	Train on suspicious activity reporting in the City of Arlington.	Establish suspicious activity reporting procedures.	Complete	Police Department	Unknown	Unknown	General funds
		STATUS: Completed and ongoing					
Lightning	Prioritize hazard mitigation projects to best utilize available City of Arlington and non-city funding.	Install lightning rods on existing and future communication infrastructure and other critical facilities, including City Hall, the elevated storage tanks, emergency	3-4 years	Office of Emergency Management	Unknown	Unknown	Enterprise funds, grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		management operations facility (public safety building), fueling facilities for city vehicles, fire stations, police stations, power facilities, and the water treatment plants. The lightning rods will provide additional protection against damage to these facilities if struck by lightning.					
		STATUS: In progress					
Extreme Temperatures	Ensure City of Arlington has an extreme heat plan in place.	Open cooling centers and provide public information.	6 months	Office of Emergency Management	$10,000	Increased public safety.	General fund, grants
		STATUS: Completed and ongoing					
Extreme Temperatures	Identify extreme heat mitigation plans for critical infrastructure	Develop extreme heat mitigation program to ensure essential functions continue in the event of high temperatures.	1 year	Office of Emergency Management	$20,000	Increased public safety.	General fund, grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	in City of Arlington.						
		STATUS: In progress					
Extreme Temperatures	Develop an extreme heat outreach program for City of Arlington citizens.	Develop an extreme heat outreach program that provides tips and pertinent information for ensuring the health and safety of citizens during extreme heat.	1 year-ongoing	Public Information Office, Office of Emergency Management	$30,000	Increased public knowledge of various forms of assistance; increased public health and safety.	General fund
		STATUS: Completed and ongoing					
Extreme Temperatures	Distribute extreme heat information to City of Arlington citizens.	Provide extreme heat information to Arlington citizens through a social media campaign.	6 month-ongoing	Public Information Office, Fire Department	$15,000	Increased public knowledge of various forms of assistance; increased public health and safety.	General fund
		STATUS: Completed and ongoing					
		Provide extreme heat information through the Arlington website.	6 month-ongoing	Public Information Office, Fire Department	$15,000	Increased public knowledge of various forms of assistance;	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
						increased public health and safety.	
		STATUS: Completed and ongoing					
Tornado	Support the construction of safe rooms in the City of Arlington.	Promote the North Central Texas Safe Room Rebate Program to increase number of participants in the City of Arlington.	Annually	Office of Emergency Management	$50,000	$180,000	General fund, HMGP
		STATUS: Completed and ongoing					
Flooding	Conduct drainage improvements to Little Creek Court location in Arlington.	Promote the North Central Texas Safe Room Rebate Program to increase number of participates in the City of Arlington.	Annually	Office of Emergency Management	$50,000	$180,000	General fund, HMGP
		STATUS: Completed and ongoing					
Hail	Provide educational materials on the hazards associated with hail to the	Research existing public information material on hail available.	6 months	Office of Emergency Management	$1,000	$3,000,000	Department of Homeland Security (DHS) funds, general fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	citizens of Arlington.	**STATUS: Completed**					
		Provide public education materials to public.	1 year	Office of Emergency Management	$800	$4,000,000	DHS funds, general fund
		STATUS: Completed and ongoing					
		Promote the North Central Texas Safe Room Rebate Program to increase number of participants in the City of Arlington.	Annually	Office of Emergency Management	$50,000	$180,000	General fund, HMGP
		STATUS: Completed and ongoing					
Lightning	Enhance current public education program in the City of Arlington to include information on surge protectors, lightning rods, safe rooms, safety tips, “KnoWhat2Do”	Conduct public education campaign on the hazards associated with lighting hazards and protective measures.	1 year	Office of Emergency Management	$800	$1,000,000	DHS funds, general fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	campaign and other elements.						
		STATUS: Completed and ongoing					
Winter Storms	Provide education materials to Arlington citizens on the hazards of winter storms and effective mitigation activities.	Conduct public education campaign on mitigating the hazards associated with winter storms.	6 months	Office of Emergency Management	$5,000	$80,000	General fund, HMPG, DHS
		STATUS: Completed and ongoing					
Drought	Continue to update and implement the City of Arlington water conservation and drought contingency plans.	In 2015, Arlington Water Utility (AWU) will install 9,000 meters and meter interface units (MIUs) through an ongoing meter replacement program and water line renewals.	2 years	Water Department	$5,289,000	$12,000,000	General and capitol project funds
		STATUS: Completed and ongoing					
		Create Water Conservation	6 months	Water Department	$98,000	$1,000,000	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Specialist/Leak Detection Position.					
		STATUS: Completed					
		Create a comprehensive water conservation program.	1 year	Water Department	$100,000	$20,000,000	General fund
		STATUS: Completed and ongoing					
Wildfire	Protect the City of Arlington critical facilities and vulnerable populations from the effects of wildfire incidents.	Ordinances will be followed to maintain minimum distances from fuels.	Continuously	Community Development and Planning, Building Inspection and Code Compliance	$150,000	$500,000	General fund
		STATUS: Completed					
Wildfire	Increase public awareness of mitigating activities to prevent and safeguard property from wildfires.	Increase distribution of public information about wildfires.	6 months	Office of Emergency Management/ Fire Department	$25,000	$80,000	General fund, DHS, HMPG
		STATUS: Completed and ongoing					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Extreme Temperatures	Improve extreme heat public education distribution in the City of Arlington.	Use multiple modes of communication to distribute extreme heat information to the public.	6 months	Office of Emergency Management	$500	$100,000	DHS and city general funds
		STATUS: Completed and ongoing					
Expansive Soils	Mitigate against expansive soils in the City of Arlington.	Continue to research and incorporate subgrade stabilization methods on street projects such as street reclamation and repairs.	Ongoing	Public Works and Transportation Department	$4,000,000	$100,000,000	Streets maintenance fund
		STATUS: Completed and ongoing					
		Distribute broadly homeowner information brochures on the do's and don'ts of maintaining constant moisture around residential foundations.	1 year	Office of Emergency Management	$800	$120,000	DHS funds
		STATUS: Completed and ongoing					

5.3 New Action Items

The City of Arlington's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[3] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection, by reviewing the scope of work, benefit-cost analysis, timeframe, and ease of implementation were also taken into account. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Drought, Earthquake, Expansive Soils, Extreme Heat, Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm, Infectious Disease**
Enhance and provide public education material about mitigation techniques for these hazards to public.	
Participating Jurisdiction:	City of Arlington
Priority:	1
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	**Drought**
Develop water conservation information packets for vendors to deliver to new customers.	
Participating Jurisdiction:	City of Arlington
Priority:	2
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Water Department
Implementation Schedule:	12 months

[3] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Flooding, Winter Storm, Infectious Disease
Evaluate the effectiveness of past mitigation projects to determine if follow up on actions are necessary.	
Participating Jurisdiction:	City of Arlington
Priority:	3
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, city funds for staff time
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works and Transportation Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Tornado, Thunderstorm, Earthquake
Encourage participation in the NCT Safe Room Rebate Program if/when the program is open and assist current participants.	
Participating Jurisdiction:	City of Arlington
Priority:	4
Estimated Cost:	$50,000
Estimated Benefit:	$3000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Wildfire
Have fire districts patrol their area to ensure fuel loads are controlled according to existing ordnances in order to mitigate the potential of and damage from a wildfire.	
Participating Jurisdiction:	City of Arlington
Priority:	5
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	2 months

Hazard(s) Addressed	Power Failure, Telecommunications Failure
Review emergency procedures with service providers to ensure viability of current plans.	
Participating Jurisdiction:	City of Arlington
Priority:	6
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	National Security Incident
Work with local stakeholders to ensure coordination policies are adequate.	
Participating Jurisdiction:	City of Arlington
Priority:	7
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, Homeland Security Grant Program
Lead Agency/Department Responsible:	Office of Emergency Management, Police Department, Fire Department
Implementation Schedule:	24 months

Hazard(s) Addressed	National Security Incident
Ensure public safety elements are equipped to respond to national security incidents.	
Participating Jurisdiction:	City of Arlington
Priority:	8
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	Homeland Security Grant Program
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquake
Map and assess community vulnerability to seismic hazards in order to address data deficiencies.	
Participating Jurisdiction:	City of Arlington
Priority:	9
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works and Transportation Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Expansive Soils
Assess and map the City's vulnerability to expansive soils in order to address data deficiencies.	
Participating Jurisdiction:	City of Arlington
Priority:	10
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works and Transportation Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Expansive Soils
Develop expansive soils information and mitigation packets for distribution to stakeholders.	
Participating Jurisdiction:	City of Arlington
Priority:	11
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works and Transportation Department, Community Development and Planning Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Expansive Soils
Study the effectiveness of current city practices and building codes and update where needed.	
Participating Jurisdiction:	City of Arlington
Priority:	12
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Community Development and Planning Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Install 9,000 meters and Meter Interface Units (MIUs) through an ongoing meter replacement program and water line renewals in order to mitigate leaks and loss of water.	
Participating Jurisdiction:	City of Arlington
Priority:	13
Estimated Cost:	$5,289,000
Estimated Benefit:	$12,000,000
Potential Funding Source(s):	City general fund, capital project funds
Lead Agency/Department Responsible:	Water Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Create a Water Conservation Specialist/ Leak Detection Specialist position.	
Participating Jurisdiction:	City of Arlington
Priority:	14
Estimated Cost:	$98,000
Estimated Benefit:	$588,000
Potential Funding Source(s):	City general fund
Lead Agency/Department Responsible:	Water Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Flooding
Research and distribute to all stakeholders current data related to the condition of and hazards associated with the city's dams.	
Participating Jurisdiction:	City of Arlington
Priority:	15
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Extreme Heat
Incorporate "heat island" countermeasures, such as cooling centers, public awareness, and cool pavements within the city.	
Participating Jurisdiction:	City of Arlington
Priority:	16
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Community Development and Planning Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Nuclear Accident, Hazardous Material Spill
Conduct training on nuclear material accident response.	
Participating Jurisdiction:	City of Arlington
Priority:	17
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, Homeland Security Grant Program
Lead Agency/Department Responsible:	Fire Department, Police Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquake, Extreme Heat, Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm, Power Failure, Telecommunications Failure
Encourage residents to take advantage of the Texas Emergency Preparedness Tax Holiday to buy supplies to enhance their mitigation efforts.	
Participating Jurisdiction:	City of Arlington
Priority:	18
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	6 months

Hazard(s) Addressed	Nuclear Accident, Hazardous Material Spill
Develop a notification system for all stakeholders when nuclear material is being transported through the city.	
Participating Jurisdiction:	City of Arlington
Priority:	19
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	6 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Arlington
Priority:	20
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the Stormwater Department and Floodplain Manager to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	City of Arlington
Priority:	21
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Arlington
Priority:	22
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Arlington
Priority:	23
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding.	
Participating Jurisdiction:	City of Arlington
Priority:	24
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquake, Thunderstorm, Tornado, National Security Incident
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Arlington
Priority:	25
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Arlington
Priority:	26
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Arlington
Priority:	27
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the state to conduct a study that will fill data deficiency including inundation zones, vulnerability to, and potential impacts of a dam failure.	
Participating Jurisdiction:	City of Arlington
Priority:	28
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.

5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Zoning Ordinances	Community Development and Planning Department	Every 5 years	Reference this HazMAP when developing the plan.	When reviewing Zoning Ordinances, the leadership team will review the HazMAP to see which action items can be addressed with the fiscal and administrative capabilities of the city.
Strategic Plan updates	Community Development and Planning Department, Public Works and Transportation Department, Transportation Department, Office of Emergency Management	Annually	Reference this HazMAP when developing the plans for critical infrastructure and resources.	The plan development team will reference the HazMAP when updating this plan, in such areas as strengthening critical infrastructure and key resources based on HazMAP hazard analysis, incorporating vulnerability data, and action items.
Capital Improvement Plan	Community Development and Planning Department, Public Works and Transportation Department	Every 5 Years	Reference this HazMAP when developing the plans for critical infrastructure and resources.	The planning team, city leadership, and city staff will review mitigation action items considering plan revision as necessary, and implement actions based on priority given to project over other projects that are also already funded. Projects approved by departments, city engineers, and city management are presented to city council for final approval to begin project.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Arlington. For additional information, see Appendices A and B.

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City of Azle

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Azle was the Fire Chief/Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Azle alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Azle will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Azle has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Azle's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Fire Chief/Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Azle. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Azle Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Azle	Fire Department	Fire Chief	General oversight, hazard identification, and plan development
City of Azle	Fire Department	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Azle	Fire Department	Battalion Chief	Hazard identification and plan development
City of Azle	Public Services Department	Director of Public Services	Hazard identification and plan development
City of Azle	Department of the City Manager	Assistant City Manager	General oversight, hazard identification, and plan development
City of Azle	Azle Police Department	Police Administration	Hazard identification and plan development
City of Azle	Development Services Department	Development Services Manager	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no recorded change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: A full list of completed mitigation actions items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Azle.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	12,064
Persons under 5 years (%)	5.8
Persons 65 years and over (%)	16.4
Language other than English spoken at home (%)	7.2
With a disability, under age 65 (%)	10.7
Persons without health insurance, under age 65 (%)	16.2
Persons in poverty (%)	11.1
Median household income	$57,923
Households, 2012-2016	4,272
Median value of owner-occupied housing units, 2012-2016	$121,500

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Azle.

City of Azle Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
City of Azle Police Department & City Administration 613 S.E. Parkway	Administration	200 people	5000	$2,000,000	$1,500,000
Azle Fire Department and Emergency Operations Center 900 Lakeview Drive	Emergency Services	100 people	17000	$4,500,000	$7,000,000 including vehicles
Azle Water Department 1500 Lakeview Drive	Water Department	30 people	4000	$20,000,000	$10,000,000
Water Tower FM 730 and Commerce	Utility	0	0	$3,000,000	$5,000
Water Tower Castle Hills	Utility	10 people	200	$4,000,000	$5,000
Sewer Department 816 Park Street	Utility	50 people	8000	$30,000,000	$17,000,000
Azle High School 1200 Boyd Road	School	2400 people	35,000	$25,000,000	$18,000,000
Azle Elementary 301 Church Street	School	400 people	10,000	$5,000,000	$3,000,000
Eagle Heights Elementary (TC) 6505 Lucerne Street	School	400 people	10,000	$10,000,000	$5,000,000
Santo Forte Junior High 479 Sand Beach Road	School	500 people	12,000	$12,000,000	$6,000,000
Azle Junior High 201 School Street	School	600 people	20,000	$20,000,000	$12,000,000
W. E. Hoover Elementary 484 Sandy Beach Road	School	400 people	8,000	$12,000,000	$6,000,000
Cross Timbers Elementary 831 Jackson Trail	School	400 people	8,000	$12,000,000	$6,000,000

3.3 Natural Hazard Profiles

The City of Azle's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Azle in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Tornado
2	Flooding
3	Thunderstorm (includes hail, wind, lightning)
4	Winter Storms
5	Wildfire
6	Extreme Heat
7	Drought
8	Expansive Soils
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent for the natural hazards.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Azle.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Significant
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	There is no historical data for drought damage in the city. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. The water supply in Azle comes from surface water and is thus subject to drought.

Jurisdiction's ground-water supply: Eagle Mountain Lake.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: Yes.

Describe any water restrictions used in your jurisdiction: Water Conservation and Drought Contingency Plan (Article 13.1800).

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: No historical data was found on any damage to critical infrastructure or roads due to expansive soils since 2015.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme heat pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. People who work outside or in non-air-conditioned buildings are also at high risk to the direct effects of summer heat. These populations are present throughout the city.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? No cases have been recorded.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

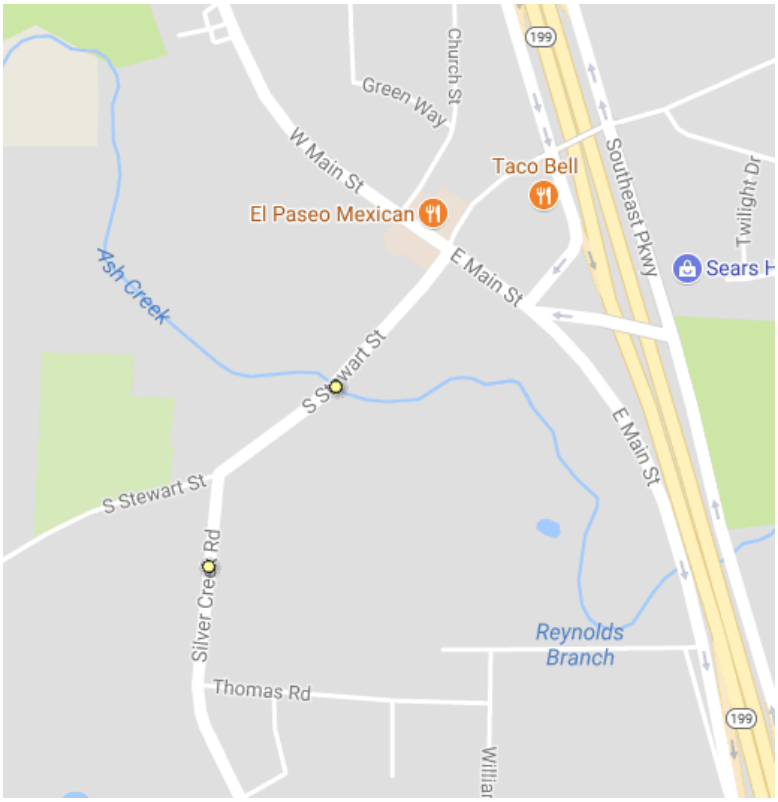
Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: The corner of State Highway 199 and Farm to Market (FM) 730 North, and the 200 block of Industrial Boulevard. See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Ash Creek.

Names of any dams in the city: There are no dams within the city.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Stewart Street	Ash Creek	Bridge Class
Silver Creek Azle Road	Reynolds Branch (Ragland Branch)	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Azle is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480584#
Community Name	City of Azle
Counties	Parker County/Tarrant County
Initial FHBM Identified	3/8/1974
Initial FIRM Identified	10/15/1985
Current Effective Map Date	9/25/2009
Reg-Emer Date	10/15/1985
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Stormwater Manager.

What specific flooding ordinances and plans does your jurisdiction have? Stormwater 821-01-02.

Repetitive and Severe Repetitive Loss Properties: There are currently 7 residential repetitive loss properties and 0 severe repetitive loss properties within the City of Azle. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Azle's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist, https://bsa.nfipstat.fema.gov/reports/1011.htm#TXT	Policies in-force: 102 Insurance in-force: $24,748,300 Written premium in-force: $96,976

How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 53 claims have been filed, but 14 of the claims closed without payment. $1,114,627.32 have been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	Approximately 1 property.
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	Data not available.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, GIS, education or outreach, inspections, and engineering capability.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Community buy-in. NFIP premiums must be paid in full and cannot be split into monthly payments.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Data not available.
Is a CAV or CAC scheduled or needed?		Data not available.

Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	1974
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	(1) Application for a Floodplain Development Permit shall be presented to the Floodplain Administrator on forms furnished by him/her and may include, but not be limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to areas of special flood hazard. Additionally, the following information is required: (a) After forms are set for the lowest floor, a letter completed by a licensed engineer or surveyor indicating the proposed lowest floor elevation (in relation to mean sea level), including basement and finished garage of all new and substantially improved structures; (b) After construction and before final inspection, an elevation certificate completed by a licensed engineer or surveyor; (c) Elevation in relation to mean sea level to which any nonresidential structure shall be floodproofed;

		(d) A certificate from a registered professional engineer or architect that the nonresidential floodproofed structure shall meet the floodproofing criteria of Section 5.02 (2); (e) Description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of proposed development; (f) Maintain a record of all such information in accordance with Section 4.02(1).
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Azle will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of thunderstorms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): No recorded damage has occurred since 2015.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Most vulnerable location (North, East, South, West) of your jurisdiction? The areas of most concern are along Ash Creek, Walnut Creek, and around Eagle Mountain Lake. These areas have rural-urban interface. Access to fight wildfires is often difficult due to thick trees and undergrowth, semi-swampy terrain, and lack of roads.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: There are no reported bridges or overpasses in the City of Azle that could be impacted by winter storms.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, is the natural hazard event that occurred within the City of Azle between 2015 and 2017.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Azle	8/6/2017	Thunderstorm Wind	61	0	0	$0	$0	EG
Total				**0**	**0**	**$0**	**$0**	

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Azle identified their greatest vulnerabilities and concerns:

- The City of Azle could be affected by severe thunderstorm and high winds. As a result, any mitigation steps taken related to severe thunderstorm winds should be undertaken on a citywide basis, such as review and updating to the most current building standards and codes.
- Drought does not have the immediate effect of other natural hazards, but sustained drought can cause severe economic stress in Azle. The potential negative effects of sustained drought are numerous. In addition to an increased threat of wildfires, drought can affect municipal and industrial water supplies, stream water quality, water recreation facilities, hydropower generation, and agricultural and forest resources. Implementation of a citywide drought plan with cooperation of Tarrant Regional Water District in order to minimize impacts to the city.
- Overall, City of Azle has high exposure to potential damage from tornadoes. Significant damage could occur if a tornado hit certain portions of Azle that are highly concentrated with homes or any of the critical facilities identified, depending upon the strength and duration of the event. Due to the destructive nature of tornadoes, it is imperative that pre-disaster mitigation measures be identified and implemented, and the community be educated.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Azle's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Partially; No; Yes
Capital Improvement Plan	Yes	No; No; Yes
Economic Development Plan	Yes	Yes; Yes; Yes
Local Emergency Operations Plan	Yes	Currently on the Tarrant Count plan: Yes; Yes; Yes
Continuity of Operations Plan	No	
Transportation Plan	No	
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	integrated Stormwater Management Program (iSWIM); Yes; Yes

Acquisition of land for open space and public recreation uses	N/A	
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year:** 2012 IBC
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating**: 3
Site Plan Review Requirements	Yes	Type(s) of requirement: staff and third party review of plans and on site.
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Established by ordinance and appears to be effective in addressing current concerns; Yes
Mitigation Planning Committee	Yes	Hazard identification and risk assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Street and Parks Department do a perpetual tree trimming and drainage cleaning throughout the year; Yes
Mutual Aid Agreements	Yes	Fire and Police Department agreements; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	No, growth is increasing in the city and is starting to go beyond his availability; Yes; Yes
Floodplain Administrator	PT	No; No; No
Emergency Manager	PT	No; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	PT	Contracted
GIS Coordinator	No	
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor warning sirens, Siren GPS; Yes
Hazard data and information	Yes	Tier II reports; Yes
Grant writing	No	
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Stormwater public events are done in the summer months. Emergency preparedness done during special events. Volunteers in policing outreach and school health advisory committee; Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Currently on city website and public events, community newsletter; Yes
Natural disaster or safety related school programs	Yes	KnoWhat2Do, city website; Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	Texas Health Azle, Azle Ministerial Alliance, Azle Independent School District, and American Red Cross; Yes
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Street maintenance and stormwater fees to address drainage; Yes
Authority to levy taxes for specific purposes	Yes	Sales tax for police department to assist in addressing crime. Tax Increment Reinvestment Zones (TIRZs) to assist in revitalization of business district. Property tax to assist in city operations. Yes
Fees for water, sewer, gas, and/or electric services	Yes	Water and sewer rates reviewed annually to assist in utility operations; Yes
Impact fees for new development	Yes	Water and sewer rate impact fees to assist in operation and service debt for future projects; Yes
Stormwater utility fee	Yes	Used for current and future drainage in the city; Yes

Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Issued debt for city hall and police station. Current issued debt for Main Street waterline project; Yes
Incur debt through private activities	No	
Community Development Block Grant	Yes	Address drainage and street projects in impacted area. Address some quality of life projects; Yes
Other federal funding programs	No	
State funding programs	Yes	Water development board funding for water treatment increase; Yes
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?
Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates, and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1]Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Azle's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Winter Storms, High Winds, Tornadoes, Severe Storms, Power Failure	Enhance warning systems to help warn the citizens of Azle, concerning the potential of tornadic activity.	Implement outdoor warning siren upgrades to address potential areas where growth has and will occur that may impact the ability of the system to reach its intended service area.	48 months	Fire Department	$75,000	The impact of warning our population of the impending tornado is difficult to measure with the impact of life and property. This number could be in the millions of dollars.	General fund
		STATUS: Partially completed-need two more outdoor warning sirens					
Winter Storms, High Winds, Tornadoes, Severe Storms, Power Failure	Add a part time emergency manager and geographic information system (GIS) specialist.	Our emergency management program is managed by a part time administrator and the fire chief. In an effort to dedicate 40 hours of staff time a week we will need to hire an emergency manager that can commit 100% of their time to preparedness and response.	36 months	Fire Department	$90,000	As our community grows so does our need to prepare for and respond effectively to emergency situations. There is a tremendous benefit to having a staff	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
						that is experienced and able to effectively prepare for and guide out organization through a wide variety of emergency situations.	
		STATUS: Deleted-no longer feasible					
Winter Storms, High Winds, Tornadoes, Severe Storms, Power Failure	Conduct annual Incident Command Structure (ICS) and National Incident Management System (NIMS) refresher training for all city employees.	Initial training in ICS and NIMS training is beneficial only if we continue to educate our personnel. It is important to ensure that everyone in the city maintains competency in their specific area of responsibility during an emergency.	24 months	Fire Department	$30,000	The benefit of this program is hard to predict since the size and type of incidents that we will have are hard to predict. This program will enhance our effectiveness with any incident that we should be called to respond.	General fund
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Tornadoes, Flooding, Wildfire, Infectious disease	Provide damage assessment training to all emergency responders within the police and fire department.	Annually train our police and fire personnel on how to accurately assess the effects that our community is exposed to after a large event.	1 year	Fire Department	$30,000	The main benefit with this program will come through effectiveness in our response, accurate damage reporting and timely assessments.	General fund
		STATUS: In progress					
Winter Storms, High Winds, Tornadoes, Severe Storms, Flooding, Power Failure	Review current monthly inspection of emergency power generators and implement changes as needed.	Task the emergency manager with evaluating our past maintenance and testing program for all of our emergency power generators.	6 months	Office of Emergency Management	$15,000	The benefit of having power during an emergency cannot be quantified in a dollar value. The benefit will be clear when we are able to properly utilize the generators during an emergency.	General fund
		STATUS: Completed					
Winter Storms, High	Evaluate all critical facilities	Ensure that all critical facilities (i.e. water	2-5 years	Fire Department	$200,000	$800,000	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Winds, Tornadoes, Severe Storms, Power Failure, Flooding	within the city and ensure that they have proper back up operating power.	department, Emergency Operations Center, fire, police and administration) maintain the ability to operate during a power failure. This action item includes the procurement and installation of new generators for critical facilities.					
		STATUS: In progress					
Wildfire	Protect the City of Azle critical facilities and vulnerable populations from the effects of wildfire incidents.	Implement defensive space practices and enforce ordinances to maintain minimum distances from fuels.	36 months	Community Development and Planning Department, Building Inspection Department, Code Compliance	$150,000	$500,000	General fund
		STATUS: In progress					
Wildfire	Implement Firewise community program.	Coordinate with Texas Forest Service, our city, and community to establish a Firewise community program.	48 months	Fire Department	$50,000	The primary benefit will come in the form of life and	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		This program will assist us with preplanning for a fire, during and after.				property conservation.	
		STATUS: In progress					
Infectious Disease Outbreak	Train first responders in point of distribution (POD) procedures.	Establish and train our responders on the proper distribution of medical supplies/medications during an emergency.	1 year	Fire Department	$20,000	The benefit is not able to be quantified. However, the benefit of being prepared to provide medications or medical supplies to our community will be extremely valuable.	General fund, grants
		STATUS: Deleted- no longer relative due to addressing natural hazards only					
Infectious Disease Outbreak	Implement continuity of operation procedures for essential personnel during a long term employee shortage.	Establish specific procedures for dealing with long term employee absence due to infectious disease within our city. The program will address essential functions that need to continue during a pandemic.	2 years	Fire Department	$25,000	Our responders will benefit by getting to actually perform the POD exercise after their training.	General fund, grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deleted- no longer relative due to addressing natural hazards only					
Infectious Disease Outbreak	Conduct a POD exercise every other year	Conduct a multiagency, multijurisdictional exercise with our area responders specific to POD.	1 year	Fire Department	$50,000	Our responders will benefit by getting to actually perform the POD exercise after their training.	General fund, grants
		STATUS: Deleted- no longer relative due to addressing natural hazards only					
Infectious Disease Outbreak	Develop a public information campaign to educate the City of Azle public about infectious disease.	This effort would be to better inform our population of actions they can take to better prepare and ultimately survive the effects of a pandemic.	1 year	Fire Department	$50,000	Difficult to predict but will be aimed at saving lives.	General fund, grants
		STATUS: Deleted- no longer relative due to addressing natural hazards only					
Drought	Educate our public about water conservation and the cities policies.	Use of public service announcements (PSAs) to educate our public about water conservation. Specific communication about our current status and ways to prevent wasting water.	24 months	Office of Emergency Management	$50,000	The impact is difficult to measure.	General fund, grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
Drought	Develop contingency plans in the city that address potential impacts of drought.	Three specific areas will need contingency plans: Power and Drinking Water Plan, Suppression Plan and Medical Plan.	3-5 years	Office of Emergency Management	$600,000	The impact of these three programs cannot be quantified but they need to be addressed if we are going to be successful in being prepared under drought conditions.	General fund or bond issuance.
		STATUS: In progress					
Terrorism	Train all hazardous material technicians on response to CBRNE incidents.	Send two HAZMAT Technicians per year to a CBRNE specialty class. The purpose is to increase their knowledge base on these specific incidents.	10 years	Fire Department	$80,000	We will see a significant impact to our preparedness for CBRNE incidents. Funding is aimed at back fill and the program tuition will be covered under a grant.	General fund, grants
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Terrorism, Hazardous Materials	Protect Azle utilities from terrorism.	Hire a third party contractor to conduct a risk assessment of all city infrastructure and property, including water distribution system. The goal is to identify and recommend protective measures.	5-8 years	Office of Emergency Management	$400,000	We will benefit by raising the level of preparedness of our organization as it relates to terrorism.	General fund, grants
		STATUS: Deleted- no longer relative due to addressing natural hazards only					
Terrorism	Train all hazardous material technicians on response to CBRNE incidents.	Send two HAZMAT Technicians per year to a CBRNE specialty class. The purpose is to increase their knowledge base on these specific incidents.	10 years	Fire Department	$80,000	We will see a significant impact to our preparedness for CBRNE incidents. Funding is aimed at back fill and the program tuition will be covered under a grant.	General fund, grants
		STATUS: Deleted- no longer relative due to addressing natural hazards only					
Terrorism, Hazardous Materials	Increase our citizen and school districts awareness of hazardous materials &	Design and develop a brief 4-hour training and awareness program to administer at the Independent School Districts and to the	1-5 years	Office of Emergency Management	$90,000	This will benefit our community by preparing them to take protective	General fund, grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	CBRNE incidents through the use of public training sessions.	public. The focus is on what to do in the event of a hazardous materials or CBRNE emergency.				measures during a hazardous materials or CBRNE event.	
		STATUS: Deleted- no longer relative due to addressing natural hazards only					
Terrorism, Hazardous Materials	Train first responders in hazardous materials mitigation.	Train three firefighters per year to the hazardous materials technician level.	Continuing	Fire Department	$100,000	Benefit our community as well as our neighboring communities providing us with the ability to mitigate hazardous materials emergencies.	General fund, grants
		STATUS: Deleted- no longer relative due to addressing natural hazards only					
Hail, Flooding	Provide educational materials on the hazards associated with hail and flooding to the citizens of Azle.	Research existing public information material on hail and flooding available.	6 months	Office of Emergency Management	$1,000	$3,000,000	Department of Homeland Security funds, general fund
		STATUS: Completed					
		Provide public education materials to public.	1 year	Office of Emergency Management	$800	$4,000,000	Department of Homeland

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
							Security funds, general fund
		STATUS: Completed					
Hail	Mitigate damage to existing structures as a result of hail using cost effective approaches in the City of Azle.	Provide awnings as a cover for emergency response vehicles located outside.	5 or more years	Department of Public Safety	Unknown	Unknown	To be determined
		STATUS: Completed					
Lightning	Enhance current public education program in the City of Azle to include information on surge protectors, lightning rods, safe rooms, safety tips, "KnoWhat2Do" campaign, and other elements.	Conduct public education campaign on the hazards associated with lightning hazards and protective measures.	1 year	Office of Emergency Management	$800	$1,000,000	Department of Homeland Security funds, general fund
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Lightning	Prioritize hazard mitigation projects to best utilize available City of Azle and non-city funding.	Install lightning rods on existing and future communication infrastructure and other critical facilities, including City Hall, the elevated storage tanks, emergency management operations facility (public safety building), fueling facilities for city vehicles, fire stations, police stations, power facilities, and the water treatment plants. The lightning rods will provide additional protection against damage to these facilities if struck by lightning.	3-4 years	Office of Emergency Management			Enterprise funds, grants
		STATUS: Completed					
Extreme Temperatures	Identify extreme heat mitigation plans for critical infrastructure e in City of Azle.	Develop extreme heat mitigation program, to ensure essential functions continue in the event of high temperatures.	1 year	Office of Emergency Management	$20,000	Increased public safety	General Fund, grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
Extreme Temperatures	Develop an extreme heat outreach program for City of Azle citizens.	Develop an extreme heat outreach program that provides tips and pertinent information for ensuring the health and safety of citizens during extreme heat.	1 year-ongoing	Public Information Office, Office of Emergency Management	$30,000	Increased public knowledge of various forms of assistance; increased public health and safety.	General fund
		STATUS: In progress					
Expansive soils	Annually monitor expansive soil insurance claims.	The purpose of this item is to track and monitor the impact that expansive soils has on our residents and businesses. This information will be used to implement mitigation efforts in the future.	10 years	Building Official	$25,000	Our community will benefit by identifying past expansive soil claims and enacting new prevention measures.	Grants
		STATUS: In progress					
Expansive Soils	Increase citizen awareness in regards to expansive soils.	Develop a public service announcement (PSA) addressing expansive soils in our area. This can be given in the form of a mailer, PSA or town hall type meeting.	3-5 years as funding is available.	Building Official	$125,000	Our community can be impacted by saving the value of our property and prevent	General fund, grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
						costly repairs to structures.	
		STATUS: In progress					
Expansive Soils	Mitigate against expansive soil in the City of Azle.	Continue to research and incorporate subgrade stabilization methods on street projects such as street reclamation and repairs.	Ongoing	Public Works and Transportation Department	$4,000,000	$100,000,000	Streets maintenance fund
		STATUS: In progress					

5.3 New Action Items

The City of Azle's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Drought, Earthquake, Expansive Soils, Extreme Heat, Flooding, Thunderstorm, Tornadoes, Wildfire, Winter Storm**
Expand and enhance current code standards for building and fire codes.	
Participating Jurisdiction	City of Azle
Priority:	1
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	General fund, city funding for staff time
Lead Agency/Department Responsible:	Building Official
Implementation Schedule:	24 months

Hazard(s) Addressed	**Flooding, Thunderstorms, Tornadoes, Wildfires**
Install Outdoor Warning Sirens to cover the North and Southeast parts of the city.	
Participating Jurisdiction	City of Azle
Priority:	2
Estimated Cost:	$20,000
Estimated Benefit:	$120,000
Potential Funding Source(s):	General fund, hazard mitigation grants
Lead Agency/Department Responsible:	Building Official
Implementation Schedule:	48 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Enhance the current public education program to include mitigation strategies for all identified hazards.	
Participating Jurisdiction	City of Azle
Priority:	3
Estimated Cost:	$8,000
Estimated Benefit:	$48,000
Potential Funding Source(s):	General fund, hazard mitigation grants
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Azle
Priority:	4
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the floodplain administrator to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	City of Azle
Priority:	5
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Azle
Priority:	6
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Azle
Priority:	7
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments along streams, creeks, rivers, and lakes to protect against flooding.	
Participating Jurisdiction:	City of Azle
Priority:	8
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Azle
Priority:	9
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfires
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Azle
Priority:	10
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
To protect power lines from severe weather either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Azle
Priority:	11
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plan	City Administration	Annually	Reference this HazMAP when updating this plan.	When reviewing the Capital Improvement Plan, the leadership team will review the mitigation action plan to see which action items can be addressed with the fiscal and administrative capabilities of the city during budget cycles.
Future Land Use	City Administration, Planning and Zoning Department	As needed or proposed development	Reference this HazMAP when updating this plan.	Administration, developers and the planning and zoning committee will review the impacts of land use based on this plan, such as stormwater drainage and building codes, for severe weather.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Drainage Plan	Stormwater Department, Streets Department	As needed	Reference this HazMAP when updating this plan.	Staff will review identified mitigation action items and consider plan revision as necessary to address them.
Current code standards for building and fire codes	Building official, Fire Marshal, City Council	As needed by area of concern.	Mitigations actions in areas of design and construction standards.	Staff will review and suggest changes based on mitigation goals.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Azle. For additional information, see Appendices A and B.

City of Bedford

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Bedford was the Deputy Fire Chief.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Bedford alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

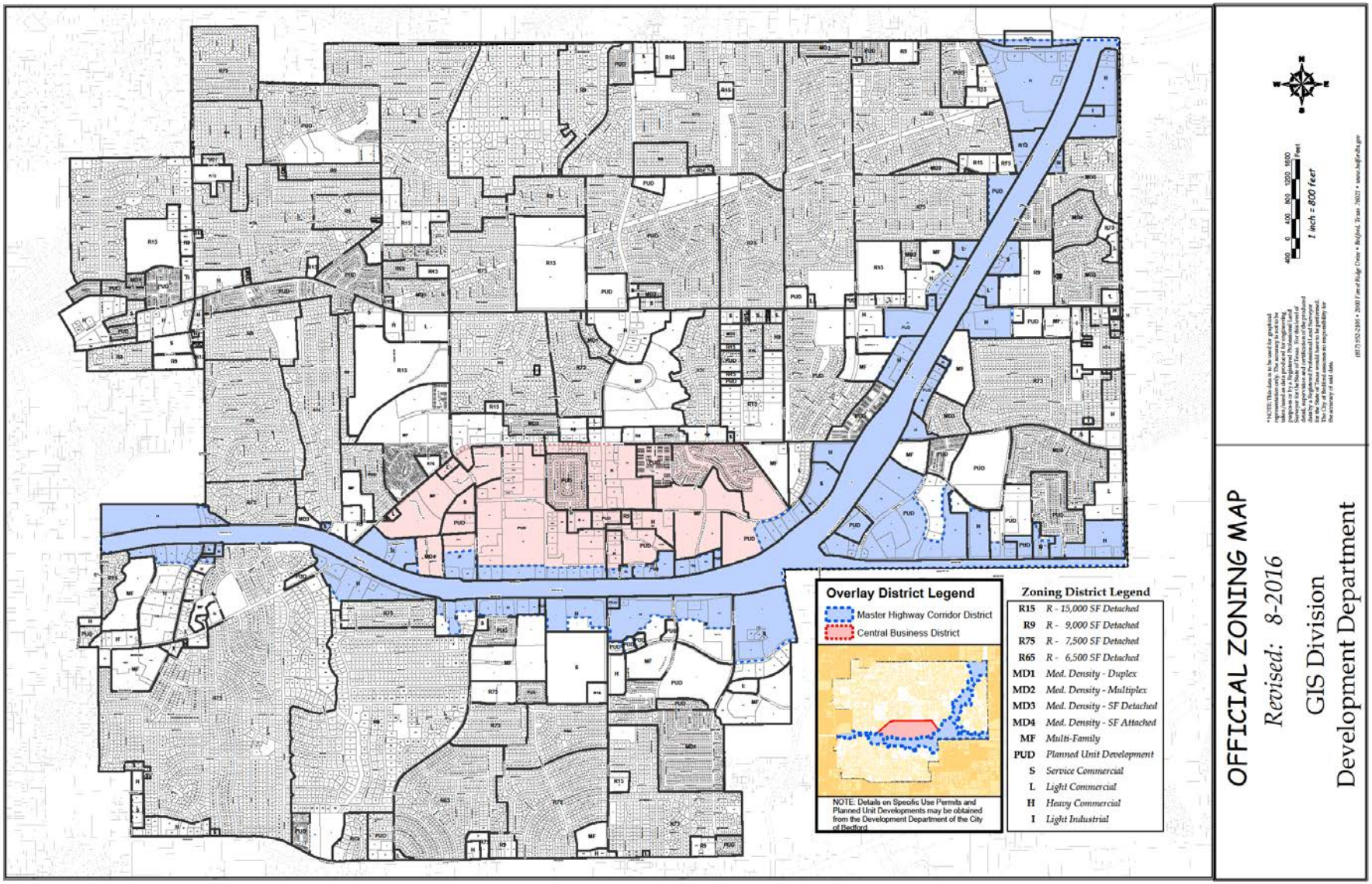
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Bedford will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of governments (NCTCOG).

1.4 Supporting Maps

The following map provides an overview of the City of Bedford:

- 2016 Official Zoning Map


OFFICIAL ZONING MAP
Revised: 8-2016
GIS Division
Development Department
1 inch = 800 feet
Overlay District Legend
Master Highway Corridor District
Central Business District
NOTE: Details on Specific Use Permits and Planned Unit Developments may be obtained from the Development Department of the City of Bedford.
Zoning District Legend
R15 R - 15,000 SF Detached
R9 R - 9,000 SF Detached
R75 R - 7,500 SF Detached
R65 R - 6,500 SF Detached
MD1 Med. Density - Duplex
MD2 Med. Density - Multiplex
MD3 Med. Density - SF Detached
MD4 Med. Density - SF Attached
MF Multi-Family
PUD Planned Unit Development
S Service Commercial
L Light Commercial
H Heavy Commercial
I Light Industrial

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Bedford has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Bedford's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Deputy Fire Chief- Operations.

The LPT was assembled in 2017 with representatives from the City of Bedford. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Bedford Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Bedford	Fire Department	Deputy Chief 1	Planning lead, hazard identification and plan development
City of Bedford	Department of the City Manager	Interim Assistant City Manager	General oversight, hazard identification, and plan development
City of Bedford	Fire Department	Deputy Chief 2	Hazard identification and plan development
City of Bedford	Fire Department	Chief	Hazard identification and plan development
City of Bedford	Police Department	Chief	Hazard identification and plan development
City of Bedford	Public Works Department	Director	Hazard identification and plan development
City of Bedford	Public Works Department	Operations Manager	Hazard identification and plan development
City of Bedford	Public Works Department	Administrative Manager	Hazard identification and plan development
City of Bedford	Public Works Department	Environmentalist	Hazard identification and plan development
City of Bedford	Parks Department	Parks Superintendent	Hazard identification and plan development
City of Bedford	Community Services Department	Manager	Hazard identification and plan development
City of Bedford	Development Department	Building Official	Hazard identification and plan development
City of Bedford	Public Information Office	Public Information Officer	Hazard identification and plan development
City of Bedford	Facility Department	Facility Services Manager	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no recorded change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: • Implemented Blackboard Connect mass notification system. • Remodeled and updated the Emergency Operations Center (technology – smart boards, cameras, computers, radios). • Updated building codes – International Building Code 2015. A full list of completed mitigation action items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Bedford.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	49,528
Persons under 5 years (%)	5.4
Persons 65 years and over (%)	16
Language other than English spoken at home (%)	17.2
With a disability, under age 65 (%)	6.8
Persons without health insurance, under age 65 (%)	14.4
Persons in poverty (%)	7.4
Median household income	$62,701
Households, 2012-2016	21,205
Median value of owner-occupied housing units, 2012-2016	$169,700

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Bedford.

City of Bedford Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Texas Health Resources Harris Methodist Hospital	Medical
Texas Utilities Yard Site	Utility
Carter Blood Bank	Medical
Walmart Super Store	Retail
Pennington Stadium	Entertainment
Harwood Junior High	Education
Bedford Junior High	Education
Meadow Creek Elementary	Education
Spring Garden Elementary	Education
Bedford Heights Elementary	Education
Shady Brook Elementary	Education
Stonegate Elementary	Education
Bell Manor Elementary	Education
Saint Vincent's Episcopal School	Education
State Highway 183	Transportation
State Highway 121	Transportation
Bedford Law Enforcement Center	Law Enforcement
Bedford City Hall Complex	Administration
Bedford Fire/ EMS Station #1	Fire
Bedford Fire/ EMS Station #2	Fire
Bedford Fire/ EMS Station #3	Fire
Bedford Boy's Ranch Community Center	Public Facility
Bedford Service Center	Utility/ Public Works
Reliant Hospital	Medical
Park Place Retirement Community	Residential
Transamerica	Large Employer
Heartland	Medical
Emeritus at Eden Estates	Medical
Parkwood Healthcare Community	Medical
Parkwood Retirement Community	Residential

*The capacity, square footage, and structure/content value of these assets were unavailable.

3.3 Natural Hazard Profiles

The City of Bedford's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Bedford in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
N/A	Wildfire
1	Thunderstorm (includes hail, wind, lightning)
2	Expansive Soils
3	Tornado
4	Flooding
5	Extreme Heat
6	Drought
7	Winter Storms
8	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Bedford.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Significant
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal due to the minor extent expected.

Jurisdiction's ground-water supply: Simpson Terrace Well and Stonegate Well**.**

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: The city follows the Tarrant Regional Water District water restrictions.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Negligible
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: No damage to buildings has occurred. Throughout the city roads, sidewalks, water mains, and sewer mains have been repaired due to shifting/expanding soil. It is estimated that around $300,000 is spent per year on repairs.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme heat poses a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. People who work outside or in buildings without air-conditioning are also at high risk to the direct effects of extreme heat. Impacted residents can be found throughout the entire city, including at nursing facilities, rehabilitation facilities, dialysis centers, and hospitals.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? Yes, Bedford has two outdoor public events each year. Each event has 5,000-10,000 visitors and each event has experienced overheated visitors.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: See the low water crossing below. This road has the potential to flood.

Names of any creeks or rivers that flood: Various sections of Sulphur Branch and SB-1 have risen within three feet of the living structure. Various sections of Hurricane Creek have risen over the banks, flooding unimproved property.

Names of dams within the city: There are no dams within the city.

Low Water Crossing: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular traffic. This crossing can be dangerous when flooded. Crossing is identified with a yellow dot.

Road	Flooding Source	Low Water Crossing Type
Donna Lane	Sulphur Branch, TRIB Stream SB-1	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Bedford is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480585#
Community Name	City of Bedford
County	Tarrant
Initial FHBM Identified	12/28/73
Initial FIRM Identified	07/18/77
Current Effective Map Date	9/27/09
Reg-Emer Date	7/18/77
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Consultant.

What specific flooding ordinances and plans does your jurisdiction have? Building codes include restrictions and requirements related to flooding prone areas.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? Builder must mitigate with United States Army Corp of Engineers and file for a Conditional Letter of Map Revision (CLOMR) through FEMA. If a CLOMR cannot be obtained, no building permit will be released.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? Building is restricted in the floodplains and is listed in the city's building codes.

Repetitive and Severe Repetitive Loss Properties: There are currently 5 residential repetitive loss properties and 0 severe repetitive loss properties within the City of Bedford. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
500	3.8%	100	1.38%

Source: City of Bedford Geographic Information System (GIS) Department, FEMA map.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Bedford's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 176 Insurance in-force: $52,383,600 Written premium in-force: $129,247
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 59 claims have been filed, but 26 of the claims closed without payment. $183,159.60 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	600.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	No data available.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, geographic information system, and inspections.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	No data available.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.

Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		No data available.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	7/18/77
Are the FIRMs digital or paper?	Community FPA	Digital and paper.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes. By building ordinance.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	No data available.

Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Bedford will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Since 2015, there has been $183,000 in damage due to lightning.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

Is there an area of the town that is the most vulnerable to tornadoes? No one area is more vulnerable than another. Critical structures and infrastructure is evenly spread throughout the planning area. Planning area is completely built out; mostly residential and light commercial property is spread evenly throughout the city.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	N/A
Probability of Future Occurrence	N/A
Maximum Probable Extent	N/A
Potential Impact	N/A
Vulnerabilities	Wildfires are not a threat to the City of Bedford due to the urbanized landscape.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: There are 4 to 6 bridges on Highway 183 (Airport Freeway), east and west, through the center portion of the city and Texas 121, north and south, on the east side of city. There are various other small bridges within the city.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents. Both freeways would have very little to no impact from winter storm because of mitigation with sand and assistance from state and Tollway Authority.

3.4 Historical Events

According to the National Centers for Environmental Information, there have been no natural hazards that have occurred in the City of Bedford since 2015, but the city has been impacted by unreported events and have damage reports from lightning and expansive soils that have occurred during this time period.

3.5 Overall Vulnerability

The City of Bedford identified their greatest vulnerabilities and concerns:

- Thunderstorms including hail, wind, lightning, and tornadoes could potentially affect the greatest number of citizens, causing the largest loss of life and the greatest expense.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Bedford's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Park safe places, creek and drainage repair, zoning plan. Yes; Yes; Yes
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	Yes	No; Yes; Yes
Local Emergency Operations Plan	Yes	Public Works Plan, Emergency Operations Center (EOC) Plan. Yes; Yes; Yes
Continuity of Operations Plan	Yes	Limited, fire and medical services response agreements (mutual agreements and automatic assistance agreements), fuel shortage plan. Yes; Yes; Yes
Transportation Plan	No	
Stormwater Management Plan	Yes	Yes, creek and drainage improvements; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	Yes	Tarrant County Emergency Management Plan, Yes; Yes; Yes
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes

Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Illicit discharge ordinance. Yes; Yes
Acquisition of land for open space and public recreation uses	No	
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year: IBC 2014 and IBC 2015**
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 2**
Site Plan Review Requirements	Yes	**Type(s) of requirement:** staff review, council review (Development Review Committee (DRC) review, Planning and Zoning review, Zoning Board of Adjustments (ZBA), review if necessary)
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	City staff, Planning and Zoning Board. Staff and volunteer committee provides thorough review and enforces zoning code; Yes
Mitigation Planning Committee	Yes	Planning and hazards assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Public Works, Development and Code Enforcement; Yes
Mutual Aid Agreements	Yes	County and State fire, medical, and law enforcement response agreements; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	PT	Floodplain engineer (Contractor) Yes, Yes, Yes
Emergency Manager	No	
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	City engineer. Yes; Yes; Yes
GIS Coordinator	FT	City engineer and Graphic Information System Coordinator. No; Yes; Yes
Other:	FT	Public Works Director. Yes; Yes; Yes
***Full-time (FT) or part-time (PT) position**		

Technical	Have capability?	Describe capability. Has capability been used to assess or mitigate risk in the past?
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Yes, Blackboard Connect. Outdoor early warning sirens, cable television override. Yes
Hazard data and information	Yes	Tier 2 reporting, mapping. Yes
Grant writing	Yes	City grant writer; No
HaZUS analysis	N/A	
Other	Yes	Collaborative Adaptive Sensing of The Atmosphere (CASA) radar services, city intersection monitoring cameras. Yes
Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	The Community Emergency Response Team (CERT), Citizens on Patrol, Environmental Manager, Volunteers in Policing Service (VIPS), Citizen Fire Academy Alumni Association (CFAAA), Citizen Police Academy Alumni Association (CPAAA), and Radio Amateur Civil Emergency Services (RACES) all include citizens in hazard and mitigation training. Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Public Works outreach (water and environmental), fire public education classes and police and fire citizens academies, community safety outreach programs, police department safety training to local businesses. Yes
Natural disaster or safety related school programs	Yes	Fire Department safety program for elementary schools (Clown Program), police department's Red Ribbon Week educational classes. Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	American Red Cross for individual assistance and for sheltering services. Yes
Other		

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	State Water Implementation Fund (SWIFT), Street Improvement Economic Development Corporation (SIEDC) and Stormwater; Yes
Authority to levy taxes for specific purposes	Yes	Ad valorem taxes; Yes
Fees for water, sewer, gas, and/or electric services	Yes	Water and sewer fees, low interest SWIFT loan; Yes
Impact fees for new development	No	Some projects require escrow fees; No
Stormwater utility fee	Yes	Drainage repair; Yes
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Infrastructure; Yes
Incur debt through private activities	No	
Community Development Block Grant	Yes	No; Yes
Other federal funding programs	Yes	Assistance for Firefighters Grant (AFG) Program, Urban Areas Security Initiative (UASI) Program; No
State funding programs	Yes	Texas A&M Forest Service (TFS), Texas Intrastate Fire Mutual Aid System (TIFMAS); No
Other		

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, policies, and resources for mitigation include budgeting and passing policies and procedures for mitigation actions, adopting and implementing stricter mitigation regulations, approving the hiring and training of staff for mitigation activities, approving mitigation updates, and additions to existing plans as new needs are recognized. Include multiple Safe Place locations at the city park to provide shelter during inclement weather.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Bedford's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Mitigate the effects of severe weather by increasing the awareness through the ability of mass notification in the City of Bedford.	Purchase and institute a reverse notification system.	24 months	Office of Emergency Management	$40,000/ year	$50,000	Grants, general fund, county funds
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires, Extreme Temperatures, Hazardous Materials Spills, Infectious	Improve the technology in the EOC to better serve the citizens of the City of Bedford in the event of an emergency.	Remodel Emergency Operations Center (EOC).	24 months	Office of Emergency Management	$50,000	$750,000	Grants, general fund, county funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Disease Outbreak							
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes, Lightning	Ensure outdoors spaces in the City of Bedford have adequate shelter for high-wind events such as severe thunderstorms or tornadoes.	Evaluate current shelters in outdoor spaces in the city of Bedford.	2015	Office of Emergency Management, Risk Management Department	$2,000	N/A	Budget
		STATUS: Completed					
		Determine the size and space needs for shelters in outdoor spaces in the city of Bedford.	2015	Office of Emergency Management, Risk Management Department	$5,000	N/A	Budget
		STATUS: Deferred to 2020 HazMAP					
		Install outdoor storm shelters at Boys Ranch Park & Activity Center | 2801 Forest Ridge Dr., Brook Hollow Park | 600 Block of Rankin, Monterrey Park | 1000 Block of Monterrey, Central Park / Pool | 1200 Central Drive,	2020	Risk Management Department	$2,000,000	N/A	None

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Stormie Jones Park | 2500 Block of Brasher, Bedford Trails / Harris Ryals Park / Linear Park, Meadow Park Athletic Complex | 3200 Meadow Park, Carousel Park | 1100 Simpson Terrace					
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes	Ensure critical facilities in the City of Bedford have adequate safe rooms to protect against high-wind events and tornadoes.	Evaluate the current conditions of critical facilities to determine which ones, if any, need safe rooms installed.	2016	Office of Emergency Management, Risk Management Department	45,000	N/A	None
		STATUS: Deferred to 2020 HazMAP					
		Determine the size and space needed to shelter the population of the critical facility.	2016	Office of Emergency Management	$5,000	N/A	None
		STATUS: Deferred to 2020 HazMAP					
		Install safe rooms as needed in critical facilities.	2020	Office of Emergency Management	$1,500,000	N/A	None
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	Ensure the City of Bedford ordinances and building codes reflect the need for high-wind resistant windows in new developments and facilities.	Review current jurisdictional ordinances and building codes related to high winds.	Ongoing	Engineering Department	$5,000	N/A	Budget
		STATUS: Completed and ongoing					
		Develop or update ordinances and building codes to recommend new developments or facilities are built with high-wind resistant windows as needed.	Ongoing	Building Development Department	$5,000	N/A	Budget
		STATUS: Completed and ongoing					
Severe Thunderstorms and High Winds, Tornadoes	Ensure the City of Bedford critical facilities, including schools, have high-wind resistant windows in place.	Evaluate the need for high-wind resistant windows in critical facilities.	2018	Risk Management Department	$5,000	N/A	Budget
		STATUS: Deferred to 2020 HazMAP					
		Install high-wind resistant windows as necessary in critical facilities, including schools.	2020	Risk Management Department	$1,000,000	N/A	Budget
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms	Develop a severe thunderstorm and	Evaluate the hazards posed by high-wind	2018	Engineering Department	$5,000	N/A	Budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
and High Winds, Tornadoes	tornado preparedness education program for the City of Bedford citizens.	events in the city of Bedford.					
		STATUS: Completed					
		Develop a severe weather preparedness education program that provides tips and pertinent information for protecting property against high-wind damage.	Ongoing	Tarrant County Office of Emergency Management	$20,000	N/A	Budget
		STATUS: Completed and ongoing					
Severe Thunderstorms and High Winds, Tornadoes	Distribute severe weather preparedness information to the City of Bedford citizens.	Provide severe weather preparedness information to Bedford citizens through a social media campaign, including severe thunderstorms and tornadoes.	Ongoing	Public Information Office	$5,000	N/A	Budget
		STATUS: Completed and ongoing					
		Ensure the Bedford city website is updated during tornado season to educate citizens on severe weather preparedness.	Ongoing	Public Information Office	$0	N/A	Budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed and ongoing					
Flooding	Add one 10’ x 10’ concrete box culvert (CBC) to the four existing CBCs along Sulphur Branch at Circle Lane in the City of Bedford.	Add one 10’ x 10’ CBC to the four existing CBCs along Sulphur Branch at Circle Lane. This will increase the existing conditions to 100-year flood level of protection in order to protect the traffic flow on streets as well as keep roadways open to allow for emergency vehicles and to protect public safety.	2 years	Public Works Department	$500,000	$2,000,000	City budget, Capital Improvement Project (CIP) funds, HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					
Flooding	Add one 10’ x 10’ CBS (concrete box culvert) to the three existing 10’ x 8’ CBCs along Sulphur Branch at Bedford Road in the City of Bedford.	Add one 10’ x 10’ CBC to the three existing 10’ x 8’ CBCs. This will increase the existing conditions to 100-year flood level of protection in order to protect the traffic flow on streets, as well as keep roadways open to allow for emergency vehicles and to protect public safety.	1 year	Public Works Department	$1,200,000	$4,800,000	City budget, CIP funds, HMGP, PDM

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
Flooding	Conduct structure improvements to Sulphur Branch Tributary at Shirley Way in the City of Bedford.	Conduct structure improvements to improve channel degradation caused by erosion include such actions as replacing rip-rap section with gabion basket and regarding steep slopes.	1 year	Public Works Department	$355,000	$1,420,000	City budget, CIP funds, HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					
Flooding	Conduct structure improvements to Sulphur Branch Tributary at Schumac Lane in the City of Bedford.	Conduct structure improvements to improve channel degradation caused by erosion include such actions as installing concrete retaining walls and reconstructing channel slopes.	1 year	Public Works Department	$285,000	$1,140,000	City budget, CIP funds, HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					
Flooding	Conduct structure improvements to Sulphur Branch Tributary at Donna Lane in the City of Bedford.	Conduct structure improvements to improve channel degradation caused by erosion. Include such actions as installing	1 year	Public Works Department	$325,000	$1,300,000	City budget, CIP funds, HMGP, PDM

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		concrete retaining walls and reconstructing channel slopes.					
		STATUS: Deferred to 2020 HazMAP					
Flooding	Conduct structure improvements to Sulphur Branch Tributary at Briar Drive in the City of Bedford.	Conduct structure improvements to improve channel degradation caused by erosion. Include such actions as installing concrete retaining walls and reconstructing channel slopes.	1 year	Public Works Department	$280,000	$1,120,000	City budget, CIP funds, HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					
Flooding	Conduct structure improvements to Sulphur Branch Tributary at Brookhollow Park in the City of Bedford.	Conduct structure improvements to improve channel degradation caused by erosion. Include such actions as installing concrete retaining walls and reconstructing channel slopes.	1 year	Public Works Department	$500,000	$2,000,000	City budget, CIP funds, HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					
Power Failure, Extreme Temperatures	Ensure the City of Bedford's facilities	Identify appropriate size and type of generator for critical facilities	Ongoing	Risk Management Department	$0	N/A	Budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	have alternate power supply.	**STATUS: Completed and ongoing**					
		Purchase/order generator for critical facilities.	Ongoing	Facility Maintenance Department	$50,000/ year	N/A	Budget
		STATUS: Completed and ongoing					
		Deliver and install critical facility generators.	Ongoing	Facility Maintenance Department	$50,000/ year	N/A	Budget
		STATUS: Completed and ongoing					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Ensure the City of Bedford's critical facilities have emergency lighting systems in place.	Evaluate emergency lighting systems in critical facilities.	Ongoing	Office of Emergency Management/ Risk Management Department	N/A	N/A	Budget
		STATUS: Completed and ongoing					
		Install emergency lighting systems in critical facilities.	Ongoing	Facility Management Department	N/A	N/A	Budget
		STATUS: Completed and ongoing					
Hail	Ensure the City of Bedford critical facilities have hail-resistant roofing	Evaluate which critical facilities need hail-resistant roofing and windows installed.	2016	Risk Management Department	$2,000	N/A	Budget
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	and windows installed.	Install hail-resistant roofing and windows in identified critical facilities.	2018	Facility Maintenance Department	$2,000,000	N/A	None
		STATUS: Deferred to 2020 HazMAP					
Hail	Provide hail-resistant parking areas for Bedford's city vehicles.	Evaluate the need for covered parking for city vehicles to protect them against hail.	2016	Risk Management Department	$2,000	N/A	Budget
		STATUS: Completed					
		Install covered parking areas as needed to protect city vehicles against hail.	2018	Facility Maintenance Department	$500,000	N/A	None
		STATUS: Deferred to 2020 HazMAP					
Hail	Develop a hail preparedness education program for the City of Bedford citizens.	Evaluate the hazards posed by hail in the city.	Ongoing	Office of Emergency Management/ Public Health Department	$0	N/A	Budget
		STATUS: Completed and ongoing					
		Develop hail preparedness education program that provides tips and pertinent information for ensuring	Ongoing	Office of Emergency Management/ Public Health Department	$2,000	N/A	Budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		the protection of property against hail.					
		STATUS: Completed and ongoing					
Hail	Distribute hail preparedness information to the City of Bedford citizens.	Provide hail preparedness information to citizens through a social media campaign.	Ongoing	Public Information Office	$2,000	N/A	Budget
		STATUS: Completed and ongoing					
		Provide hail preparedness information through the city website.	Ongoing	Public Information Office	$0	N/A	Budget
		STATUS: Completed and ongoing					
Wildfire	Ensure the City of Bedford's water systems are adequate for fighting wildfires.	Evaluate the city of Bedford's water system to ensure capacity for fighting wildfires.	Ongoing	Public Works Department / Trinity River Authority	$10,000	N/A	Budget
		STATUS: Deleted - no area is vulnerable to wildfire in the affected area of the plan.					
		Install or upgrade needed equipment to ensure water systems are adequate.	Ongoing	Public Works Department / Trinity River Authority	Unknown	N/A	Budget
		STATUS: Deleted - no area is vulnerable to wildfire in the affected area of the plan.					
Wildfire	Mitigate wildfires by instituting	Prevent wildfires from spreading to critical	Ongoing	Code Enforcement	$50,000	N/A	Budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	landscaping practices at the City of Bedford's critical facilities.	facilities by landscaping plants and brush away from buildings.		Department / Parks Department			
		STATUS: Deleted - no area is vulnerable to wildfire in the affected area of the plan.					
Wildfire	Review city ordinances and laws to ensure mitigation practices are in effect in the City of Bedford.	Enact building permit process that encourages wildfire resistant construction.	Ongoing	Building & Fire Departments	$20,000	N/A	Budget
		STATUS: Deleted - no area is vulnerable to wildfire in the affected area of the plan.					
Wildfire	Ensure that adequate Bedford Fire Department wildfire response plans and procedures are in place.	Review current wildfire response plans and procedures.	Ongoing Regional Plan	Northeast Tarrant County Fire Departments	Unknown	N/A	Budget
		STATUS: Deleted - no area is vulnerable to wildfire in the affected area of the plan.					
		Develop or update wildfire response plans and procedures.	Annually	Regional Plan	Unknown	N/A	Budget
		STATUS: Deleted - no area is vulnerable to wildfire in the affected area of the plan.					
		Provide wildfire response training to fire personnel.	Annually	Texas Forestry Service	Unknown	N/A	State Budget
		STATUS: Deleted - no area is vulnerable to wildfire in the affected area of the plan.					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Wildfire	Provide information to the City of Bedford citizens regarding the hazards posed by wildfires	Develop a wildfire preparedness education program that provides tips and pertinent information for ensuring the protection of property against wildfires.	Annually	Tarrant County Office of Emergency Management	Unknown	N/A	County Budget
		STATUS: Deleted - no area is vulnerable to wildfire in the affected area of the plan.					
Wildfire	Determine the process for becoming a Firewise Community in the City of Bedford.	Work with the Texas Department of Emergency Management to become a Firewise Community.	Annually	State of Texas, Tarrant County Office of Emergency Management	Unknown	N/A	State & County Budget
		STATUS: Deleted - no area is vulnerable to wildfire in the affected area of the plan.					
Winter Storms	Evaluate winter weather response capabilities in the City of Bedford.	Conduct an assessment of winter weather response capabilities.	Annually	State / County / City Public Works Departments	Unknown	N/A	Budgets
		STATUS: Completed and ongoing					
		Acquire equipment needed as determined by assessment.	Annually	State / County / City Public Works Departments	Unknown	N/A	Unknown
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Provide safety training to first responders on winter weather hazards.	Annually	State / County / City Public Works & Fire Department	$10,000	N/A	Budget
		STATUS: Completed and ongoing					
Winter Storms	Evaluate winter weather planning capabilities in the City of Bedford.	Conduct an assessment of winter weather plans in place for jurisdiction public works.	Annually	City Office of Emergency Management, Public Works Department, Fire Department	$5,000	N/A	Budget
		STATUS: Completed and ongoing					
		Develop or update winter weather preparedness plan.	2018	City Office of Emergency Management, Public Works Department, Fire Department	$10,000	N/A	Budget
		STATUS: Deferred to 2020 HazMAP					
Winter Storms	Develop a winter weather preparedness program for Bedford citizens.	Evaluate the hazards posed by severe winter weather in the City of Bedford.	Annually	City Office of Emergency Management, Public Works Department,	$5,000	N/A	Budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
				Fire Department, Police Department			
		STATUS: Completed and ongoing					
		Develop a winter weather preparedness education program that provides tips and pertinent information for avoiding hypothermia and icy conditions.	Annually	City Office of Emergency Management, Public Information Department, Tarrant County Office of Emergency Management	$10,000	N/A	Budget
		STATUS: Deleted – managed by other agencies.					
Winter Storms	Distribute winter weather preparedness information to City of Bedford residents.	Provide winter weather preparedness information to Bedford citizens through a social media campaign.	Annually	Public Information Department, Office of Emergency Management	$5,000	N/A	Budget
		STATUS: Completed and ongoing					
		Ensure the Bedford city website is updated during winter months to educate citizens on	Annually	Public Information Department, Office of	$5,000	N/A	Budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		winter weather preparedness.		Emergency Management			
		STATUS: Completed and ongoing					
Infectious Disease Outbreak	Prepare City of Bedford first responders for mass prophylaxis distribution.	Train first responders in point of distribution (POD) procedures.	Ongoing	Fire Department, Tarrant County Public Health Department	$5,000	N/A	Budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Conduct a POD exercise to test plans and procedures.	2017	Public Health Department, Tarrant County Public Health Department	$10,000	N/A	None
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Infectious Disease Outbreak	Provide physical security at the Hurst, Euless, and Bedford (HEB) POD site while treating up to 200,000 people within a 48-hour timeframe.	Develop plans for security needs within the POD site.	Completed	Hurst-Euless-Bedford	Unknown	Unknown	Hurst-Euless-Bedford, FEMA, Center for Disease Control Public Health Preparedness Funds
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Calculate police personnel requirements and availability, then prepare a viable plan with schedules and assignments.	Completed	Hurst-Euless-Bedford	$49,000	$200,000	Hurst-Euless-Bedford, FEMA, Center for Disease Control Public Health Preparedness Funds
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Estimate fuel needs for police and ICS vehicles, and generators.	31-Dec-13	Hurst-Euless-Bedford	Unknown	Unknown	Hurst-Euless-Bedford FEMA
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Infectious Disease Outbreak	Coordinate the effective traffic flow leading into, out of, and within the Hurst, Euless, and Bedford POD site.	Plan for law enforcement personnel needs for traffic control.	Completed	Hurst-Euless-Bedford	$35,000	$140,000	Hurst-Euless-Bedford, FEMA
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Plan for portable, physical barrier needs (cones, barricades, etc.).	Completed	Hurst-Euless-Bedford	Unknown	Unknown	Hurst-Euless-Bedford, FEMA
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Determine points of ingress/egress to POD site for management purposes.	Completed	Hurst-Euless-Bedford	Unknown	Unknown	Hurst-Euless-Bedford, FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Infectious Disease Outbreak	Complete and disseminate the Hurst, Euless, and Bedford POD site to local agencies, school and hospital district, and Tarrant County officials.	Prepare and disseminate POD plan.	Completed	Bedford	Unknown	Unknown	Unknown
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Infectious Disease Outbreak	Ensure continuity procedures are in place to prepare for a long-term employee shortage at City of Bedford facilities.	Review continuity of operations (COOP) plans and procedures for city employees and facilities.	2017	Office of Emergency Management/ Risk Management Department	$0	N/A	Budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Provide COOP training for jurisdiction employees.	2017	Office of Emergency Management /Human Resources Department	$5,000	N/A	Budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Infectious Disease Outbreak	Develop a public information campaign to educate the City of Bedford public about infectious diseases.	Educate the public on pandemics, including isolation, quarantine, triage, and medical care.	6 months	Tarrant County Public Information Office	N/A	N/A	N/A
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Drought	Review the City of Bedford's water enforcement legislation and update as necessary to mitigate the effects of drought.	Review current legislation for water conservation enforcement in the City of Bedford.	On Going	Code Enforcement Department	$0	N/A	Budget
		STATUS: Completed and ongoing					
		Develop or update water conservation enforcement legislation to ensure effective practices during periods of drought.	On Going	Code Enforcement Department	$0	N/A	Budget
		STATUS: Completed and ongoing					
Drought	Develop contingency plans for the City of	Review current contingency plans.	2015	Trinity River Authority	$0	N/A	Budget
		STATUS: Completed and ongoing					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	Bedford to ensure adequate power and water supply during prolonged periods of drought.	Develop or update potable water contingency plans.	2015	Public Works Department	$2,000,000	N/A	None
		STATUS: Completed					
		Develop or update power supply contingency plans.	2018	Public Works Department	$400,000	N/A	None
		STATUS: Completed					
Drought	Upgrade water and irrigation systems to conserve water in the City of Bedford	Upgrading irrigation systems, installing better water fixtures at critical facilities, replace aging/leak delivery systems, upgrade domestic meters.	2020	Public Works Department	$6,000,000	Reduce usage by 15%	None
		STATUS: Deferred to 2020 HazMAP					
Drought	Upgrade water and irrigation systems to conserve water in the City of Bedford	(Insert specific projects to be accomplished to mitigate drought. For example, upgrading irrigation systems, installing better water fixtures at critical facilities, etc.).	Annually	Tarrant County, all participating jurisdictions	$1,000	$2,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Drought	Develop a drought awareness education program for the City of Bedford citizens.	Evaluate the hazards posed by drought in the City of Bedford.	2015	Public Works Department, Fire Department , Public Health Department	$5,000	N/A	Budget
		STATUS: Completed					
		Develop a drought awareness education program that provides tips and pertinent information for ensuring the protection of property and the environments against drought.	2014	Public Information Office	$2,000	N/A	Budget
		STATUS: Completed					
Drought	Distribute drought awareness information to the City of Bedford citizens.	Provide drought awareness information to the City of Bedford citizens through a social media campaign.	2015	Public Information Office	$20,000	N/A	None
		STATUS: Completed					
		Provide drought awareness information through the Bedford's city website.	2015	Information Services Department	$0	N/A	Budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
Terrorism	Ensure officers provide for the safety of the public in the immediate vicinity of the investigation/ incident in the City of Bedford.	Control ingress/egress to the area.	Completed	Bedford Police Department	$4,500	$18,000	Bedford
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Evacuate area residents/businesses as necessary.	Completed	Bedford Police and Fire Departments			Bedford
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Site security/hazard mitigation during investigation.	Completed	Bedford Police and Fire Departments			Bedford
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Terrorism	Provide for the safety of emergency responders in the City of Bedford during investigations.	Plan and implement site security/hazard mitigation during the investigation.	Completed	Bedford Police and Fire Departments	$1,000	$4,000	Bedford
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Develop and utilize a call list for specialized personnel to assist in high-risk incidents/investigations involving hazardous	Completed	Bedford Police and Fire Departments			Area agencies and the Bureau of Alcohol, Tobacco, Firearms and

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		chemicals and/or bomb-making components.					Explosives (ATF)
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Terrorism	Provide security and traffic control for the City of Bedford annual July 4th "4-Fest" event.	Calculate police personnel requirements and availability and then prepare a viable plan with schedules and assignments.	Completed	Bedford	$8,000	$32,000	Bedford
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Determine points of ingress/egress to event site for management purposes.	Completed	Bedford	Unknown	Unknown	Unknown
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Terrorism	Provide security and traffic control for the City of Bedford annual Blues Fest event.	Calculate police personnel requirements and availability and then prepare a viable plan with schedules and assignments.	Completed	Bedford	$11,000	$44,000	Bedford
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Determine points of ingress/egress to event site for management purposes.	Completed	Bedford	Unknown	Unknown	Unknown

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Terrorism	Increase citizen domestic and international terrorism awareness, preparedness, and response in the City of Bedford for public events.	Increase public terrorism awareness through public speaking engagements.	12 months	Police Department	$1,000	$5,000	City budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Lightning	Protect communication infrastructure in the City of Bedford from lightning.	Evaluate the need for lightning protection on communications infrastructure in the city of Bedford.	2018	Risk Management Department, Engineering Department	$5,000	N/A	None
		STATUS: Deferred to 2020 HazMAP					
		Install lightning rods on existing and future communication infrastructure.	2020	Facility Maintenance Department	$200,000	$2,000,000	None
		STATUS: Deferred to 2020					
Lightning	Ensure the City of Bedford critical facilities are	Evaluate the need for lightning protection for the city of Bedford critical facilities.	2018	Risk Management Department,	$5,000	N/A	None

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	protected against lightning.			Engineering Department			
		STATUS: Deferred to 2020 HazMAP					
		Install lightning rods and other protective equipment on critical facilities.	2020	Facility Maintenance Department	$300,000	$30,000,000	None
		STATUS: Deferred to 2020					
Lightning	Develop a lightning preparedness education program for the City of Bedford citizens.	Evaluate the hazards posed by lightning in the city of Bedford.	Ongoing	Office of Emergency Management	$2,000	N/A	Budget
		STATUS: Completed and ongoing					
		Evaluate the hazards posed by lightning in the city of Bedford.	2018	Office of Emergency Management, Public Health Department	$5,000	N/A	Budget
		STATUS: Completed					
Lightning	Distribute lightning preparedness information to the City of Bedford citizens.	Provide lightning preparedness information to Bedford citizens through a social media campaign.	On Going	Public Information Office	$10,000	N/A	Budget
		STATUS: Completed and ongoing					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Provide lightning awareness information at outdoor spaces throughout the city of Bedford.	On Going	Public Information Office	$0	N/A	Budget
		STATUS: Deleted – managed by another agency.					
Hazardous Materials	Provide the City of Bedford fire personnel with the necessary gear to respond to hazmat releases.	Evaluate the hazmat gear currently provided by the city of Bedford Fire Department.	Ongoing	Fire Department	$2,000	N/A	Budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Acquire the gear needed as identified in the evaluation.	Ongoing	Fire Department	$20,000	N/A	Budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Hazardous Materials	Ensure the City of Bedford fire department has the equipment necessary to respond to hazmat releases.	Evaluate the hazmat equipment currently owned by the city of Bedford Fire Department.	Ongoing	Fire Department	$2,000	N/A	Budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Acquire the equipment needed as identified in the evaluation.	Ongoing	Fire Department	Ongoing	N/A	Budget, bonds
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Hazardous Materials	Develop a hazardous materials awareness education program for the City of Bedford citizens.	Evaluate hazardous materials that are used or transported in the city of Bedford.	Ongoing	Office of Emergency Management	$2,000	N/A	Budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Develop a hazardous materials awareness education program that provides tips and pertinent information for ensuring the protection of property and people from hazardous materials.	Ongoing	Tarrant County Office of Emergency Management, Public Health Department	$2,000	N/A	Budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Hazardous Materials	Distribute hazardous materials awareness information to the City of Bedford citizens.	Provide hazardous materials awareness information to Bedford's citizens through a social media campaign.	Ongoing	Public Information Office	$2,000	N/A	Budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Provide hazardous materials awareness information through the Bedford's city website.	Ongoing	Public Information Office	$0	N/A	Budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Hazardous Materials	Improve the evacuation of the City of Bedford citizens during a hazardous event.	Partner with the American Red Cross to locate shelter locations within the city of Bedford.	Annually	Tarrant County Office of Emergency Management	$0	N/A	Budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
		Secure agreements with the American Red Cross and the school district for shelters.	Annually	Tarrant County Office of Emergency Management	$0	N/A	Budget
		STATUS: Deleted – no longer addressing technological hazards in mitigation action plan.					
Extreme Temperatures	Ensure the City of Bedford has an extreme heat plan in place.	Review current plans and procedures related to extreme heat.	2015	Office of Emergency Management	$0	N/A	Budget
		STATUS: Completed					
		Develop or update extreme heat plans and ensure they provide procedures for opening cooling centers and providing public information.	2015	Office of Emergency Management	$2,000	N/A	Budget
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Identify extreme heat plans for critical	Evaluate the need for extreme heat plans for critical infrastructure to	2016	Office of Emergency Management,	$2,000	N/A	Budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	infrastructure in the City of Bedford.	ensure essential functions continue in the event of high temperatures.		Parks Department, Public Works Department			
		STATUS: Deferred to 2020 HazMAP					
		Develop or update plans and procedures for critical infrastructure when high temperatures are present.	2016	Office of Emergency Management, Parks Department, Public Works Department	$2,000	N/A	Budget
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Develop an extreme heat preparedness education program for City of Bedford citizens.	Evaluate the hazards posed by extreme heat in the City of Bedford.	2016	Office of Emergency Management, Tarrant County Public Health Department	$0	N/A	Budget
		STATUS: Completed					
		Develop an extreme heat preparedness education program that provides tips and pertinent information for ensuring the health	2016	Office of Emergency Management, Tarrant County Public	$10,000	N/A	Budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		and safety of citizens during extreme heat.		Health Department			
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Distribute extreme heat preparedness information to City of Bedford citizens.	Provide extreme heat preparedness information to the City of Bedford citizens through a social media campaign.	Ongoing	Public Information Office	$3,000	N/A	Budget
		STATUS: Completed and ongoing					
		Provide extreme heat preparedness information through the Bedford's city website.	Ongoing	Public Information Office	$0	N/A	Budget
		STATUS: Completed and ongoing					
Expansive Soils	Mitigate expansive soils in the City of Bedford.	Improve construction techniques through building code enhancements.	Ongoing	Building Department	$5,000	N/A	Budget
		STATUS: Completed and ongoing					
		Educate construction contractors, homeowners, and business owners about mitigation techniques.	Ongoing	Building Department	$5,000	N/A	Budget
		STATUS: Completed and ongoing					

5.3 New Action Items

The City of Bedford's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[2] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Thunderstorms, Tornadoes**
Evaluate the current conditions of critical facilities to determine which ones, if any, need safe rooms installed.	
Participating Jurisdiction:	City of Bedford
Priority:	1
Estimated Cost:	$45,000
Estimated Benefit:	$270,000
Potential Funding Source(s):	Grants, general fund, county funds
Lead Agency/Department Responsible:	Office of Emergency Management, Risk Management Department
Implementation Schedule:	36 months

Hazard(s) Addressed	**Earthquakes, Thunderstorms, Tornadoes**
Install safe rooms, as needed, in existing and future critical facilities to protect employees and visitors during inclement weather.	
Participating Jurisdiction:	City of Bedford
Priority:	2
Estimated Cost:	$1,500,000
Estimated Benefit:	$9,000,000
Potential Funding Source(s):	Grants, general fund, county funds
Lead Agency/Department Responsible:	Office of Emergency Management, Risk Management Department
Implementation Schedule:	48 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Tornadoes, Thunderstorms
Install lightning rods and other protective equipment on existing and future communication infrastructure and critical facilities based on a city evaluation.	
Participating Jurisdiction:	City of Bedford
Priority:	3
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Risk Management Department, Facility Maintenance
Implementation Schedule:	36 months

Hazard(s) Addressed	Flooding
Conduct structure improvements to improve channel degradation caused by erosion due to flooding. Includes such actions as installing concrete retaining walls and reconstructing channel slopes.	
Participating Jurisdiction:	City of Bedford
Priority:	4
Estimated Cost:	$355,000
Estimated Benefit:	$213,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Add one 10’ x 10’ concrete box culvert (CBC) to the four existing CBCs along Sulphur Branch at Circle Lane. This will increase the existing conditions to 100-year flood level of protection in order to protect the traffic flow on streets as well as keep roadways open to allow for emergency vehicles and to protect public safety.	
Participating Jurisdiction:	City of Bedford
Priority:	5
Estimated Cost:	$500,000
Estimated Benefit:	$3,000,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Extreme Heat
Develop and implement an extreme heat plan for the city and ensure it provides procedures for opening cooling centers and providing public information.	
Participating Jurisdiction:	City of Bedford
Priority:	6
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City budget, hazard mitigation grants, staff time
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Extreme Heat
Develop and implement extreme heat plans and procedures for critical infrastructure to ensure essential functions continue in the event of high temperatures.	
Participating Jurisdiction:	City of Bedford
Priority:	7
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Office of Emergency Management, Public Information Office
Implementation Schedule:	18 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Install outdoor storm shelters at Boys Ranch Park & Activity Center | 2801 Forest Ridge Dr., Brook Hollow Park | 600 Block of Rankin, Monterrey Park | 1000 Block of Monterrey, Central Park / Pool | 1200 Central Drive, Stormie Jones Park | 2500 Block of Brasher, Bedford Trails / Harris Ryals Park / Linear Park, Meadow Park Athletic Complex | 3200 Meadow Park, Carousel Park | 1100 Simpson Terrace.	
Participating Jurisdiction:	City of Bedford
Priority:	8
Estimated Cost:	$2,000,000
Estimated Benefit:	$12,000,000
Potential Funding Source(s):	Grants, general fund, county funds
Lead Agency/Department Responsible:	Risk Management Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Earthquakes, Expansive Soils, Thunderstorms, Tornadoes
Adopt and implement most current building codes that require all new building slabs to be engineered to reduce potential damage done by earthquakes and/or expansive soils along with any other building requirements to mitigate the damage from severe weather.	
Participating Jurisdiction:	City of Bedford
Priority:	9
Estimated Cost:	$8,000
Estimated Benefit:	$48,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Economic Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Winter Storms
Enhance the winter weather mitigation plan.	
Participating Jurisdiction:	City of Bedford
Priority:	10
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, Hazard Mitigation Grant Program (HMGP)
Lead Agency/Department Responsible:	Public Works Department, Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct structure improvements to improve channel degradation caused by erosion; includes such actions as replacing rip-rap section with gabion basket and regarding steep slopes.	
Participating Jurisdiction:	City of Bedford
Priority:	10
Estimated Cost:	$500,000
Estimated Benefit:	$3,000,000
Potential Funding Source(s):	City budget, Hazard Mitigation Grant Program (HMGP)
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Enhance irrigation systems, install low water fixtures at all critical facilities, replace aging/leaking delivery systems, and enhance domestic meters.	
Participating Jurisdiction:	City of Bedford
Priority:	11
Estimated Cost:	$6,000,000
Estimated Benefit:	$36,000,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department, Parks Department, Facility Maintenance
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Enhance the public education program to provide mitigation strategies for the identified hazards.	
Participating Jurisdiction:	City of Bedford
Priority:	12
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Parks Department, Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Extreme Heat
Enhance Stonegate Well and pump house (replace electrical, pumps and equipment) to withstand drought and heat conditions, to include the installation of a generator.	
Participating Jurisdiction:	City of Bedford
Priority:	13
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Earthquakes, Expansive Soils
Utilize standards for expansive soils on new water line replacements and installation.	
Participating Jurisdiction:	City of Bedford
Priority:	14
Estimated Cost:	$75,000,000
Estimated Benefit:	$4,500,000,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Install impact-resistant roofs and windows in existing and future critical facilities, including schools, as necessary.	
Participating Jurisdiction:	City of Bedford
Priority:	15
Estimated Cost:	$3,000,000
Estimated Benefit:	$18,000,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Risk Management Department, Facilities Maintenance
Implementation Schedule:	36 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Bedford
Priority:	16
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the floodplain administrator to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	City of Bedford
Priority:	17
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Bedford
Priority:	18
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Bedford
Priority:	19
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Bedford
Priority:	20
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Bedford
Priority:	21
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Promote conservation of open space to alleviate pressure on stormwater runoff and to promote water absorption through the soil.	
Participating Jurisdiction:	City of Bedford
Priority:	22
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Bedford
Priority:	23
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Annual Budget Review	City Administration, department heads	Annually	Allowances will be made in accordance with grant applications sought or mitigation actions that will be undertaken according to the Implementation schedule of the specific action.	Various departments and key personnel that participate in the planning process will review the plan and mitigation actions therein when conducting their annual budget review.
Grant Applications	City Administration, department heads	As Needed	The HazMAP will be consulted by planning team members whenever grant funding is sought for mitigation projects.	If a project is not in the plan, an amendment may be necessary to include the action in the plan.
Capital Improvement Plans	City Administration, Plan Committees	As Needed	Drainage improvement projects, Outdoor Warning Sirens, and shelter areas within city parks.	When reviewing the Capital Improvement Plan, the leadership team will review the mitigation action plan to see which action items can be addressed with the fiscal and administrative capabilities of the city.
Regulatory Plans	City Administration, department heads	As Needed	Reference this HazMAP when developing the plan.	The plan will be consulted when city departments review or revise their current regulatory planning mechanisms, or in the development of regulatory plans that are not currently in place.
Drainage Master Plan	Public Works Department	As Needed	Notations of potential drainage concerns.	City leadership and public works staff will review identified mitigation action items and consider plan revision as necessary to address them.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
2020 Parks Master Plan	Parks and Recreation Department	Every 10 years	Reference this HazMAP when developing the plan.	When reviewing the Parks Master Plan, the Parks and Recreation Department will review the mitigation action plan to see which action items can be addressed with the fiscal and administrative capabilities of the city.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Bedford. For additional information, see Appendices A and B.

City of Blue Mound

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Blue Mound was the Fire Chief.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided is for the City of Blue Mound alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Blue Mound will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at NCTCOG.

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Blue Mound has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Blue Mound's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Fire Chief.

The LPT was assembled in 2017 with representatives from the City of Blue Mound. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Blue Mound Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Blue Mound	Fire Department	Fire Chief	General oversight, hazard identification, and plan development
City of Blue Mound	Police Department	Police Chief	General oversight
City of Blue Mound	Public Works Department	Public Works Director	Hazard identification and plan development
City of Blue Mound	City Council	Mayor	General oversight

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no recorded change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: A full list of completed mitigation actions items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Blue Mound.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	49,528
Persons under 5 years (%)	5.4
Persons 65 years and over (%)	16
Language other than English spoken at home (%)	17.2
With a disability, under age 65 (%)	6.8
Persons without health insurance, under age 65 (%)	14.4
Persons in poverty (%)	7.4
Median household income	$62,701
Households, 2012-2016	21,205
Median value of owner-occupied housing units, 2012-2016	$169,700

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Blue Mound.

City of Blue Mound Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
City Hall / Library 301 South Blue Mound Road	Administration	5 people	3,460	$100,000	$50,000
Police/Fire Station 301 South Blue Mound Road	Law Enforcement/ Fire Protection	50 people	3,000	$100,000	$1,000,000
Community Center 1824 Fagan Drive	Community Center	100 people	1,800	$50,000	$10,000
Elementary School 701 Waggonman Road	Educational	700 people	Unknown	Unknown	Unknown
City of Blue Mound Water Facilities 1601 Bell Drive	Water Production	2 people	Unknown	$1,200,000	Unknown
City of Blue Mound Public Works Facility 1800 Fagan Dr.	Public Works / Water Storage Tanks	50 people	2,000	$200,000	unknown

3.3 Natural Hazard Profiles

The City of Blue Mound's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Blue Mound in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
N/A	Wildfire
1	Thunderstorm (includes hail, wind, lightning)
2	Tornado
3	Drought
4	Extreme Heat
5	Expansive Soils
6	Winter Storms
7	Flooding
8	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Blue Mound.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal due to the minor extent expected.

Jurisdiction's ground-water supply: There are elevated storage wells of 75,000 gallons and ground storage wells of 320,000 gallons.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: There are no water restrictions in the City of Blue Mound.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Unknown. The Department of Public Works does not track road damage caused by expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from summer heat. People who work outside or in buildings without air-conditioning are also at high risk to the direct effects of extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? There are no cases of extreme heat exposure recorded.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. There is one square mile and 500 residential parcels in the 100-year floodplain.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: No intersections have been reported.

Names of any creeks or rivers that flood: Blue Mound Creek and Little Fossil Creek.

Names of dams within the city: There are no dams within the city.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Blue Mound is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480587#
Community Name	City of Blue Mound
County	Tarrant County
Initial FHBM Identified	12/17/73
Initial FIRM Identified	07/16/80
Current Effective Map Date	09/25/09
Reg-Emer Date	07/16/80
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? There is no floodplain administrator.

What specific flooding ordinances and plans does your jurisdiction have? There is no floodplain ordinance in place.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? There are no building requirements.

What building restrictions, in regard to floodplains, does your jurisdiction enforce? There are no building restrictions.

Repetitive and Severe Repetitive Loss Properties: There are currently 0 repetitive loss properties and 0 severe repetitive loss properties within the City of Blue Mound. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Though the City of Blue Mound is an NFIP participant, data about their flood program was unavailable. The city will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of thunderstorms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): In 2016, there was $1,000 in property damage from thunderstorm winds.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	N/A
Probability of Future Occurrence	N/A
Maximum Probable Extent	N/A
Potential Impact	N/A
Vulnerabilities	Wildfires are not a threat to the City of Blue Mound because there is no large amount of open-space in the developed community.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: There are no bridges or overpasses reported within the City of Blue Mound.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Blue Mound between 2015 and 2017. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Blue Mound	5/27/2015	Flash Flood		0	0	$0	$0	
Blue Mound	3/8/2016	Thunderstorm Wind	52	0	0	$1,000	$0	EG
Blue Mound	6/2/2017	Flash Flood		0	0	$0	$0	
Total				**0**	**0**	**$1,000**	**$0**	

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Blue Mound identified their greatest vulnerability and concern:

- The City of Blue Mound is a small jurisdiction and could quickly become overwhelmed if a disaster strikes; therefore, the use of mutual aid is extremely important.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Blue Mound's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Some; Yes; Yes
Capital Improvement Plan	No	
Economic Development Plan	No	
Local Emergency Operations Plan	No	Tarrant County Emergency Management Plan
Continuity of Operations Plan	No	
Transportation Plan	Yes	Yes; No; No
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	Yes	Tarrant County HazMAP: Yes; Yes; Yes
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	
Acquisition of land for open space and public recreation uses	No	

Building Code; Permitting; and Inspections	Have capability?	
Building Code	Yes	**Version/Year:** ICC 2012
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating**: 7
Site Plan Review Requirements	Yes	**Type(s) of requirement:** staff reviews
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and Zoning; Yes
Mitigation Planning Committee	Yes	Planning and Hazard Assessment; Yes
Maintenance programs to reduce risk (e.g.; tree trimming; clearing drainage systems)	Yes	Tree Trimming; maintenance and clearing of draining systems; Yes
Mutual Aid Agreements	Yes	Response and assistance; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	PT	Yes; Yes; Yes
Floodplain Administrator	No	
Emergency Manager	PT	Yes; Yes; Yes
Community Planner	No	
Civil Engineer	No	
GIS Coordinator	No	
Other:	Yes	Police Chief, Fire Chief, Emergency Manager, Public Works Director
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g.; Reverse 911; outdoor warning signals)	Yes	Outdoor Warning System; Yes
Hazard data and information	No	
Grant writing	Yes	Police grant writing; No
HaZUS analysis	No	Don't use; FEMA software outdated
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection; emergency preparedness; access and functional needs populations; etc.	No	
Ongoing public education or information program (e.g.; responsible water use; fire safety; household preparedness; environmental education)	Yes	Brochures; on-line; website; responsible water use sent with utility bill; Yes
Natural disaster or safety related school programs	Yes	Public education for fire; Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	Red Cross sheltering; Yes
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If Yes; for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	No; Yes
Authority to levy taxes for specific purposes	No	
Fees for water; sewer; gas; and/or electric services	Yes	Water only; Yes
Impact fees for new development	No	
Stormwater utility fee	No	
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	No; Yes
Incur debt through private activities	No	

Funding Resources	Have capability?	Has the funding resource been used in past? If Yes; for what type of activities? Could the resource be used to fund future mitigation actions?
Community Development Block Grant	Yes	Yes; street; Texas Division of Transportation (TxDOT) grant; Yes
Other federal funding programs	Yes	Yes; police grants for equipment; Yes
State funding programs	Yes	Yes; police grants for equipment; Yes
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, policies, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates, and additions to existing plans as new needs are recognized. Continuing to involve citizens and non-profit organizations could lead to reduced costs for labor and a secondary source of funding. Communicating through different media outlets to inform citizens of actions they can take to reduce risks can also be expanded. Additional funding would permit the addition of more staff involved in mitigation measures, such as a full-time Emergency Manager, Civil Engineer, Geographic Information System Coordinator, and Grant Administrator.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Blue Mound's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires, Extreme Temperatures, Hazardous Materials Spills, Infectious Disease Outbreak	Provide hazard awareness, preparedness, and training information to citizens of Blue Mound.	Develop/maintain a website for citizen information: shelter locations, shelter-in-place, safe room information, and links to awareness web sites.	2 years	City Administration	$1,500	$6,000	Budget
		STATUS: Completed and ongoing					
Severe Thunderstorms and High Winds, Tornadoes	Ensure outdoors spaces in Blue Mound have adequate shelter for high wind events such as severe thunderstorms or tornadoes.	Review current jurisdictional ordinances and building codes related to high winds.	Ongoing	Engineering Department	$500	N/A	Budget
		STATUS: Completed and ongoing					
		Develop or update ordinances and building codes to recommend new developments or	Ongoing	Building Development	$5,000	N/A	Budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		facilities are built with high wind resistant windows as needed.					
		STATUS: Completed and ongoing					
Severe Thunderstorms and High Winds, Tornadoes	Ensure critical facilities in Blue Mound have adequate safe rooms to protect against high wind events and tornadoes.	Evaluate the current conditions of critical facilities to determine which ones, if any, need safe rooms installed.	Annually	Tarrant County, all participating jurisdictions	Unknown	$500	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Determine the size and space needed to shelter the population of the critical facility.	Annually	Tarrant County, all participating jurisdictions	Unknown	$500	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
		Install safe rooms as needed in critical facilities.	Annually	Tarrant County, all participating jurisdictions	$5,000	$5,000	Hazard Mitigation Grant Program (HMGP)
		STATUS: Completed and ongoing					
Severe Thunderstorms and High Winds,	Ensure Blue Mound ordinances and building codes reflect the need for high wind resistant	Review current jurisdictional ordinances and building codes related to high	Annually	Tarrant County, all participating jurisdictions	$5,000	$20,000	Tarrant County, individual jurisdiction

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Tornadoes	windows in new developments and facilities.	winds.					budgets
		STATUS: Completed and ongoing					
		Develop or update ordinances and building codes to recommend new developments or facilities are built with high wind resistant windows as needed.	Annually	Tarrant County, all participating jurisdictions	$5,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Severe Thunderstorms and High Winds, Tornadoes	Ensure Blue Mound critical facilities, including schools, have high wind resistant windows in place.	Evaluate the need for high wind resistant windows in critical facilities.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Install high wind resistant windows as necessary in critical facilities, including schools.	Annually	Tarrant County, all participating jurisdictions	$10,000	$10,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Severe Thunderstorms and High Winds,	Develop a severe thunderstorm and tornado preparedness education program for	Evaluate the hazards posed by high wind events in Blue Mound.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Tornadoes	Blue Mound citizens.						budgets
		STATUS: Completed and ongoing					
		Develop a severe weather preparedness education program that provides tips and pertinent information for protecting property against high wind damage.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Severe Thunderstorms and High Winds, Tornadoes	Distribute severe weather preparedness information to Blue Mound citizens.	Provide severe weather preparedness information to Blue Mound citizens through a social media campaign, including severe thunderstorms and tornadoes.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Ensure the Blue Mound website is updated during tornado season to educate citizens on severe weather preparedness.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed and ongoing					
Flooding	Decrease flood insurance premiums in Blue Mound by participating in the Federal Emergency Management Agency's (FEMA)Community Rating System (CRS) program.	Work with city officials to become a member of the CRS program.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Flooding	Review and remove repetitive loss properties in Blue Mound.	Review repetitive loss properties and work with homeowners to remove them using FEMA funding.	Unknown	Unknown	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Have automatic emergency power generators for both stations in the event that the main power supply is disrupted in the City of Blue Mound.	Identify appropriate size and type of generator for police and fire station.	2 years	City Administration	$20,000	$80,000	FEMA, City budget
		STATUS: Completed and ongoing					
Hail	Ensure Blue Mound	Evaluate which critical	Annually	Tarrant County,	Unknown	$5,000	Tarrant

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	critical facilities have hail-resistant roofing and windows installed.	facilities need hail-resistant roofing and windows installed.		all participating jurisdictions			County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Install hail-resistant roofing and windows in identified critical facilities.	Annually	Tarrant County, all participating jurisdictions	$10,000	$10,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Hail	Provide hail-resistant parking areas for Blue Mound's city vehicles.	Evaluate the need for covered parking for city vehicles to protect them against hail.	Annually	Tarrant County, all participating jurisdictions	Unknown	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Install covered parking areas as needed to protect city vehicles against hail.	Annually	Tarrant County, all participating jurisdictions	Unknown	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Deferred to 2020 HazMAP					
Hail	Develop a hail preparedness education program for Blue	Evaluate the hazards posed by hail in the city.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	Mound citizens.						jurisdiction budgets
		STATUS: Completed and ongoing					
		Develop hail preparedness education program that provides tips and pertinent information for ensuring the protection of property against hail.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Hail	Distribute hail preparedness information to Blue Mound citizens.	Provide hail preparedness information to citizens through a social media campaign.	Annually	Tarrant County, all participating jurisdictions	$500	$500	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Provide hail preparedness information through the city website.	Annually	Tarrant County, all participating jurisdictions	$500	$500	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Wildfire	Ensure Blue Mound water systems are	Evaluate the Blue Mound water system to	Annually	Tarrant County, all participating	Unknown	Unknown	Tarrant County,

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	adequate for fighting wildfires.	ensure capacity for fighting wildfires.		jurisdictions			individual jurisdiction budgets
		STATUS: Completed					
		Install or upgrade needed equipment to ensure water systems are adequate.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Wildfire	Mitigate wildfires by instituting landscaping practices at Blue Mound critical facilities.	Prevent wildfires from spreading to critical facilities by landscaping plants and brush away from buildings.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Wildfire	Review city ordinances and laws to ensure mitigation practices are in effect in Blue Mound.	Enact building permit process that encourages wildfire resistant construction.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Deleted-no longer a priority					
		Review current wildfire response plans and procedures.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
							budgets
		STATUS: Completed					
Wildfire	Ensure adequate Blue Mound wildfire response plans and procedures are in place.	Develop or update wildfire response plans and procedures.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
		Provide wildfire response training to fire personnel.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Wildfire	Provide information to Blue Mound citizens regarding the hazards posed by wildfires.	Develop a wildfire preparedness education program that provides tips and pertinent information for ensuring the protection of property against wildfires.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Wildfire	Determine the process for becoming a Firewise Community in Blue	Work with the Texas Department of Emergency	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	Mound.	Management to become a Firewise Community.					jurisdiction budgets
		STATUS: Deleted- no longer a priority					
Winter Storm	Evaluate winter weather response capabilities in Blue Mound.	Conduct an assessment of winter weather response capabilities.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Acquire equipment needed as determined by assessment.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
		Provide safety training to first responders on winter weather hazards.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Winter Storm	Evaluate winter weather planning capabilities in Blue Mound.	Conduct an assessment of winter weather plans in place for jurisdiction public works.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
							budgets
		STATUS: Completed					
		Develop or update winter weather preparedness plan.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Winter Storm	Develop a winter weather preparedness program for Blue Mound citizens.	Evaluate the hazards posed by severe winter weather in the city of Blue Mound.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
		Develop a winter weather preparedness education program that provides tips and pertinent information for avoiding hypothermia and icy conditions.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Winter Storm	Distribute winter weather preparedness information to Blue	Provide winter weather preparedness information to Blue	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	Mound residents.	Mound citizens through a social media campaign.					jurisdiction budgets
		STATUS: Completed					
		Ensure the Blue Mound website is updated during winter months to educate citizens on winter weather preparedness.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Infectious Disease Outbreak	Prepare Blue Mound first responders for mass prophylaxis distribution.	Train first responders in point of distribution (POD) procedures.	Unknown	Unknown	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
		Conduct a POD exercise to test plans and procedures.	Unknown	Unknown	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Deferred to a later time.					
Infectious Disease Outbreak	Ensure continuity procedures are in place to prepare for a long-	Review continuity of operations (COOP) plans and procedures	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	term employee shortage at Blue Mound facilities.	for city employees and facilities.					jurisdiction budgets
		STATUS: Completed and ongoing					
		Provide COOP training for jurisdiction employees.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Infectious Disease Outbreak	Develop a public information campaign to educate Blue Mound public about infectious diseases.	Educate the public on pandemics, including isolation, quarantine, triage, and medical care.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Drought	Review Blue Mound's water enforcement legislation and update as necessary to mitigate the effects of drought.	Review current legislation for water conservation enforcement in Blue Mound.	Annually	Tarrant County, all participating jurisdictions	$2,000	$10,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Develop or update water conservation enforcement legislation to ensure effective practices during periods	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		of drought.					
		STATUS: Completed and ongoing					
Drought	Develop contingency plans for Blue Mound to ensure adequate power and water supply during prolonged periods of drought.	Review current contingency plans.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Develop or update potable water contingency plans.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Develop or update power supply contingency plans.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Drought	Develop a drought awareness education program for Blue Mound citizens.	Evaluate the hazards posed by drought in Blue Mound.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed and ongoing					
		Develop a drought awareness education program that provides tips and pertinent information for ensuring the protection of property and the environments against drought.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Drought	Distribute drought awareness information to Blue Mound citizens.	Provide drought awareness information to Blue Mound citizens through a social media campaign.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Provide drought awareness information through the Blue Mound website.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Lightning	Protect communication infrastructure in Blue Mound from lightning.	Evaluate the need for lightning protection on communications	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		infrastructure in Blue Mound.					jurisdiction budgets
		STATUS: Completed and ongoing					
		Install lightning rods on existing and future communication infrastructure.	Annually	Tarrant County, all participating jurisdictions	$15,000	$15,000	Tarrant County, individual jurisdiction budgets
		STATUS: Deferred to 2020 HazMAP					
Lightning	Ensure Blue Mound critical facilities are protected against lightning.	Evaluate the need for lightning protection for Blue Mound critical facilities.	Annually	Tarrant County, all participating jurisdictions	$15,000	$15,000	HMGP
		STATUS: Deferred to 2020 HazMAP					
		Install lightning rods and other protective equipment on critical facilities.	Annually	Tarrant County, all participating jurisdictions	$15,000	$15,000	HMGP
		STATUS: Deferred to 2020 HazMAP					
Lightning	Develop a lightning preparedness education program for Blue Mound citizens.	Evaluate the hazards posed by lightning in Blue Mound.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Develop a lightning preparedness education program that provides tips and pertinent information for protecting property against lightning damage.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Lightning	Distribute lightning preparedness information to Blue Mound citizens.	Provide lightning preparedness information to Blue Mound citizens through a social media campaign.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Provide lightning awareness information at outdoor spaces throughout Blue Mound.	Annually	Tarrant County, all participating jurisdictions	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Extreme Temperatures	Ensure the Blue Mound has an extreme heat plan in place.	Review current plans and procedures related to extreme heat.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed and ongoing					
Extreme Temperatures	Identify extreme heat plans for critical infrastructure in Blue Mound.	Develop or update extreme heat plans and ensure they provide procedures for opening cooling centers and providing public information.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Evaluate the need for extreme heat plans for critical infrastructure to ensure essential functions continue in the event of high temperatures.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Develop or update plans and procedures for critical infrastructure when high temperatures are present.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Extreme Temperatures	Develop an extreme heat preparedness	Evaluate the hazards posed by extreme heat	Annually	Tarrant County, all participating	$1,000	$5,000	Tarrant County,

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	education program for Blue Mound citizens.	in Blue Mound.		jurisdictions			individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Develop an extreme heat preparedness education program that provides tips and pertinent information for ensuring the health and safety of citizens during extreme heat.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Extreme Temperatures	Distribute extreme heat preparedness information to Blue Mound citizens.	Provide extreme heat preparedness information to the Blue Mound citizens through a social media campaign.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
		Provide extreme heat preparedness information through the Blue Mound's website.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Expansive soils	Mitigate expansive soils in the Blue Mound.	Improve construction techniques through building code enhancements.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
		Educate construction contractors, homeowners, and business owners about mitigation techniques.	Annually	Tarrant County, all participating jurisdictions	$1,000	$5,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed and ongoing					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes, Extreme Temperatures	Ensure consistent power supply during outages.	Purchase and install automatic emergency power generators for critical infrastructure in the event that the main power supply is disrupted in the City of Blue Mound.	6 months	Public Works Department, Fire Department	$300,000	$1,200,000	Local funds, HMGP, PDM
		STATUS: Completed					

5.3 New Action Items

The City of Blue Mound's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Earthquakes, Expansive Soils, Flooding, Tornadoes**
Adopt and implement most current International Code Council (ICC) building codes for new and existing buildings to mitigate the damage from these identified hazards.	
Participating Jurisdiction	City of Blue Mound
Priority:	1
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	City budget, building permit fees
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	**Earthquakes, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms**
Enhance alert capabilities for phone, text, and email by implementing a mass notification system.	
Participating Jurisdiction	City of Blue Mound
Priority:	2
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Earthquakes, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Eliminate potential loss of power to municipal buildings from these identified hazards with the installation of backup generators for electrical power in municipal buildings.	
Participating Jurisdiction	City of Blue Mound
Priority:	3
Estimated Cost:	$225,000
Estimated Benefit:	$1,350,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Risk Management Department, Facility Maintenance
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Enhance the comprehensive public education program with recommended activities to mitigate the impact of each identified hazard.	
Participating Jurisdiction	City of Blue Mound
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City Budget
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Educate city employees on the most “at-risk” populations in the city and how to mitigate the risks to these populations.	
Participating Jurisdiction	City of Blue Mound
Priority:	5
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City Budget
Lead Agency/Department Responsible:	Office of Emergency Management, Fire Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Retrofit existing and future city buildings with impact-resistant roofing material.	
Participating Jurisdiction	City of Blue Mound
Priority:	6
Estimated Cost:	$6,000
Estimated Benefit:	$36,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Building Officials
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Provide flood mitigation risk mapping materials for property owners in floodplains.	
Participating Jurisdiction	City of Blue Mound
Priority:	7
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Conduct a hydrologic study to determine threat, risk, and potential impacts of flooding from Little Fossil Creek.	
Participating Jurisdiction	City of Blue Mound
Priority:	8
Estimated Cost:	$2,000,000
Estimated Benefit:	$12,000,000
Potential Funding Source(s):	Grants, general fund, county funds
Lead Agency/Department Responsible:	Public Works Department, Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Create and implement a drought contingency plan for city facilities and property.	
Participating Jurisdiction	City of Blue Mound
Priority:	9
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, hazard mitigation grants, water suppliers
Lead Agency/Department Responsible:	Public Works Department, Office of Emergency Management
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought
Create and implement a water conservation program for public and residential property.	
Participating Jurisdiction	City of Blue Mound
Priority:	10
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City budget, hazard mitigation grants, private companies
Lead Agency/Department Responsible:	Public Works Department, Office of Emergency Management
Implementation Schedule:	18 months

Hazard(s) Addressed	Flooding
Hire a floodplain administer to oversee the National Flood Insurance Program (NFIP).	
Participating Jurisdiction:	City of Blue Mound
Priority:	11
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	City Manager
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Develop a floodplain ordinance.	
Participating Jurisdiction:	City of Blue Mound
Priority:	12
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Blue Mound
Priority:	13
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Blue Mound
Priority:	14
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes..	
Participating Jurisdiction:	City of Blue Mound
Priority:	15
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Blue Mound
Priority:	16
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Comprehensive Plan	Planning, Zoning, and Public Works Departments	Annually	Reference this HazMAP when developing the plans for critical infrastructure and resources.	The plan development team will reference the HazMAP when updating this plan, in such areas as strengthening critical infrastructure and key resources based on HazMAP hazard analysis; incorporating vulnerability data and action items.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Blue Mound. For additional information, see Appendices A and B.

City of Colleyville

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Colleyville was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Colleyville alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

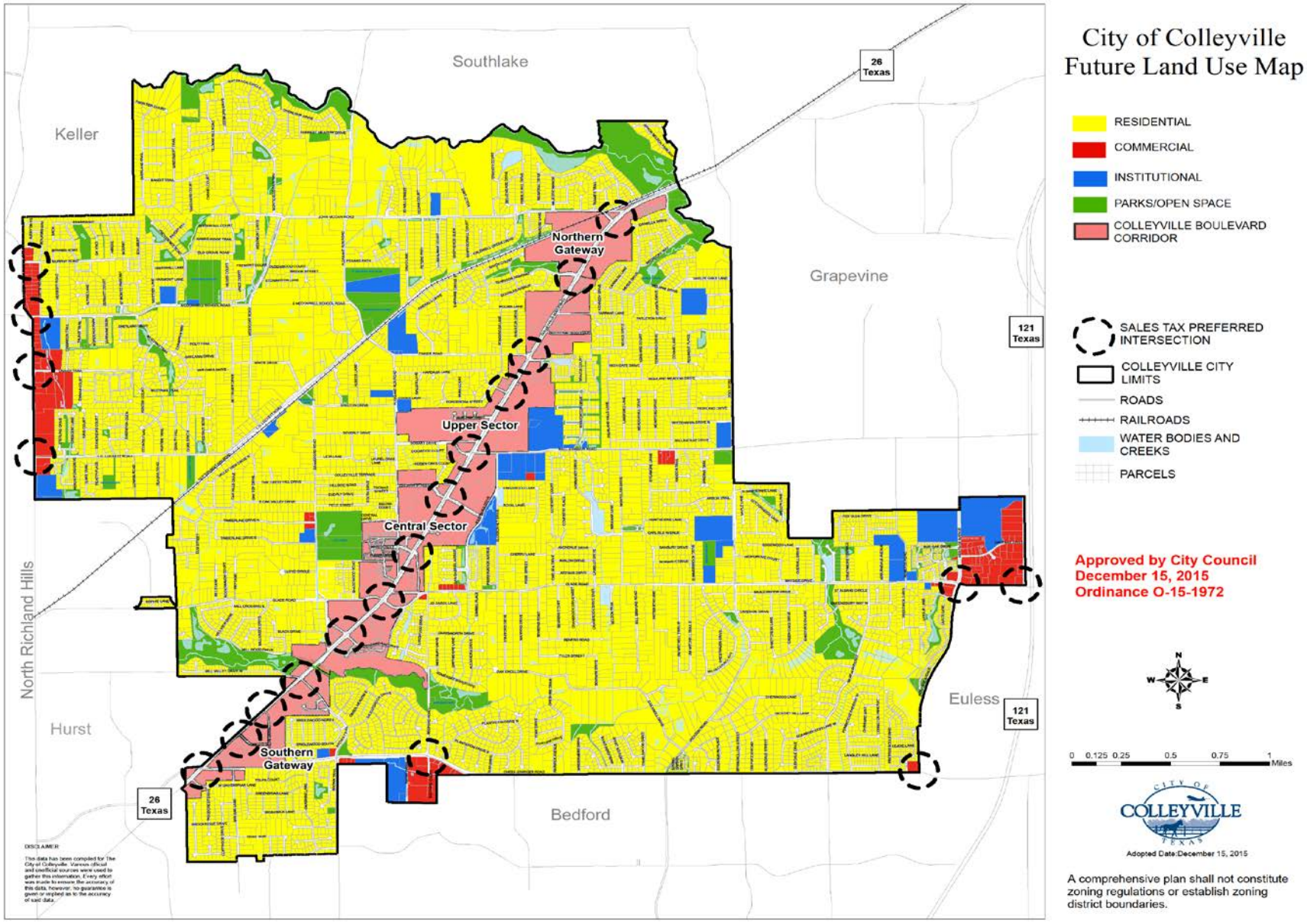
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Colleyville will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at NCTCOG.

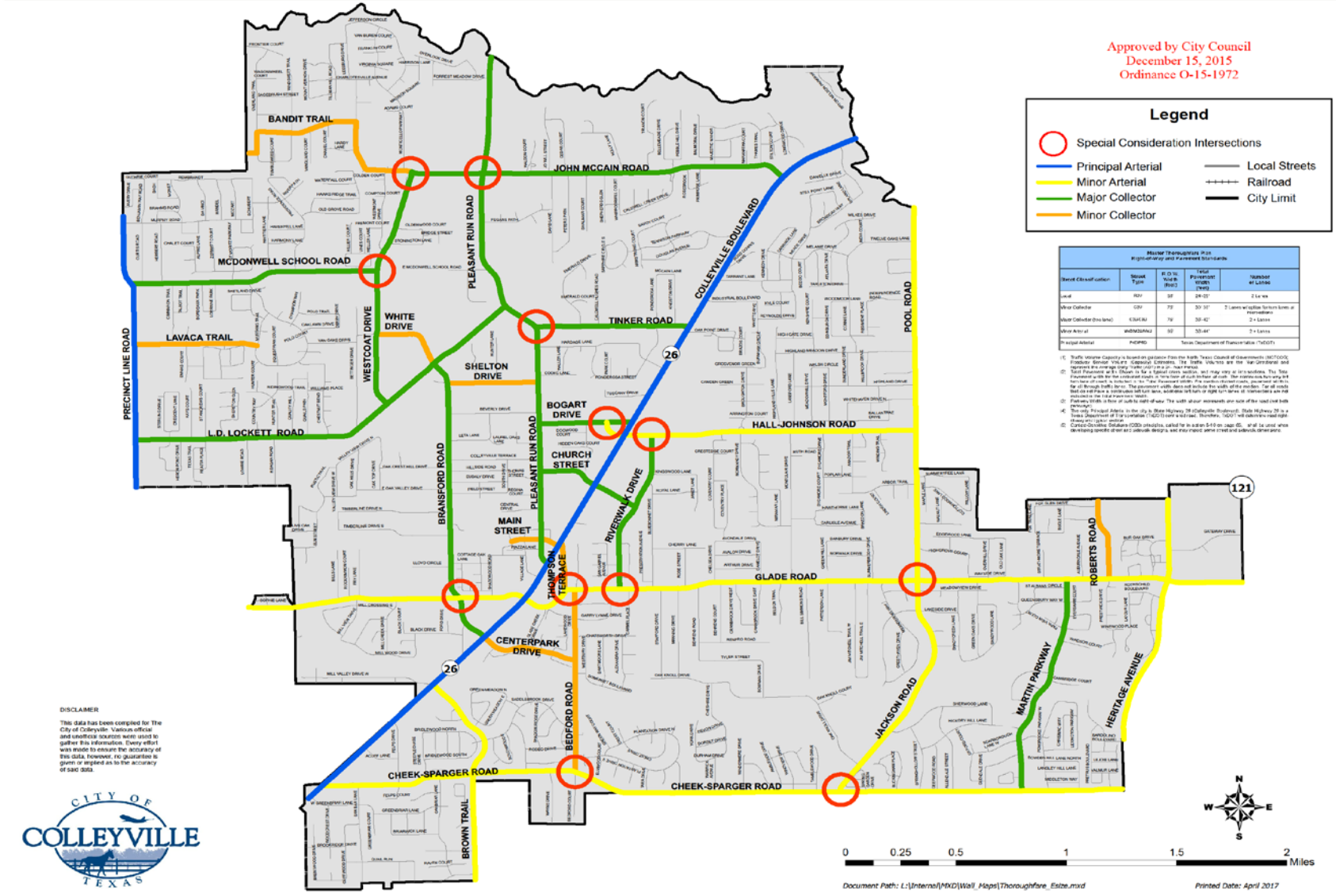
1.4 Supporting Maps

The following maps provide an overview of the City of Colleyville:

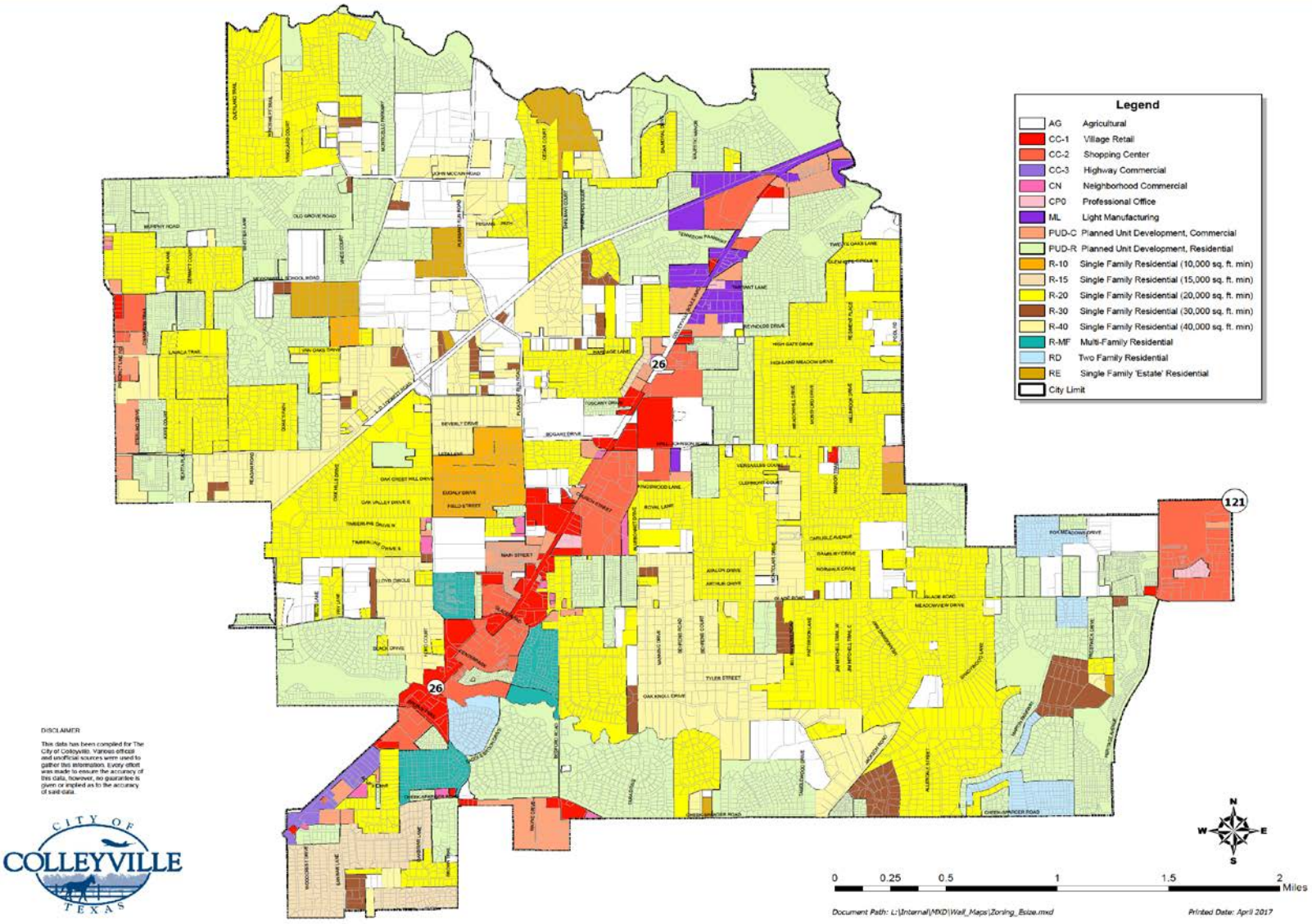
- Future Land Use Map
- Master Thoroughfare Map
- Zoning Map


City of Colleyville
Future Land Use Map
RESIDENTIAL
COMMERCIAL
INSTITUTIONAL
PARKS/OPEN SPACE
COLLEYVILLE BOULEVARD CORRIDOR
SALES TAX PREFERRED INTERSECTION
COLLEYVILLE CITY LIMITS
ROADS
RAILROADS
WATER BODIES AND CREEKS
PARCELS
Approved by City Council
December 15, 2015
Ordinance O-15-1972
Southlake
Keller
Grapevine
Euless
Bedford
Hurst
North Richland Hills
Northern Gateway
Upper Sector
Central Sector
Southern Gateway
26 Texas
121 Texas
0 0.125 0.25 0.5 0.75 1 Miles
COLLEYVILLE
Adopted Date:December 15, 2015
A comprehensive plan shall not constitute zoning regulations or establish zoning district boundaries.

City of Colleyville Master Thoroughfare Plan



City of Colleyville Zoning



Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Colleyville has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Colleyville's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Colleyville. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Colleyville Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Colleyville	Office of Emergency Management	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Colleyville	Fire Department	Chief	Hazard identification and plan development
City of Colleyville	Police Department	Assistant Chief	Hazard identification and plan development
City of Colleyville	Engineering Department	City Engineer Stormwater	Hazard identification and plan development
City of Colleyville	Public Works Department	Director	Hazard identification and plan development
City of Colleyville	Public Works Department	Manager	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no chance since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: • Currently developing a mitigation project for flooding. • Waiting approval for a generator for the City Hall/back-up Emergency Operations Center. • Updating roads to include drainage. • Adopted new fire and building codes in November 2014. A full list of completed mitigation action items are described in Chapter 5 of this annex.

Declared Disaster Code	Incident Period	Date Declared	Description	Impact
DR-4223	May 4-June 23, 2015	May 29, 2015	Severe storms, tornadoes, strait-line winds, and flooding	All low water crossing closed and had to be cleaned before reopening. Sparger Park Flooded and was damaged. Recovered $11,500 from FEMA.
DR-4245	Oct. 22-31, 2015	November 25, 2015	Severe storms, tornadoes, straight-line winds, and flooding	Trees and branches in roads, low water crossings closed.
DR-4266	March 7-29, 2016	March 19, 2016	Severe storms, tornadoes, and flooding	Low water crossing closed.

Declared Disaster Code	Incident Period	Date Declared	Description	Impact
DR-4269	April 17-30, 2016	April 25, 2016	severe storms and flooding	Low water crossings closed.
DR-4272	May 26-June 24, 2016	June 11, 2016	severe storms and flooding	Most low water crossings closed.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Colleyville.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	26,152
Persons under 5 years (%)	3.9
Persons 65 years and over (%)	15.6
Language other than English spoken at home (%)	11.4
With a disability, under age 65 (%)	3.8
Persons without health insurance, under age 65 (%)	4.4
Persons in poverty (%)	1.9
Median household income	$162,183
Households, 2012-2016	8,621
Median value of owner-occupied housing units, 2012-2016	$432,600

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Colleyville.

City of Colleyville Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Assets**	**Square Feet**	**Structure Value**	**Content Value**
City Hall 100 Main Street	Administration	66,000	$5,973,961	$2,389,584
Police Department 5201 Riverwalk Drive	Law Enforcement	30,338	$3,755,560	$1,502,224
Fire Station #1 5209 Colleyville Boulevard	Fire/EMS	15,200	$1,702,089	$680,835
Fire Station #2 5212 Pool Road	Fire/Rescue	Unknown	Unknown	Unknown
Fire Station #3 312 McDonwell School Road	Fire/Rescue	3,690	$91,580	$36,632
Colleyville Middle School 1100 Bogart Drive	Education	82,700	$2,334,588	$933,835

City of Colleyville Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Assets**	**Square Feet**	**Structure Value**	**Content Value**
Heritage High School 5401 Heritage Avenue	Education	300,000	$27,830,584	$11,132,233
Glenhope Elementary 6600 Glenhope Circle	Education	51,700	$2,134,631	$853,852
Heritage Middle School 5300 Heritage Avenue	Education	Unknown	$3,903,640	$1,561,456
Public Works Field Operations Center 1601 Hall Johnson Road	Public Works	7,800	$186,064	$74,425

3.3 Natural Hazard Profiles

The City of Colleyville's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Colleyville in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Thunderstorm (includes hail, wind, lightning)
2	Flooding
3	Tornado
4	Winter Storms
5	Expansive Soils
6	Extreme Heat
7	Wildfire
8	Drought
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent for the hazards.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Colleyville.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Dry and shrinking soils can cause foundation problems.

Jurisdiction's ground-water supply: City of Colleyville uses the Trinity River Authority (TRA) to supply water to homes and businesses. All city owned water wells have been capped.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: The City of Colleyville does not allow watering after between the hours of 0900 and 1800. Colleyville follows the TRA guidelines when water restrictions are needed.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Although earthquakes have been felt in Colleyville none have been strong enough to result in damage. The citizens of Colleyville, property-commercial and residential, critical facilities and infrastructure are all at risk in the event of a large earthquake. Since earthquakes are new to the area complete studies are needed to advise staff on the proper way to protect the City of Colleyville.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. The soil in Colleyville has the potential to cause an expansive soils problem. The expansive soil issue can impact structures such foundations, roads, water systems and other utilities. Colleyville does not require permits for foundation repairs, so data is limited.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: The City of Colleyville has budgeted $10,695,000 in the 2018 Capital Improvement Plan for the road rehabilitation project. Damage to roads occurs across the city but the amount of damage is unknown.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	The City of Colleyville has the potential to be impacted by extreme heat every year. Extreme heat can cause issues for elderly and the very young. The City of Colleyville demographics is becoming older, so this may present more of an issue in years to come. With Colleyville and surrounding cities becoming more populated, there will be more of a demand on the electric grid that may cause rolling blackouts during extreme heat. When electrical problems occur during extreme heat shelters/cooling centers may be needed to protect the citizens.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young, and those with medical conditions are most at risk to feel the effects of the extreme heat. People that work and play outside are also prone to becoming ill from extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? Colleyville is the host to many outdoor youth sporting events. A number of community events are also held outdoors during the summer. During these events medical personnel are on standby and provide water to the people attending the events.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? The city hall/library has lost power as a result of extreme heat, this complex does not have a generator and is home to our communications hub. Power was also lost at the public safety tower that does have a generator.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Limited
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All City of Colleyville assets (public and private) can be impacted by a flooding event. The area of Colleyville most often impacted by flooding events in along Little Bear Creek, which runs east west through the City of Colleyville. When the creek floods there is a number of low water crossings that become unpassable and must be closed. The streets impacted are Jackson Road, Oak Knoll, Cheshire, Bedford, Martin, and Heritage. Responders have had to rescue a number of people from these locations when flashing flooding occurs and crews are unable to close the roads before traffic is impacted. The city has also had minor flooding on Colleyville Blvd., but with the new construction there is hope that these flooding issue will be resolved.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported, though expenses have acquired from debris/tree removal from roads and the flooding of the low water crossings.

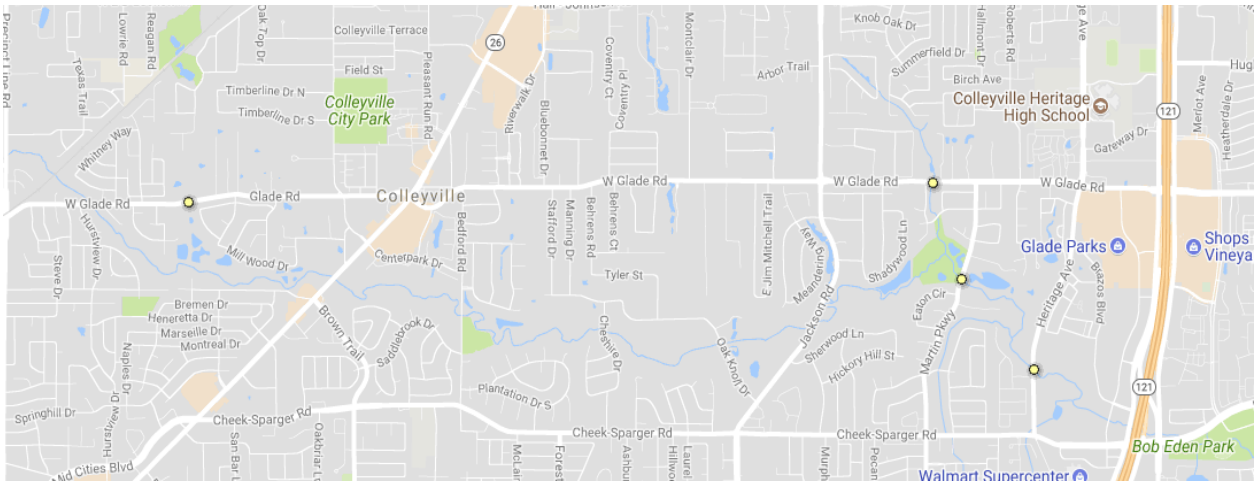
Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: Jackson Road, Martin Parkway, Bedford Road, Oak Knoll, Cheshire, and Heritage Avenue. The south side of the city is impacted the most. See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Little Bear Creek and Big Bear Creek.

Names of dams within the city: There are no dams within the city.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Heritage Avenue	Little Bear Creek	Vented Ford
Martin Parkway	Little Bear Creek	Vented Ford
Glade Road	Little Bear, TRIB 1	Vented Ford
Glade Road	Little Bear, TRIB 2	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Colleyville is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480590#
Community Name	City of Colleyville
County	Tarrant
Initial FHBM Identified	05/10/74
Initial FIRM Identified	12/01/82
Current Effective Map Date	09/25/09
Reg-Emer Date	12/01/82
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? City Engineer.

What specific flooding ordinances and plans does your jurisdiction have? Floods Ordinance, Floodplain Administration Ordinance, Flood Damage Prevention Ordinance.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? Data unavailable.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? Building is regulated through permitting, building inspections, and code enforcement. Require FEMA elevation certificate for all buildings located in floodplains.

Repetitive and Severe Repetitive Loss Properties: There are currently 8 residential repetitive loss properties and 0 severe repetitive loss properties within the City of Colleyville. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 186 Insurance in-force: $62,072,600 Written premium in-force: $83,117

How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 54 claims have been filed, but 18 of the claims closed without payment. $686,640.47have been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	At least 8 structures are at risk to flooding.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	Structures along Little Bear Creek.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	No data available.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	No data available.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		No data available.
Is a CAV or CAC scheduled or needed?		No.

Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	05/10/74
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes. By building ordinance.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	The Engineering Department is responsible for issuing floodplain permits, based on developers meeting minimum NFIP standards.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Colleyville will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Most damage was done to trees, fences, and roofs by high winds.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Tornadoes have the potential to impact the entire City of Colleyville. All existing and future buildings, emergency facilities, critical facilities, critical infrastructure, improved property, and the entire population of the city is exposed to this hazard. Although the City of Colleyville has had no reported damage from tornadoes since 2015, there have been under a number of tornado warnings and activations of the outdoor warning system for the possible event.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	There are a number of areas within the City of Colleyville that are on one to over ten acres tracks of land. These areas are scattered throughout the city and may be impacted by wildfires. Outbuildings, commercial, residential, and public buildings are all at risk for potential wildfires. Since the last HazMAP, the City of Colleyville has had two grass fire that have consumed over two acres of vegetation, no structures have been lost to these fires.

Most vulnerable location (North, East, South, West) of your jurisdiction? Colleyville has pockets of undeveloped land throughout the city, most are between 1 and 10 acres.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Bridges on Jackson Road, Martin Parkway, and Colleyville Boulevard have all been impacted by ice. Overland Trail is not a bridge but a steep road that could prevent public safety from responding to the homes at the bottom of the hill.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents. Travel from north to south is delayed and causes a longer response for first responders.

3.4 Historical Events

Despite being impacted by recent Disaster Declarations and a continual budget for road repairs due to expansive soils, according to the National Centers for Environmental Information, no natural hazard events have occurred within the City of Colleyville between 2015 and 2017.

3.5 Overall Vulnerability

The City of Colleyville identified their greatest vulnerabilities and concerns within the respective hazard sections.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Colleyville's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; Yes; Yes
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	Yes	No; No; Yes
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	Yes	Yes; Yes; Yes
Transportation Plan	Yes	Yes; Yes; Yes
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	Yes	Yes; Yes; Yes
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Yes; Yes

Acquisition of land for open space and public recreation uses	Yes	Yes; Yes
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year: International 2012**
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 4**
Site Plan Review Requirements	Yes	Type(s) of requirement: Goes to a review committee
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and Zoning Boards; yes
Mitigation Planning Committee	Yes	Planning and Hazard Assessment; yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Clearing of drainage systems; yes
Mutual Aid Agreements	Yes	Response and assistance as needed; yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	PT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:		
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor Warning System, Reverse 911, lightning detectors in city parks; Yes
Hazard data and information	Yes	THIRA; No
Grant writing	Yes	Use outside contractor; No
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Fire Prevention, Lightning Safety Program; Yes
Natural disaster or safety related school programs	Yes	Fire Prevention and classes for community groups; Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	No	
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes, for street repairs, building repairs and other miscellaneous capital improvement projects; Yes
Authority to levy taxes for specific purposes	Yes	No; Yes
Fees for water, sewer, gas, and/or electric services	Yes	These fees are used to pay for water and sewer services. Yes, but specifically related to water or sewer services.
Impact fees for new development	Yes	Impact fees has been used to fund qualified projects for new development; Yes
Stormwater utility fee	Yes	This is used for stormwater maintenance and projects; Yes

Funding Resources	Have capability?	Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Would require a vote by citizens. Has been used in the past; Yes
Incur debt through private activities	No	
Community Development Block Grant	As Available	The city could potentially pursue if funds were made available and Colleyville's needs were as eligible.
Other federal funding programs	As Available	The city could potentially pursue if funds were made available and Colleyville's needs were as eligible.
State funding programs	As Available	The city could potentially pursue if funds were made available and Colleyville's needs were as eligible.
Other		

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions, passing policies and procedures for mitigation actions, adopting and implementing stricter mitigation regulations, approving mitigation updates, and additions to existing plans as new needs are recognized. The city could train more personnel on local hazards and their mitigation actions, and well as implement policy changes within the jurisdiction. They could expand our public education to include more local hazard awareness and mitigation actions as well as create a Colleyville Community Emergency Response Team (CERT) team or other citizen group. Include actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Colleyville's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Develop and maintain volunteer base to support and operate amateur (HAM) radios for communications in the City of Colleyville Emergency Operations Center (EOC).	Identify the need for an amateur radio club.	4 months	Police Department	$1,500	$14,000	Local
		STATUS: Completed					
		Train people to be HAM/ Radio Amateur Civil Emergency Service (RACES) members.	4 months	Police Department	$1,500	$6,000	FEMA, budget
		STATUS: Completed					
		Upgrade radios in EOC.	4 months	Police Department, Office of Emergency Management	$2,000	$8,000	Grants, budget
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Purchase needed communications equipment for the City of Colleyville EOC.	Purchase extra mobile radios to have on hand in the EOC.	5 months	Office of Emergency Management	$37,000	$148,000	Grants, city budget
		STATUS: Deferred to 2020 HazMAP					
		Purchase some earpieces for the radios to have in the EOC.	5 months	Office of Emergency Management	$400	$1,600	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
		Update the radio room in the EOC.	5 months	Office of Emergency Management	$3,000	$12,000	City, grants
		STATUS: Deferred to 2020 HazMAP					
		Purchase satellite phones for the EOC.	15 months	Office of Emergency Management	$4,000	$16,000	Grant
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires, Extreme Temperatures, Hazardous Materials Spills, Infectious Disease Outbreak	Establish a standard business database in the City of Colleyville.	Identify software that will merge tasks between both building and fire departments.	7 months	Building Department	$100,000	$400,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Merge data previously housed in separate databases into one database.	8 months	Fire Department, Building Department	$5,000	$20,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Train end users on the proper methods to	9 months	Fire Department, Building Department	$5,000	$20,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		utilize new software.					
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires, Extreme Temperatures, Hazardous Materials Spills, Infectious Disease Outbreak	Implement a multijurisdictional Automatic Vehicle Location (AVL) system for both police and fire from Colleyville, Keller, Southlake, and Westlake (NETCOM).	Survey the eight departments and ascertain need and want as well as determine the number of users needed.	7 months	Northeast Tarrant County Communications (NETCOM)	Unknown	Unknown	Unknown
		STATUS: In progress					
		Determine vendor for purchase.	1 year	NETCOM with a representative from all cities	Unknown	Unknown	Unknown
		STATUS: In progress					
		Purchase hardware for all jurisdictions.	16 months	NETCOM	$90,000	$360,000	Individual city budgets
		STATUS: In progress					
		Purchase software for dispatch center and each unit.	2 years	NETCOM	$10,000	$40,000	Individual city budgets
		STATUS: In progress					
Severe Thunderstorms	Maintain a database for people with special needs	Complete a memoranda of	4 months	City Manager	$200	$800	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires, Extreme Temperatures, Hazardous Materials Spills, Infectious Disease Outbreak	for Colleyville emergency response.	agreement (MOA) with Fort Worth for the Special Needs Assistance Program (SNAP).					
		STATUS: Deferred to 2020 HazMAP					
		Educate the citizens about the program.	1 year	Office of Emergency Management	$1,000	$4,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Enter the information into the Computer Aided Dispatch (CAD) system.	1 year	NETCOM	$1,000	$4,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Ensure that the City of Colleyville is able to operate when there is a loss of power to the building.	Hire a consultant to evaluate the power needs to the building.	5 months	Engineering Department	$700	$2,100	Grant, FEMA, City budget
		STATUS: In progress					
		Purchase and install generator.	5 months	Engineering Department	$60,000	$240,000	Grant, FEMA, City budget
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Winter Storm	Have the needed equipment to clear snow and ice from roads as a result of a winter storm in Colleyville.	Add one snow plow and one spreader to clear roads from ice and snow, to the City of Colleyville's fleet.	Feb-2015	Public Works Department	$10,000	It is hard to place a dollar amount on opening of streets for traffic; It will enable stores to open, and emergency equipment to respond to calls.	General fund, grants
		STATUS: Deferred to 2020 HazMAP					
Drought	Develop contingency plan to ensure that the citizens of Colleyville have access to potable water.	Create plans for alternate potable water sources.	As funding is available	Public Works Department	Staff time	Unknown	General fund
		STATUS: Deferred to 2020 HazMAP					
Drought	Develop a drought awareness program for the citizens of Colleyville. Research and make educational material about drought, a flyer, public service announcements, and social media. Once the	Educate the citizens of Colleyville on negative effects of drought.	As funding is available	Public Works Department	$2,000 and staffs' time	Unknown	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	education materials are made, distribute the materials to the citizens of Colleyville.						
		STATUS: Deferred to 2020 HazMAP					
Terrorism	Commission a study to evaluate additional equipment needed to protect the Citizens of Colleyville from a terror incident resulting in the use of chemical, biological, radiological, nuclear, and explosive (CBRNE) agents.	Evaluate the needs and equipment now in place at the Colleyville Police Department.	5 months	Police Department, Office of Emergency Management	Unknown	Unknown	In-house resources
		STATUS: Deferred to 2020 HazMAP					
		Research vendors for resources identified in the evaluation and prepare request for bids.	7 months	Police Department, Office of Emergency Management	$1,000	$1,000	City current year budget, available grant funding
		STATUS: Deleted-no longer identifying technological hazards					
		Process bids and issue purchase orders for resources as needed.	9 months	Police Department , Office of Emergency Management	$20,000	$20,000	City current year budget, available grant funding

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deleted-no longer identifying technological hazards					
Terrorism	City of Colleyville Emergency Management and Police Department personnel will implement deployment of additional equipment.	Deploy equipment and resources.	9 months	Police Department , Office of Emergency Management	$1,000	$1,000	City current year budget, available grant funding
		STATUS: Deleted-no longer identifying technological hazards					
		Train all Police Department personnel in the use of and care for new equipment.	10 months	Police Department , Office of Emergency Management	$3,000	$3,000	City current year budget, available grant funding
		STATUS: Deleted-no longer identifying technological hazards					
Terrorism	Implement ongoing training on all new equipment in the City of Colleyville.	Provide adequate training to ensure all new officers are proficient in the use of with the new anti-terrorism equipment.	Continual	Police Department Training Division	$1,000 per year	$1,000 per year	City budget, FEMA grants
		STATUS: Deleted-no longer identifying technological hazards					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Provide adequate maintenance to insure continued use of the new anti-terrorism equipment.	Continual	Police Department Training Division	$2,000 per year	$2,000 per year	City budget, FEMA grant
		STATUS: Deleted-no longer identifying technological hazards					
Hazardous Materials	Improve the evacuation of City of Colleyville citizens during a hazardous materials incident.	Partner with the American Red Cross to locate shelter locations within the city.	5 months	Office of Emergency Management	$200	$800	City budget
		STATUS: Completed					
		Secure agreements with the American Red Cross and the school district for shelters.	5 months	Office of Emergency Management	$200	$800	City budget
		STATUS: Completed					
Expansive Soils	Develop and enforce city ordinances that will limit development on soils known to have problems with expansion in the City of Colleyville.	When new construction is initiated in the City of Colleyville the construction will adhere to	As funding is available	Engineering Department	$30,000 for soil samples and mapping; other cost to be	Having codes on building on expansive soils will reduce dollar loss from foundation	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		current building standards.			determined by personnel costs.	problems in later years.	
		STATUS: Completed					
Expansive Soils	Educate homeowners on how to care for the soil their homes are built on, in the City of Colleyville.	Use booklets free of cost to homeowners to advise them how to water their foundation.	As funding is available.	Engineering Department	$2,000	The amount of money spent on the education materials would be low compared to the cost of repairing foundations.	General fund, grants
		STATUS: Deferred to 2020 HazMAP					
Tornadoes, Severe Thunderstorms and High Winds	Start a social media outlet for Emergency Management to notify citizens of the potential for tornadic activity.	Start a twitter page that can be linked into an automatic weather alert about the threat of tornadoes.	1 year	Office of Emergency Management	Staff Time	Unknown	General fund
		STATUS: Deferred to 2020 HazMAP					
Tornadoes, Severe Thunderstorms	Upgrade the Code Red phone notification system platform.	Purchase and institute Code Red phone	1-2 years, as funding allows.	Office of Emergency Management	$2,500	Unknown	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
and High Winds		notifications for tornado warnings.					
		STATUS: Deferred to 2020 HazMAP					
Flooding	Construct a new bridge on Jackson Road that is higher and can withstand flood waters.	Construct the bridge on Jackson Road to withstand high flood waters.	10-15 years, as funding is available.	Public Works Department	$2,000,000	Unknown	Certificate of Obligation, bonds, grants
		STATUS: Deferred to 2020 HazMAP					
Flooding	Enhance our high-water warning system, by adding automatic gates on the streets that normally flood.	Add gates to the roads so that when water is over the flood elevations the gates would slowly close to prevent traffic from traveling the road.	5-10 years, as funding becomes available.	Engineering Department	$100,000	$40,000,000	FEMA HMGP, other grants
		STATUS: Deferred to 2020 HazMAP					
Drought	Plant vegetation on city properties that requires little water to withstand periods of drought and provide material to the	Plant drought resistant plants on city property to lessen the need to use	1-2 years, as funding allows.	Parks Department	$50,000	Unknown	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	public on how to grow drought resistant plants.	water on landscape.					
		STATUS: In progress					
Drought	Develop a contingency plan for the delivery of Potable water during times of severe drought.	Institute water saving measures to lessen the demand of potable water. Increase the water storage capability through both above ground storage and portable tanks. Have contracts with private companies to supply potable water if needed.	3-10 years	Public Works Department	Staff hours, unknowns	Unknown	General fund
		STATUS: Deferred to 2020 HazMAP					
Thunderstorms and High Winds	Increase shelter space at the city parks for people to seek protection when severe thunderstorm is in the area.	Construct storm shelters at City baseball and soccer fields.	2020	Parks Department	$100,000	Unknown	City budget, grants
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Thunderstorms and High Winds	Provide safe locations inside city facilities for people to seek shelter during severe storms.	Evaluate each building owned by the City of Colleyville to locate shelter locations. If there is no safe location within the building install a safe room. Educate occupants of the building where to seek shelter.	2017	Office of Emergency Management	$80,000	Unknown	City budget, grants
		STATUS: In progress					
Hail	Provide hail resistant parking for city owned vehicles.	Install covered parking at city locations to protect emergency and public works vehicles.	2020	Facility Maintenance Department	$100,000	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					
Hail	Install hail resistant roofing on City of Colleyville buildings.	Install hail resistant roofing on City of Colleyville facilities when	2018	Facility Maintenance Department	$200,000	Unknown	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		the current roof needs replaced.					
		STATUS: Deferred to 2020 HazMAP					
Hail	Increase awareness to the citizens on how the can protect themselves and their property from the effects of hail.	Distribute educational materials on hail resistant roofing and windows. Use other forms of media to teach people how to protect themselves from hail.	2019	Office of Emergency Management	$1,500	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					
Lightning	Protect the public safety communication site from lightning.	Install lightning safety equipment at the Public Safety Communications Site.	2016	Office of Emergency Management	$25,000	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					
Lightning	Install lightning detection equipment at all parks.	Install lightning detection equipment at all city parks so that people using the	2017	Parks Department	$50,000	Unknown	City budget, grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		park will be notified when lightning is in the area.					
		STATUS: Deferred to 2020 HazMAP					
Lightning	Provide a lightning preparedness education program for the City of Colleyville.	Reach out to community groups and provide a one-hour education program on the dangers of lightning and how to protect themselves from lightning.	2015	Office of Emergency Management	Staff Time	Unknown	City budget
		STATUS: In progress					
Winter Storms	Develop an annual tree trimming program to protect power lines during ice storms.	Remove tree limbs near power lines that could cause the power line to be damaged during wind and ice storms.	2015	Public Works Department	$1,500	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Winter Storms	Provide information to the citizens of Colleyville about road conditions and school and city office closings.	Utilize the city web site, emails, Code Red, and social media to keep the people of Colleyville informed on how a winter storm is impacting city services.	2015	Public Information Office, Office of Emergency Management	Staff	Unknown	City budget
		STATUS: In progress					
Winter Storms	Conduct an assessment of the winter weather protocols for city departments.	Provide training to all employees that work outside on the dangers of winter weather and wats that they need to protect themselves from the effects of the cold, wet, dark, and icy conditions.	2015	Risk Management Department	$1,000	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Wildfire	Reduce the amount of fuel available for the spread of a Wildfire.	Use our high weed and grass ordinance to reduce the fuel load in the community. By keeping the grasses low to the ground the growth and spread of a wildfire will be diminished.	2015	Code Enforcement Department	Cost of Staff	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Develop a tree trimming program to raise the canopy of trees off the ground and reduce the fuel for spreading wildfires.	Plan an annual program to trim trees that will help with the spread of a wildfire. Use the website to educate people on how to protect their homes using tree trimming.	2017	Public Works Department	$25,000	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Wildfire	Ensure the Fire Department wildfire plan and equipment are current.	Review the SOP on wildfire response. Ensure that all equipment and protective gear is ready. Provide annual training to first responders.	2015	Fire Department	$2,500	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Upgrade the City of Colleyville water system so it is adequate to fight a large wildfire.	Upgrade the water systems supply lines. Update mutual aid agreements with other cities for tanker trucks.	2015	Fire Department	Unknown	Unknown	City budget
		STATUS: In progress					
Extreme Temperatures	Develop an extreme temperature plan for the City of Colleyville.	Work with churches and other volunteer organizations to open cooling centers. This will help the citizens of Colleyville be able to stay	2016	Parks Department	$1,500	Unknown	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		safe from the effects of heat.					
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Distribute extreme temperature preparedness/mitigation literature at community events.	Provide safety information to citizens using pamphlets. The pamphlets will provide safety information and include websites to find more information.	2017	Office of Emergency Management	$2,000	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Update the extreme temperature protocols for city departments.	Provide training to all employees that work outside on hot days, to protect themselves from the effects extreme temperatures.	2015	Office of Emergency Management	Staff time	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					
Expansive Solis	Manage expansive soils in the City of Colleyville	Improve construction	2018	Building Department	$5,500	Unknown	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	through education and building codes.	methods through updated building codes. Educate building contractors and building owners on expansive soil mitigation techniques.					
		STATUS: Deferred to 2020 HazMAP					
Expansive Solis	Identify areas of our city that have a history of soil related damage to structures.	Provide information to builders that will be building on those sites of ways to improve the soil before construction starts. Educate the occupants of buildings in the areas that are on expansive soils how to care for the soil to prevent damage	2018	Building Department	$2,000	Unknown	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		to their structure.					
		STATUS: Deferred to 2020 HazMAP					

5.3 New Action Items

The City of Colleyville's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Flooding**
Improve drainage at low water crossings, to include culverts and or retention ponds.	
Participating Jurisdiction:	City of Colleyville
Priority:	1
Estimated Cost:	$40,000
Estimated Benefit:	$240,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	36 months

Hazard(s) Addressed	**Flooding**
Enhance the current high-water warning system, by adding automatic gates on the streets that normally flood.	
Participating Jurisdiction:	City of Colleyville
Priority:	2
Estimated Cost:	$15,000
Estimated Benefit:	$90,0000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Flooding
Replace the bridge on Jackson Road so that traffic can pass during flash flooding events.	
Participating Jurisdiction:	City of Colleyville
Priority:	3
Estimated Cost:	$4,000,000
Estimated Benefit:	$24,000,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes, Extreme Heat, Floods, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Purchase and install a generator for the City Hall Complex.	
Participating Jurisdiction:	City of Colleyville
Priority:	4
Estimated Cost:	$250,000
Estimated Benefit:	$1,500,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Earthquakes, Extreme Heat, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Build shelters at the city parks so that people can be protected from severe storms/tornadoes.	
Participating Jurisdiction:	City of Colleyville
Priority:	5
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Parks Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Develop and fund a rebate program for citizens to buy weather alert radios.	
Participating Jurisdiction:	City of Colleyville
Priority:	6
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Review and enhance the Stormwater Management Plan.	
Participating Jurisdiction:	City of Colleyville
Priority:	7
Estimated Cost:	$15,000
Estimated Benefit:	$90,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Flooding
Improve drainage where flash flooding normally occurs.	
Participating Jurisdiction:	City of Colleyville
Priority:	8
Estimated Cost:	$10,000,000
Estimated Benefit:	$60,000,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management, Engineering Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfire
Purchase two mobile outdoor warning sirens and Public Address System.	
Participating Jurisdiction:	City of Colleyville
Priority:	9
Estimated Cost:	$80,000
Estimated Benefit:	$480,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management, Parks Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Purchase extra portable radios and radio equipment for Emergency Operations Center (EOC) and update radio room.	
Participating Jurisdiction:	City of Colleyville
Priority:	10
Estimated Cost:	$120,000
Estimated Benefit:	$720,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	18 months

Hazard(s) Addressed	Extreme Heat, Thunderstorms, Winter Storms
Provide covered, impact-resistant parking for city owned vehicles.	
Participating Jurisdiction:	City of Colleyville
Priority:	11
Estimated Cost:	$80,000
Estimated Benefit:	$480,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Thunderstorms
Install hail resistant roofing on City of Colleyville facilities when the current roof needs to be replaced.	
Participating Jurisdiction:	City of Colleyville
Priority:	12
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Facilities Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Update current outdoor warning system that could include automatic activation for tornado warnings and secure the radio system.	
Participating Jurisdiction:	City of Colleyville
Priority:	13
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	18 months

Hazard(s) Addressed	Thunderstorms
Install lightning detection equipment and lightning rods at all city parks.	
Participating Jurisdiction:	City of Colleyville
Priority:	14
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Parks Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Survey the fire and police departments serviced by the Northeast Tarrant County Communications (NETCOM) communications office and ascertain need and want as well as determine the number of users needed to implement a multijurisdictional Automatic Vehicle Location (AVL) system within Colleyville, Keller, Southlake, and Westlake.	
Participating Jurisdiction:	City of Colleyville
Priority:	15
Estimated Cost:	$200
Estimated Benefit:	$1,200
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Northeast Tarrant County Communications (NETCOM)
Implementation Schedule:	7 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Purchase hardware/software for participating jurisdictions and NETCOM to implement a multijurisdictional Automatic Vehicle Location (AVL) system for both police and fire from Colleyville, Keller, Southlake, and Westlake (NETCOM).	
Participating Jurisdiction:	City of Colleyville
Priority:	16
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	NETCOM
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Purchase satellite phones for the Emergency Operations Center in order to keep communications during an event.	
Participating Jurisdiction:	City of Colleyville
Priority:	17
Estimated Cost:	$6,000
Estimated Benefit:	$36,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquake, Extreme Heat, Flood, Thunderstorm, Tornado, Wildfire, Winter Storm, Power Failure, Telecommunications Failure
Create a database for people with special needs for Colleyville emergency response: complete a memoranda of agreement (MOA) with Fort Worth for the Special Needs Assistance Program (SNAP), educate the citizens about the program, and enter information into the computer aided dispatch (CAD).	
Participating Jurisdiction:	City of Colleyville
Priority:	18
Estimated Cost:	$15,000
Estimated Benefit:	$90,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management, Public Information Office, NETCOM
Implementation Schedule:	6 months

Hazard(s) Addressed	Winter Storms
Purchase equipment to clear streets of ice and snow.	
Participating Jurisdiction:	City of Colleyville
Priority:	19
Estimated Cost:	$25,000
Estimated Benefit:	$1,500,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Develop a hazard awareness program for the citizens of Colleyville. Provide educational material about the mitigation strategies for each hazard and develop a social media campaign.	
Participating Jurisdiction:	City of Colleyville
Priority:	20
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Expansive Soils
Educate homeowners and commercial owners on the care of their foundation and soils in order to mitigate the damage from expansive soils.	
Participating Jurisdiction:	City of Colleyville
Priority:	21
Estimated Cost:	$25,000
Estimated Benefit:	$1,500,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department, Office of Emergency Management, Public Information Office, Engineering Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Drought
Develop and implement a drought contingency plan to ensure for critical facilities and private property.	
Participating Jurisdiction:	City of Colleyville
Priority:	22
Estimated Cost:	$7,000
Estimated Benefit:	$45,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Extreme Heat
Work with churches and other volunteer organizations to open cooling centers.	
Participating Jurisdiction:	City of Colleyville
Priority:	23
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	City budget, staff time
Lead Agency/Department Responsible:	Office of Emergency Management, Public Information Office
Implementation Schedule:	12 months

Hazard(s) Addressed	Winter Storms
Conduct an assessment of the winter weather protocols for city departments and train employees.	
Participating Jurisdiction:	City of Colleyville
Priority:	24
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	Staff Time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Wildfire
Ensure the Fire Department wildfire plan and equipment is current.	
Participating Jurisdiction:	City of Colleyville
Priority:	25
Estimated Cost:	$150,000
Estimated Benefit:	$900,000
Potential Funding Source(s):	City budget, SAFER grant
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Expansive Soils
Manage expansive soils in the City of Colleyville through building code enforcement.	
Participating Jurisdiction:	City of Colleyville
Priority:	26
Estimated Cost:	$8,000
Estimated Benefit:	$48,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Building Inspections
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Harden public safety buildings from the threats of severe weather, to include but not limited to: installing ballistic shielding where appropriate to prevent damage from hail and debris, installing closed-circuit televisions, installing proper fencing and gates, installing weather monitors, installing weather stations, installing new ballistic windows to prevent damage from hail and debris, installing alert buttons/intercom system, and purchasing detection equipment to better protect the citizens and employees in the public safety buildings.	
Participating Jurisdiction:	City of Colleyville
Priority:	27
Estimated Cost:	$1,500,000
Estimated Benefit:	$4,500,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Colleyville
Priority:	28
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the floodplain administrator to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	City of Colleyville
Priority:	29
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Colleyville
Priority:	30
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Colleyville
Priority:	31
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Colleyville
Priority:	32
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquake, Thunderstorm, Tornado, National Security Incident
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Colleyville
Priority:	33
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Colleyville
Priority:	34
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Colleyville
Priority:	35
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Stormwater Plan	Engineering	Every 10 years	Reference this HazMAP when developing the plan.	The consultant will meet with the Emergency Management Coordinator to reference the HazMAP when reviewing the Stormwater Plan to see which action items can be addressed.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvements	Leadership Team	Every 5 years	Reference this HazMAP when budgeting and improving critical infrastructure and resources.	The leadership team will reference the HazMAP when updating this plan, in such areas as strengthening critical infrastructure and key resources based on HazMAP hazard analysis; incorporating vulnerability data and action items.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Colleyville. For more information, see Appendices A and B.

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City of Crowley

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Crowley was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Crowley alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

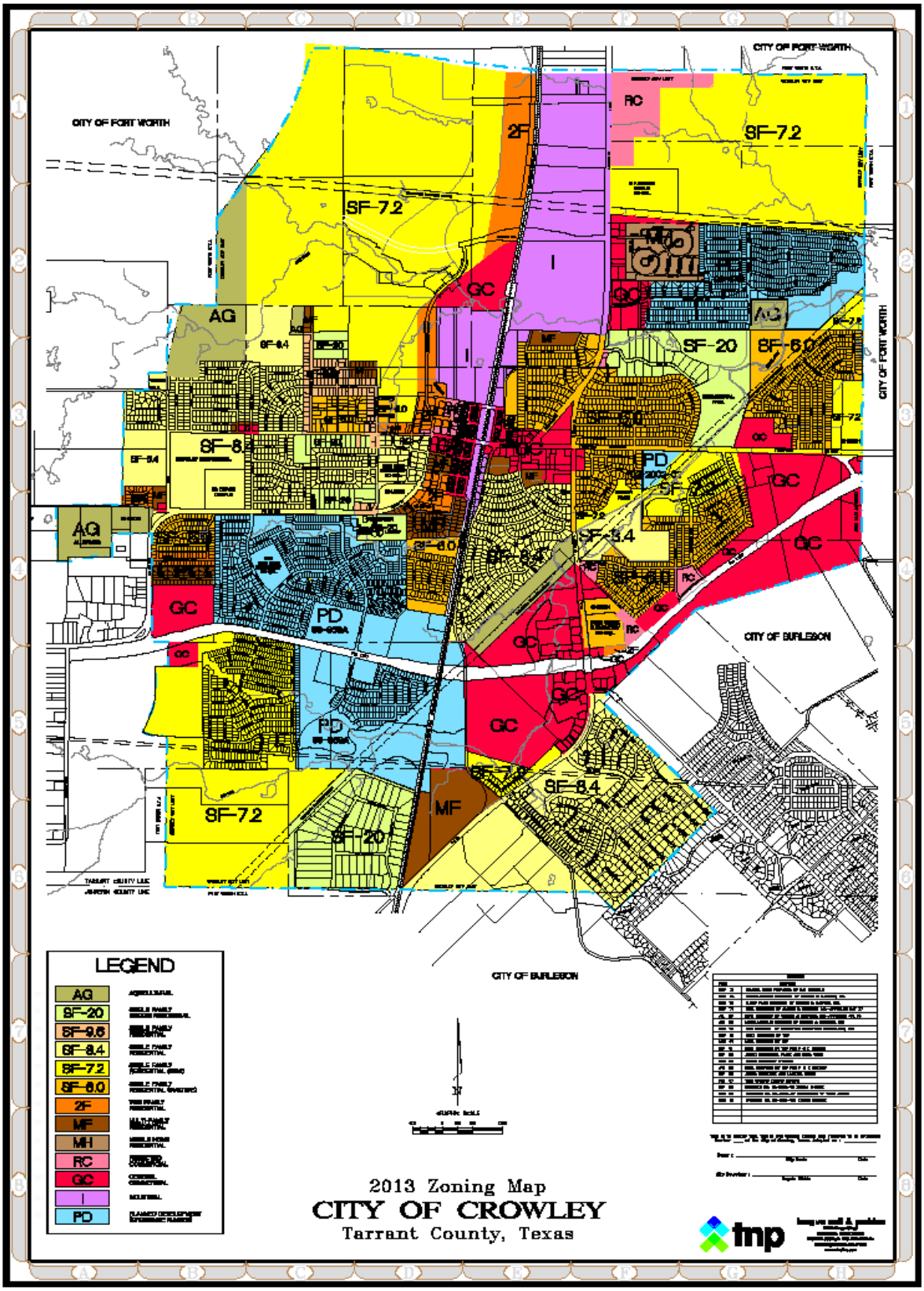
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

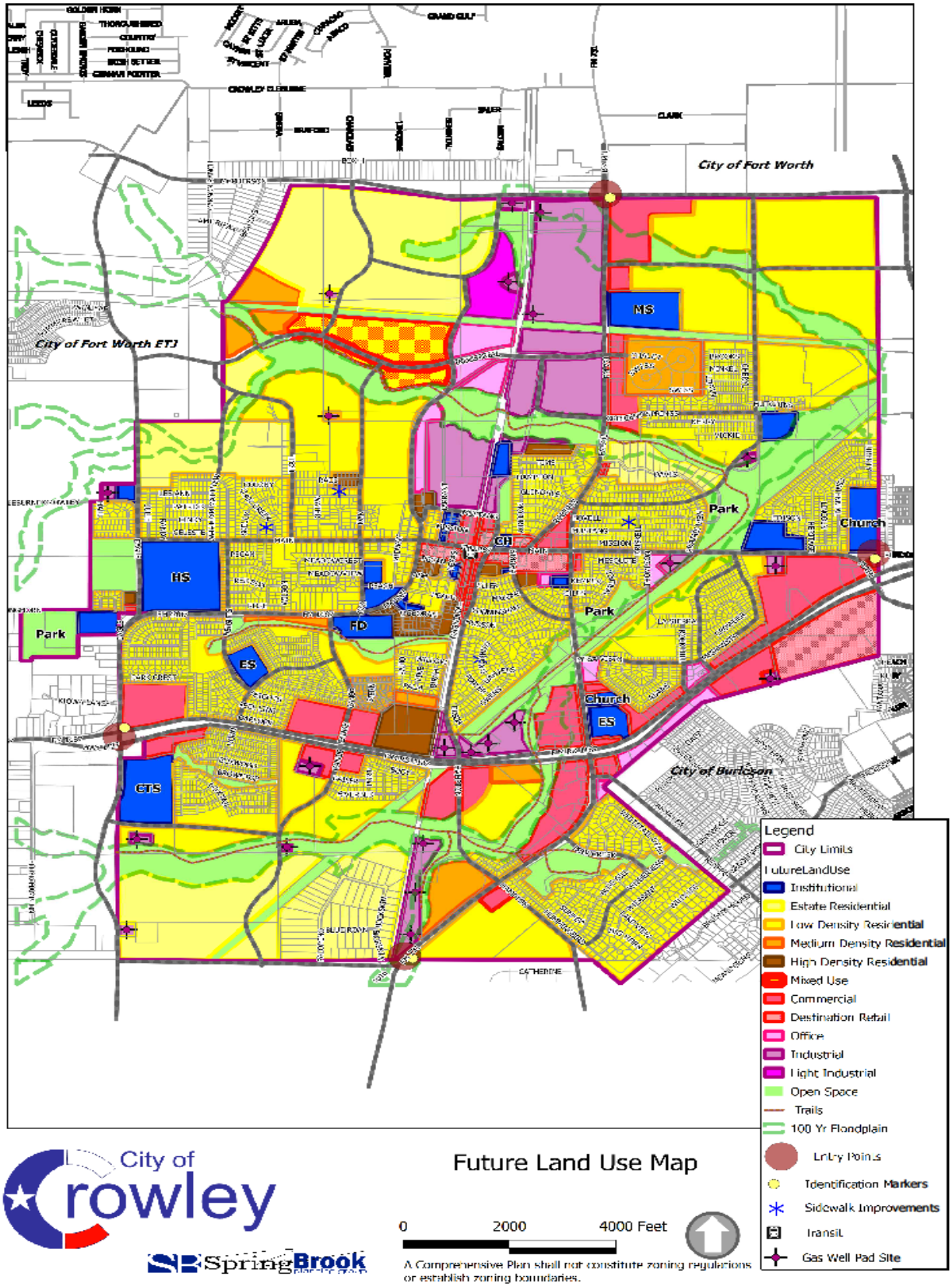
Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Crowley will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at NCTCOG.

1.4 Supporting Maps

The following maps provide an overview of the City of Crowley:

- 2013 Zoning Map
- Future Land Use Map


CITY OF FORT WORTH
CITY OF BURLESON
AG
SF-7.2
SF-8.4
SF-9.6
SF-20
SF-6.0
2F
MF
MH
RC
GC
I
PD
LEGEND
2013 Zoning Map
CITY OF CROWLEY
Tarrant County, Texas
tnp


City of Fort Worth
City of Fort Worth ETJ
City of Burleson
MS
HS
Park
FD
ES
CH
Church
CTS
Legend
City Limits
FutureLandUse
Institutional
Estate Residential
Low Density Residential
Medium Density Residential
High Density Residential
Mixed Use
Commercial
Destination Retail
Office
Industrial
Light Industrial
Open Space
Trails
100 Yr Floodplain
Entry Points
Identification Markers
Sidewalk Improvements
Transit
Gas Well Pad Site
Future Land Use Map
0
2000
4000 Feet
A Comprehensive Plan shall not constitute zoning regulations or establish zoning boundaries.
City of Crowley
SpringBrook

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Crowley has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Crowley's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Crowley. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Crowley Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Crowley	Fire Department	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Crowley	Fire Department	Fire Chief	Hazard identification and plan development
City of Crowley	Police Department	Police Lieutenant	Hazard identification and plan development
City of Crowley	Economic Development Department	Economic Developer	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: • Expansion of Crescent Springs Neighborhood • Addition of Creek Side Neighborhood • Addition of The Bridges Neighborhood Although none of these developments are in particularly hazard-prone areas they are susceptible to identified citywide hazards such as tornados/severe weather.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: Enforcement of building codes, city ordinances, and fire code. A full list of completed mitigation action items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Crowley.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	14,969
Persons under 5 years (%)	Data unavailable
Persons 65 years and over (%)	Data unavailable
Language other than English spoken at home (%)	9.2
With a disability, under age 65 (%)	8.8
Persons without health insurance, under age 65 (%)	18.4
Persons in poverty (%)	10.6
Median household income	$66,559
Households, 2012-2016	4,882
Median value of owner-occupied housing units, 2012-2016	$120,500

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Crowley.

City of Crowley Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Asset**	**Square Feet**	**Structure Value**	**Content Value**
Crowley Fire Station 1 201 E. Main Street	Fire/Rescue	15,000	$1,050,000	$420,000
Crowley Fire Station 2 400 South Oak Street	Fire/Rescue	9,800	$1,230,310	$492,124
Crowley Police Station 617 West Farm to Market 1187	Law Enforcement	23,000	$3,799,275	$1,519,710
Public Works 105 East Hampton Road	Utility	14,113	$1,500,000	$600,000
City Hall 201 East Main Street	Administration	8,568	$1,397,823	$559,129
Animal Shelter 101 East Hampton Road	Shelter	6,324	$1,264,907	$75,000

3.3 Natural Hazard Profiles

The City of Crowley's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Crowley in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Tornado
2	Thunderstorm (includes hail, wind, lightning)
3	Flooding
4	Winter Storms
5	Drought
6	Wildfire
7	Extreme Heat
8	Expansive Soils
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent of the hazards.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Crowley.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Significant
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal due to the minor extent expected.

Jurisdiction's ground-water supply: The City of Crowley receives water from the City of Fort Worth.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: Water restrictions are those set forth by the City of Fort Worth. The City of Crowley purchases water from the City of Fort Worth.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Negligible
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: There is no data on any damage to critical infrastructure or roads due to expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. People who work outside or in buildings without air-conditioning are also at a high risk to the direct effects of extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? Isolated incidents of heat exposure during our annual Celebration of Freedom Event held every July; however, no deaths have been reported due to this event and data on injuries is unavailable.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? Yes, thought data is not available.

Intersections or traffic routes impacted by flooding: South Heights at Business Farm to Market 1187.

Names of any creeks or rivers that flood: Deer Creek flows through the City of Crowley, but there is no historical data of it flooding over its designated banks.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Crowley is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480591#
Community Name	City of Crowley
Counties	Johnson County/Tarrant County
Initial FHBM Identified	05/15/79
Initial FIRM Identified	04/15/81
Current Effective Map Date	09/25/09
Reg-Emer Date	04/15/81
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Community Development Coordinator and the City Engineer.

What specific flooding ordinances and plans does your jurisdiction have? Subpart B, Land Development Code, Chapter 94 Floods.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? The City of Crowley enforces the minimum FEMA standards as well as some higher standards. These include the requirement for a building's finished floors to be a minimum of 2 feet above fully-developed flood elevations. The city also requires the FEMA Conditional Letter of Map Revision (CLOMR) submittals when the floodplains are impacted. The city also requires floodplain development permits for properties to be constructed in and around the floodplain.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? The city does not allow development that is not properly elevated above the floodplain. Development in the floodplain is not permitted without satisfactory studies and FEMA permitting being conducted.

Repetitive and Severe Repetitive Loss Properties: There are currently 2 residential repetitive loss property and 0 severe repetitive loss properties within the City of Crowley. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Crowley's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 29 Insurance in-force: $8,311,800 Written premium in-force: $12,696
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 2 claims have been filed. $10,676.72 have been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	At least 2 structures are at risk to flooding.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	Data unavailable.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	New residential construction not allowed in 100-year floodplain, permit review, geographic information system, education or outreach, inspections, and engineering capability.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	N/A.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		Data unavailable.

When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Data unavailable.
Is a CAV or CAC scheduled or needed?		Data unavailable.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	4/15/1981
Are the FIRMs digital or paper?	Community FPA	Paper.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	• Requiring and maintaining FEMA elevation certificates for all new and improved buildings located in floodplains. • The Building Official is responsible for issuing floodplain permits. • Implementing damage reduction measures for existing buildings such as acquisition, relocation, retrofitting, and maintenance of drainage ways and retention basins. • Maintenance of drainage ways and retention basins. Installation of retention basins on new construction. • Taking action to minimize the effects of flooding on people, property, and building contents through measures including flood warning, emergency response, and evacuation planning. Flood warning by way of existing public notification systems, emergency response, and evacuation planning.

Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Crowley will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Most damage occurred to trees, fences, and roofs by high winds, causing around $12,000 in damages.

Number of homes lost due to lightning-induced fires: One home damaged due to lighting.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Limited
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Most vulnerable location (North, East, South, West) of your jurisdiction? The most vulnerable part of Crowley is the northwest side, as it is undeveloped land.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: There are several small bridges over creeks and drainage ways on Farm to Market (FM) 731 and FM1187; one bridge on Hampton Road, over FM1187.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Crowley between 2015 and 2017. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Crowley	4/18/2015	Thunderstorm Wind	65	0	0	$12,000	$0	EG
Crowley	3/23/2016	Hail	1	0	0	$0	$0	
Crowley	3/30/2016	Hail	1	0	0	$0	$0	
Crowley	3/30/2016	Hail	0.88	0	0	$0	$0	
Crowley	3/30/2016	Hail	1	0	0	$0	$0	
Crowley	7/4/2016	Thunderstorm Wind	52	0	0	$0	$0	EG
Total				**0**	**0**	**$12,000**	**$0**	

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Crowley identified their greatest vulnerabilities and concerns:

- Approximately 8.3% of the population in Crowley consists of individuals who are 65 years or older. In addition, approximately 4.3 % of Crowley families live below the poverty line. While tornadoes and thunderstorms pose a serious threat to any population, issues with mobility could make it difficult for these populations to evacuate ahead of a tornado or thunderstorm threat or relocate after the hazard has occurred.
- The City of Crowley is home to critical facilities that would be vulnerable to the effects of all types of hazards considered in this plan. This includes city facilities valued at $10.2 million.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Crowley's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; Yes; Yes
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	Yes	No; No; No
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	No	
Transportation Plan	Yes	Yes; No; No
Stormwater Management Plan	Yes	Yes; Yes; No
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Yes; Yes
Acquisition of land for open space and public recreation uses	Yes	Yes; Yes

Building Code, Permitting, and Inspections	Have capability?	
Building Code	Yes	**Version/Year:** IBC, 2012
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating:** 2
Site Plan Review Requirements	Yes	**Type(s) of requirement:** staff review, board approval

Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and Zoning Boards; Yes
Mitigation Planning Committee	Yes	Planning and Hazard Assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Clearing of drainage systems; Yes
Mutual Aid Agreements	Yes	Response and assistance as needed; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; No; Yes
Floodplain Administrator	FT	Yes; No; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; No; Yes
Civil Engineer	Outside contactor	Yes; Yes; Yes
GIS Coordinator	FT	Yes; No; Yes
Other:	FT	Yes; No; Yes
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor Warning System, Everbridge mass notification system; Yes
Hazard data and information	Yes	Mapping; Yes
Grant writing	Yes	Use outside contractor; No
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Citizens on Patrol relays information to the dispatch about road conditions and property damage from storms; Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Community newsletter, social media, city website, fire safety; Yes
Natural disaster or safety related school programs	Yes	Weather radios on school campuses; Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	A memorandum of understanding (MOU) with the local chapter of the American Red Cross
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If Yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes, not for mitigation; Yes
Authority to levy taxes for specific purposes	Yes	Yes, large capital improvements; Crime Control Prevention District; Yes
Fees for water, sewer, gas, and/or electric services	Yes	Yes, general operating budget; not for mitigation; Yes
Impact fees for new development	Yes	Yes, general operating budget, not for mitigation; Yes
Stormwater utility fee	Yes	Yes, general operating budget, not for mitigation; Yes
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes, large capital improvements; not for mitigation; Yes
Incur debt through private activities	No	No; No

Community Development Block Grant	Yes	Yes, not for mitigation; yes
Other federal funding programs	Yes; Grants	Yes, not for mitigation; yes
State funding programs	Yes; Grants	Yes, not for mitigation; yes
Other	No	No; No

How can any of these capabilities be expanded and improved to reduce risk?
Actions that can expand and improve existing authorities, plans, policies, and resources for mitigation include budgeting and passing policies and procedures for mitigation actions, adopting and implementing stricter mitigation regulations, approving the hiring and training of staff for mitigation activities, and approving mitigation updates, and additions to existing plans as new needs are recognized.

The city could apply for Assistance for Firefighters Grant (AFG) to improve firefighting equipment; increase staffing to fire and police departments, replace fire apparatus and police vehicles as needed, retrofit city hall and recreation center with back-up generators, expand the outdoor warning siren system as new development expands, establish a Community Emergency Response Team (CERT), use updated mapping and GIS software as needed, develop a continuity of operations plan, and include hazard mitigation in the Economic Development Plan.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Crowley's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Provide Mobile Command Post for City of Crowley multidepartment operations during natural disasters.	Research types of command post along with communication systems.	6 months	Crowley Police Department	$100,000	$600,000	Federal Emergency Management Agency (FEMA)
		STATUS: Deleted- no longer a priority					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires, Extreme Temperatures, Hazardous Materials Spills, Infectious Disease Outbreak	Provide an emergency response trailer with necessary equipment for responding to disaster sites in the City of Crowley.	Identify suitable trailer for responding needs.	3 months	Crowley Police Department	$44,250	$265,500	FEMA
		STATUS: Deleted- no longer a priority					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires, Extreme Temperatures, Hazardous Materials Spills, Infectious Disease Outbreak	Provide barricades, signs, generators, portable lighting, hydration supplies, and fuel to disaster locations. These items will be preloaded for quick response in the City of Crowley.	Research equipment needed and purchase equipment.	3 months	Crowley Police Department	$18,000	$108,000	FEMA
		STATUS: Deleted- no longer a priority					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires, Extreme Temperatures,	Form a multijurisdictional tactical unit with Forest Hill, Kennedale, and Crowley.	Develop inter local agreement (ILA) and planning.	3 months	Forest Hill Police Department (FHPD), Kennedale Police Department, Crowley Police Department	Unknown	Unknown	Forest Hill, Kennedale, Crowley
		STATUS: Deleted- no longer a priority					
		Acquire appropriate equipment.	8 months	FHPD	$25,000	$150,000	Forest Hill
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Hazardous Materials Spills, Infectious Disease Outbreak, Terrorism		Train law enforcement officers and implement.	1 year	FHPD	$50,000	$300,000	Forest Hill
		STATUS: Deleted- no longer a priority					
Severe Thunderstorms and High Winds, Tornadoes	Ensure outdoors spaces in Crowley have adequate shelter for high wind events such as severe thunderstorms or tornadoes.	Evaluate current shelters in outdoor spaces in Crowley.	Complete study to determine cost	Office of Emergency Management, Fire Department	To be determined	To be determined	Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Grant Program (PDM)
		STATUS: Deleted- no longer a priority					
		Determine the size and space needs for shelters in outdoor spaces in Crowley.	Complete study to determine cost	Office of Emergency Management, Fire Department	To be determined	To be determined	To be determined
		STATUS: Deleted- no longer a priority					
		Install outdoor storm shelters at various locations in the city.	Complete study to determine cost	Office of Emergency Management, Fire Department	To be determined	To be determined	HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	Ensure critical facilities in Crowley have adequate safe rooms to protect against high wind events and tornadoes.	Evaluate the current conditions of critical facilities to determine which ones, if any, need safe rooms installed.	Complete study to determine cost	Office of Emergency Management, Fire Department	To be determined	To be determined	HMGP, PDM
		STATUS: Deleted- no longer a priority					
		Determine the size and space needed to shelter the population of the critical facility.	Complete study to determine cost	Office of Emergency Management, Fire Department	To be determined	To be determined	To be determined
		STATUS: Deferred to 2020 HazMAP					
		Install safe rooms as needed in critical facilities.	Complete study to determine cost	Office of Emergency Management, Fire Department	To be determined	To be determined	HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes	Develop a severe thunderstorm and tornado public education program for Crowley citizens.	Evaluate the hazards posed by high wind events in Crowley.	2 years post study	Office of Emergency Management, Fire Department	To be determined	To be determined	HMGP, PDM
		STATUS: Deleted- no longer a priority					
		Develop a severe weather public education program that provides tips and pertinent information for	2 years post study	Office of Emergency Management, Fire Department	To be determined	To be determined	HMGP, PDM

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		protecting property against high wind damage.					
		STATUS: Deleted- no longer a priority					
Severe Thunderstorms and High Winds, Tornadoes	Distribute severe weather preparedness information to Crowley citizens.	Provide severe weather mitigation information to Crowley citizens through a social media campaign, including severe thunderstorms and tornadoes.	Continual	City Secretary's Office	Unknown	Unknown	General fund
		STATUS: Completed					
		Ensure the City of Crowley website is updated during tornado season to educate citizens on severe weather preparedness.	Continual	City Secretary's Office	Unknown	Unknown	General fund
		STATUS: Completed					
Flooding	Decrease flood insurance premiums in Crowley by participating in the FEMA Community Rating System (CRS) program.	Identify appropriate types of self-contained light/generators.	Continual	Police Department	$25,000	$150,000	FEMA
		STATUS: Deleted- no longer a priority					
		Identify movable generators for	Continual	Police Department	$31,498	$188,988	FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		multiple locations within disaster area.					
		STATUS: Deleted- no longer a priority					
		Research types of command post along with communication systems.	Continual	Police Department	100,000	$600,000	FEMA
		STATUS: Deleted- no longer a priority					
Flooding	Review and remove repetitive loss properties in the City of Crowley.	Review repetitive loss properties and work with homeowners to remove them using FEMA funding.	Unknown	Public Works Department	Unknown	Unknown	Tarrant County, individual jurisdiction budgets
		STATUS: Deleted- no longer a priority					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes, Extreme Heat	Have automatic emergency power for the Crowley Recreation Center in the event the main power supply is disrupted.	Identify appropriate size and type of generator for the Crowley Recreation Center.	1 year	Building Department	Could find a set cost after appropriate size and type is determined	To Be Determined	FEMA, State, bond
		STATUS: Deferred to 2020 HazMAP					
Power Failure, Winter Storms, Severe Thunderstorms	Have emergency lighting for catastrophic mass casualty incidents at	Identify appropriate types of self-contained light/generators.	3 months	Police Department	$25,000	$150,000	FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
and High Winds, Tornadoes	the City of Crowley police station.						
		STATUS: Deleted- no longer a priority					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Ensure access to portable generators in case of emergencies in the City of Crowley.	Identify movable generators for multiple locations within disaster area.	3 months	Police Department	$31,498	$188,988	FEMA
		STATUS: Deleted- no longer a priority					
Hail	Ensure the City of Crowley critical facilities have hail resistant roofing and windows installed.	Evaluate which critical facilities need hail resistant roofing and windows installed.	Continual	Office of Emergency Management, Fire Department	$100,000	$600,000	HMGP, PDM
		STATUS: Deleted- no longer a priority					
		Install hail resistant roofing and windows in identified critical facilities.	Continual	Office of Emergency Management, Fire Department	$300,000	$1,800,000	HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					
Hail	Provide hail resistant parking areas for Crowley's city vehicles.	Evaluate the need for covered parking for city vehicles to protect them against hail.	Continual	Office of Emergency Management, Fire Department	$10,000	$60,000	HMGP, PDM

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
		Install covered parking areas as needed to protect city vehicles against hail.	Continual	Office of Emergency Management, Fire Department	$200,000	$1,200,000	HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					
Hail	Develop a hail mitigation education program for the City of Crowley citizens.	Evaluate the hazards posed by hail in the city.	Study + 2 years	Office of Emergency Management, Fire Department	To be determined	To be determined	HMGP, PDM
		STATUS: Deleted- no longer a priority					
		Develop hail outreach education program that provides tips and pertinent information for ensuring the protection of property against hail, through mitigation activities.	Study + 2 years	Office of Emergency Management, Fire Department	To be determined	To be determined	HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					
Hail	Distribute hail mitigation information to the	Provide hail mitigation information to citizens through a	Continual	City Secretary's Office	Unknown	Unknown	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	City of Crowley citizens.	social media campaign.					
		STATUS: Completed					
		Provide hail mitigation information through the city website.	Continual	City Secretary's Office	Unknown	Unknown	General fund
		STATUS: Completed					
Wildfire	Implement Firewise community program.	Coordinate our city and community with the Texas A&M Forest Service (TFS) to establish a Firewise community program. This program will assist us with preplanning for a fire, during and after.	3 years	Fire Department	$50,000	The primary benefit will come in the form of life and property conservation	General fund, grants
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Ensure Crowley water systems are adequate for fighting wildfires.	Evaluate the Crowley water system to ensure capacity for fighting wildfires.	Continual	Fire Department, Public Works Department	$30,000	$180,000	General fund
		STATUS: Deleted- no longer a priority					
		Install or upgrade needed equipment to ensure water	Continual	Public Works Department	$300,000	$1,800,000	HMGP, PDM

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		systems are adequate.					
		STATUS: Deleted- no longer a priority					
		Provide wildfire response training to fire personnel.	Continual	Fire Department	$300	$1,800	General fund
		STATUS: Deleted- no longer a priority					
Winter Storm	Evaluate winter weather response capabilities in the City of Crowley.	Conduct an assessment of winter weather response capabilities.	2 years, post study	Office of Emergency Management, Public Works Department	To Be Determined	To Be Determined	HMGP, PDM
		STATUS: Deleted- no longer a priority					
		Acquire equipment needed as determined by assessment. (need sanding equipment)	2 years, post study	Public Works Department	$250,000	$1,500,000	HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					
		Provide safety training to first responders on winter weather hazards.	Continual	Fire Department, Police Department	Unknown	Unknown	General fund
		STATUS: Deleted- no longer a priority					
Winter Storm	Evaluate winter weather planning	Conduct an assessment of winter weather plans in	Continual	Office of Emergency Management	To be determined	To be determined	HMGP, PDM

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	capabilities in the City of Crowley.	place for jurisdiction public works.					
		STATUS: Deleted- no longer a priority					
		Develop or update winter weather preparedness plan.	Continual	Office of Emergency Management, Public Works Department	To be determined	To be determined	HMGP, PDM
		STATUS: Deleted- no longer a priority					
Winter Storm	Develop a winter weather outreach program City of Crowley citizens.	Evaluate the hazards posed by severe winter weather in the city of Crowley.	Ongoing	Public Works Department	Unknown	Unknown	General fund
		STATUS: Deleted- no longer a priority					
		Develop a winter weather outreach program that provides tips and pertinent information for avoiding hypothermia and icy conditions.	Ongoing	Public Works Department, City Secretary's Office	Unknown	Unknown	General fund
		STATUS: Deferred to 2020 HazMAP					
Winter Storm	Distribute winter weather information to the City of Crowley residents.	Provide winter weather mitigation information to Crowley citizens	Ongoing	City Secretary's Office	Unknown	Unknown	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		through a social media campaign.					
		STATUS: Deferred to 2020 HazMAP					
		Ensure the Crowley city website is updated during winter months to educate citizens on winter weather mitigation activities.	Ongoing	City Secretary's Office	Unknown	Unknown	General fund
		STATUS: Deferred to 2020 HazMAP					
Infectious Disease Outbreak	Prepare City of Crowley first responders for mass prophylaxis distribution.	Train first responders in point of distribution (POD) procedures.	Unknown	Tarrant County	Unknown	Unknown	Unknown
		STATUS: Deleted- no longer a priority					
		Conduct a POD exercise to test plans and procedures.	Unknown	Tarrant County	Unknown	Unknown	Unknown
		STATUS: Deleted- no longer a priority					
Infectious Disease Outbreak	Ensure continuity procedures are in place to prepare for a long-term employee shortage at City of Crowley facilities.	Review continuity of operations (COOP) plans and procedures for city employees and facilities.	Unknown	Tarrant County	Unknown	Unknown	Unknown
		STATUS: Deleted- no longer a priority					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Provide COOP training for jurisdiction employees.	Unknown	Tarrant County	Unknown	Unknown	Unknown
		STATUS: Deleted- no longer a priority					
Infectious Disease Outbreak	Develop a public information campaign to educate Crowley public about infectious diseases.	Educate the public on pandemics, including isolation, quarantine, triage, and medical care.	Unknown	Tarrant County Fire Department, Crowley City Secretary's Office	Unknown	Unknown	Unknown
		STATUS: Deleted- no longer a priority					
Drought	Review Crowley water enforcement legislation/Ordinance and update as necessary to mitigate the effects of drought.	Review current legislation/ordinance for water conservation enforcement in Crowley.	Ongoing	Public Works Department, Code Compliance	$10,000	$60,000	General fund
		STATUS: Deleted- no longer a priority					
		Develop or update water conservation enforcement legislation/ordinance to ensure effective practices during periods of drought.	Ongoing	Public Works Department, City Council	$20,000	$80,000	General fund
		STATUS: Deleted- no longer a priority					
Drought	Develop contingency plans for Crowley to	Review current contingency plans.	Continual	Public Works Department	$10,000	$60,000	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	ensure adequate power and water supply during prolonged periods of drought.	**STATUS: Deleted- no longer a priority**					
		Develop or update potable water contingency plans.	Continual	Public Works Department	$10,000	$60,000	HMGP
		STATUS: Deleted- no longer a priority					
		Develop or update power supply contingency plans.	Continual	Public Works Department	$600,000	$3,600,000	HMGP
		STATUS: Deleted- no longer a priority					
Drought	Upgrade water and irrigation systems to conserve water in the City of Crowley.	Maintaining current irrigation systems at City facilities; keeping watering schedules to a minimum.	Continual	Public Works Department	$500	$3,000	General fund
		STATUS: Completed					
Drought	Develop a drought awareness education program for Crowley citizens.	Evaluate the hazards posed by drought in Crowley.	Continual	Public Works Department	$100,000	$600,000	HMGP, PDM
		STATUS: Deleted- no longer a priority					
		Develop a drought awareness education program that provides tips and pertinent information for ensuring the protection of	Continual	Public Works Department, Utility Billing	$100,000	$600,000	HMGP, PDM

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		property and the environments against drought.					
		STATUS: Deferred to 2020 HazMAP					
Drought	Distribute drought awareness information to Crowley citizens.	Provide drought awareness information to Crowley citizens through a social media campaign.	Continual	Public Works Department	Unknown	Unknown	General fund
		STATUS: Completed					
		Provide drought awareness information through the city website.	Continual	Public Works Department, City Secretary's Office	Unknown	Unknown	General fund
		STATUS: Completed					
Lightning	Develop a lightning preparedness education program for City of Crowley citizens.	Evaluate the hazards posed by lightning in Crowley.	2 years post study	Office of Emergency Management, Fire Department	$100,000	$600,000	HMGP, PDM
		STATUS: Deleted- no longer a priority					
		Develop a lightning outreach program that provides tips and pertinent information for protecting property against lightning damage.	2 years post study	Office of Emergency Management., Fire Department	$300,000	$1,800,000	HMGP, PDM

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
Lightning	Distribute lightning preparedness information to City of Crowley citizens.	Provide lightning mitigation information to Crowley citizens through a social media campaign.	Unknown	City Secretary's Office	Unknown	Unknown	General fund
		STATUS: Completed					
		Provide lightning awareness information at outdoor spaces throughout Crowley.	Unknown	City Secretary's Office	Unknown	Unknown	General fund
		STATUS: Deleted- no longer a priority					
Power Failure	Provide mobile auxiliary power, lights, and breathing air for hazardous material release, structure fires, and sub-grade rescues for the Crowley Fire Department. This type of unit could be a power source for mobile command units and emergency power emergency	Identify appropriate size and type of the following: truck, generator, command lights, SCBA compressor, fill station; 150' fill line with reel.	1 year	Crowley Fire Department	$625,000	$3,750,000	FEMA, State

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	shelters for the surrounding areas.						
		STATUS: Deleted- no longer a priority					
Expansive Soils	Mitigate expansive soils in Crowley.	Improve construction techniques through building code enhancements.	Unknown	Public Works Department	Unknown	Unknown	General fund
		STATUS: Deferred to 2020 HazMAP					
		Educate construction contractors, homeowners, and business owners about mitigation techniques.	Unknown	Public Works Department	Unknown	Unknown	General fund
		STATUS: Deleted- no longer a priority					
Flooding, Dam Failure	Participate in FEMA's Community Rating System to lower flood insurance premiums for residents with flood insurance.	Participate in FEMA's Community Rating System to lower flood insurance premiums for residents with flood insurance.	1 year	Public Works Department	$10,000	$60,000	Local funds, HMGP, PDM, FMA
		STATUS: Deferred to 2020 HazMAP					
Flooding, Dam Failure	Develop a buyout program for properties in the floodplain.	Develop a buyout program for properties in the floodplain.	As funding is available	Public Works Department	To be determined	To be determined	Local funds, HMGP, PDM, FMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deleted- no longer a priority					
Severe Thunderstorms, High Winds, Lightning, and Tornadoes	Ensure outdoors spaces in Crowley have adequate shelter for high wind events such as severe thunderstorms or tornadoes.	Ensure outdoors spaces in Crowley have adequate shelter for high wind events such as severe thunderstorms or tornadoes.	As funding is available	Office of Emergency Management	To be determined	To be determined	Local funds, HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms, High Winds, Lightning, and Tornadoes	Distribute severe weather mitigation information to Crowley citizens.	Distribute severe weather mitigation information to Crowley citizens.	As funding is available	Office of Emergency Management	To be determined	To be determined	Local funds, HMGP, PDM
		STATUS: Deleted- no longer a priority					
Winter Storms	Equip city vehicles and equipment with digital thermometers to identify pavement/asphalt temperatures to determine freeze levels for bridges and overpasses.	Equip city vehicles and equipment with digital thermometers to identify pavement/asphalt temperatures to determine freeze levels for bridges and overpasses.	As funding is available	Office of Emergency Management	To be determined	To be determined	Local funds, HMGP, PDM
		STATUS: Deleted- no longer a priority					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Power Failure, Extreme Heat, and Winter Storm	Ensure access to portable generators in case of emergencies in the City of Crowley.	Ensure access to portable generators in case of emergencies in the City of Crowley.	As funding is available	Office of Emergency Management	To be determined	To be determined	Local funds, HMGP, PDM
		STATUS: Deleted- no longer a priority					
Wildfire	Develop a community wildfire protection plan (CWPP) to identify areas at risk for wildfire and identify additional wildland resources.	Develop a community wildfire protection plan (CWPP) to identify areas at risk for wildfire and identify additional wildland resources.	As funding is available	Office of Emergency Management	To be determined	To be determined	Local funds, HMGP, PDM
		STATUS: Deleted- no longer a priority					
Wildfire	Develop a wildfire mitigation outreach program City of Crowley citizens.	Develop a wildfire mitigation outreach program City of Crowley citizens.	As funding is available	Office of Emergency Management	To be determined	To be determined	Local funds, HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperature	Develop an extreme heat outreach program for City of Crowley citizens.	Develop an extreme heat outreach program for City of Crowley citizens.	As funding is available	Office of Emergency Management	To Be Determined	To Be Determined	Local funds, HMGP, PDM
		STATUS: Deferred to 2020 HazMAP					

5.3 New Action Items

The City of Crowley's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Earthquakes, Thunderstorms, Tornadoes**
Install safe rooms in all new and existing city buildings.	
Participating Jurisdiction:	City of Crowley
Priority:	1
Estimated Cost:	$3,000,000
Estimated Benefit:	$18,000,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Emergency Management Office, Fire Department, Public Works Department
Implementation Schedule:	48 months

Hazard(s) Addressed	**Flooding, Thunderstorms, Tornadoes, Wildfires**
Install additional Outdoor Warning Sirens to increase warning coverage.	
Participating Jurisdiction:	City of Crowley
Priority:	2
Estimated Cost:	$75,000
Estimated Benefit:	$450,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Emergency Management Office
Implementation Schedule:	36 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires
Improve and enforce building codes.	
Participating Jurisdiction:	City of Crowley
Priority:	3
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Building Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Winter Storms
Enhance winter storm mitigation efforts with the purchase sanding/deicing equipment to retrofit City dump trucks.	
Participating Jurisdiction:	City of Crowley
Priority:	4
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires
Develop and implement a comprehensive public education program that includes recommended actions to mitigate the impacts of these hazards.	
Participating Jurisdiction:	City of Crowley
Priority:	5
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Fire Department, Public Relations Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Enforce watering restrictions.	
Participating Jurisdiction:	City of Crowley
Priority:	6
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	General budget
Lead Agency/Department Responsible:	Code Enforcement
Implementation Schedule:	12 months

Hazard(s) Addressed	Wildfire
Review and modify the City's Municipal Code, if necessary and feasible, to restrict excessive fuel build up, including tree trimmings, brush, and cuttings to establish a clear zone and reduce wildland fire risk in residential areas.	
Participating Jurisdiction:	City of Crowley
Priority:	7
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	General budget
Lead Agency/Department Responsible:	Code Enforcement
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought, Expansive Soils
Create and implement drought contingency plan for the city facilities and property that addresses the use of low flow fixtures, xeriscaping, or drought-tolerant plants.	
Participating Jurisdiction:	City of Crowley
Priority:	8
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Expansive Soils, Thunderstorms, Tornadoes
Adopt and implement most current building codes that require all new building slabs to be engineered to reduce potential damage done by earthquakes and/or expansive soils along with any other building requirements.	
Participating Jurisdiction:	City of Crowley
Priority:	9
Estimated Cost:	$8,000
Estimated Benefit:	$48,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Economic Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Winter Storms
Enhance the winter weather mitigation plan.	
Participating Jurisdiction:	City of Crowley
Priority:	10
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct structure improvements, to include replacing rip-rap section with gabion basket and regarding steep slopes, to improve channel degradation caused by erosion from flooding.	
Participating Jurisdiction:	City of Crowley
Priority:	11
Estimated Cost:	$500,000
Estimated Benefit:	$3,000,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Enhance irrigation systems, install low water fixtures at critical facilities, replace aging/leak delivery systems, and enhance domestic meters.	
Participating Jurisdiction:	City of Crowley
Priority:	12
Estimated Cost:	$6,000,000
Estimated Benefit:	$36,000,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Enhance the public education program to provide mitigation strategies for the identified hazards.	
Participating Jurisdiction:	City of Crowley
Priority:	13
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Emergency Management Office, Parks Department, Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Extreme Heat
Enhance Stonegate Well and pump house (replace electrical, pumps and equipment) to withstand drought and heat conditions, to include the installation of a generator.	
Participating Jurisdiction:	City of Crowley
Priority:	14
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Earthquakes, Expansive Soils
Utilize standards for expansive soils on new water line replacements and installation.	
Participating Jurisdiction:	City of Crowley
Priority:	15
Estimated Cost:	$75,000,000
Estimated Benefit:	$4,500,000,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Install impact-resistant roofs and windows in new and existing critical facilities, including schools, as necessary.	
Participating Jurisdiction:	City of Crowley
Priority:	16
Estimated Cost:	$3,000,000
Estimated Benefit:	$18,000,000
Potential Funding Source(s):	Grants, general budget
Lead Agency/Department Responsible:	Emergency Management Office, Risk Management Office, Facilities Maintenance
Implementation Schedule:	36 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Crowley
Priority:	17
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Crowley
Priority:	18
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Crowley
Priority:	19
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Crowley
Priority:	20
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquake, Thunderstorm, Tornado, National Security Incident
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Crowley
Priority:	21
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Crowley
Priority:	22
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm
To protect power lines from severe weather either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Crowley
Priority:	23
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Annual Budget Review	City Administration, Department Heads	Annually	Allowances will be made in accordance with grant applications sought or mitigation actions that will be undertaken according to the implementation schedule of the specific action.	Various departments and key personnel that participated in the planning process will review the HazMAP and mitigation actions therein, when conducting their annual budget review.
Grant Applications	City Administration, Department Heads	As Needed	The HazMAP will be consulted by planning team members whenever grant funding is sought for mitigation projects.	If a project is not in the HazMAP, an amendment may be necessary to include the action in the HazMAP.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plan (CIP)	City Administration, CIP Committees	As Needed	Drainage improvement projects, outdoor warning sirens, shelter areas within city parks	When reviewing the Capital Improvement Plan, the leadership team will review the mitigation action plan to see which action items can be addressed with the fiscal and administrative capabilities of the city.
Regulatory Plans (such as Emergency Management Plans, Continuity of Operations, Disaster Recovery Plans, Economic Development and Evacuation Plans)	City Administration, Department Heads	As Needed	Reference the HazMAP when updating these plans.	The HazMAP will be consulted when city departments review or revise their current regulatory planning mechanisms, or in the development of regulatory plans that are not currently in place.
Drainage Master Plan	Public Works	As Needed	Notations of potential drainage concerns	City leadership and public works staff will review identified mitigation actions and consider plan revision, as necessary, to address them.
2020 Parks Master Plan	Parks and Recreation	Every 10 years	Reference this HazMAP when developing the plan.	When reviewing the Parks Master Plan, the Parks and Recreation Department will review the HazMAP to see which action items can be addressed with the fiscal and administrative capabilities of the city.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Crowley. For additional information, see Appendices A and B.

2020

City of Dalworthington Gardens*

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

The City of Dalworthington Gardens is a new participant in the Tarrant County Hazard Mitigation Action Plan (HazMAP) and does not have a previous mitigation plan.

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County HazMAP planning process for the City of Dalworthington Gardens, a new participant in the HazMAP, was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Dalworthington Gardens alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

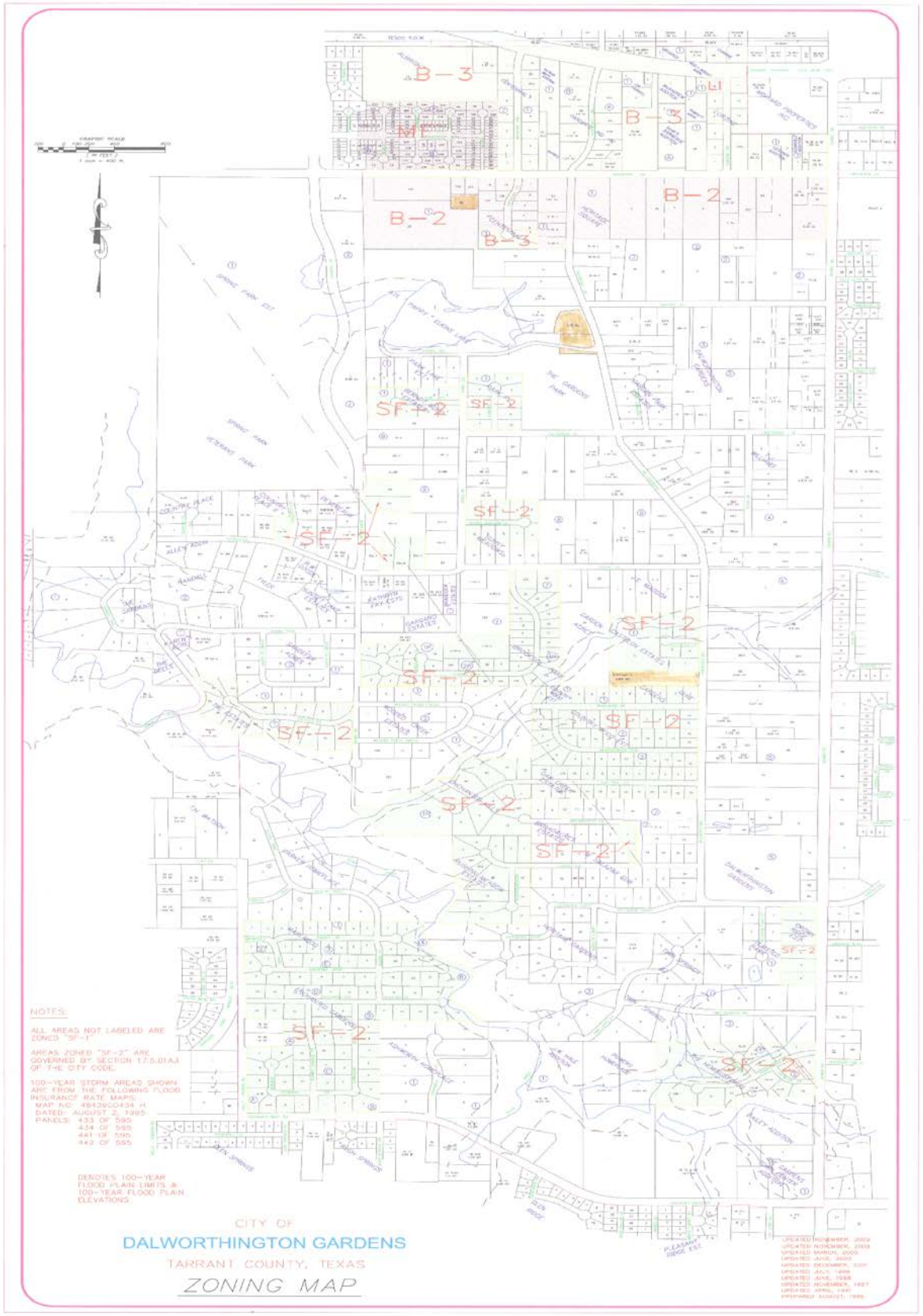
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Dalworthington Gardens will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at NCTCOG.

1.4 Supporting Maps

The following map provides an overview of the City of Dalworthington Gardens:

- Zoning Map


B-3
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NOTES:
ALL AREAS NOT LABELED ARE ZONED "SF-1"
AREAS ZONED "SF-2" ARE GOVERNED BY SECTION 17.5.01A3 OF THE CITY CODE.
100-YEAR STORM AREAS SHOWN ARE FROM THE FOLLOWING FLOOD INSURANCE RATE MAPS:
MAP NO: 48439C0434 H
DATED: AUGUST 2, 1995
PANELS: 433 OF 595
434 OF 595
441 OF 595
442 OF 595
DENOTES 100-YEAR FLOOD PLAIN LIMITS & 100-YEAR FLOOD PLAIN ELEVATIONS
CITY OF
DALWORTHINGTON GARDENS
TARRANT COUNTY, TEXAS
ZONING MAP

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Dalworthington Gardens has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Dalworthington Gardens' Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Dalworthington Gardens. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Dalworthington Gardens Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Dalworthington Gardens	Department of Public Safety	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Dalworthington Gardens	Department of Public Safety	Public Safety Officer	General oversight Hazard identification and plan development
City of Dalworthington Gardens	Department of Public Safety	Director	Hazard identification and plan development
City of Dalworthington Gardens	Public Works Department	Director	Hazard identification and plan development
City of Dalworthington Gardens	City Administration	City Administrator	Hazard identification and plan development
City of Dalworthington Gardens	Department of Public Safety	Deputy Fire Chief	Hazard identification and plan development
City of Dalworthington Gardens	Department of Public Safety	Assistant Chief	Hazard identification and plan development
City of Dalworthington Gardens	Department of Public Safety	Sergeant	Hazard identification and plan development
City of Dalworthington Gardens	City Council	Mayor	Plan approval

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

As the City of Dalworthington Gardens is a new participant in the Tarrant County HazMAP, there are no changes in development.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Dalworthington Gardens.

Dalworthington Gardens is a city within the City of Arlington.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	2,387
Persons under 5 years (%)	Data unavailable.
Persons 65 years and over (%)	Data unavailable.
Language other than English spoken at home (%)	Data unavailable.
With a disability, under age 65 (%)	Data unavailable.
Person without health insurance, under age 65 (%)	6.8
Persons in poverty (%)	3.8
Median household income	$129,750
Households, 2012-2016	846
Median value of owner-occupied housing units, 2012-2016	$355,600

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Dalworthington Gardens.

City of Dalworthington Gardens Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Municipal Complex 2600 Roosevelt Drive	City Hall, Courts, Public Works, Department of Public Safety, Emergency Operations Center	50 people	30,000	$3,000,000	$2,500,000 (including vehicles)
Water tower 3200 Roosevelt Drive	Utility	0 people	0	$1,5000,000	$2,500
Water tower 3200 West Arkansas Lane	Utility	0 people	0	$2,000,000	$2,500

3.3 Natural Hazard Profiles

The City of Dalworthington Gardens' Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Dalworthington Gardens in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Extreme Heat
2	Drought
3	Thunderstorm (includes hail, wind, lightning)
4	Flooding
5	Tornado
6	Expansive Soils
7	Wildfire
8	Winter Storms
9	Earthquake

The hazard profiles described in this section are listed in alphabetical order. A comprehensive review of previous occurrences, changes in development, potential impacts, and the possible extent were used to analyze risks.

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Dalworthington Gardens.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Impact on citizens Impact on car washes, parks, and pools
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal due to the minor extent expected. There is an approximate loss of $35 million due to drought if a water shortage occurs. This number was determined using numbers from Arlington Independent School District (who owns an agriculture barn inside the city limits) as well as from historical records related to tax filings.

Jurisdiction's ground-water supply: Arlington Municipal Water Supply.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: While areas of the city are zoned for agricultural use, there are no commercial stables, barns, or farms with in the city limits; however, there is an educationally zoned barn/stable/agricultural complex.

Describe any water restrictions used in your jurisdiction: There are no water restrictions.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Significant
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: There is damage to roads and property throughout the community. Unable to estimate value due to majority of repairs being done by the Texas Department of Transportation (TxDOT). There have been significant funds spent by property owners to repair foundations of homes and businesses throughout the city.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Major
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	The elderly, young, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. People who work outside or in buildings without air-conditioning are also at high risk to the direct effects of extreme heat. 60% of the population is over 60 years of age and 5.3% is over 75.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? No cases have been identified.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. There are approximately 10 homes in the affected area and $20 million of improved property. Properties along Rush Creek are at greatest risk.

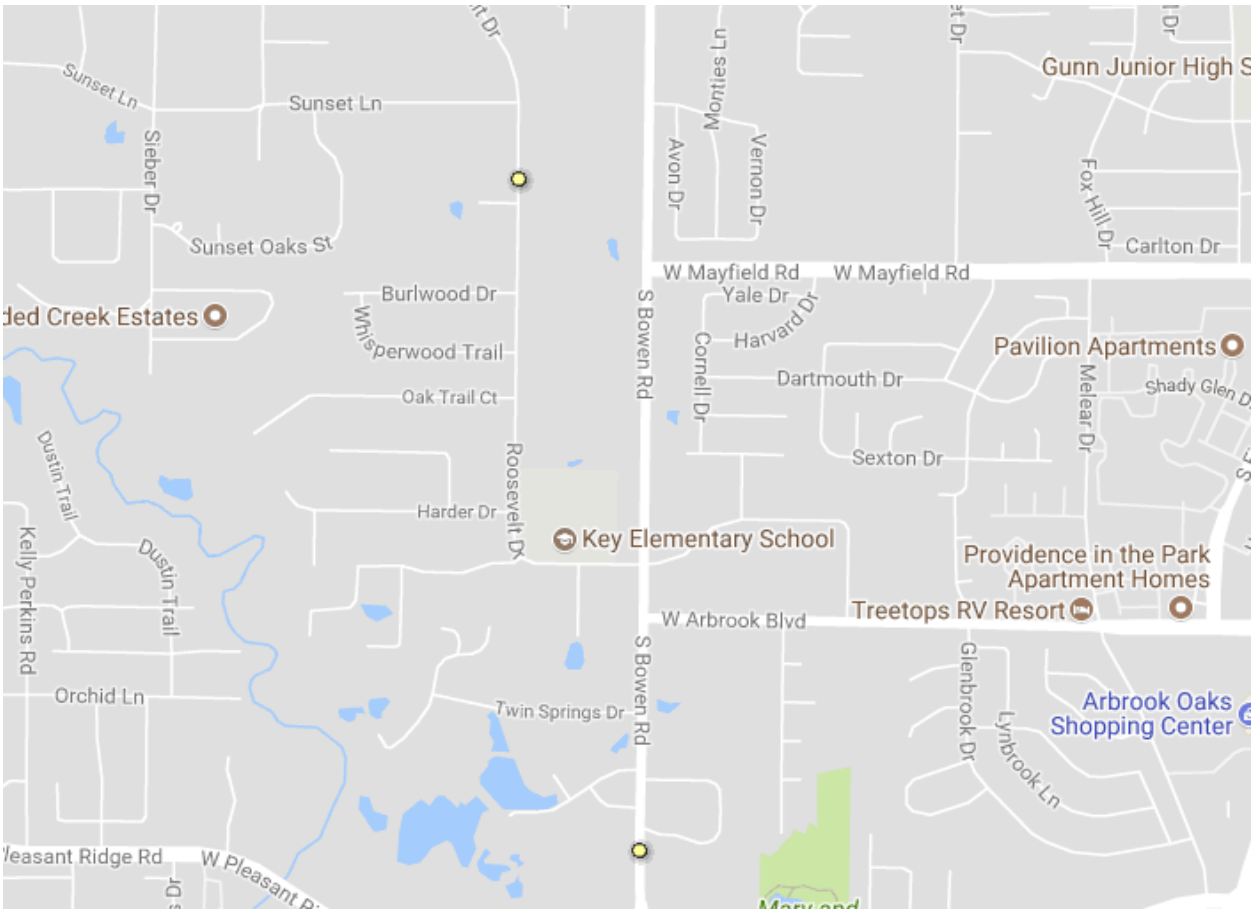
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported before 2017, though an estimated $450,000 of damage occurred in August/September of 2018 due to heavy rainfalls.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: The 3400 block of Indian Trail at Rush Creek. See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Rush Creek.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Roosevelt Drive	Ryan's Creek	Vented Ford
Bowen Road	Twin Springs Draw	Vented Ford
Indian Trails (not mapped)	Rush Creek	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low-water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Residential	654	40	6%
Commercial	66	0	0%
Undeveloped	575	104	18%
Roadways	103	20	17%
Parks	19	3	15%
Public/semipublic/parks	82	15	18%
Total	**1393**	**182**	**13%**

Source: City of Dalworthington Gardens.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Dalworthington Gardens is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	481013#
Community Name	City of Dalworthington Gardens
Counties	Tarrant County
Initial FHBM Identified	08/06/76
Initial FIRM Identified	05/17/82
Current Effective Map Date	09/25/09
Reg-Emer Date	05/17/82
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? City Administrator.

What specific flooding ordinances and plans does your jurisdiction have? Section in code of ordinances: "Article 3.06 Flood Damage Prevention."

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? There are no building requirements.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? Ordinance states "Restrict or prohibit uses that are dangerous to health, safety or property in times of flood, or cause excessive increases in flood heights or velocities;

(1) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

(2) Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of floodwaters;

(3) Control filling, grading, dredging and other development which may increase flood damage;

(4) Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands."

Repetitive and Severe Repetitive Loss Properties: There are currently 1 residential and 1 nonresidential repetitive loss properties and 0 severe repetitive loss properties within the City of Dalworthington Gardens. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Dalworthington Gardens' ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 25 Insurance in-force: $7,617,100 Written premium in-force: $17,206
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 9 claims have been filed, but 4 have closed without payment. $38,738.70 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	25.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	None.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	No.
Is floodplain management an auxiliary function?	Community FPA	Yes.

Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, GIS, education and explanation of requirements.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Knowledge of program, knowledge of requirements, ability to enforce.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Unknown.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	08/06/76
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Meets standard.

Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Application for a floodplain development permit shall be presented to the floodplain administrator on forms furnished by him/her and may include, but not be limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to areas of special flood hazard. Additionally, the following information is required: (1) Elevation (in relation to mean sea level) of the lowest floor (including basement) of all new and substantially improved structures; (2) Elevation in relation to mean sea level to which any nonresidential structure shall be floodproofed; (3) A certificate from a registered professional engineer or architect that the nonresidential floodproofed structure shall meet the floodproofing criteria of section 3.06.092(2); (4) Description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of proposed development; (5) Maintain a record of all such information in accordance with section 3.06.042(1) hereof. (b) Approval or denial of a floodplain development permit by the floodplain administrator shall be based on all of the provisions of this article and the following relevant factors: (1) The danger to life and property due to flooding or erosion damage; (2) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner; (3) The danger that materials may be swept onto other lands to the injury of others; (4) The compatibility of the proposed use with existing and anticipated development; (5) The safety of access to the property in times of flood for ordinary and emergency vehicles; (6) The costs of providing governmental

		services during and after flood conditions, including maintenance and repair of streets and bridges, and public utilities and facilities such as sewer, gas, electrical and water systems; (7) The expected heights, velocity, duration, rate of rise and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site; (8) The necessity to the facility of a waterfront location, where applicable; (9) The availability of alternative locations, not subject to flooding or erosion damage, for the proposed use.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Dalworthington Gardens will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Most damage occurred to trees, fences, and roofs by high winds. $600,000 in damage estimated using insurance claim data available.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. The municipal complex located at 2600 Roosevelt Drive is of considerable risk as it houses City Hall and Department of Public Safety. All our industrial buildings are also located in a zoned area off Arkansas and 303, running along Michigan Avenue/Court and Corzine Drive.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado before 2017.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard. There are 24 residential parcels located within the wildland-urban interface (WUI).

Most vulnerable location (North, East, South, West) of your jurisdiction? The west side of the city is very rural and undeveloped with agricultural space. $40 million in structures are at risk on the west side of the city in the underdeveloped areas. This was determined using assessed tax data.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard. Based on historical data, winter storm events can be expected to cause an average of two-four closures yearly due to road conditions. This could cause an estimated $100,000 in lost revenue.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: There are no bridges or overpasses within the city.

3.4 Historical Events

According to the National Centers for Environmental Information, no natural hazard events have occurred within the City of Dalworthington Gardens up to 2017, though the city has experienced severe thunderstorms and damage from expansive soils.

3.5 Overall Vulnerability

The City of Dalworthington Gardens identified their greatest vulnerabilities and concerns:

- The city is bordered by a creek that utilizes a low water crossing. During any measureable rainfall, this crossing becomes inaccessible, cutting off access to part of the city. The city is also at a nominal risk for severe weather and flash flooding due to the amount of concrete and urbanization.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Dalworthington Gardens' Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; very high level mitigation of some natural and technological hazards. No; and maybe.
Capital Improvement Plan	No	
Economic Development Plan	Yes	No; No; maybe at the private level
Local Emergency Operations Plan	Yes	Yes; No; maybe
Continuity of Operations Plan	In progress	Yes; No; No
Transportation Plan	No	
Storm Water Management Plan	No	
Community Wildfire Protection Plan	No	
Other Plans (e.g.; disaster recovery; climate change adaptation)	Yes	County HazMAP; County Emergency Operations Plan; Arlington Independent School District Emergency Plan (AISD); Arlington Medical Reserve Response Plan Yes; Yes; Yes for all except AISD Plan (Yes; Yes; No)
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	No	

Floodplain Ordinance	No	
Flood Insurance Rate Maps	No	
Natural Hazard Specific Ordinance (e.g.; stormwater; wildfire)	No	
Acquisition of land for open space and public recreation uses	No	
Building Code; Permitting; and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year:** IBC, 2015
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating:** 4
Site Plan Review Requirements	Yes	**Type(s) of requirement:** All new construction plans must be reviewed by city engineer and fire inspector. New construction is signed off on prior to issuing a Certificate of Occupancy.
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Monthly discussion on new construction and Planning and Zoning items. Yes
Mitigation Planning Committee	Yes	Hazard identification and risk assessment. Yes
Maintenance programs to reduce risk (e.g.; tree trimming; clearing drainage systems)	Yes	Public Works Department does tree trimming; handles water and stormwater issues; road repair/replacement; repair to city infrastructure.
Mutual Aid Agreements	Yes	Automatic/Mutual aid with cities that neighbor us as well as a member of a mutual aid system.
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	PT	Yes; Yes; Yes
Floodplain Administrator	No	
Emergency Manager	FT (dual role)	Public Safety Office: Yes; Yes; Yes
Community Planner	No	
Civil Engineer	PT (contract)	Yes; Yes; Yes
GIS Coordinator	No	
Other:	Yes	Public Works Director (FT); Fire inspector (volunteer). Yes; Yes; Yes
***Full-time (FT) or part-time (PT) position**		

Technical	Have capability?	Describe capability. Has capability been used to assess or mitigate risk in the past?
Warning Systems/Services (e.g.; Reverse 911; outdoor warning signals)	Yes	Use Tarrant County warning systems. Social media such as a city Facebook page, Department of Public Safety (DPS) Facebook page, and official Nextdoor accounts that are ran by individual city staff members. Yes
Hazard data and information	No	
Grant writing	Yes	Internal employees as an ancillary duty. Yes
HaZUS analysis	No	
Other	Yes	Crime data and other public/private intel that is found related to the city.
Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or Non-profit organizations focused on environmental protection; emergency preparedness; access and functional needs populations; etc.	Yes	Citizens DPS Academy, Citizens DPS Association, and Citizens on Patrol do hazard surveillance and crime prevention. Yes
Ongoing public education or information program (e.g.; responsible water use; fire safety; household preparedness; environmental education)	Yes	Current programs for fire safety and basic emergency preparedness. Yes
Natural disaster or safety related school programs	N/A	No schools under control of city.
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	No	
Other		

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements Project funding	No	Yes; however, the funding no longer exists.
Authority to levy taxes for specific purposes	Yes	Yes, currently use for Crime Control and Prevention District; No
Fees for water; sewer; gas; and/or electric services	Yes	Yes, general funds. No
Impact fees for new development	Yes	
Stormwater utility fee	No	
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes, road projects and other capital projects. No
Incur debt through private activities	No	
Community Development Block Grant	Yes	No; Yes
Other federal funding programs	Yes	Yes, specific department funds. No
State funding programs	Yes	Yes, specific department funds. No
Other		

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, policies, and resources for mitigation include budgeting and passing policies and procedures for mitigation actions, adopting and implementing stricter mitigation regulations, approving the hiring and training of staff for mitigation activities, and approving mitigation updates, additions to existing plans as new needs are recognized, increase outreach and education program to include KnoWhat2Do, increase fire safety and emergency preparedness through outreach materials, upgrade public safety vehicle fleet, deploy mass notification system for hazards, and create specific hazard related ordinances that the city is prone to and expand current ordinances to reduce hazards across the community.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

As a new participant, the City of Dalworthington Gardens does not have previous mitigation actions to review.

5.3 New Action Items

The City of Dalworthington Gardens' action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.
[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Create a city wide notification system for phone, text, and email by implementing a system such as CodeRed or Everbridge.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	1
Estimated Cost:	$70,000
Estimated Benefit:	$420,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	3 months

Hazard(s) Addressed	Flooding
Purchase and install a technological based high water detection system for low water crossings to mitigate the hazards when the location floods.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	2
Estimated Cost:	$300,000
Estimated Benefit:	$1,800,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Department of Public Safety, Public Works Department
Implementation Schedule:	8 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Retrofit city buildings with impact-resistant roofing materials, windows, and creation of interior safe rooms.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	3
Estimated Cost:	$1,500,000
Estimated Benefit:	$9,000,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Building Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Develop and implement a comprehensive public education program that includes recommended activities to mitigate the impact of each identified hazard.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Eliminate potential loss of power to municipal buildings from these identified hazards with the installation of backup generators for electrical power in municipal buildings.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	5
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	6 months

Hazard(s) Addressed	Extreme Heat, Thunderstorms, Winter Storms
Install covered parking and awnings to protect emergency vehicles and pedestrians from hail and severe weather.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	6
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Department of Public Safety, Public Works Department
Implementation Schedule:	5 months

Hazard(s) Addressed	Extreme Heat, Thunderstorms, Tornadoes, Winter Storms
Install a fortified pavilion with a community tornado shelter in city park to provide shelter from severe weather.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	7
Estimated Cost:	$500,000
Estimated Benefit:	$3,000,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Department of Public Safety, Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Purchase weather radios for all households.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	8
Estimated Cost:	$300,000
Estimated Benefit:	$1,800,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms
Install a lighting detector system for Elkins Park to reduce injury from lightning strikes.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	9
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	6 months

Hazard(s) Addressed	Extreme Heat
Install public water fountains around the city to prevent dehydration.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	10
Estimated Cost:	$30,000
Estimated Benefit:	$90,000
Potential Funding Source(s):	Hazard mitigation grants, city budget, donations
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	10 months

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Winter Storms
Purchase geographic information system (GIS) software for better identifying and mitigating at risk properties.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	11
Estimated Cost:	$37,500
Estimated Benefit:	$225,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	3 months

Hazard(s) Addressed	Earthquakes, Expansive Soils, Thunderstorms, Tornadoes
Adopt and implement most current ICC building codes for new and existing buildings to mitigate the damage from these identified hazards.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	12
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	City funds, permits
Lead Agency/Department Responsible:	Public Works Department, Planning and Zoning Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Create and implement a drought contingency plan for city facilities and property.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	13
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City funds
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	6 months

Hazard(s) Addressed	Drought
Create and implement a water conservation program for public and residential property.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	14
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City funds
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	15
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	16
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	17
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	18
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquake, Thunderstorm, Tornado, National Security Incident
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	19
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	20
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm
To protect power lines from severe weather either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	21
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Require that the floodplain administrator is certified.	
Participating Jurisdiction:	City of Dalworthington Gardens
Priority:	22
Estimated Cost:	$2,000
Estimated Benefit:	$112,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.
Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Emergency Operations Plan (EOP)	Department of Public Safety	Annually	Reference this HazMAP when developing the plan.	When updating the EOP, the planning team will align the hazards section to become congruent with the HazMAP as well as reference the HazMAP as an associated plan.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Comprehensive Plan	Planning and Zoning Department, Department of Public Safety, City Administration	Every 5 years	Reference this HazMAP when developing the plans for critical infrastructure and resources.	The plan development team will reference the HazMAP when updating this plan, in such areas as strengthening critical infrastructure and key resources based on HazMAP hazard analysis; incorporating vulnerability data and action items.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Dalworthington Gardens. For additional information, see Appendices A and B.

Town of Edgecliff Village*

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

The Town of Edgecliff Village is a new participant in the Tarrant County Hazard Mitigation Action Plan (HazMAP) and does not have a previous mitigation plan.

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County HazMAP planning process for the Town of Edgecliff Village, a new participant in the HazMAP, was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided is for the Town of Edgecliff Village alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the Town of Edgecliff Village will take the HazMAP to Town Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the Town of Edgecliff Village has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped town officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The town's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The town developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the Town of Edgecliff Village's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the town's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the Town of Edgecliff Village. The town acted as the plan development consultant, providing hazard mitigation planning services.

Town of Edgecliff Village Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
Town of Edgecliff Village	Fire Department	Emergency Management Coordinator	General oversight, hazard identification and plan development
Town of Edgecliff Village	Fire Department	Fire Chief	Hazard identification and plan development
Town of Edgecliff Village	Town Council	Mayor	Hazard identification and plan development
Town of Edgecliff Village	Town Council	Alderman	Hazard identification and plan development
Town of Edgecliff Village	Public Works Department	Director	Hazard identification and plan development
Town of Edgecliff Village	Tarrant County Sheriff's Office	Tarrant County Sheriff's Office	Hazard identification and plan development
Town of Edgecliff Village	Texas Elementary School of the Arts	Principal	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the town, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the town in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

As the Town of Edgecliff Village is a new participant in the Tarrant County HazMAP, there are no changes in development.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the Town of Edgecliff Village. Edgecliff Village is a town surrounded by the City of Arlington.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	3,021
Persons under 5 years (%)	Data unavailable.
Persons 65 years and over (%)	Data unavailable.
Language other than English spoken at home (%)	Data unavailable.
With a disability, under age 65 (%)	Data unavailable.
Person without health insurance, under age 65 (%)	13.1
Persons in poverty (%)	10.3
Median household income	$72,663
Households, 2012-2016	1,040
Median value of owner-occupied housing units, 2012-2016	$129,500

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the Town of Edgecliff Village.

Town of Edgecliff Village Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Texas School of Arts 6025 Village Parkway	Education
Town Office 1605 Edgecliff Road	Municipal Complex
Fair Park Baptist Church 6000 Crowley Road	Education

Town of Edgecliff Village Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Union Pacific Railroad track East part of town	Transportation
Burlington Northern Santa Fe (BNSF) Railway track West part of town	Transportation

*The capacity, square footage, and structure value of these assets were unavailable.

3.3 Natural Hazard Profiles

The Town of Edgecliff Village's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the Town of Edgecliff Village in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	**Thunderstorm (includes hail, wind, lightning)**
2	**Tornado**
3	**Wildfire**
4	**Extreme Heat**
5	**Flooding**
6	**Winter Storms**
7	**Expansive Soils**
8	**Drought**
9	**Earthquake**

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire Town of Edgecliff Village.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal due to the minor extent expected.

Jurisdiction's ground-water supply: Surface water and the Trinity River Water District.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: None.

Describe any water restrictions used in your jurisdiction: Edgecliff Village is under permanent stage 1 water restrictions year-round unless higher stages are needed.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Expansive soils are a major consideration to all existing and future structures. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Damage to roads is spread throughout the town. The town spends between $20,000 and $40,000 per year on road repairs due to cracking, heaving, and buckling caused by expansive soils. To date, town buildings have no documented damages directly attributed to expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	The elderly, homeless, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. People who work outside or buildings without air-conditioning are also at high risk to the direct effects of extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? No cases of extreme heat exposure have been reported.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? In 2016, Town Hall, the Public Works Department, and Fire Department all suffered a power failure during the month of July due to extreme heat.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. In total, 12.27% of the town's residential parcels are located within the 100-year floodplain.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: On August 11, 2018, the town experienced flash flooding in most of the town. There was minor damage reported to the bridge over Sycamore Creek. The bridge runs north to south throughout the east side of town.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: Impacted traffic routes include the following: Edgecliff Road between Village Parkway and Crowley Road (Farm to Market (FM) 731) running east to west; the bridge at Sycamore Creek Road and Edgecliff Road; FM 731 north and south bound in the area of 6000 Crowley Road (FM731) at the bridge; intersection of Ed Coady Road and Sycamore Creek Road; intersection of Ed Coady Road and Rockmoor Drive; and Village Parkway and Edgecliff Road at the bridge.

Names of any creeks or rivers that flood: Sycamore Creek.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The Town of Edgecliff Village is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480592#
Community Name	Town of Edgecliff Village
County	Tarrant County
Initial FHBM Identified	12/28/1973
Initial FIRM Identified	08/19/1986
Current Effective Map Date	09/25/2009
Reg-Emer Date	08/19/1986
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Emergency Management Coordinator.

What specific flooding ordinances and plans does your jurisdiction have? Section in code of ordinances: "Article 3.06 Flood Damage Prevention."

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? Sec. 3.05.008 "Provisions for flood hazard reduction."

What building restrictions, in regards to floodplains, does your jurisdiction enforce?

1. All subdivision proposals, including the placement of manufactured home parks and subdivisions, shall be consistent with sections 3.05.002, 3.05.003, and 3.05.004 of this article.
2. All proposals for the development of subdivisions, including the placement of manufactured home parks and subdivisions, shall meet development permit requirements of section 3.05.006(c) and section 3.05.007(c) and the provisions of this section.
3. Base flood elevation data shall be generated for subdivision proposals and other proposed development, including the placement of manufactured home parks and subdivisions, which is greater than 50 lots or 5 acres, whichever is lesser, if not otherwise provided pursuant to section 3.05.006(b) or section 3.05.007(b)(8) of this article.

4. Base flood elevation data shall be generated by a detailed engineering study for all Zone A areas, within 100 feet of the contour lines of Zone A areas, and other streams not mapped by FEMA, as indicated on the community's FIRM.
5. All subdivision proposals, including the placement of manufactured home parks and subdivisions, shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize or eliminate flood damage.

Repetitive and Severe Repetitive Loss Properties: There are currently 0 repetitive loss properties and 0 severe repetitive loss properties within the Town of Edgecliff Village. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
110	12.27%	1	6%

Source: FEMA Flood Map Service Center.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the Town of Edgecliff Village's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 39 Insurance in-force: $7,825,900 Written premium in-force: $40,507
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 15 claims have been filed, but 5 have been closed without payment. $72,918.51 have been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	110.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	No data available.

Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, engineering capability.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Lack of participation.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Unknown.
Is a CAV or CAC scheduled or needed?		Unknown
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	08/19/86
Are the FIRMs digital or paper?	Community FPA	Paper.

Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Application is submitted to the town and reviewed by town engineering firm and flood plain admin.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The Town of Edgecliff Village will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Major
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): No damage has been reported.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: In 1994, there was a small, brief F0 (EF0 on today's scale) tornado that struck the Town of Edgecliff Village, but no damage was reported.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the town are exposed to this hazard. Based on geographic data, approximately 22.1% of residential parcels and 27% of the population in the town are in the wildland-urban interface (WUI) and are vulnerable to wildfires, as well as 2 commercial entities including an elementary school with a daily enrollment of approximately 350 students. Both Burlington Northern Santa Fe (BNSF) and Union Pacific (UP) have rail lines in the town and are vulnerable to wildfires that could disrupt service or can create sparks that could cause a wildfire.

Residential		Commercial		Industrial	
Residential Parcels Within WUI	Percentage (%) Within WUI	Commercial Parcels Within WUI	Percentage (%) Within WUI	Industrial Parcels Within WUI	Percentage (%) Within WUI
300	22.1%	2	13.3%	2	13.3%

Source: Town of Edgecliff Village.

Most vulnerable location (North, East, South, West) of your jurisdiction? New subdivisions on our east and south east locations have created an increased percentage of WUI, rail lines on our east and west contribute to multiple fires per year. There is also an elementary school within our WUI area on the east side. Wildfires can cause significant damage to property and threaten lives of people who are unable to evacuate. Assets located in these wildfire-prone areas are considered vulnerable and can be exposed to this hazard.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the town are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: The bridge over Sycamore Creek at Farm to Market (FM) 731 (Crowley Road), bridge over Edgecliff Road/Brenton Drive, bridge over Sycamore Creek at Sycamore Creek Road/Edgecliff Road, and bridge over Sycamore Creek at Village Parkway/Edgecliff Road.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? When these areas are impacted by winter storms, traffic flow is affected in and out of the town as all of these areas are main routes in and out of Edgecliff Village.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information and the Town of Edgecliff Village, are natural hazard events that occurred within the Town of Edgecliff Village in its history. The material is organized by location and date.

Historical Events From The National Centers For Environmental Information (www.ncdc.noaa.gov)							
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
Edgecliff Village	4/25/1994	Tornado	F0	0	0	$0	$0
Edgecliff Village	4/25/1994	Hail	2.75	0	0	$0	$0
Edgecliff Village - Cliffside Drive	3/1999	Flood		0	0	$0	$0
Edgecliff Village	3/26/2000	Hail	0.75	0	0	$0	$0
Edgecliff Village	8/11/2018	Flood	30”	0	0	$10,000	$0
Total:				**0**	**0**	**$0**	**$0**

3.5 Overall Vulnerability

The Town of Edgecliff Village identified their greatest vulnerabilities and concerns:

- Several parts of the town are vulnerable to wildfires due to WUI and will be addressed.
- In the event of power outages from severe weather, the town has no backup power generators for critical infrastructures such as town hall, public works, and the fire department.
- All of the town is at risk during severe weather, such as thunderstorms. Education and prevention programs need to be planned and implemented.
- Flooding is a considerable risk for over 100 residential parcels within the town, as well as several bridges and roadways.
- Due to the large population of elderly residents, high emphasis on several risks need to be addressed including: extreme heat, winter storms, severe weather, and flooding.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the town to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the Town of Edgecliff Village's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	No	
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	No	
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	Yes	Yes; Yes; Yes
Transportation Plan	No	
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	Yes	Yes; Yes; Yes
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; No
Subdivision Ordinance	Yes	No; No
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Yes; Yes
Acquisition of land for open space and public recreation uses	No	

Building Code, Permitting, and Inspections	Have capability?	
Building Code	Yes	**Version/year: ICC/2006**
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 3**
Site Plan Review Requirements	Yes	Type(s) of requirement: plans review and Planning and Zoning Board approval
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and zoning; Yes
Mitigation Planning Committee	Yes	Planning and hazard analysis; No
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Annual drainage system clearance; No
Mutual Aid Agreements	Yes	Response and assistance; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Yes	No; Yes; No
Floodplain Administrator	Yes	Yes; Yes; No
Emergency Manager	Yes	No; Yes; No
Community Planner	No	
Civil Engineer	Yes	Yes; Yes; No
GIS Coordinator	No	
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Reverse 911, Town of Fort Worth outdoor warning sirens; Yes
Hazard data and information	Yes	Tier II reporting; Yes
Grant writing	Yes	As needed. FEMA Assistance to Firefighters grants; Texas Forestry Service House Bill (HB) 2604 grants; No
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Citizens on Patrol assists with evacuations, Meals on Wheels provides nutrition services to access and functional needs population; Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Fire protection safety program for school children and also elderly population, household chemical education, water usage; Yes
Natural disaster or safety related school programs	Yes	Fire protection and prevention safety programs for elementary age kids
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	American Red Cross
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes, streets and sewers; No
Authority to levy taxes for specific purposes	Yes	No; No
Fees for water, sewer, gas, and/or electric services	Yes	Yes, town operations; No
Impact fees for new development	Yes	Yes, town projects; No
Stormwater utility fee	Yes	Yes, sewers; No
Incurrence of debt through general obligation bonds and/or special tax bonds	No	
Incur debt through private activities	No	
Community Development Block Grant	No	

Other federal funding programs	Yes	Yes, Assistance to Firefighters grant (AFG-FEMA); Yes
State funding programs	Yes	Yes, Texas Forestry Service HB 2604; No
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, policies, and resources for mitigation include budgeting and passing policies and procedures for mitigation actions, adopting and implementing stricter mitigation regulations, approving the hiring and training of staff for mitigation activities, approving mitigation updates and additions to existing plans as new needs are recognized, looking into both the StormReady and Firewise programs and obtain those certifications, adopting more recent editions of all codes for the town and have trained and motivated personnel to interpret and enforce these codes.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

As a new participant in the HazMAP, the Town of Edgecliff Village did not have mitigation actions to review.

5.3 New Action Items

The Town of Edgecliff Village's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the town has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Earthquakes, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Wildfire
Adopt and implement most current ICC building codes for new and existing buildings to mitigate the damage from these identified hazards.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	1
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	Town budget, building permit fees
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Winter Storms
Enhance the town wide notification system for phone, text, and email by implementing a system such as CodeRed or Everbridge.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	2
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Eliminate potential loss of power to municipal buildings from these identified hazards with the installation of backup generators for electrical power in municipal buildings.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	3
Estimated Cost:	$225,000
Estimated Benefit:	$1,350,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Develop and implement a comprehensive public education program that includes recommended activities to mitigate the impact of each identified hazard.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Educate town employees on the most "at-risk" populations in the town and how to mitigate the risks to these populations.	
Participating Jurisdiction/s	Town of Edgecliff Village
Priority:	5
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	Town budget, hazard mitigation grants, town funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management, Fire Department, Tarrant County Public Health (support)
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms
Retrofit town buildings with impact-resistant roofing material.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	6
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Building Official
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Provide flood mitigation risk mapping materials for property owners in floodplains.	
Participating Jurisdiction/s	Town of Edgecliff Village
Priority:	7
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Conduct a hydrologic study to determine threat, risk, and potential impacts of flooding from Sycamore Creek.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	8
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department, US Army Corps of Engineers (support)
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Create and implement a drought contingency plan for town facilities and property.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	9
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Town budget, hazard mitigation grants, water suppliers
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought
Create and implement a water conservation program for public and residential property.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	10
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	Town budget, hazard mitigation grants, private companies
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	11
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	12
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquake, Thunderstorm, Tornado, National Security Incident
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	13
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	14
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm
Ensure ordinances for proper vegetation management practices to protect power lines from severe weather.	
Participating Jurisdiction:	Town of Edgecliff Village
Priority:	15
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the town were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the town, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the town's website, in the town newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plan	Town Council, Town Administration	Annually	Installation of backup generators in municipal buildings, enhancement of town wide notification systems, hydrological study for flood mitigation.	Office of Emergency Management will participate in the review process and suggest changes based on mitigation goals.
Ordinances	Town Council, Town Administration, Building Official, Code Officials	As needed, by topic of concern	Mitigation actions in all areas with the most current ICC codes.	Office of Emergency Management will participate in the review process and suggest changes based on mitigation goals.
Land Smartscape	Town Council, Town Administration, Town Engineers, Public Works Department	Annually	"Smartscape" design expectations for town facilities and property.	Office of Emergency Management will participate in the review process and suggest changes based on mitigation goals.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the Town of Edgecliff Village. For additional information, see Appendices A and B.

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City of Euless

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Euless was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Euless alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

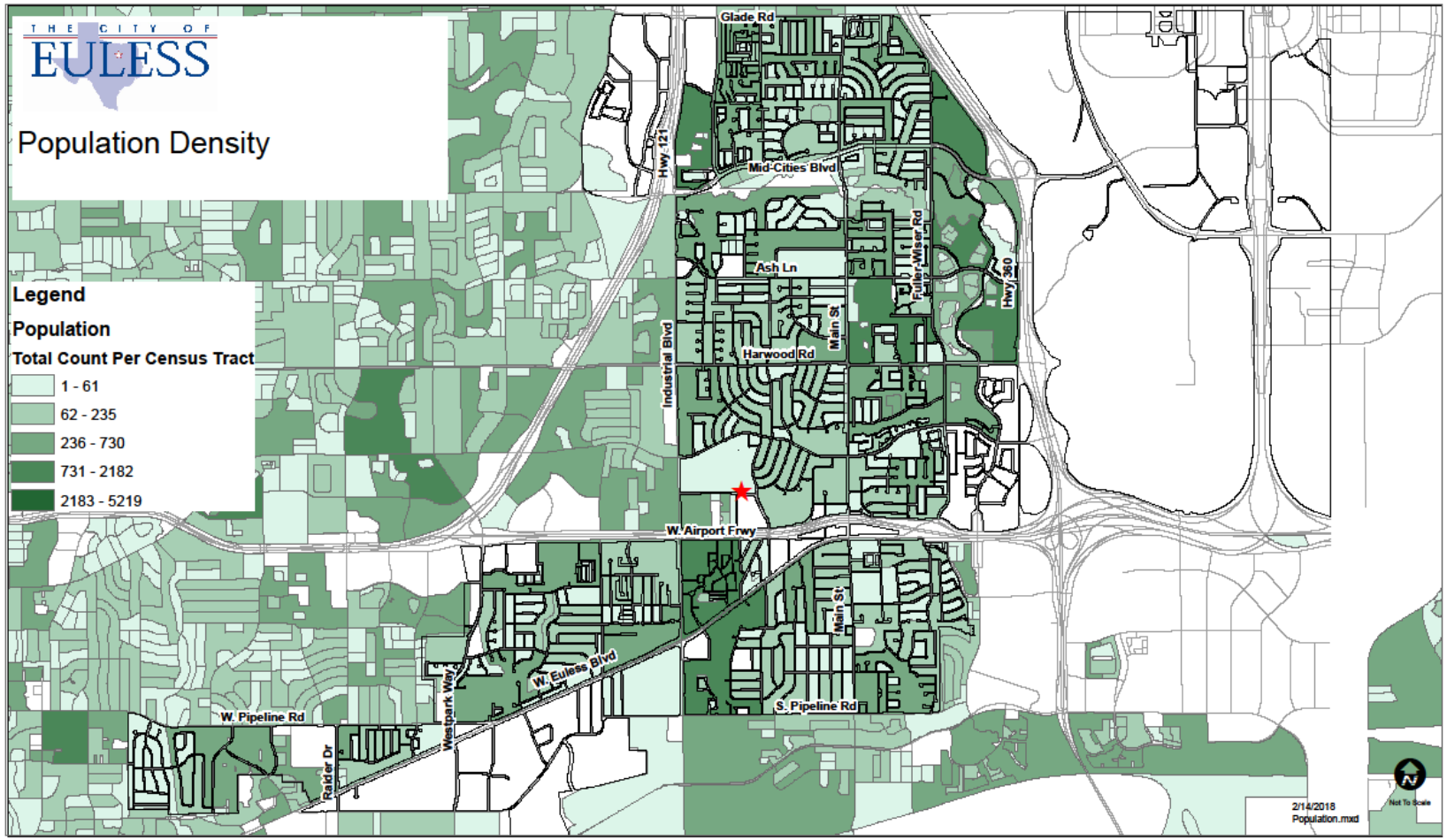
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Euless will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

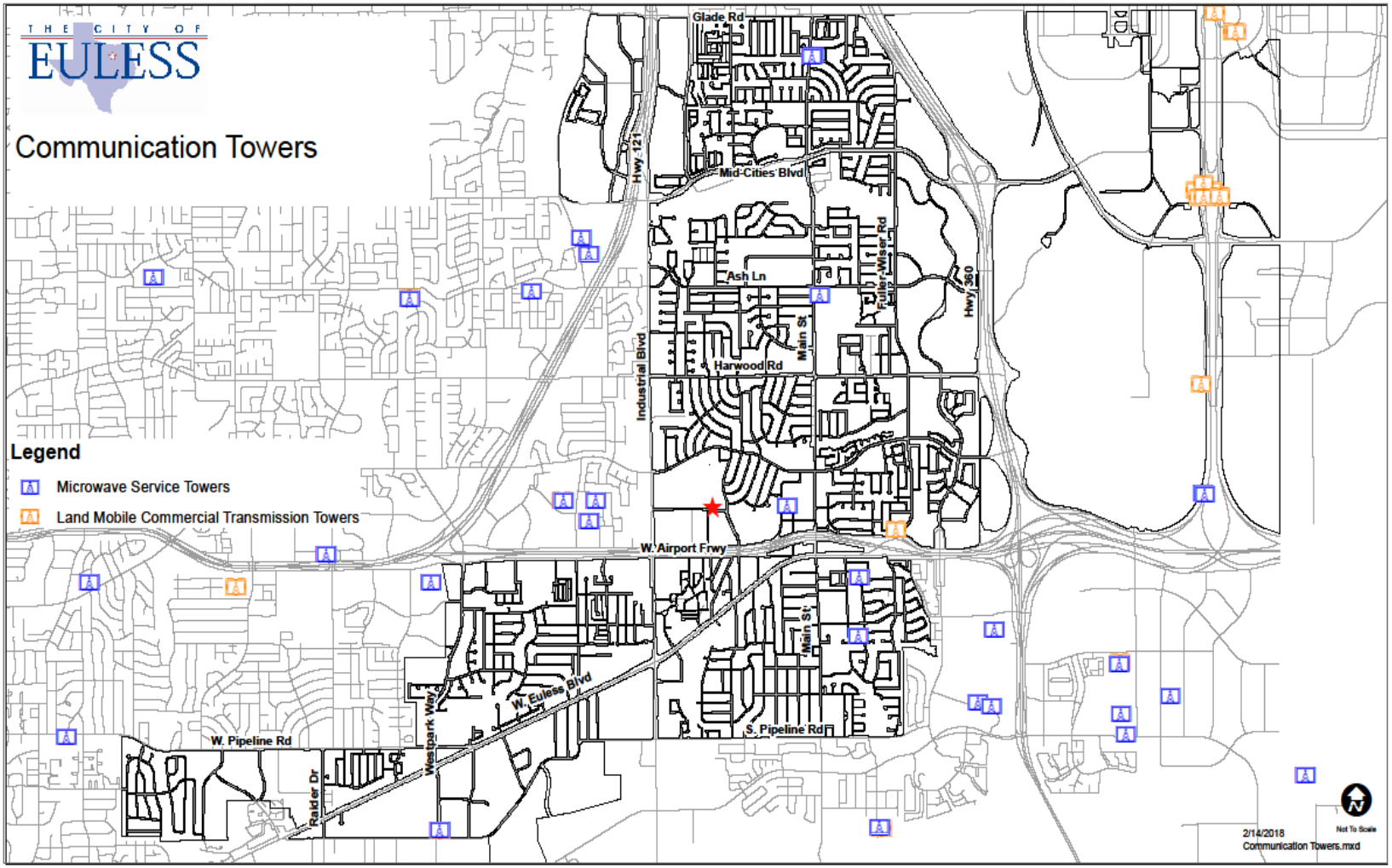
1.4 Supporting Maps

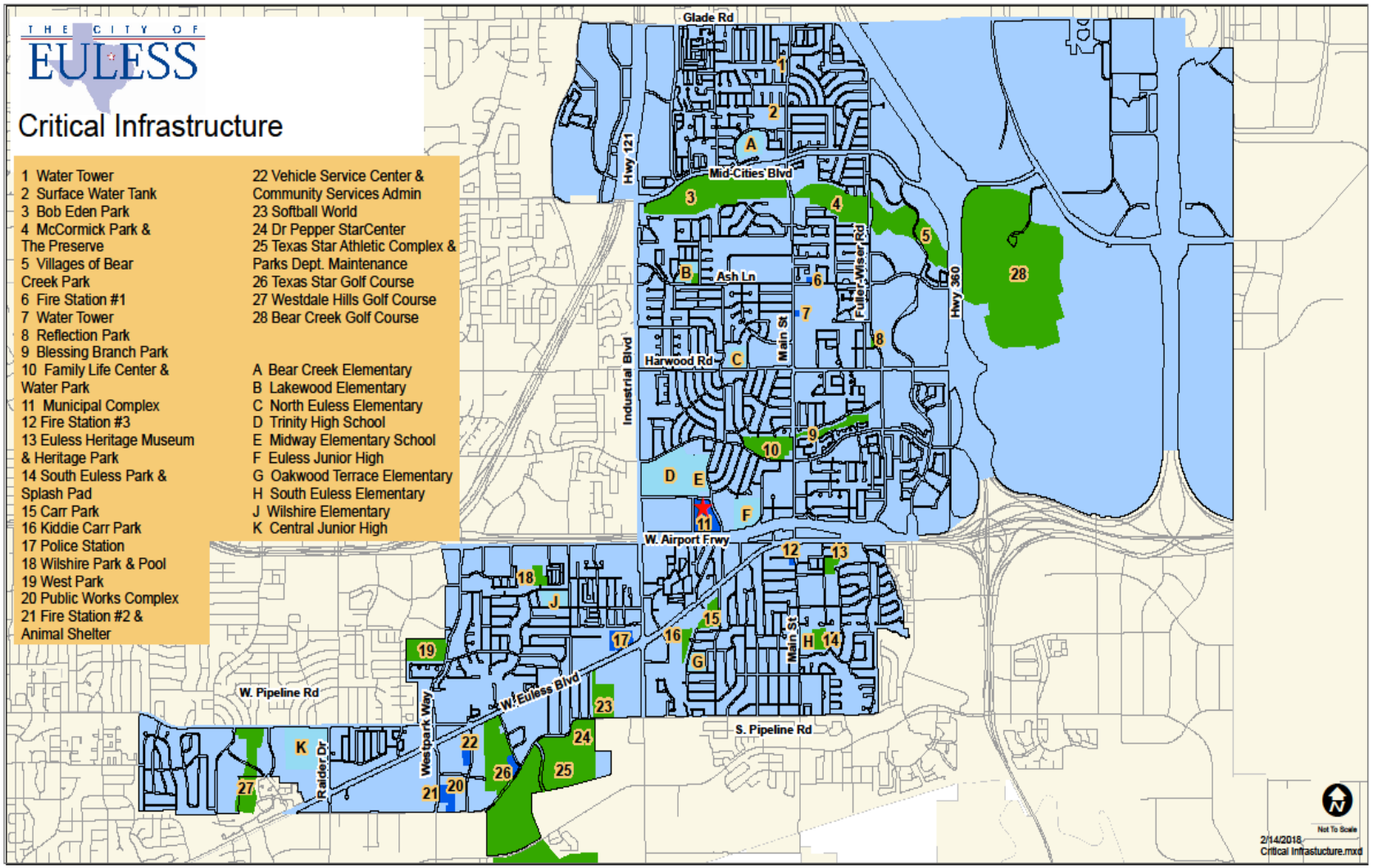
The following maps provide an overview of the City of Euless:

- Population Density Map
- Communication Towers Map
- Critical Infrastructure Map
- Critical Wetlands Map
- Electric Substations Map
- Highway System Map
- Petroleum Pipelines Map
- Regional Trauma Centers Map



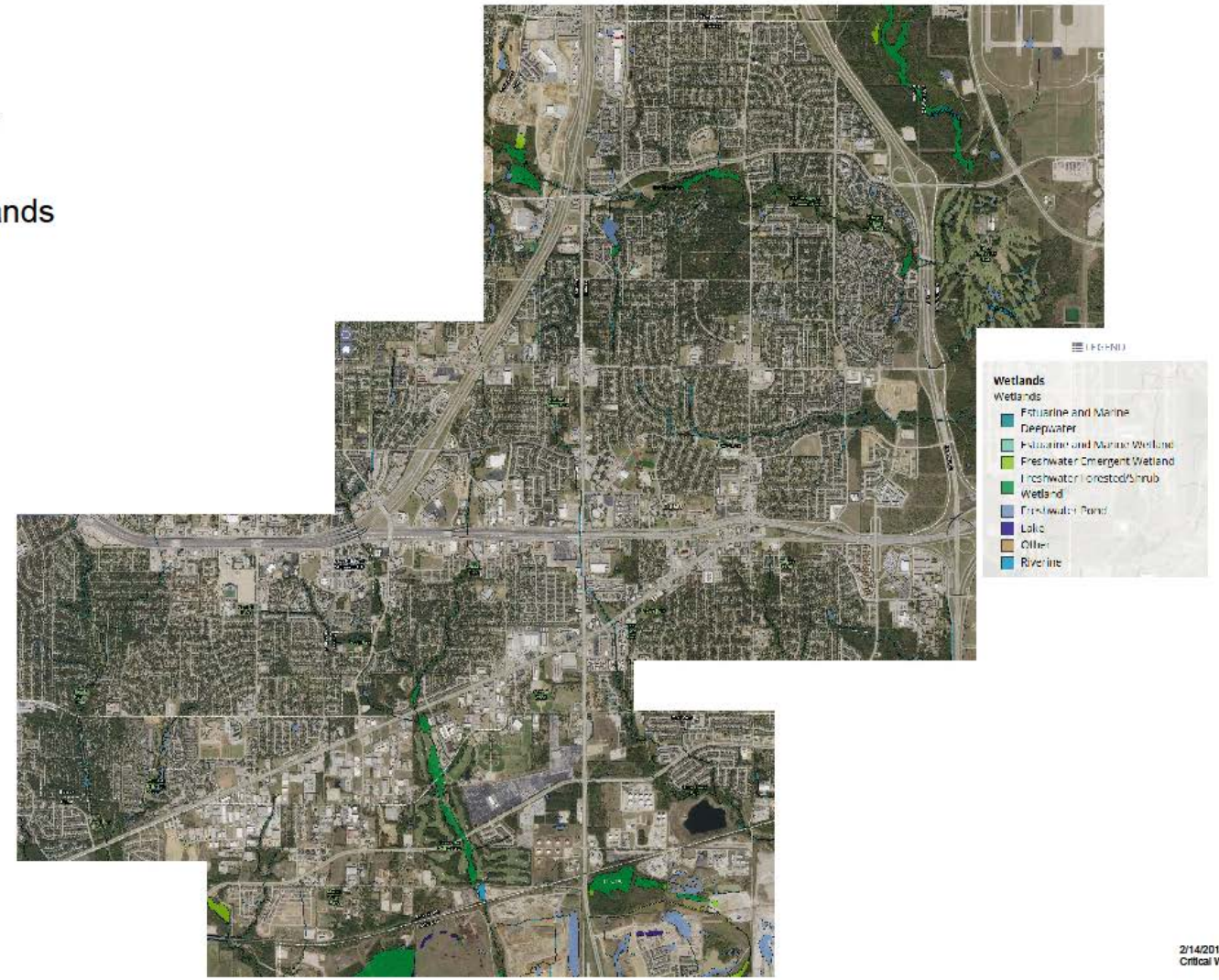
1 Population estimates available through 2016

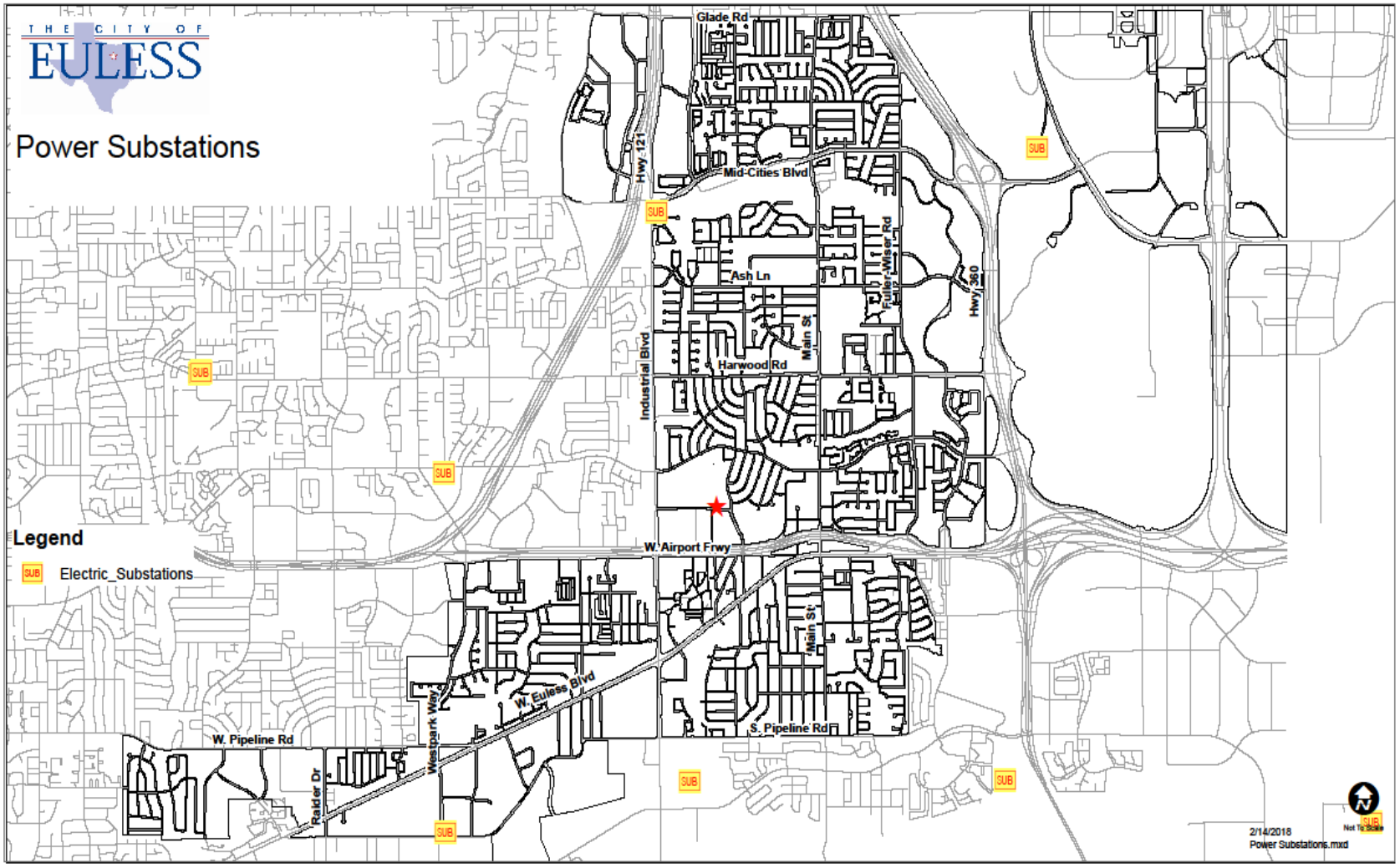

THE CITY OF
EULESS
Communication Towers
Legend
Microwave Service Towers
Land Mobile Commercial Transmission Towers
Glade Rd
Mid-Cities Blvd
Hwy 121
Ash Ln
Harwood Rd
Industrial Blvd
Main St
Hwy 360
W. Airport Frwy
W. Euless Blvd
S. Pipeline Rd
W. Pipeline Rd
Raider Dr
Westpark Way
2/14/2018
Communication Towers.mxd
Not To Scale

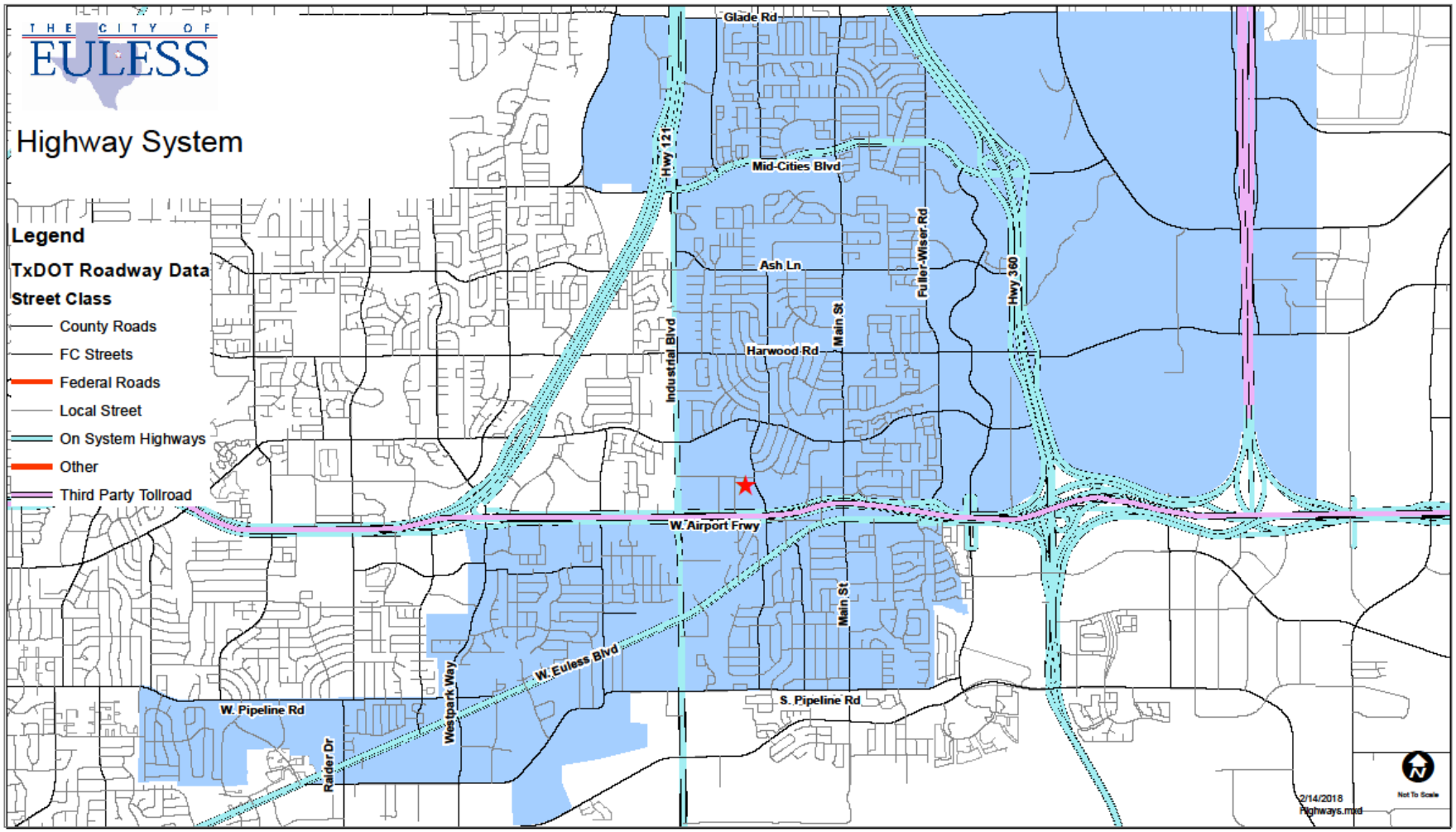

THE CITY OF EULESS
Critical Infrastructure
1 Water Tower
2 Surface Water Tank
3 Bob Eden Park
4 McCormick Park & The Preserve
5 Villages of Bear Creek Park
6 Fire Station #1
7 Water Tower
8 Reflection Park
9 Blessing Branch Park
10 Family Life Center & Water Park
11 Municipal Complex
12 Fire Station #3
13 Euless Heritage Museum & Heritage Park
14 South Euless Park & Splash Pad
15 Carr Park
16 Kiddie Carr Park
17 Police Station
18 Wilshire Park & Pool
19 West Park
20 Public Works Complex
21 Fire Station #2 & Animal Shelter
22 Vehicle Service Center & Community Services Admin
23 Softball World
24 Dr Pepper StarCenter
25 Texas Star Athletic Complex & Parks Dept. Maintenance
26 Texas Star Golf Course
27 Westdale Hills Golf Course
28 Bear Creek Golf Course
A Bear Creek Elementary
B Lakewood Elementary
C North Euless Elementary
D Trinity High School
E Midway Elementary School
F Euless Junior High
G Oakwood Terrace Elementary
H South Euless Elementary
J Wilshire Elementary
K Central Junior High
Glade Rd
Hwy 121
Mid-Cities Blvd
Ash Ln
Fuller-Wiser Rd
Hwy 360
Industrial Blvd
Harwood Rd
Main St
W. Airport Frwy
W. Euless Blvd
W. Pipeline Rd
S. Pipeline Rd
Westpark Way
Raider Dr
2/14/2018
Critical Infrastucture.mxd

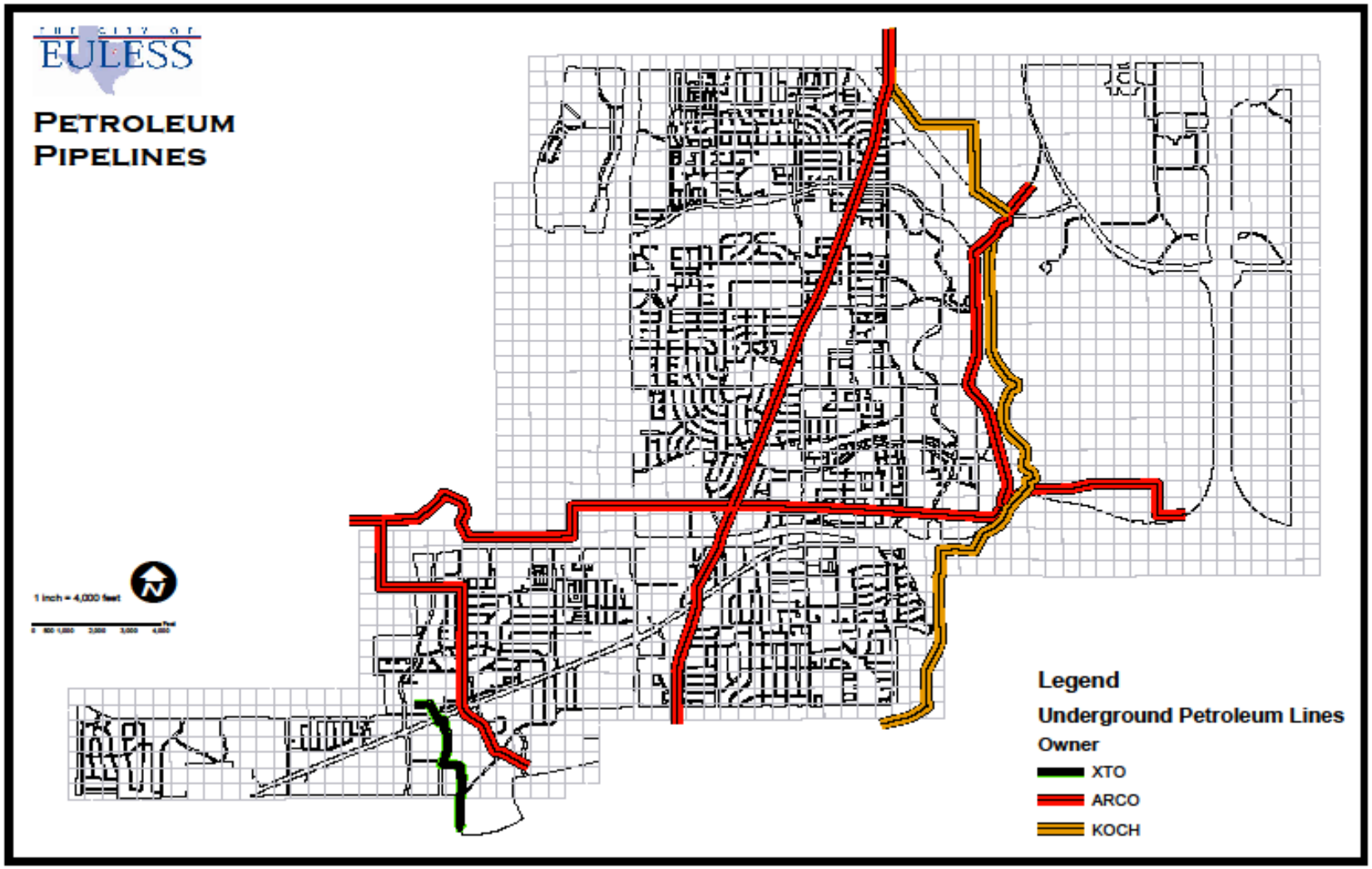
THE CITY OF EULESS

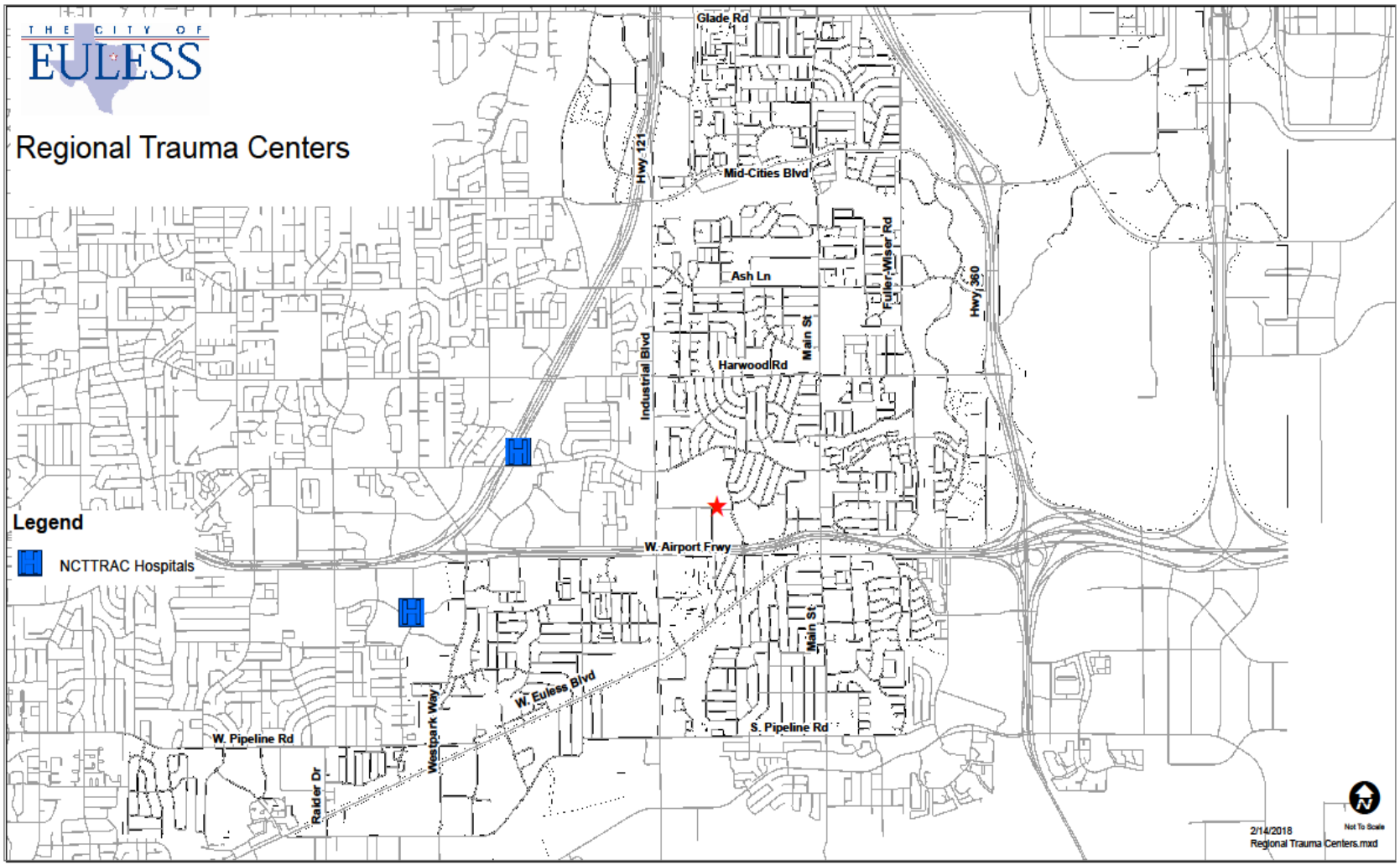
Critical Wetlands




THE CITY OF
EULESS
Power Substations
Legend
SUB Electric_Substations
Glade Rd
Mid-Cities Blvd
Hwy 121
Ash Ln
Harwood Rd
Main St
Industrial Blvd
Hwy 360
W. Airport Frwy
W. Euless Blvd
S. Pipeline Rd
W. Pipeline Rd
Raider Dr
Westpark Way
2/14/2018
Power Substations.mxd


THE CITY OF
EULESS
Highway System
Legend
TxDOT Roadway Data
Street Class
County Roads
FC Streets
Federal Roads
Local Street
On System Highways
Other
Third Party Tollroad
Glade Rd
Hwy 121
Mid-Cities Blvd
Ash Ln
Fuller-Wiser Rd
Hwy 360
Industrial Blvd
Main St
Harwood Rd
W. Airport Frwy
Main St
W. Euless Blvd
Westpark Way
W. Pipeline Rd
Raider Dr
S. Pipeline Rd
2/14/2018
Highways.mxd
Not To Scale


THE CITY OF
EULESS
PETROLEUM
PIPELINES
1 Inch = 4,000 feet
Legend
Underground Petroleum Lines
Owner
XTO
ARCO
KOCH


THE CITY OF
EULESS
Regional Trauma Centers
Legend
NCTTRAC Hospitals
Glade Rd
Hwy 121
Mid-Cities Blvd
Ash Ln
Fuller-Wiser Rd
Hwy 360
Main St
Industrial Blvd
Harwood Rd
W. Airport Frwy
Main St
W. Euless Blvd
Westpark Way
S. Pipeline Rd
W. Pipeline Rd
Raider Dr
2/14/2018
Regional Trauma Centers.mxd
Not To Scale

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Euless has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Euless' Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Euless. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Euless Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Euless	Office of Emergency Management	Emergency Management Coordinator	General oversight
City of Euless	Fire Department	Fire Chief	Hazard identification and plan development
City of Euless	Police Department	Assistant Police Chief	Hazard identification and plan development
City of Euless	Flood Plain Administration	Civil Engineer	Hazard identification and plan development
City of Euless	Public Works Department	Assistant Director	Hazard identification and plan development
City of Euless	Stormwater Management	Stormwater Coordinator	Hazard identification and plan development
City of Euless	Parks and Recreation Department	Director	Hazard identification and plan development
City of Euless	City Manager's Office	Deputy or Assistant City Manager	Hazard identification and plan development
City of Euless	Geographic Information Systems Department	GIS Manager	Mapping support
City of Euless	Information Services Department	IS Administrator	Hazard identification and plan development
City of Euless	Planning and Development Department	Director	Hazard identification and plan development
City of Euless	Building Code Enforcement Department	Building Official	Hazard identification and plan development
City of Euless	Office of Risk Management	Risk Manager	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability

New development in hazard-prone areas:

There has been significant growth in both commercial and residential development in the last few years:

- New Residential Construction Value:
  - 2014 - $33,720,470
  - 2015 - $61,924,301
  - 2016 - $76,268,202
  - 2017 - $69,737,736
- New Commercial Construction Value:
  - 2014 - $38,394,486
  - 2015 - $16,724,934
  - 2016 - $8,478,705
  - 2017 - $128,090,265

Decreasing Vulnerability

Mitigation actions implemented to reduce risk or adopted codes to protect future development:

- Installed lightning detection systems at golf course, sports complex and the aquatic park. (2012)
- Purchased severe repetitive loss properties and maintaining as open space. (2010)
- Participated in the safe room program administered by NCTCOG.
- Public awareness campaigns to inform people how to protect and prepare for natural hazards.
- Use of the Comprehensive Master Plan, Capital Improvement Plan, Transportation Plan, Stormwater Management Plan, Unified Development Code, Zoning Ordinance, Subdivision Ordinance, Floodplain Ordinance, Flood Insurance Rate Maps, building codes and site plan review requirements to guide new development and protect future development by minimizing risks to natural hazards.

A full list of completed mitigation action items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Euless.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	54,769
Persons under 5 years (%)	6.4
Persons 65 years and over (%)	9.0
Language other than English spoken at home (%)	34.2
With a disability, under age 65 (%)	6.0
Persons without health insurance, under age 65 (%)	20.5
Persons in poverty (%)	13.0
Median household income	$58,606
Households, 2012-2016	21,038
Median value of owner-occupied housing units, 2012-2016	$159,400

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Euless.

City of Euless Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
City Hall 201 North Ector Drive	City Administration	215 people	16,104	$1,700,000	$900,000
Planning and Engineering Building 201 North Ector Drive	Administration Public Works	148 people	11,094	$1,800,000	$900,000
Finance and Human Resources Building 201 North Ector Drive	City Administration	225 people	16,906	$2,400,000	$850,000
City Library 201 North Ector Drive	Education	654 people	40,528	$13,500,000	$3,400,000
Fire Administration Building 201 North Ector Drive	Fire Administration	140 people	14,058	$1,800,000	$1,200,000
Police and Courts Building 1102 West Euless Boulevard	Law Enforcement	754 people	56,565	$12,500,000	$4,900,000
Fleet and Facility Maintenance 1314 Royal Parkway	All city fleet and city facility maintenance	153 people	11,440	$1,200,000	$1,000,000

City of Euless Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Euless Animal Shelter 1517 Westpark Way	Animal Shelter	41 people	3,050	$504,375	$1,000,000
Fire Station #1 201 East Ash Lane	Fire	200 people	15,000	$1,400,000	$1,000,000
Fire Station #2 1515 Westpark Way	Fire	100 people	8,427	$1,200,000	$710,000
Fire Station #3 202 South Main Street	Fire	183 people	13,694	$3,100,000	$700,000
Public Works Facility 1513 Westpark Way	Public Works	178 people	13,326	$1,700,000	$1,000,000
Parks Administration Building 1314 Royal Parkway	Sheltering Administration and Community Services	72 people	7,200	$927,000	$500,000
Euless Family Life Center 300 West Midway Drive	Shelter and Community Services	600 people	75,500	$7,800,000	$160,000
Trinity High School 500 North Industrial Boulevard	Education (Hurst-Euless-Bedford Independent School District (HEB-ISD))	2,500 people	269,700	$26,700,000 Appraisal District Value	Unknown
Keys Learning Center 1100 Raider Drive	Education (HEB-ISD)	250 people	156,728	$9,100,000 Appraisal District Value	Unknown
Central Junior High School 3191 West Pipeline Road	Education (HEB-ISD)	1,305 people	Included in above property	Included in above property	Unknown
Euless Junior High School 306 West Airport Freeway	Education (HEB-ISD)	1,084 people	83,500	$11,500,000 Appraisal District Value	Unknown
Lakewood Elementary School 1600 Donley Drive	Education (HEB-ISD)	700 people	50,125	$4,400,000 Appraisal District Value	Unknown

City of Euless Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Midway Park Elementary School 409 North Ector Drive	Education (HEB-ISD)	850 people	71,343	$9,800,000 Appraisal District Value	Unknown
North Euless Elementary School 1101 Denton Drive	Education (HEB-ISD)	805 people	48,000	$1,600,000 Appraisal District Value	Unknown
Oakwood Terrace Elementary School 700 Ranger Drive	Education (HEB-ISD)	665 people	44,850	$4,900,000 Appraisal District Value	Unknown
South Euless Elementary School 605 South Main Street	Education (HEB-ISD)	700 people	45,300	$2,900,000 Appraisal District Value	Unknown
Wilshire Elementary School 420 Wilshire Drive	Education (HEB-ISD)	805 people	57,718	$7,000,000 Appraisal District Value	Unknown
Bear Creek Elementary School 401 Bear Creek Parkway	Education (Grapevine-Colleyville Independent School District (GCISD))	815 people	76,461	$9,100,000 Appraisal District Value	Unknown
HEB Auxiliary Services Facility 1350 West Euless Boulevard	Education/ Transportation (HEB-ISD)	300 people	78,040	$11,900,000 Appraisal District Value	Unknown
Harmony School of Innovation 701 South Industrial Boulevard	Education (Charter)	300 people	Unknown	$82,000 Appraisal District Value	Unknown
Oncor / Euless Substation 1990 North Industrial	Utility	N/A	97,356	$97,357 Appraisal District Value	Unknown
Verizon Switching Center 921 Bear Creek	Utility	40 people	31,416	$5,200,000 Appraisal District Value	Unknown
AT&T Switching Center 108 Ross Avenue	Utility	40 people	52,320	$722,215 Appraisal District Value	Unknown

City of Euless Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
DFW Airport Water Pump Station 400 Minters Chapel Road	Utility	N/A	Unknown	$1,700,000 Appraisal District Value	Unknown
North Ground Tank & Water Well 2591 North Main Street	Utility	N/A	25,700	$102,800 Appraisal District Value	Unknown
Overhead 1 Mil Tank & Water Well 1400 North Main Street	Utility	N/A	27,007	$81,127 Appraisal District Value	Unknown
Ground Tank & Water Well 118 West Fuller Drive	Utility	N/A	6,621	$26,484 Appraisal District Value	Unknown
Cullum Water Tower 201 Cullum Drive	Utility	N/A	25,700	$102,800 Appraisal District Value	Unknown
Overhead Water Tower 2700 North Main Street	Utility	N/A	56,700	$453,600 Appraisal District Value	Unknown
South Well Site 702 South Pipeline Road West	Utility	N/A	N/A	$286,672 Appraisal District Value	Unknown
Future School 340 East Midway Drive	Education	Unknown	430,575	$1,700,000 Appraisal District Value	Unknown
JPS Hospital 3200 West Euless Boulevard	Healthcare	Unknown	34,200	$1,600,000 Appraisal District Value	Unknown

3.3 Natural Hazard Profiles

The City of Euless' Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Euless in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Thunderstorm (includes hail, wind, lightning)
2	Tornado
3	Flooding
4	Extreme Heat
5	Expansive Soils
6	Drought
7	Winter Storms
8	Wildfire
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent for the hazards.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Euless.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal overall. Impacts to wetland areas and aquatic life along the Little Bear and Big Bear Creek corridor in the North end of the city are expected. In the past, a trees root system weakened during drought conditions and therefore is not as strong for the next storm season. The city has lost numerous trees during a storm season that occurs immediately after a drought due to these conditions.

Jurisdiction's ground-water supply: The City of Euless drinking water is obtained from surface and ground water sources. It is supplied by Trinity River Authority (Cedar Creek and Richland Chambers Lakes) and Euless water wells (Trinity Aquifer).

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: Not applicable in the City of Euless.

Describe any water restrictions used in your jurisdiction: After the drought of 2006, Euless officials realized that we need to protect this precious resource by enacting measures that make sense for Euless residents. Effective July 1, 2007 all Euless residents fall under a time of day watering ordinance that prohibits watering outdoors from 10 a.m. to 6 p.m. year-round.

The new rules apply to city water customers who use automatic and non-automatic irrigation systems and garden hose-attached sprinklers to water their lawns. Watering between 10 a.m. and 6 p.m. is an inefficient method of maintaining yards. Water from sprinklers and irrigations systems is lost by evaporation due to heat and wind. In addition, daylight watering as well as domestic use, places additional demands on the water treatment plant.

The ordinance does provide for watering home foundations, lawns and new landscape plantings by handheld hose, drip irrigation or soaker hose. There are three stages to the city ordinance and the City Manager, in consultation with TRA may invoke the next stage based on drought conditions. In 2017, the City of Euless replaced over 14,000 water meters throughout the city and set up an online customer portal. The new meters and online customer portal will help our homeowners to manage their water usage as well as detect leaks and identify unknown water uses such as sprinkler systems that unintentionally water more than intended. This portal provides a detailed usage history as well as gives water customers the ability to create custom alerts to warn them about high water usage.

Reclaimed Water

The severe drought in Texas has highlighted how important water conservation is for our future. Our region needs a sustainable water source to meet the needs of a growing population and continue to meet future water supply needs.

The City of Euless uses reclaimed water from the Village Creek Wastewater Treatment Plant in Fort Worth to irrigate landscaping at various locations throughout the City. These locations include the Texas Star Golf Course and the Texas Star Sports Complex as well as numerous multi-family and commercial properties. Last year alone, the City delivered just under 200 million gallons of reclaimed water.

Reclaimed or "recycled" water is produced from the water we use and discard every day. After proper treatment, it is ideal for many non-drinking purposes such as landscape watering. Reclaimed water is rapidly becoming a valuable resource and is a practical method of relieving the demand on potable water supplies. The use of reclaimed water is a critical component of both the City of Euless and State of Texas Region C Water Planning Group’s future water needs planning and supply efforts.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

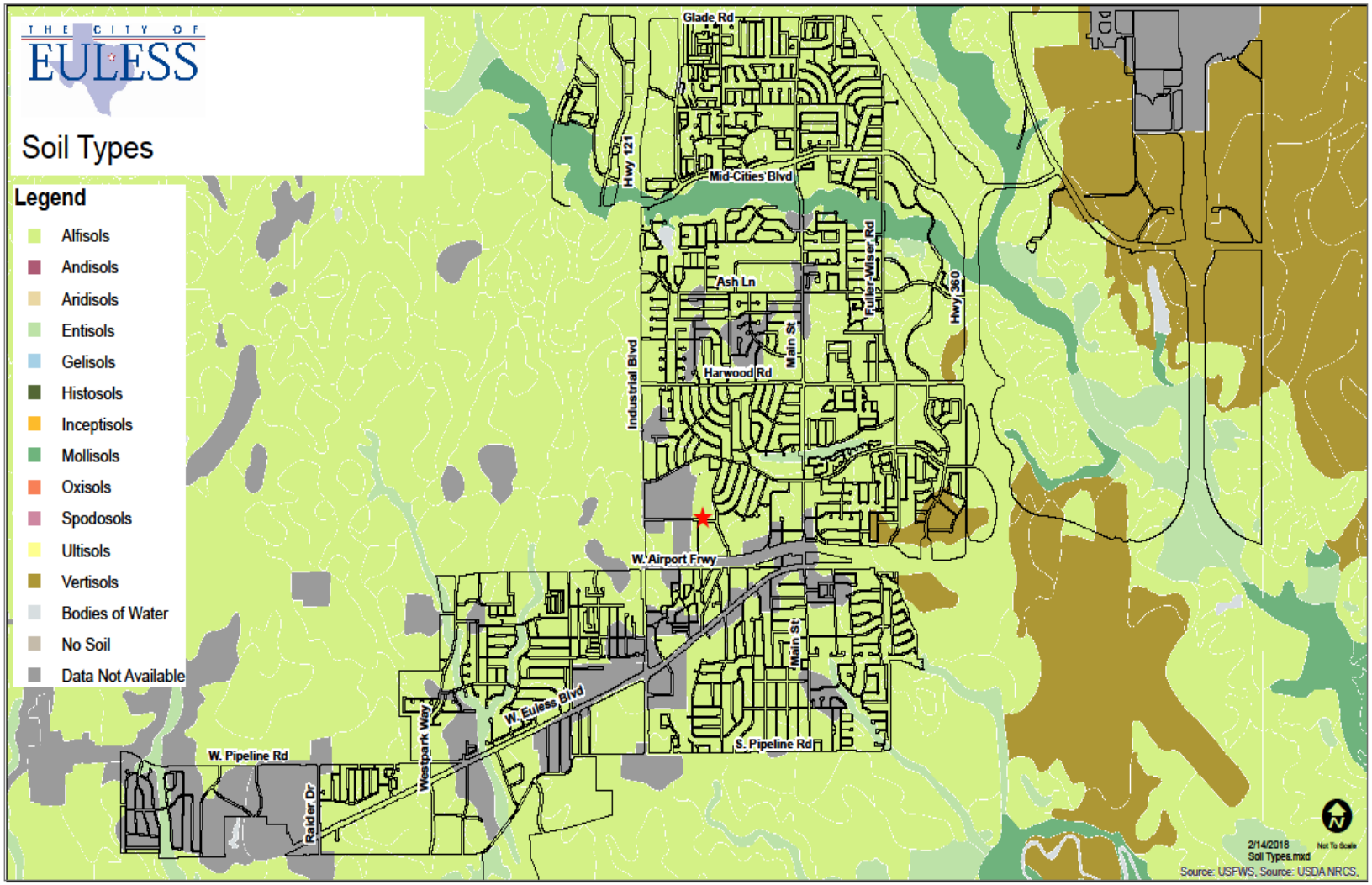
Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: On September 14, 2017, a 2.6 magnitude earthquake occurred 3.7 miles southeast of Euless. No damage was reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the total amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: The City Department of Public Works does not track road damage caused by expansive soils. The Building Inspection Department estimates that in from October 1, 2016 to September 30, 2017, there has been $322,980 spent by citizens for foundation repair due to expansive soils.

The following map shows the soil type within the City of Euless.


THE CITY OF EULESS
Soil Types
Legend
Alfisols
Andisols
Aridisols
Entisols
Gelisols
Histosols
Inceptisols
Mollisols
Oxisols
Spodosols
Ultisols
Vertisols
Bodies of Water
No Soil
Data Not Available
Glade Rd
Hwy 121
Mid-Cities Blvd
Ash Ln
Fuller-Wiser Rd
Hwy 360
Industrial Blvd
Main St
Harwood Rd
W. Airport Frwy
Main St
W. Euless Blvd
Westpark Way
S. Pipeline Rd
W. Pipeline Rd
Raider Dr
2/14/2018
Soil Types.mxd
Not To Scale
Source: USFWS, Source: USDA NRCS,

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	The entire population would be vulnerable to extreme heat. People are vulnerable to the effects of extreme temperatures, including power outages, effects on transportation routes, establishment of shelters, etc. Those with existing medical conditions are affected by extreme temperatures, and the elderly population may be at higher risk. Business interruption to commercial properties could result in an economic impact to the business community as well as employees who could be negatively affected by missing work while facilities were not operable.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: Elderly populations and those with medical conditions that are complicated by extreme heat. 7.7% of the population is 65 years of age and up. In addition, 13% of the population lives in poverty.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? The City of Euless hosts many sporting events such as golf, baseball, and softball tournaments. Many of these events are played on a strict time schedule. Tournament officials take precautions to ensure players, coaches and participants are kept hydrated and safe during these occurrences. No cases of extreme heat exposure have been reported.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? Yes, there have been power failures at the Police Department. This facility does have a generator but the generator does not provide HVAC for the entire building. There have been instances where it has been difficult to work in certain parts of the facility. In addition, the power often has to be manually reset by Facilities staff after a power outage because the variable frequency drives on the chillers operate behind the generator. In fiscal year 2018, additional air conditioners were added to the computer/server rooms that often overheated. The rooms are required to be cooler than the rest of the building to keep technology and telecommunications in operation. However, these additional air units are not on generated power when necessary.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Commuters and any buildings in a floodplain are considered most at risk. There are 15 residential structures located within the 100-year floodplain. There are no commercial properties located within the 100-year floodplain. Based on geographic information, $11,529,105 of improved property is exposed to potential impact. Of the total assessed value improvement in the city, .05% is at risk from a 100-year storm event.

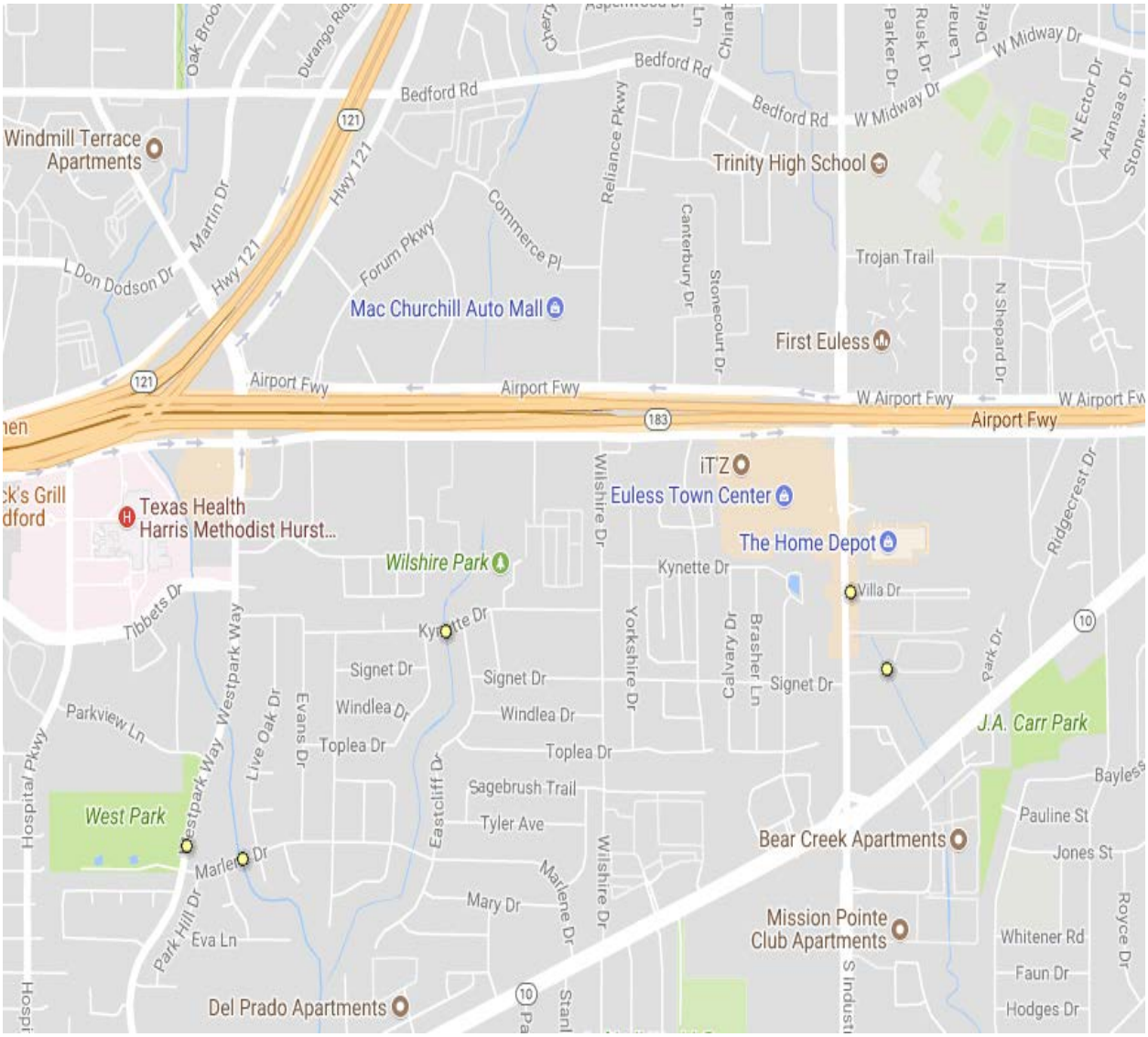
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? The City of Euless does require a permit for foundation repair. The Building Inspection Department estimates that there has been $0 spent by citizens for foundation repair due to flooding.

Intersections or traffic routes impacted by flooding: The vehicular bridge at 1812 Kynette Drive is a low water crossing that is flooded annually. Bridge traffic is blocked, which affects the surrounding residential subdivisions. See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Little Bear Creek, Big Bear Creek, Hurricane Creek, Boyd Branch, Blessing Branch, and Fuller Branch.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Mid Cities Boulevard	Big Bear Creek	Vented Ford
Euless Boulevard	Boyd Branch	Vented Ford
Marlene Drive	Hurricane Branch	Bridge Class
Kynette Drive	Hurricane Branch, TRIB Stream HC-1	Vented Ford
Westpark Way	Hurricane Creek West Branch	Vented Ford
Euless Boulevard (at Texas Star Parkway)	Hurricane Creek West Branch	Bridge Class

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Commercial	1,613.3	74.9	4.6%
Industrial	2,887.1	223.9	7.8%
Residential	4,269.5	114.65	2.7%
Total	**8,769.9**	**413.45**	**15.1%**

Source: City of Euless Floodplain Administrator, Public Works & Engineering Department.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Euless is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480593#
Community Name	City of Euless
County	Tarrant County
Initial FHBM Identified	03/22/74
Initial FIRM Identified	04/03/85
Current Effective Map Date	09/05/09
Reg-Emer Date	04/03/85
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Civil Engineer.

What specific flooding ordinances and plans does your jurisdiction have? Flood Ordinance, Floodplain Administration Ordinance, Flood Damage Prevention Ordinance.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? New construction or substantial improvement of any structure must have the lowest floor elevated two feet or more above the base flood elevation. Base flood elevation data shall be generated for subdivision proposals and other proposed developments adjacent to the floodplain. Encroachments of the floodway are prohibited unless a professional engineer provides a zero rise certificate.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? New construction or substantial improvement of any structure must have the lowest floor elevated two feet or more above the base flood elevation.

Repetitive and Severe Repetitive Loss Properties: There are currently 14 residential repetitive loss properties and 1 residential severe repetitive loss properties within the City of Euless. More information on these locations can be obtained by contacting the city's floodplain administrator. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
442	3.6%	30	5.8%

Source: City of Euless Floodplain Administrator, Public Works & Engineering Department.

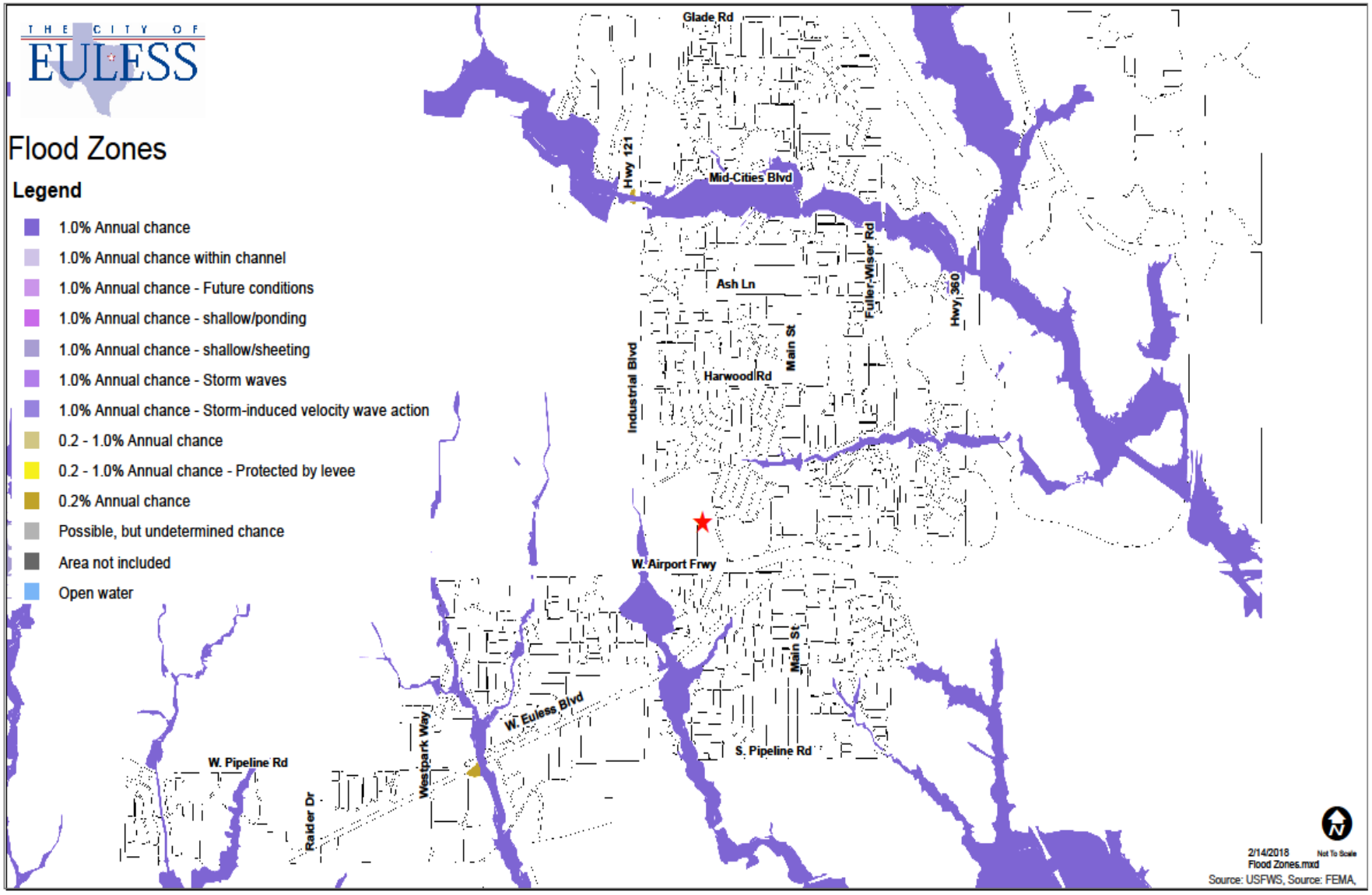
The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Euless's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 164 $133,422 in premiums.
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Claims: 107 Total payments: $2,766,693

NFIP Topic	Source of Information	Comments
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	164.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	None Known.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, Geographic information systems, inspections, professionally licensed, certified floodplain manager, and Hydrologic Engineering Center's River Analysis System modeling.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	None.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?	Community FPA	No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	Community FPA	Unknown.
Is a CAV or CAC scheduled or needed?	Community FPA	No.

Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	3/22/1974
Are the FIRMs digital or paper?	Community FPA	Paper.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	All developments must be initiated via the Development Services Group (DSG). The group consists of staff from the Planning and Development Department, Fire Department, Geographic Information Systems Department, Police Department and Public Works and Engineering Department. Applications for development projects undergo a rigorous plan review and approval process prior to construction. The DSG ensures that all aspects of a project relative to zoning, platting, utilities, construction and architectural standards, aesthetics, and life/safety issues are in compliance with City Codes and Ordinances and any Federal and State regulations that are applicable. The approval process consists of ten steps, from a pre-submittal meeting, reviews, public meetings, and inspections.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Euless will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.


THE CITY OF EULESS
Flood Zones
Legend
1.0% Annual chance
1.0% Annual chance within channel
1.0% Annual chance - Future conditions
1.0% Annual chance - shallow/ponding
1.0% Annual chance - shallow/sheeting
1.0% Annual chance - Storm waves
1.0% Annual chance - Storm-induced velocity wave action
0.2 - 1.0% Annual chance
0.2 - 1.0% Annual chance - Protected by levee
0.2% Annual chance
Possible, but undetermined chance
Area not included
Open water
Glade Rd
Hwy 121
Mid-Cities Blvd
Fuller-Wiser Rd
Hwy 360
Ash Ln
Industrial Blvd
Main St
Harwood Rd
W. Airport Frwy
Main St
W. Euless Blvd
Westpark Way
Raider Dr
W. Pipeline Rd
S. Pipeline Rd
2/14/2018
Flood Zones.mxd
Not To Scale
Source: USFWS, Source: FEMA,

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Property damage, tree debris, and power failure occurred mainly due to high winds in a thunderstorm.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

Is there an area of the town that is the most vulnerable to tornadoes? The City of Euless has one neighborhood that has mobile homes/manufactured housing located in the southeast quadrant of the city. In addition, there is one nursing home located in the southwest quadrant of the city. Developers are currently building two senior living facilities in our city. One is located in the eastern part of the city and another northwest of the city. The city is also home to seven elementary schools, two junior high schools and two high schools. The city has numerous churches where groups of people gather several times per week. In addition, the city has large shopping complexes where large groups of people could be gathered shopping, eating at restaurants, or seeing a movie.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Assessed Value of Improvements	
In the WUI	**Percentage in the WUI**
$428,033,230 Note: Does not include DFW International Airport	9.1% with-out DFW International Airport 33.8% with DFW International Airport

Source: Euless Information Services Department, Geographic Information System Manager.

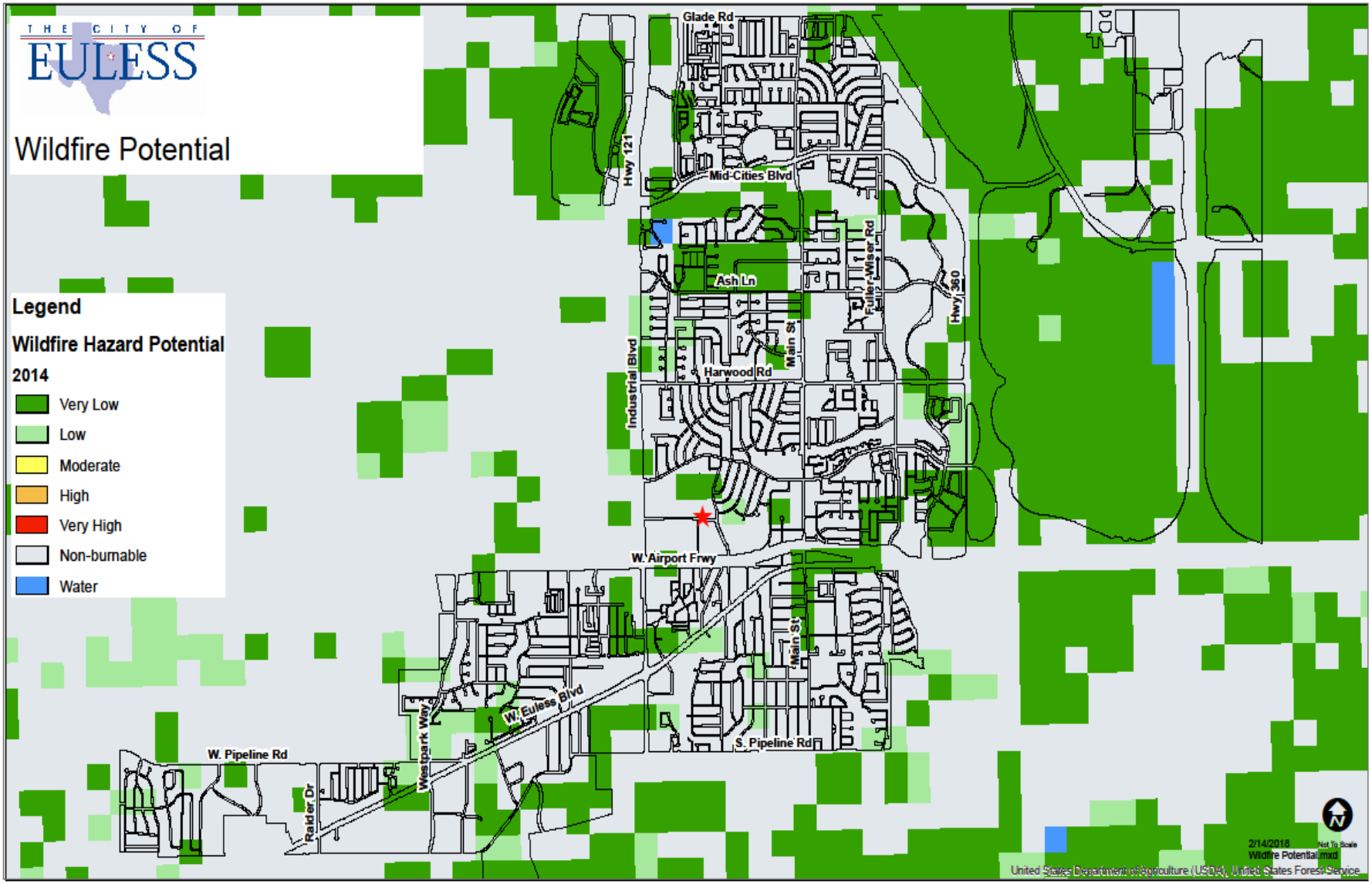
Parcel Types in the WUI					
Residential		**Commercial**		**Industrial**	
Residential Parcels Within WUI	Percentage (%) Within WUI	Commercial Parcels Within WUI	Percentage (%) Within WUI	Industrial Parcels Within WUI	Percentage (%) Within WUI
543	9.31%	16	4.84%	1	.96%

*Note: Area of D/FW Airport within WUI represents 84.9% of the WUI.

Source: Euless Information Services Department, Geographic Information System Manager.

Most vulnerable location (North, East, South, West) of your jurisdiction? The most vulnerable location, if any, would be the far eastern portion of the City of Euless, bordering the Dallas Fort Worth International Airport.

In the summer of 2018, the City of Euless experienced three grass fires along the Highway 360 corridor from Midway Drive to Glade Road This area borders DFW International Airport to the east and City of Euless apartments with high population density to the west. The Texas Department of Transportation (TXDOT) is responsible for maintaining the state highways, including the mowing. The standard is to mow highway two times per year. This standard creates a potential wildfire hazard during drier months in this area. In addition, the same type of hazard has the potential to exits along Highways 183 and 121 in Euless.


THE CITY OF
EULESS
Wildfire Potential
Legend
Wildfire Hazard Potential
2014
Very Low
Low
Moderate
High
Very High
Non-burnable
Water
Glade Rd
Hwy 121
Mid-Cities Blvd
Ash Ln
Fuller-Wiser Rd
Hwy 360
Industrial Blvd
Main St
Harwood Rd
W. Airport Frwy
Main St
W. Euless Blvd
Westpark Way
Raider Dr
W. Pipeline Rd
S. Pipeline Rd
2/14/2018
Wildfire Potential.mxd
Not To Scale
United States Department of Agriculture (USDA), United States Forest Service

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: The bridges and overpasses at Highway 183 and Main Street; Highway 183 and Ector Drive; Highway 183 and Industrial Boulevard; Highway 121 and Glade Road; Highway 360 and Harwood Road; Highway 360 and Mid Cities Boulevard; and Highway 10 (Westpark Way to 183).

Streets: Pipeline Road (Driftwood to Royal Parkway, Royal Parkway to 157); Midway Drive (157-360) Harwood Road (157-360); Westpark Way (183-Highway 10); Highway 157 / Industrial Boulevard (Pipeline to Mid Cities); Main Street (Pipeline to Glade Road); Fuller Wiser Road (183 to Glade Road)

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

The following, taken from Euless Office of Emergency Management Records, are natural hazard events that occurred within the City of Euless between 2015 and 2017. The material is organized by date.

Date	Location within Jurisdiction	Event	Deaths	Injuries	Property Damage Estimated Value	Crop Damage Estimated Value
6/2/16	Kynette / Sierra Drive	Flash Flood	0	0	0	0
6/2/16	Burgundy Towers (lower level parking garage)	Flash Flood	0	0	0	0
6/2/16	Del Paso Apartments (creek only)	Flash Flood	0	0	0	0
6/2/16	Simmons Drive (creek only)	Flash Flood	0	0	0	0
6/2/16	306-308 Rambling Court	Flash Flood	0	0	0	0
6/2/16	314 Yorkshire Drive	Flash Flood	0	0	0	0
6/2/16	900 block of Highway 10	Flash Flood	0	0	0	0
6/2/16	South Airport Circle	Severe Storm	0	0	$1,000	0
1/15/17	600 East Ash Lane	Severe Storm	0	0	$1,000	0
1/15/17	900 East Harwood Road	Severe Storm	0	0	$1,000	0
1/15/17	1000 East Ash Lane	Severe Storm	0	0	$1,000	0
1/15/17	1300 block of Westpark Way	Severe Storms	0	0	$2,500	0
1/15/17	1001 Fuller Wiser Road	Severe Storms	0	0	$25,000	0
1/15/17	177 Doc McGinnis Drive	Severe Storms	0	0	$1,000	0
7/6/17	500 Summit Ridge	Severe Storm	0	0	$1,000	0
7/6/17	428 Milam Drive	Severe Storm	0	0	$1,000	0
7/6/17	200 block of Country Lane	Severe Storm	0	0	$1,000	0
Total:			**0**	**0**	**$35,500**	**0**

3.5 Technological Hazards Profiles

The City of Euless has identified the following technological hazards that have affected or could affect the local planning area. Technological hazards are not ranked by risk to the city.

- Hazardous Materials (HAZMAT) Event
- Infectious Disease Outbreak
- National Security Hazard
- Nuclear Accident
- Power Failure
- Telecommunications Failure

3.5.1 Hazardous Materials (HAZMAT) Event

Hazard Profile: Hazardous Materials Event	
Category	**Response**
Geographic Area Affected	Significant
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from spills Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Misplaced residents
Most Vulnerable Assets	Because of the several highways that pass through Euless as well as the many industrial organizations that use hazardous materials in their processes, the entire city can be considered to be vulnerable to a hazardous materials release or spill. However, the exact vulnerability is largely dependent on the chemical, weather, and location of the release.

What type of hazardous materials affect your jurisdiction, and how much of that type?

- Gasoline, flammable liquid spills/leaks
- Gas (natural and liquefied petroleum gas) leaks
- Chemical spills/leaks
- Carbon Monoxide incidents

The amount of materials is unavailable.

What are the health effects from the exposure to each material?

Gasoline

Many of the harmful effects seen after exposure to gasoline are due to the individual chemicals in the gasoline mixture, such as benzene and lead in very small amounts. Inhaling or swallowing large amounts of gasoline can cause death. The levels of gasoline that killed people are about 10,000-20,000 ppm when breathed in and about 12 ounces when swallowed. High concentrations of gasoline are irritating to the lungs when breathed in and irritating to the lining of the stomach when swallowed. Gasoline is also a skin irritant. Breathing in high levels of gasoline for short periods of time or swallowing large amounts of gasoline may also cause harmful effects on the nervous system. These effects become more serious as the amount of gasoline breathed in or swallowed increases. Less serious nervous system effects include dizziness and headaches, while more serious effects include coma and the inability to breathe. Effects on the nervous system have also occurred in people exposed to gasoline vapors for long periods of time, either in their jobs or because they intentionally sniff gasoline for its ability to cause hallucinations. Harmful effects on the lungs can occur when a person swallows large amounts of gasoline because the gasoline in the stomach can enter the lungs during vomiting.

Gas (natural gas)

Exposure to extremely high levels of natural gas can cause loss of consciousness or even death. If a natural gas leak has occurred and is severe, oxygen can be reduced, causing dizziness, fatigue, nausea, headache, and irregular breathing. Exposure to low levels of natural gas is not harmful to your health.

Chemical Spill

The effects of a toxic chemical on your body may be either *acute* or *chronic*.

Acute (short-term) effects show up immediately or soon after exposure to the chemical. They may be minor, like nose or throat irritation, or they could be serious, like eye damage or passing out from chemical vapors. What all these effects have in common is that they happen right away.

Chronic (long-term) effects may take years to show up. They are usually caused by regular exposure to a harmful substance over a long period of time. These effects are usually permanent. Some chemicals cause both acute and chronic effects. For example, breathing solvent vapors might make you dizzy right away (an acute effect). But breathing the same vapors all the time for many years might eventually cause liver damage (a chronic effect).

Carbon Monoxide (CO)

Breathing CO can cause headache, dizziness, vomiting, and nausea. If CO levels are high enough, you may become unconscious or die. Exposure to moderate and high levels of CO over long periods of time has also been linked with increased risk of heart disease.

How current is your jurisdiction's Tier II reports? Tier II reports are required to be submitted on an annual basis (by March 1 of each year) to the Texas Center for Environmental Quality. Tarrant County Office of Emergency Management provides records to each municipality of all the submissions. In addition, the City of Euless requires that Tier II reports be submitted annually by each organization. The documentation is submitted to the Fire Marshal's Office and the Office of Emergency Management. The Fire Marshal's Office receives a copy of the Tier II reports and verifies that the listed products are captured in the Hazardous Materials section of the FireHouse computer program used by the Fire Department. A copy of the Tier II report is added to the occupancy file in either electronic or paper format.

Where are Tier II reports stored? Tier II reports are stored in the Fire Marshal's Office and in the Office of Emergency Management. In addition, they are stored on-line in FireHouse software program.

How often are HAZMAT facilities inspected? Data unavailable.

How is HAZMAT routed throughout your jurisdiction? There are no designated HAZMAT routes identified by the Texas Department of Transportation through the City of Euless. However, Euless is surrounded by major highways on all borders. Highway 10, Highway 183, Highway 360, Highway 121 and FM157 are all located in the City of Euless.

Historical Events:

Date	Location within Jurisdiction	Quantity of Incidents
2013	Combustible, flammable gas condition	3
2014	Combustible, flammable gas condition	2
2015	Combustible, flammable gas condition	1
2016	Combustible, flammable gas condition	1
2017	Combustible, flammable gas condition	1
2013	Gasoline or other flammable liquid spill	9
2014	Gasoline or other flammable liquid spill	6
2015	Gasoline or other flammable liquid spill	6
2016	Gasoline or other flammable liquid spill	4
2017	Gasoline or other flammable liquid spill	4
2013	Gas Leak (natural or LPG)	31
2014	Gas Leak (natural or LPG)	28
2015	Gas Leak (natural or LPG)	28
2016	Gas Leak (natural or LPG)	28
2017	Gas Leak (natural or LPG)	34
2013	Oil or other combustible liquid	1
2014	Oil or other combustible liquid	0
2015	Oil or other combustible liquid	6
2016	Oil or other combustible liquid	2
2017	Oil or other combustible liquid	3
2013	Chemical Hazard (no spill or leak)	0
2014	Chemical Hazard (no spill or leak)	0
2015	Chemical Hazard (no spill or leak)	2

Date	Location within Jurisdiction	Quantity of Incidents
2016	Chemical Hazard (no spill or leak)	1
2017	Chemical Hazard (no spill or leak)	0
2013	Chemical Spill or Leak	2
2014	Chemical Spill or Leak	0
2015	Chemical Spill or Leak	2
2016	Chemical Spill or Leak	1
2017	Chemical Spill or Leak	2
2013	Carbon Monoxide Incident	2
2014	Carbon Monoxide Incident	6
2015	Carbon Monoxide Incident	1
2016	Carbon Monoxide Incident	4
2017	Carbon Monoxide Incident	3

Source: Euless Fire Department, Fire Marshal's Office.

3.5.2 Infectious Disease Outbreak

Hazard Profile: Infectious Disease Outbreak	
Category	**Response**
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Hospitals are overwhelmed Short supply of medical resources
Vulnerabilities	The entire human and animal population is at risk to an infectious disease outbreak, but children, the elderly, and those with immune system disorders are at a greater risk.

What types of infectious disease are a concern in your jurisdiction?

- Cyclospora
- West Nile Virus
- Cryptosporidium
- Zika Virus
- Measles
- Food-borne Illnesses
- All above illnesses have past history in Tarrant County.
- Pandemic Flu

What are the health effects from each infectious disease exposure? The two most realistic infectious disease sources are influenza and West Nile Virus. Both initially present as "flu like" symptoms. West Nile Virus is particularly dangerous to those with preexisting health issues which makes discerning between influenza and West Nile Virus more important.

What are potential sources of an infectious disease outbreak in your jurisdiction? As with most infectious diseases, contact with other humans is a significant factor in the spread of the disease. Additionally, the lakes and streams in Euless present possible breeding sites for West Nile Virus particularly where stagnant water exists.

Historical Events:

Number of Cases Reported				
Disease	**2016**	**2015**	**2014**	**2013**
West Nile Virus	29	0	0	<5
Zika	29	0	0	0
Cryptosporidiosis	45	74	37	38
Measles	0	<5	<5	16
Salmonellosis	337	404	351	342

Source: Tarrant County Public Health Department-Communicable Disease Reports.

3.5.3 National Security Hazard

Hazard Profile: National Security Hazard	
Category	**Response**
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Transportation disruption Loss of property Structure and infrastructure damage
Vulnerabilities	A national security attack would have an extreme effect on the economy of the entire region. An event that would close Dallas/Fort Worth (DFW) International Airport for any reason would have a direct effect on the economy of the City of Euless. Citizens who live in Euless would be directly affected because so many of them work in positions that support airport operations. All assets within the City of Euless are vulnerable to being affected by a terrorist incident. Specifically, the large event spaces, urban environments and the proximity to DFW International Airport make these facilities targets for a national security event. Communication infrastructure, transportation infrastructure, and utility infrastructure would all be vulnerable. Wireless and landline phone/communications hub and switching centers located in the community would also be vulnerable and, if disrupted, could cause communication issues in other neighboring communities as well.

What types of national security hazards does your jurisdiction face? Facilities and government organizations that are considered potential terrorist targets per Federal Bureau of Investigation analysis, do reside within or border our jurisdictions including DFW International Airport, water treatment plants, electrical substations, pipeline/gas facilities, wireless phone switching centers, and telephone switching centers in the community. The neighboring City of Arlington is home to two professional sports teams (the Texas Rangers and the Dallas Cowboys) where the Super Bowl, NCAA Final Four, and many large events have occurred since its opening in 2009.

Past damage done to your jurisdiction's critical infrastructure and facilities due to a national security hazard, including where the damage occurred: None.

Historical Events: No national security event has been recorded since 2015.

3.5.4 Power Failure

Hazard Profile: Power Failure	
Category	**Response**
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Power outage Transportation disruption Loss of critical services Loss of communications
Vulnerabilities	Due to the extensive need for electricity by all sectors of society, it is reasonable to estimate that the entire city is vulnerable to this hazard.

What are the potential sources of power failure? Power failure can result from winter storms, high winds, tornadoes, severe thunderstorms, energy shortages, damage to a power line or other part of the distribution system, a short circuit, or the overloading of electricity mains. If lost entirely, a power loss is referred to as a blackout. A brownout occurs when some power is retained, but the voltage level is below the minimum level specified for the system. Downed power lines, damaged transformers, and cut power lines from digging are sources of power failure.

How many people have been impacted by power failure, including any populations that are specifically vulnerable? Power failures are particularly hazardous during winter months when they threaten the ability to heat a home or office, directly affecting the health of its inhabitants. Extreme heat in summer months can be difficult to manage if power outages affect air conditioning. Transportation routes are affected when traffic signals are disrupted by power outages. Additionally, when power is restored, surges can cause fires. Populations that are extremely vulnerable are those who have medical equipment that require electricity to stay in operation.

How many people could be impacted by power failure? The entire city population is vulnerable to power failure.

Historical Events: No data was available.

3.5.5 Telecommunications Failure

Hazard Profile: Telecommunications Failure	
Category	**Response**
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Disruption in emergency services Loss of communication for all critical entities
Vulnerabilities	The entire city is vulnerable to this hazard, but critical services would be impacted the most. Locations that are monitored remotely like water distribution facilities where alarms are sent out remotely to warn of possible issues with a system. Security cameras at various locations that may be monitored remotely would be disrupted. Communications inside police and fire vehicles could be interrupted. Technology that is now relied on to assist in the safety of first responders might not be available during a telecommunications failure. Wireless and land-line phone switching centers located in the community would also be vulnerable and if disrupted could cause communication issues in other neighboring communities as well.

What are the potential sources of telecommunication failure? Damage to cell towers. Extremely high call volumes in the aftermath of a disaster that would overwhelm the network and render it unusable.

Who has been impacted by telecommunication failure? The City of Euless has not experienced a significant telecommunications failure.

What has been impacted by telecommunication failure? The City of Euless has not experienced a significant telecommunications failure.

Historical Events:

Date	Location within Jurisdiction	Time	Magnitude	Type of Failure
2/2017	Phone & Internet Outage	2 a.m.	High	Contractor Cut Cable
4/3/2017	AT & T Outage	11 a.m.	High	Carrier Failure
4/3/2017	Internet Outrage	12 p.m.	High	Carrier Failure
6/9/17	Admin Lines in Dispatch	7 a.m.		Equipment Failure

Source: Euless Office of Emergency Management.

3.6 Overall Vulnerability

The City of Euless identified their greatest vulnerabilities and concerns:

- A major disaster in the community would quickly overwhelm local resources and communication systems.
- Training of employees who are not first responders in disaster planning is difficult due to time constraints.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Euless's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; Yes; Yes
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	Yes	No; No; No
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	No	Under Development
Transportation Plan	Yes	Local Thoroughfare Plan and part of NCTCOG Regional Transportation Plan
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	Yes	Unified Development Code: Yes; Yes; Yes
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Yes; Yes (illegal dumping and specific regulation on stormwater)

Acquisition of land for open space and public recreation uses	Yes	Yes; Yes
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year:** 2015 International Building Code
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 1**
Site Plan Review Requirements	Yes	**Type(s) of requirement:** parking, landscaping, emergency vehicle circulation, 2015 International Fire Code covers fire lanes and hydrant spacing.
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Commission is appointed by the Mayor and Council and serve two-year terms; Yes
Mitigation Planning Committee	Yes	Planning and hazard assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Members of the Public Works Department are tasked with this mission; Yes
Mutual Aid Agreements	Yes	Euless has adopted the statewide mutual aid system; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Mass notification, outdoor warning sirens; Yes
Hazard data and information	Yes	Records of past incidents/disasters on file; Yes

Grant writing	Yes	Several employees in different departments apply for grants; Yes
HaZUS analysis	No	Do not use. FEMA software not up to date.
Other	Yes	Geographic Information System mapping; Yes

Education and Outreach Assessment

Program or Organization	Have capability?	Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?
Local citizen groups or Non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	The Community Emergency Response Team (CERT), Citizen Police & Fire Academies, Citizens on Patrol, and the Amateur Radio Club train citizens on local hazards. Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Use water bills, city website, social media, special events to provide hazard information; Yes
Natural disaster or safety related school programs	Yes	The Fire Department Clown Program and Fire Department Poster Contest educates children on fire. Yes
StormReady certification	Yes	StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education, and awareness. To be officially StormReady, a community must: • Establish a 24-hour warning point and emergency operations center. • Have more than one way to receive severe weather warnings and forecasts and to alert the public. • Create a system that monitors weather conditions locally. • Promote the importance of public readiness through community seminars. • Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises. Yes
Firewise Communities Certification	No	

Public/private partnership initiatives addressing disaster-related issues	Yes	American Red Cross Sheltering Agreement; Yes
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If Yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes, flood mitigation; Yes
Authority to levy taxes for specific purposes	Yes	Yes, Part 4B sales tax, Crime Control & Prevention District; No
Fees for water, sewer, gas, and/or electric services	Yes	Yes, water and sewer fees; Yes
Impact fees for new development	Yes	Yes, fees ensure capacity is maintained resulting in greater resiliency of services; Yes
Stormwater utility fee	Yes	Yes, drainage repair; Yes
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes, improved infrastructure through bonds ensure resiliency of city infrastructure; Yes
Incur debt through private activities	Yes	Yes, Council can incur debt from private banks; No
Community Development Block Grant	Yes	Yes, Euless is an entitlement city; Yes
Other federal funding programs	No	
State funding programs	Yes	Yes, Texas Department of Transportation, Texas Parks & Wildlife, Texas Water Development Board; Yes
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates, and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Euless's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Have accurate real time information to assist in giving timely warnings to citizen population of the City of Euless.	Identify systems or methods for obtaining current and pending weather conditions.	1 month	Office of Emergency Management	Unknown	Unknown	City budget
		STATUS: Completed					
		Purchase/order weather/lightning monitoring/warning system.	1 month	Office of Emergency Management	$60,000	$240,000	City budget
		STATUS: Completed					
		Deliver and install weather/lightning monitor/warning system.	1 month	Office of Emergency Management	Unknown	Unknown	City budget
		STATUS: Completed					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Ensure City of Euless critical facilities have alternate power supply.	Evaluate emergency lighting systems in critical facilities.	Jan-2015	All departments	$5,000	$20,000	City budget
		STATUS: Completed					
		Install emergency lighting systems in critical facilities.	Jan-2016	Facilities Department	$40,000	$75,000	City budget
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Infectious Disease Outbreak	Provide physical security at the Hurst, Euless, and Bedford (HEB) point of distribution (POD) site while treating up to 200,000 people within a 48-hour timeframe.	Develop plans for security needs within the POD site.	Completed	Hurst-Euless-Bedford (HEB)	Unknown	Unknown	HEB, Federal Emergency Management Agency (FEMA), Center for Disease Control public health preparedness funds
		STATUS: Completed					
		Calculate police personnel requirements and availability and then prepare a viable plan with schedules and assignments.	Completed	HEB	$49,000	$200,000	HEB, FEMA, Center for Disease Control public health preparedness funds
		STATUS: Completed					
		Estimate fuel needs for police and Incident Command System vehicles, and generators.	31-Dec-2013	HEB	Unknown	Unknown	HEB, FEMA
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Infectious Disease Outbreak	Coordinate the effective traffic flow leading into, out of, and within the Hurst, Euless, and Bedford POD site.	Plan for law enforcement personnel needs for traffic control.	Completed	HEB	$35,000	$140,000	HEB, FEMA
		STATUS: Completed					
		Plan for portable, physical barrier needs (cones, barricades, etc.).	Completed	HEB	Unknown	Unknown	HEB, FEMA
		STATUS: Completed					
		Determine points of ingress/egress to POD site for management purposes.	Completed	HEB	Unknown	Unknown	HEB, FEMA
		STATUS: Completed					
Infectious Disease Outbreak	Complete and disseminate the Hurst, Euless, and Bedford POD site to local agencies, school and hospital district, and	Prepare and disseminate POD plan.	Completed	City of Bedford	Unknown	Unknown	Unknown

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	Tarrant County officials.						
		STATUS: Completed					
Infectious Disease Outbreak	Ensure continuity procedures are in place to prepare for a long-term employee shortage at City of Euless facilities.	Review continuity of operations (COOP) plans and procedures for city employees and facilities.	Jan-2016	All departments	$5,000	$75,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Provide COOP training for jurisdiction employees.	Jan-2017	All departments	$10,000	$100,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Infectious Disease Outbreak	Develop a public information campaign to educate Euless public about infectious diseases.	Educate the public on pandemics, including isolation, quarantine, triage, and medical care.	Jan-2015	Public Information Office, Office of Emergency Management	$3,000	$50,000	City budget
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Drought	Upgrade water and irrigation systems to conserve water in the City of Euless.	Evaluate feasibility of extending reclaimed water lines and usage to new or existing subdivisions and business districts.	Jan-2016	Public Works Department	$5,000	$500,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Drought	Develop a drought awareness education program for Euless citizens.	Evaluate the hazards posed by drought in Euless.	Jun-2015	Public Works Department, Office of Emergency Management	$1,000	$100,000	City budget
		STATUS: Completed					
		Develop a drought awareness education program that provides tips and pertinent information for ensuring the protection of property and the environment against drought.	Jun-2016	Public Works Department, Public Information Office, Office of Emergency Management	$5,000	$200,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Drought	Distribute drought awareness	Provide drought awareness information to	Jun-2014	Public Information Office, Office of Emergency Management	$500	$5,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	information to Euless citizens.	Euless citizens through a social media campaign.					
		STATUS: Deferred to 2020 HazMAP					
		Provide drought awareness information through the City of Euless website.	Jun-2014	Public Information Office, Office of Emergency Management	$500	$5,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Ensure the City of Euless has an extreme heat mitigation plan in place.	Review current mitigation plans and procedures related to extreme heat.	Jul-2014	All departments	$1,000	$50,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Open cooling center and provide public information.	Jul-2014	All departments	$1,000	$50,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Identify extreme heat mitigation plans for critical infrastructure	Ensure essential functions continue in the event of high temperatures, by implementing mitigation activities.	Jul-2014	Public Works Department, Facilities Department, Office of Emergency Management	$1,000	$50,000	City budget
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	in the City of Euless.	Develop or update mitigation procedures for critical infrastructure when high temperatures are present.	Jul-2014	Public Works Department, Facilities Department, Office of Emergency Management	$1,000	$50,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Develop an extreme heat preparedness education program for Euless citizens.	Develop an extreme heat outreach program that provides tips and pertinent information for ensuring the health and safety of citizens during extreme heat.	Jul-2015	Fire Department, Public Information Office, Office of Emergency Management	$3,000	$50,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Distribute extreme heat mitigation information to Euless citizens.	Provide extreme heat mitigation information to the Euless citizens through a social media campaign.	Jul-2015	Fire Department, Public Information Office, Office of Emergency Management	$3,000	$50,000	City budget
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Provide extreme heat mitigation information through the City of Euless's website.	Jul-2015	Fire Department, Public Information Office, Office of Emergency Management	$500	$10,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Expansive Soils	Mitigate expansive soils in Euless.	Improve construction techniques through building code enhancements.	Jan-2017	Planning and Development Department	$5,000	$50,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Educate construction contractors, homeowners, and business owners about mitigation techniques.	Jan-2017	Planning and Development Department	$5,000	$50,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Flooding	Remove repetitive loss properties in Euless.	Work with homeowners to purchase and remove repetitive loss properties.	Continual	City Engineering Department, Public Works Department	$750,000	$1,500,000	City budget, Hazard Mitigation Grant Program
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Flooding	Provide flood awareness education to citizens of Euless.	Develop and print preparedness materials.	2 years	Public Information Office, Office of Emergency Management	$3,000	$15,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Obtaining lightning sensing equipment for city parks not currently covered	5 years	Parks and Recreation Department, Office of Emergency Management	$50,000	$300,000	City budget
		STATUS: Completed					
Lightning	Protect critical facilities against lightning.	Install lightning rods and other protective equipment on critical facilities.	5 years	Office of Emergency Management, Facilities Department	$200,000	$700,000	City budget
		STATUS: Completed					
Winter Storm, Extreme Temperatures	Develop winter storm ad extreme temperature mitigation plans for City of Euless.	Open public warming or cooling centers.	5 years	Office of Emergency Management	$2,000	$10,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Winter Storm	Provide winter storm education to	Develop and print public outreach materials.	5 years	Office of Emergency Management, Public Information Office	$3,000	$15,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	citizens of Euless.						
		STATUS: Deferred to 2020 HazMAP					
Drought	Reduce water usage by city facilities.	Install landscaping rain collection systems at city facilities.	5 years	Office of Emergency Management, Facilities Department	$35,000	$250,000	City budget
		STATUS: Completed					
Hail	Mitigate damage to existing structures as a result of natural hazards using cost effective approaches in the City of Euless.	Provide awnings as a cover for emergency response vehicles located outside.	5 or more years	Department of Public Safety	Unknown	Unknown	To be determined
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Provide information to Euless citizens regarding the hazards	Develop a wildfire mitigation outreach program.	2 years	Fire Department, Public Information Office, Office of Emergency Management	$2,000	$10,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	posed by wildfires.						
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Implement Firewise community program.	Coordinate with Texas Forest Service, our city and community to establish a Firewise community program. This program will assist us with preplanning for a fire, during and after.	3 years	Fire Department	$50,000	The primary benefit will come in the form of life and property conservation.	General fund, grants
		STATUS: Deferred to 2020 HazMAP					

5.3 New Action Items

The City of Euless' action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms, Hazardous Materials, Infectious Disease, National Security Hazard, Power Failure, Telecommunications Failure**
Provide alternative power solutions to critical infrastructure to ensure the ability to respond and availability of communications during emergency response.	
Participating Jurisdiction:	City of Euless
Priority:	1
Estimated Cost:	$75,000
Estimated Benefit:	$450,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Office of Emergency Management, Facilities Department, Information Services Department
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms, Hazardous Materials, Infectious Disease, National Security Hazard, Power Failure, Telecommunications Failure
Ensure first responders have the necessary equipment to respond to any and all disasters.	
Participating Jurisdiction:	City of Euless
Priority:	2
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Office of Emergency Management, Police Department, Fire Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms, Hazardous Materials, Infectious Disease, National Security Hazard, Power Failure, Telecommunications Failure
Develop, train and exercise Continuity of Operations (COOP) plans for city employees and facilities.	
Participating Jurisdiction:	City of Euless
Priority:	3
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	All City departments
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms, Hazardous Materials, Infectious Disease, National Security Hazard, Power Failure, Telecommunications Failure
Develop and implement a comprehensive public education program that includes recommended activities to mitigate the impact of each identified hazard.	
Participating Jurisdiction:	City of Euless
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Office of Emergency Management, Public Information Office, Fire Department, Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms, Hazardous Materials, Infectious Disease, National Security Hazard, Power Failure, Telecommunications Failure
Enhance computer technology and software to provide for the most coordinated, efficient response possible. Provide prevention and protection of technology to secure information, intelligence and communications are operable and interoperable at all times.	
Participating Jurisdiction:	City of Euless
Priority:	5
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Office of Emergency Management, Police Department, Fire Department, Information Services Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms, Hazardous Materials, National Security Hazard
Enhance warning systems to ensure timely and accurate information is disseminated in the event of an emergency.	
Participating Jurisdiction:	City of Euless
Priority:	6
Estimated Cost:	$25,000
Estimated Benefit:	$150,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms, Hazardous Materials, Infectious Disease, National Security Hazard, Power Failure, Telecommunications Failure
Ensure communications systems allow first responders to communicate with each other and other responding agencies.	
Participating Jurisdiction:	City of Euless
Priority:	7
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Office of Emergency Management, Police Department, Fire Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Develop a plan to reduce stream bank erosion impacts due to flooding along Big Bear Creek, Headwaters Walker Branch, Little Bear Creek, and Hurricane Creek to improve drainage within the City of Euless.	
Participating Jurisdiction:	City of Euless
Priority:	8
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Review City of Euless Ordinance No. 2029 – Drought Contingency Plan and enhance as necessary to mitigate effects of drought.	
Participating Jurisdiction:	City of Euless
Priority:	9
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Review drought contingency plans to ensure adequate water supply during prolonged periods of drought.	
Participating Jurisdiction:	City of Euless
Priority:	10
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Expansive Soils
Improve construction techniques through building code enhancements.	
Participating Jurisdiction:	City of Euless
Priority:	11
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Planning and Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Evaluate feasibility of extending reclaimed water lines and usage to new or existing subdivisions and business districts.	
Participating Jurisdiction:	City of Euless
Priority:	12
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Office of Emergency Management, Facilities Department, Information Services
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Extreme Heat, Winter Storms
Review current mitigation plans and procedures related to extreme temperatures and ensure essential functions continue in the event of extreme temperatures by implementing mitigation activities (i.e. open warming / cooling centers.)	
Participating Jurisdiction:	City of Euless
Priority:	13
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	All City departments
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Develop a wildfire mitigation plan and consider the feasibility of establishing a Firewise community program in the City of Euless.	
Participating Jurisdiction:	City of Euless
Priority:	14
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Office of Emergency Management, Fire Departments
Implementation Schedule:	24 months

Hazard(s) Addressed	Extreme Heat, Thunderstorms, Winter Storms
Evaluate the feasibility and provide awnings as a cover for emergency response vehicles to protect from severe weather.	
Participating Jurisdiction:	City of Euless
Priority:	15
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Department of Public Safety
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Educate the public on the design, purchase, and installation of safe rooms and assist participants in the North Central Texas Safe Room Rebate Program.	
Participating Jurisdiction:	City of Euless
Priority:	16
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget, grant funds
Lead Agency/Department Responsible:	Office of Emergency Management, Building Inspections, North Central Texas Council of Governments (NCTCOG)
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Euless
Priority:	17
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Euless
Priority:	18
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Euless
Priority:	19
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Euless
Priority:	20
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquake, Thunderstorm, Tornado, National Security Incident
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Euless
Priority:	21
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Euless
Priority:	22
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm
To protect power lines from severe weather either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Euless
Priority:	23
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Plan creation by the Planning and Economic Development Department.
2. Plan is reviewed by the Development Services Group, which has representation from all applicable City departments and public input/participation.
3. Reviewed by the City Manager's Office, followed by presentation to the Planning and Zoning Commission for recommendation. If the proposal is passed, the appropriate local authority implements the change.
4. The final step is presentation to the City Council for approval.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
2030 Comprehensive Plan	Planning and Development Department	As needed	Reference this HazMAP for flood mitigation activities and vulnerabilities.	The plan development team will reference the HazMAP when updating this plan.
Comprehensive Zoning Ordinance	Planning and Development Department	As needed	Reference this HazMAP when updating the ordinance.	The plan development team will reference the HazMAP when updating this plan.
Drought Plan	Public Works Department	As needed	Reference this HazMAP for drought mitigation activities and vulnerabilities.	Ordinance No. 2029 – Drought Contingency Plan.
Flood Ordinance	Public Works Department	As needed	Reference this HazMAP for flood mitigation activities and vulnerabilities.	Ordinance No. 1856 – Floods.
International Building Codes	Planning and Development Department	3 year cycle	Reference this HazMAP when identifying building code enhancements.	Ordinance No. 1942.
Capital Improvement Plan	All departments	1 year	Reference this HazMAP to identify city infrastructure projects.	Each department updates their Capital Improvement Plan each year during the annual budget cycle for presentation to the City Manager’s Office, followed by presentation to the City Council for approval.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Euless. Supporting material is in Appendix A and B, respectively.

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City of Everman*

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

The City of Everman is a new participant in the Tarrant County Hazard Mitigation Action Plan (HazMAP) and does not have a previous mitigation plan.

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County HazMAP planning process for the City of Everman, a new participant in the HazMAP, was the Director of Emergency Services.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided is for the City of Everman alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation “Approved Pending Local Adoption” from the Federal Emergency Management Agency (FEMA), the City of Everman will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Everman has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the emergency management contact for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Everman's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Director of Emergency Services.

The LPT was assembled in 2017 with representatives from the City of Everman. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Everman Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Everman	Emergency Management	Director of Emergency Services	General oversight, hazard identification and plan development
City of Everman	Public Works Department (Streets)	Director	Hazard identification and plan development
City of Everman	Public Works Department (Water)	Director	Hazard identification and plan development
City of Everman	Fire Department	Lieutenant	Hazard identification and plan development
City of Everman	Police Department	Patrol Sergeant	Hazard identification and plan development
City of Everman	Financial	Accounting	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

As the City of Everman is a new participant in the Tarrant County HazMAP, there are no changes in development.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Everman.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2017)	6,348
Persons under 5 years (%)	5.3
Persons 65 years and over (%)	10.7
Language other than English spoken at home (%)	47.5
With a disability, under age 65 (%)	11.0
Person without health insurance, under age 65 (%)	30.8
Persons in poverty (%)	20.0
Median household income	$36,929
Households, 2012-2016	2,025
Median value of owner-occupied housing units, 2012-2016	$70,800

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Everman. The capacity of these facilities was unknown.

City of Everman Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Asset**	**Square Feet**	**Structure Value**	**Content Value**
Everman City Hall 212 North Race Street	City Administration	5,151	$721,000	$125,000
City Hall Annex 213 North Race Street	City Administration	3,550	$497,000	$5,000
Everman Animal Control Facility 3961 Bluebell Drive	Animal Control Facility	1,200	$168,000	$10,000

Everman Fire Station 400 West Enon Avenue	Public Safety Building	5,680	$795,200	$2,000,000
Everman Public Library 100 North Race Street	Public Facility	4,633	$648,620	$167,000
Maintenance Garage 411 West Trammell Avenue	Maintenance Facility	3,451	$483,140	$50,000
Everman Police Department 404 West Enon Avenue	Public Safety Building	5,775	$808,500	$250,000
Everman Streets Department 405 West Trammell Avenue	Public Works Facility	6,540	$168,000	$75,000
Water Department Storage and Well Site 800 Shelby Road	Public Works Facility	1,488	$240,000	$150,000
Water Department Well Site 618 Townley Drive	Public Works Facility	325	$85,000	$265,000
Water Department Well Site 400 West Trammell Avenue	Public Works Facility	255	$35,700	$50,000

3.3 Natural Hazard Profiles

The City of Everman's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Everman in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Flooding
2	Tornado
3	Thunderstorm (includes hail, wind, lightning)
4	Extreme Heat
5	Expansive Soils
6	Winter Storms
7	Drought
8	Wildfire
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Everman.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Agriculture is extremely vulnerable.

Jurisdiction's ground-water supply: The City of Everman drinking water is obtained from ground water sources. It is supplied by the Trinity Aquifer and Paluxy water wells.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: Yes, the City of Everman has multiple agriculturally zoned properties.

Describe any water restrictions used in your jurisdiction: The City of Everman has adopted the City of Fort Worth Water Restriction Guidelines.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Significant
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Earthquakes were not a hazard in the past, thus existing buildings are vulnerable due to the building code standards not considering earthquake-resilient construction. Pipelines and water mains are also at risk.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Expansive soils are a major consideration to all existing and future structures. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. There are old cast metal water lines throughout the city that could be damaged.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: The aged infrastructure in the City of Everman is of concern. The movement of the soil could cause the old cast metal water lines to shift, which can cause breakage of the lines and service line taps to disconnect from the water main. The leak may not appear right away and could cause a cavitation beneath the surface or roadway. A sink hole could be created as well as depletion of the integrity of the roads. The entire city if affected by expansive soils and damages happen several times a year. The City of Everman spends approximately $15,000 per year to repair damages due to expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	The elderly, homeless, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. People who work outside or buildings without air-conditioning are also at high risk to the direct effects of extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? No.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Many roads become impassable and dangerous. Properties experience various levels of damage.

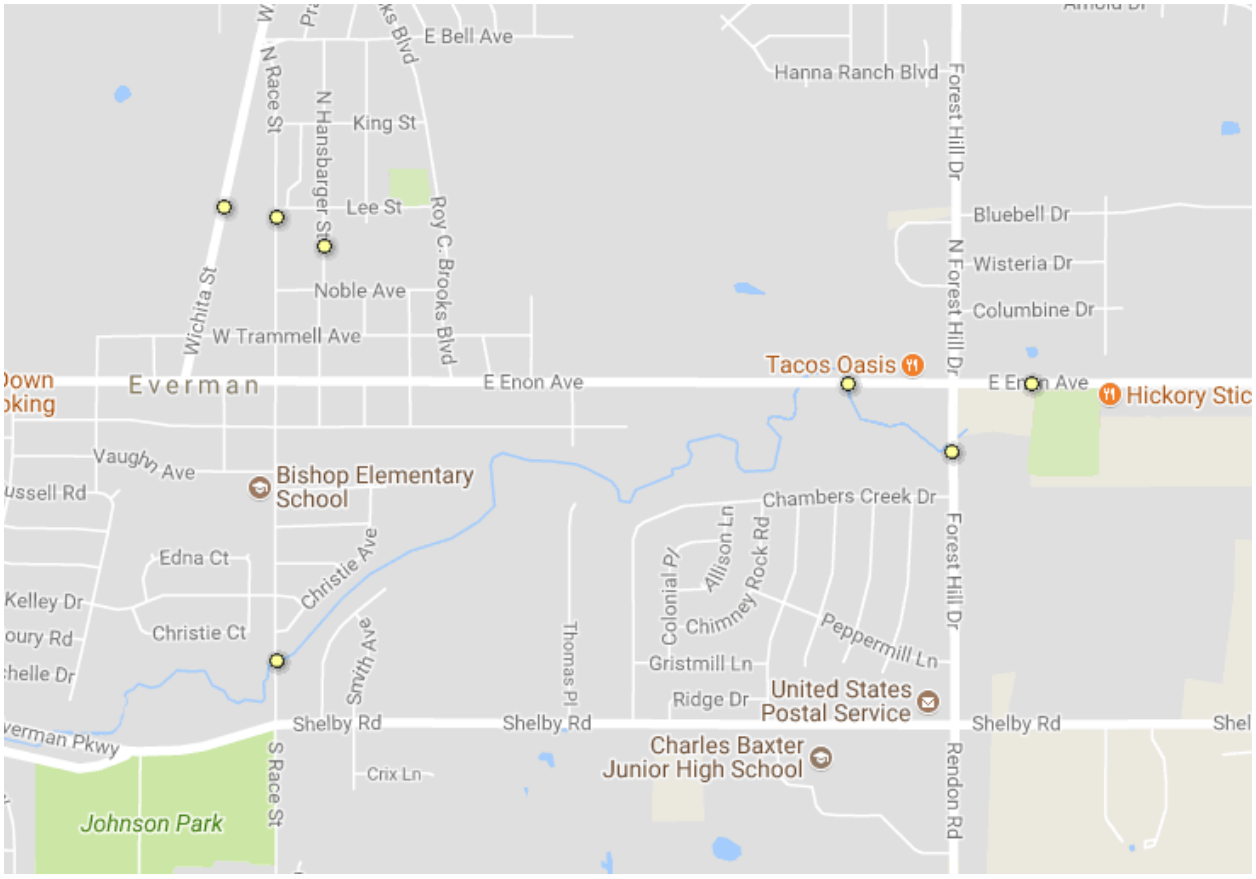
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: Properties along the creeks experience flooding during wet seasons.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? Data unavailable.

Intersections or traffic routes impacted by flooding: Race Street, Everman Parkway, Shelby Road, Christie Avenue, Johnson Avenue, Pittman Avenue, Vaden Avenue, Neill Avenue, West Barron Avenue, East Barron Avenue, Hansbarger Street, Langley Avenue, Smith Avenue, Thomas Place, Noble Avenue, Lee Street, East Enon, Avenue, Southway, Columbine, Chambers Creek Drive, Chambers Creek Drive South, Christie Court, Russell Road, and Christopher Drive.

Names of any creeks or rivers that flood: Chambers Creek.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. This crossing can be dangerous when flooded. The low water crossings within the city are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Enon Avenue	Chambers Creek	Vented Ford
North Forest Drive (Rendon Drive)	Chambers Creek	Vented Ford
Enon Avenue	Chambers Creek	Vented Ford
Hansbarger Street	Chambers Creek North Fork	Vented Ford
Race Street	Chambers Creek North Fork	Vented Ford
Wichita Street	Chambers Creek North Fork	Vented Ford
Race Street	Chambers Creek South Fork	Vented Ford

Low Water Crossing Types Defined:

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Everman is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480594#
Community Name	City of Everman
County	Tarrant
Initial FHBM Identified	12/17/73
Initial FIRM Identified	09/17/80
Current Effective Map Date	09/25/09
Reg-Emer Date	09/17/80
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Building Official.

What specific flooding ordinances and plans does your jurisdiction have? A subdivision ordinance regulating building in floodplain/flood zones.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? Minimum 2 feet above base floor elevation; hydraulic and hydrologic studies required.

What building restrictions, in regard to floodplains, does your jurisdiction enforce? Work in or near floodplain is reviewed by city engineer for compliance.

Repetitive and Severe Repetitive Loss Properties: There are currently 3 residential repetitive loss properties and 0 severe repetitive loss properties within the City of Everman. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Everman's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 67 Insurance in-force: $10,815,400 Written premium in-force: $110,895
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 75 claims have been filed, but 12 closed without payment. $646,802.08 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	There are at least 53 commercial parcels and 239 residential parcels located in the 100-year floodplain.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	Data unavailable.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	No.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Work in or near floodplain is reviewed by city engineer for compliance.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Data unavailable.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.

Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Data unavailable.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	12/17/73
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP	When plans are submitted to the city, if they are in or near a floodplain/zone, they are sent to the city engineer for compliance review.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Everman will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Though not documented by the National Centers for Environmental Information, the City of Everman has experienced several severe thunderstorms. Most of the damage across the city consists of downed trees, fences, and utility lines by high winds.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

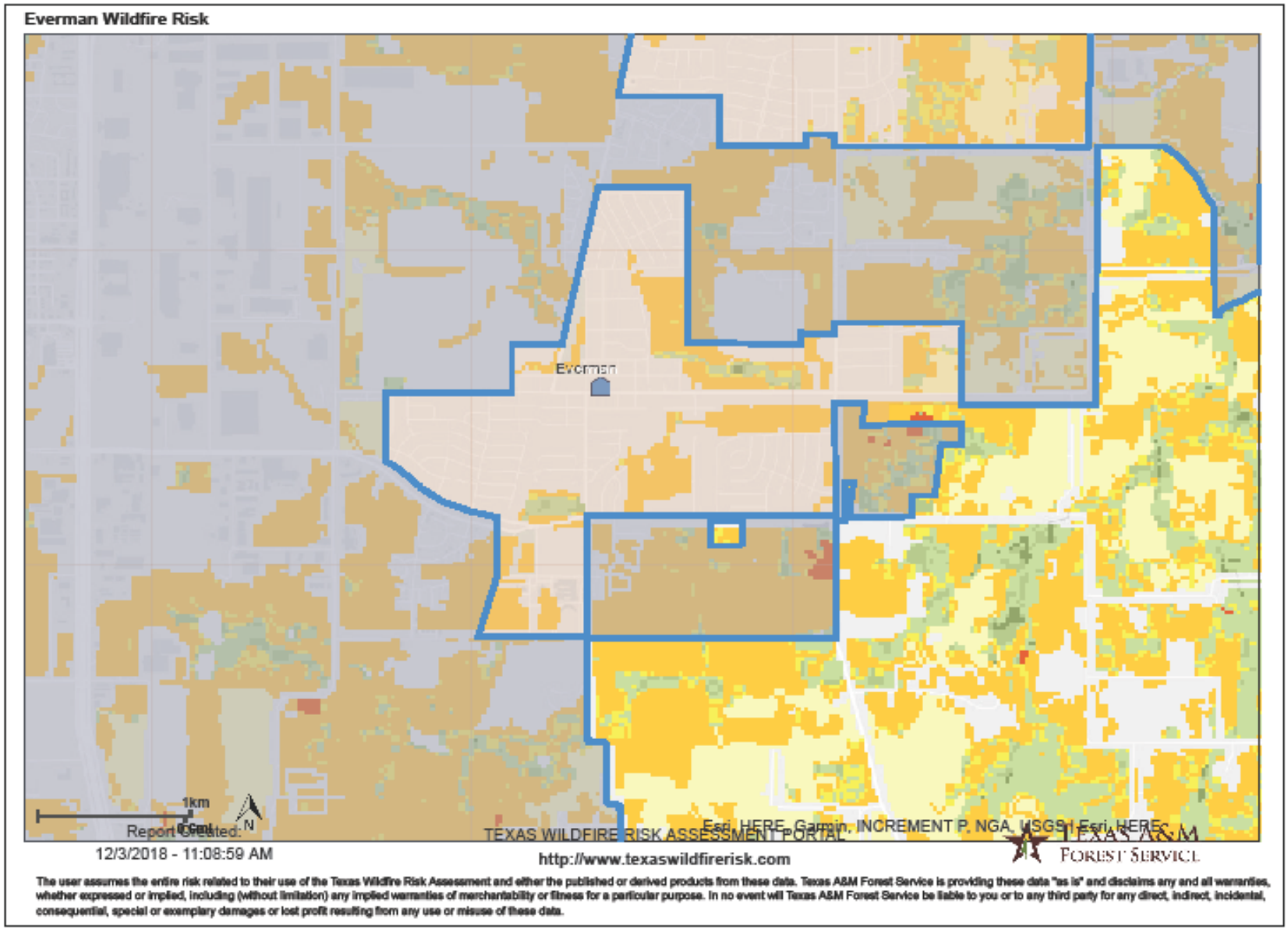
Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Many residential structures are aging and could be severely damaged if struck by a tornado.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reported tornadoes.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Most vulnerable location (North, East, South, West) of your jurisdiction? Portions of the city that are near undeveloped properties are most vulnerable. The following map shows the highest areas at risk in orange, ranked 4 out of 5 on the Fire Intensity Scale, meaning moderate to high risk; however, with the proximity to the fire station, minor damage is expected.


Everman Wildfire Risk
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TEXAS WILDFIRE RISK ASSESSMENT PORTAL
http://www.texaswildfirerisk.com
Esri, HERE, Garmin, INCREMENT P, NGA, USGS | Esri, HERE,
TEXAS A&M FOREST SERVICE
The user assumes the entire risk related to their use of the Texas Wildfire Risk Assessment and either the published or derived products from these data. Texas A&M Forest Service is providing these data "as is" and disclaims any and all warranties, whether expressed or implied, including (without limitation) any implied warranties of merchantability or fitness for a particular purpose. In no event will Texas A&M Forest Service be liable to you or to any third party for any direct, indirect, incidental, consequential, special or exemplary damages or lost profit resulting from any use or misuse of these data.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard. Bridges are of high concern across the city.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: The City of Everman has bridges on each main road leading into and exiting the City of Everman, including Wichita Street, Race Street, East Enon Avenue, Forest Hill Drive, and Everman Parkway.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? During winter events these bridges become hazardous to drive on, leading to multiple accidents every event.

3.4 Historical Events

The following table, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the history of the City of Everman, up to 2017. The material is organized by location and date. Reports of flooding have occurred within the city but was not captured by the National Weather Service.

Historical Events From The National Centers For Environmental Information (www.ncdc.noaa.gov)							
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
Everman	9/25/1999	Hail	.75	0	0	0	0
Everman	4/24/2011	Hail	1.75	0	0	50,000	0
Total:				**0**	**0**	**$50,000**	**$0**

3.5 Overall Vulnerability

The City of Everman identified their greatest vulnerabilities and concerns:

- Intense and/or prolonged rain events is identified as the greatest vulnerability and concern to the City of Everman. Historically, flooding events have caused significant damages to homes and business within the City of Everman as well as infrastructure damages to roadways, bridges, parks, etc.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Everman's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	No; Yes; Yes
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	No	
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	No	
Transportation Plan	No	
Stormwater Management Plan	Yes	Yes; No; No
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	N/A	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	
Acquisition of land for open space and public recreation uses	No	

Building Code, Permitting, and Inspections	Have capability?	
Building Code	Yes	**Version/year:** IBC 2015
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating:** 4
Site Plan Review Requirements	Yes	Plan review required for all new construction.
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and Zoning; Yes
Mitigation Planning Committee	No	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	No	There are no specific programs in place, however the City of Everman Public Works Division addresses maintenance issues as the need arises.
Mutual Aid Agreements	Yes	For Police, Fire, EMS and Public Works; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	PT	Yes; Yes; Yes
Civil Engineer	Contract	Yes; Yes; Yes
GIS Coordinator	No	
Other: Public Works Director	FT	Yes; Yes; Yes
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	The City of Everman does have one Outdoor Warning Siren located near the center of the City. The City of Everman also utilizes social media as well as a telephone CTY System for emergency alerts; yes
Hazard data and information	No	
Grant writing	Yes	Yes; No
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Everman Emergency Services and Public Works Division work closely with the Everman Independent School District (EISD) to provide programs such as Fire Education, household preparedness and responsible water use to students.
Natural disaster or safety related school programs	Yes	EISD with the assistance of the Everman Emergency Services conducts regular emergency tests and drills.
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	American Red Cross – smoke detector installations.
Other		
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	No	Funding for capital improvement projects is assessed annually; Yes.
Authority to levy taxes for specific purposes	Yes	Taxes have been levied previously, however this has never been done in relation to hazard mitigation; No.
Fees for water, sewer, gas, and/or electric services	Yes	Yes, water and sewer fees are used to replace damaged water lines caused by expansive soils; Yes.
Impact fees for new development	No	
Stormwater utility fee	No	
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes; Yes

Funding Resources	Have capability?	Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?
Incur debt through private activities	No	
Community Development Block Grant	Yes	Participant through Tarrant County; Yes
Other federal funding programs	Yes	Yes; Yes
State funding programs	Yes	No; Yes
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, policies, and resources for mitigation include budgeting and passing policies and procedures for mitigation actions, adopting and implementing stricter mitigation regulations, approving the hiring and training of staff for mitigation activities, approving mitigation updates and additions to existing plans as new needs are recognized, looking into both the StormReady and Firewise programs and obtain those certifications, adopting more recent editions of all codes for the city and have trained and motivated personnel to interpret and enforce these codes.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

As a new participant in the HazMAP, the City of Everman did not have mitigation actions to review.

5.3 New Action Items

The City of Everman's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Flooding, Expansive Soils
Contract with US Army Corps of Engineers (USACE) to conduct proper studies in and around Everman to identify potential causes of flooding and to provide better information on mitigation of flooding.	
Participating Jurisdiction:	City of Everman
Priority:	1
Estimated Cost:	$300,000
Estimated Benefit:	$1,800,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department, Public Works
Implementation Schedule:	18 Months

Hazard(s) Addressed	Flooding, Expansive Soils
Implement recommended mitigation actions proposed by the USACE as a result of their studies.	
Participating Jurisdiction:	City of Everman
Priority:	2
Estimated Cost:	$3,500,000
Estimated Benefit:	$21,000,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department, Public Works
Implementation Schedule:	36 Months

Hazard(s) Addressed	Earthquake, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Ensure new and existing Everman critical facilities have alternative power supply, to include the purchase and installation of generators.	
Participating Jurisdiction:	City of Everman
Priority:	3
Estimated Cost:	$150,000
Estimated Benefit:	$900,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department, Public Works
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Implement a Stream Flow Monitoring system on Chambers Creek that will allow for historical tracking as well as constant monitoring of water levels to assist with providing early warning to residents.	
Participating Jurisdiction:	City of Everman
Priority:	4
Estimated Cost:	$25,000
Estimated Benefit:	$150,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquake, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Develop and implement a comprehensive public education program that includes recommended actions to mitigate the impacts of each identified hazard.	
Participating Jurisdiction:	City of Everman
Priority:	5
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department
Implementation Schedule:	24 Months

Hazard(s) Addressed	Drought, Earthquake, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Upgrade technology and equipment within the Everman Emergency Operations Center that will allow better communications capability and planning capability for hazard mitigation.	
Participating Jurisdiction:	City of Everman
Priority:	6
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Enhance current drought contingency plan for city facilities and property that addresses the use of low flow fixtures and drought tolerant plants.	
Participating Jurisdiction:	City of Everman
Priority:	7
Estimated Cost:	$6,000
Estimated Benefit:	$36,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms
Install lightning protection on Everman existing and future critical facilities.	
Participating Jurisdiction:	City of Everman
Priority:	8
Estimated Cost:	$1,000
Estimated Benefit:	$75,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Flooding
Participate in FEMA's Community Rating System to lower flood insurance premiums for residents with flood insurance.	
Participating Jurisdiction:	City of Everman
Priority:	9
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department, Public Works
Implementation Schedule:	36 Months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Everman
Priority:	10
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department, Public Works
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Everman
Priority:	11
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department, Public Works
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Everman
Priority:	12
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department, Public Works
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Everman
Priority:	13
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department, Public Works
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquake, Thunderstorm, Tornado, National Security Incident
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Everman
Priority:	14
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department, Public Works
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Everman
Priority:	15
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department, Public Works
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm
To protect power lines from severe weather either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Everman
Priority:	16
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Emergency Services Department, Public Works
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Require that the floodplain administrator is certified.	
Participating Jurisdiction:	City of Everman
Priority:	17
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.

6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Ordinances	City Council, City Administration	As needed	Reference this HazMAP when updating this plan.	Office of Emergency Management will participate in the review process and suggest changes based on mitigation goals.
Planning & Zoning	City Council, Planning and Zoning Board, City Administration, Economic Development	As Needed	Reference this HazMAP when updating this plan.	Office of Emergency Management will participate in the review process and suggest changes based on mitigation goals.
Capital Improvement Project	City Administration, City Council	As Needed	Reference this HazMAP when updating this plan.	Office of Emergency Management will participate in the review process and suggest changes based on mitigation goals.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Everman. For additional information, see Appendices A and B.

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City of Forest Hill

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Forest Hill was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided is for the City of Forest Hill alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

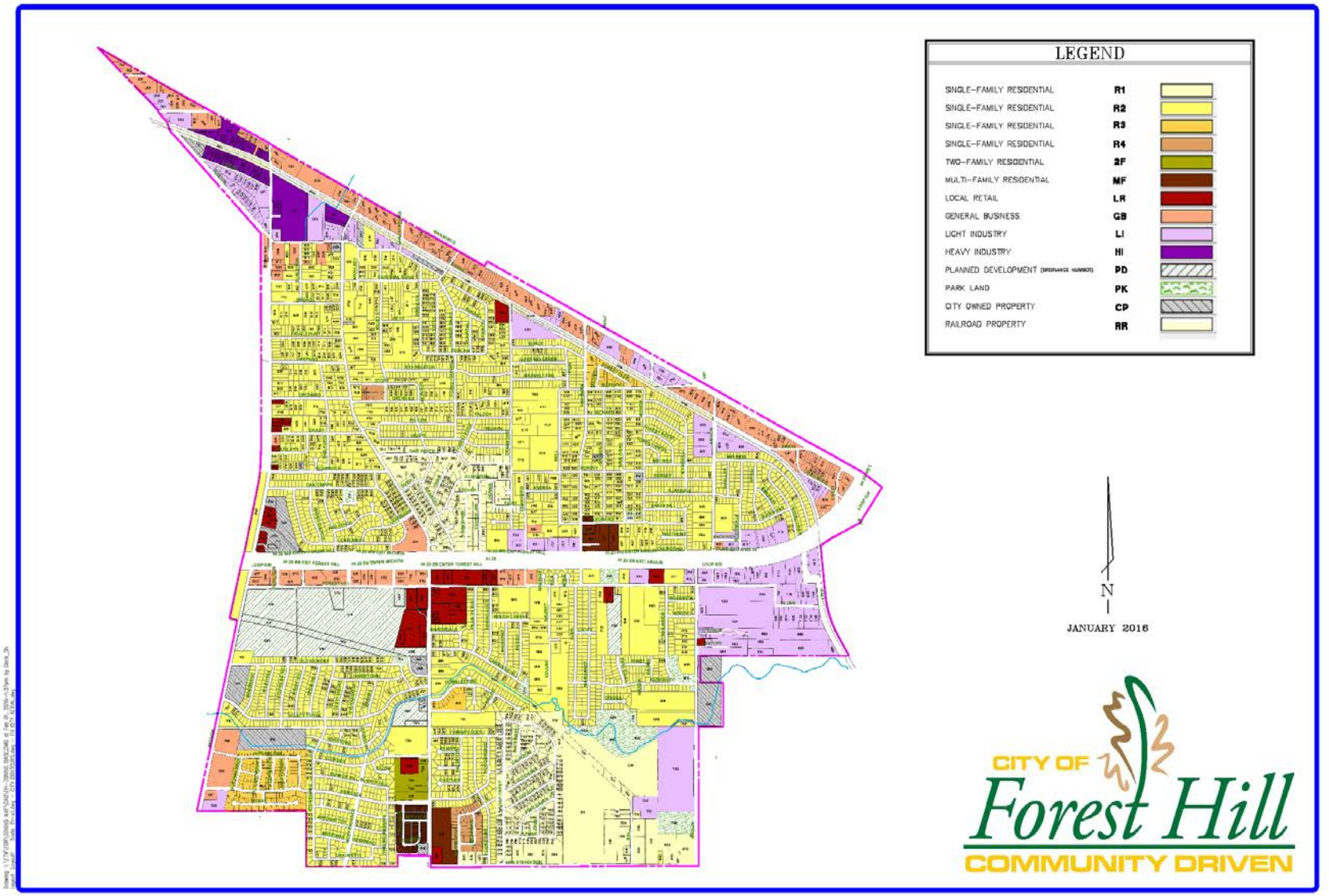
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Forest Hill will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

The following map provides an overview of the City of Forest Hill.

- 2016 Zoning Map


LEGEND
SINGLE-FAMILY RESIDENTIAL R1
SINGLE-FAMILY RESIDENTIAL R2
SINGLE-FAMILY RESIDENTIAL R3
SINGLE-FAMILY RESIDENTIAL R4
TWO-FAMILY RESIDENTIAL 2F
MULTI-FAMILY RESIDENTIAL MF
LOCAL RETAIL LR
GENERAL BUSINESS GB
LIGHT INDUSTRY LI
HEAVY INDUSTRY HI
PLANNED DEVELOPMENT PD
PARK LAND PK
CITY OWNED PROPERTY CP
RAILROAD PROPERTY RR
N
JANUARY 2016
CITY OF
Forest Hill
COMMUNITY DRIVEN

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Forest Hill has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Forest Hill's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Forest Hill. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Forest Hill Local Planning Team Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Forest Hill	Fire Department	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Forest Hill	Fire Department	Fire Chief	Hazard identification and plan development
City of Forest Hill	Police Department	Police Chief	Hazard identification and plan development
City of Forest Hill	Public Works Department	Public Works Director	Hazard identification and plan development
City of Forest Hill	Planning Department	City Planner	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: Since 2015, there have been approximately 200 new homes constructed in a new housing addition on the south side of the city.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: In 2016, the 2015 International code suite was adopted. A full list of completed mitigation action items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Forest Hill.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	12,947
Persons under 5 years (%)	7.7
Persons 65 years and over (%)	11.3
Language other than English spoken at home (%)	41.6
With a disability, under age 65 (%)	9.3
Persons without health insurance, under age 65 (%)	34.1
Persons in poverty (%)	27.6
Median household income	$41,988
Households, 2012-2016	3,867
Median value of owner-occupied housing units, 2012-2016	$78,300

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Forest Hill.

City of Forest Hill Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
City Hall 3219 California Parkway	Administration	100 people	11,000	$632,000	$130,000
Communication Center 3336 Horton Road	Communication Center	5 people	300	$5,220	$500,000
Law Enforcement 3336 Horton Road	Law Enforcement Center	25 people	9,000	$155,000	$31,000
Fire Station 6304 Wanda Lane	Fire Rescue	18 people	4,250	$83,000	$18,000

3.3 Natural Hazard Profiles

The City of Forest Hill's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Forest Hill in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
N/A	Wildfire
1	Tornado
2	Thunderstorm (includes hail, wind, lightning)
3	Winter Storms
4	Flooding
5	Extreme Heat
6	Expansive Soils
7	Earthquake
8	Drought

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent for the hazards.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Forest Hill.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal due to the minor extent expected.

Jurisdiction's ground-water supply: The City of Forest Hill receives its water supply from the City of Fort Worth.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: There are currently no water restrictions in place.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Significant
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though potential damage is indeterminable. The City of Forest Hill has experienced no earthquakes. A jurisdiction in Tarrant County near Forest Hill has experienced earthquakes 2.1 to 3.4 in magnitude. Due to the risk associated with a distant quake, earthquakes have the potential to occur anywhere within the planning area.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: City buildings have no documented damages directly attributable to expansive soils. Forest Hill spends approximately $10,000 per year rebuilding roads due to cracking, heaving, and buckling caused by expansive soils. The road damage is spread evenly throughout the city.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	Based on historical data, extreme heat events can be expected to cause an average of zero injuries and fatalities per year in the city. The elderly, homeless, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: Extreme heat generally effects the entire population, but the homeless, very young, elderly, and citizens without air conditioning are most vulnerable. Most of the homes on the north side of the city are much older houses and older citizens making them more vulnerable to extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? No.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. All, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal. In total, 5.56% of the city's residential parcels are located in the 100 year floodplain.

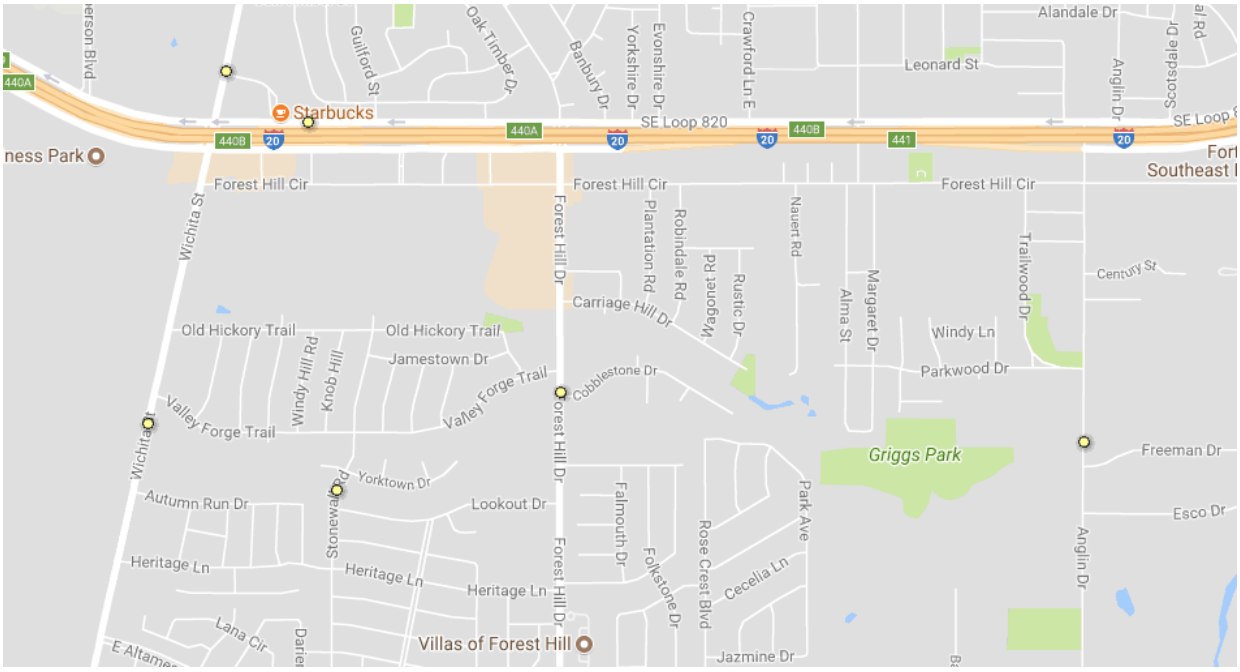
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: See low water crossings below, as these roads have the potential of flooding.

Names of any creeks or rivers that flood: South Creek.

Low Water Crossings: A **low water** crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Anglin Drive	South Creek	Bridge Class
Forest Hill Drive	South Creek	Bridge Class
Stonewall Drive	South Creek	Vented Ford
Wichita Street	South Creek	Vented Ford
Southeast Loop 820 Westbound Frontage Road	South Creek North Fork North Branch	Vented Ford
Wichita Street	South Creek North Fork North Branch	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Forest Hill is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480595#
Community Name	City of Forest Hill
County	Tarrant
Initial FHBM Identified	1/23/74
Initial FIRM Identified	8/1/78
Current Effective Map Date	9/25/09
Reg-Emer Date	08/1/78
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? City Planner.

What specific flooding ordinances and plans does your jurisdiction have? A subdivision ordinance regulating building in floodplain/flood zones.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? Minimum 2 feet above base floor elevation; hydraulic and hydrologic studies required.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? No data available.

Repetitive and Severe Repetitive Loss Properties: There are currently 0 repetitive loss properties and 0 severe repetitive loss properties within the City of Forest Hill. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Commercial	331	15	4.53%
Industrial	288	3	1.04%
Residential	2,069	115	5.56%
Total	**2,688**	**133**	**4.98%**

Source: City of Forest Hill Geographic Information Systems Department.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
320	7.03%	32	6.48%

Source: City of Forest Hill Geographic Information Systems Department.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Forest Hill's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 42 Insurance in-force: $8,101,400 Written premium in-force: $34,593
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 26 claims have been filed, but 8 closed without payment. $181,600.40 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	2,688.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	Data unavailable.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	No.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Work in or near floodplain are reviewed by city engineering firm for compliance.

What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Data unavailable.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Data unavailable.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	01/23/74
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP	When plans are submitted to the city, if they are in or near a floodplain/zone, they are sent to the city engineering firm for compliance review.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Forest Hill will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Though not documented by the National Centers for Environmental Information, since 2015 Forest Hill has experienced several severe thunderstorms. Most of the damage across the city consisted of downed trees and fences caused by high winds.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

Is there an area of the town that is the most vulnerable to tornadoes? No one area is more vulnerable than another. Critical structures and infrastructure is evenly spread throughout the planned area.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	N/A
Probability of Future Occurrence	N/A
Maximum Probable Extent	N/A
Potential Impact	N/A
Vulnerabilities	Wildfires are not a threat to the City of Forest Hill due to the urban landscape.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: The City of Forest Hill is split by Interstate 20. There are 4 bridges between the 3100 block to the 5300 block of the highway.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? During winter events these bridges become hazardous to drive on, leading to multiple accidents every event.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Forest Hill between 2015 and 2017, thought the city has experienced events, like thunderstorms, that have not been reported to the National Weather Service. The material is organized by location and date.

Historical Events (Since 2015) From The National Centers For Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Forest Hill	1/15/2017	Thunderstorm Wind	55	0	0	$0	$0	MG
Total				**0**	**0**	**$0**	**$0**	

*MG- Measured Wind Gusts

3.5 Overall Vulnerability

The City of Forest Hill identified their greatest vulnerabilities and concerns within the hazard profiles.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Forest Hill's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; Yes; Yes
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	Yes	No; No; No
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	No	
Transportation Plan	No	
Stormwater Management Plan	Yes	Yes; No; No
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)		
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	
Acquisition of land for open space and public recreation uses	Yes	Yes; Yes

Building Code, Permitting, and Inspections	Have capability?	
Building Code	Yes	**Version/Year: ICC 2015**
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 3**
Site Plan Review Requirements	Yes	Plan review required for all new construction
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and Zoning; Yes
Mitigation Planning Committee	Yes	Planning and hazard analysis: Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Tree trimming, maintain and clear draining systems; Yes
Mutual Aid Agreements	Yes	Response and assistance; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other: Public Works Director	FT	Yes; Yes; Yes
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor sirens, Blackboard Connect system; Yes
Hazard data and information	Yes	Geographic information system layers, mapping; Yes
Grant writing	Yes	As needed; Yes
HaZUS analysis	No	Don’t use; FEMA software out of date
Other		

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Citizens Police Academy, Citizens on Patrol assists with evacuations and crowd management; Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	City newsletter; Yes
Natural disaster or safety related school programs	Yes	Weather radios and fire prevention; Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	American Red Cross, partnered to install smoke detectors in citizens homes.
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes, road repairs due to damage caused by expansive soils; Yes
Authority to levy taxes for specific purposes	Yes	Yes, taxes levied to fund hiring police officers; Yes
Fees for water, sewer, gas, and/or electric services	Yes	Yes, water and sewer fees used to replace damaged water lines caused by expansive soils; Yes
Impact fees for new development	Yes	No; No
Stormwater utility fee	Yes	Yes; installation of storm drains; Yes
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	No; Yes
Incur debt through private activities	No	

Community Development Block Grant	Yes	Yes, road repairs due to damage caused by expansive soils; Yes
Other federal funding programs	Yes	No; Yes
State funding programs	Yes	Yes, the Texas Department of Transportation (TXDOT) funds to replace bridges damaged to expansive soils; Yes
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, policies, and resources for mitigation include budgeting and passing policies and procedures for mitigation actions, adopting and implementing stricter mitigation regulations, approving the hiring and training of staff for mitigation activities, and approving mitigation updates, and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Forest Hill's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires	Form a multijurisdictional tactical unit with Forest Hill, Kennedale, and Crowley.	Develop inner-local agreements and planning.	3 months	Forest Hill Police Department (FHPD), Kennedale Police Department, Crowley Police Department	Unknown	Unknown	Forest Hill, Kennedale, Crowley
		STATUS: Deleted - no longer a priority					
		Acquire appropriate equipment.	8 months	FHPD	$25,000	$50,000	Forest Hill
		STATUS: Deleted - no longer a priority					
		Train law enforcement officers and implement.	1 year	FHPD	$50,000	$50,000	Forest Hill
		STATUS: Deleted - no longer a priority					
Severe Thunderstorms and High Winds, Lightning, Tornadoes	Ensure outdoors spaces in Forest Hill have adequate shelter for high wind events such as severe	Evaluate current shelters in outdoor spaces in Forest Hill.	2 weeks	Fire Department, Building Department	$1,000	Unknown	City budget
		STATUS: Deleted - no longer a priority					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	thunderstorms or tornadoes.	Determine the size and space needs for shelters in outdoor spaces in Forest Hill.	2 weeks	Fire Department, Building Department	$1,000	Unknown	City budget
		STATUS: Deleted - no longer a priority					
Severe Thunderstorms and High Winds, Tornadoes	Ensure critical facilities in Forest Hill have adequate safe rooms to protect against high wind events and tornadoes.	Evaluate the current conditions of critical facilities to determine which ones, if any, need safe rooms installed.	2 weeks	Fire Department	$1,000	Unknown	City budget
		STATUS: Deleted - no longer a priority					
		Determine the size and space needed to shelter the population of the critical facility.	2 weeks	Fire Department	$1,000	Unknown	City budget
		STATUS: Deleted - no longer a priority					
		Install safe rooms, as needed, in critical facilities.	2 weeks	Fire Department	$1,000	Unknown	City budget
		STATUS: Deleted - no longer a priority					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	Ensure Forest Hill ordinances and building codes reflect the need for high wind resistant windows in new developments and facilities.	Review current jurisdictional ordinances and building codes related to high winds.	2 weeks	Fire Department, Building Department	$1,000	Unknown	City budget
		STATUS: Deleted - no longer a priority					
		Develop or update ordinances and building codes to recommend new developments or facilities are built with high wind resistant windows as needed.	2 months	Fire Department, Building Department	$5,000	$25,000	Federal Emergency Management Agency (FEMA)
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes	Ensure Forest Hill critical facilities, including schools, have high wind resistant windows in place.	Evaluate the need for high wind resistant windows in critical facilities.	2 weeks	Fire Department, Building Department	$1,000	Unknown	City budget
		STATUS: Deleted - no longer a priority					
		Install high wind resistant windows as necessary in	2 months	Fire Department,	$5,000	$25,000	FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		critical facilities, including schools.		Building Department			
		STATUS: Deleted - no longer a priority					
Severe Thunderstorms and High Winds, Tornadoes	Develop a severe thunderstorm and tornado preparedness education program for Forest Hill citizens.	Evaluate the hazards posed by high wind events in Forest Hill.	2 weeks	Fire Department, Building Department	$1,000	Unknown	City budget
		STATUS: Deleted - no longer a priority					
		Develop a severe weather preparedness education program that provides tips and pertinent information for protecting property against high wind damage.	2 months	Fire Department, Building Department	$5,000	$25,000	FEMA
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	Distribute severe weather preparedness information to Forest Hill citizens.	Provide severe weather preparedness information to Forest Hill citizens through a social media campaign, including severe thunderstorms and tornadoes.	1 month	Fire Department, Court	$2,000	$10,000	FEMA
		STATUS: Completed					
		Ensure the Forest Hill website is updated during tornado season to educate citizens on severe weather preparedness.	2 weeks	Fire Department, Court	$0	N/A	N/A
		STATUS: Deferred to 2020 HazMAP					
Flooding	Decrease flood insurance premiums in Forest Hill by participating in the Federal Emergency Management Agency's (FEMA) Community	Work with city officials to become a member of the CRS program.	6 months	Fire Department, Public Works Department	$5,000	$20,000	FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	Rating System (CRS) program.						
		STATUS: In progress					
Flooding	Review and remove repetitive loss properties in Forest Hill.	Review repetitive loss properties and work with homeowners to remove them using FEMA funding.	1 week	Fire Department, Building Department	$0	$0	N/A
		STATUS: Deleted - no longer a priority					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes, and Extreme Temperature	Ensure Forest Hill critical facilities have alternate power supply.	Identify appropriate size and type of generator for critical facilities.	2 months	Fire Department, FHPD	$2,000	$20,000	FEMA
		STATUS: Deferred to 2020 HazMAP					
		Purchase/order generator for critical facilities.	2 months	Fire Department, FHPD	$4,000	$40,000	FEMA
		STATUS: Deferred to 2020 HazMAP					
Power Failure, Winter Storms,	Ensure Forest Hill critical facilities have	Evaluate emergency	4 months	Fire Department,	$4,000	Unknown	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	emergency lighting systems in place.	lighting systems in critical facilities.		Building Department			
		STATUS: Deleted - no longer a priority					
		Install emergency lighting systems in critical facilities.	6 months	Fire Department, Building Department	$10,000	Unknown	FEMA
		STATUS: Deleted - no longer a priority					
Hail	Ensure Forest Hills critical facilities have hail-resistant roofing and windows installed.	Evaluate which critical facilities need hail-resistant roofing and windows installed.	1 week	Fire Department, Building Department	$0	$0	N/A
		STATUS: Deleted - no longer a priority					
		Install hail-resistant roofing and windows in identified critical facilities.	N/A	N/A	N/A	N/A	N/A
		STATUS: Deleted - no longer a priority					
Hail	Provide hail-resistant parking areas for Forest Hill's city vehicles.	Evaluate the need for covered parking for city vehicles to protect them against hail.	2 weeks	Fire Department, FHPD, Building Department	$2,000	$50,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deleted - no longer a priority					
		Install covered parking areas as needed to protect city vehicles against hail.	N/A	N/A	N/A	N/A	N/A
		STATUS: Deleted - no longer a priority					
Hail	Develop a hail outreach program for Forest Hill citizens.	Evaluate the hazards posed by hail in the city.	2 weeks	Fire Department, Building Department	$0	N/A	N/A
		STATUS: Deleted - no longer a priority					
		Develop hail outreach program that provides tips and pertinent information for ensuring the protection of property against hail.	4 weeks	Fire Department, Building Department	$1,000	$50,000	FEMA
		STATUS: Deferred to 2020 HazMAP					
Hail	Distribute hail mitigation information to Forest Hill citizens.	Provide hail mitigation information to citizens through a	4 weeks	Fire Department, Court	$1,000	$50,000	FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		social media campaign.					
		STATUS: Deferred to 2020 HazMAP					
		Provide hail mitigation information through the city website.	4 weeks	Fire Department, Court	$1,000	$25,000	FEMA
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Ensure Forest Hill water systems are adequate for fighting wildfires.	Evaluate the Forest Hill water system to ensure capacity for fighting wildfires.	1 month	Fire Department, Public Works Department	$1,000	$20,000	City budget
		STATUS: Completed					
		Install or upgrade needed equipment to ensure water systems are adequate.	3 months	Fire Department, Public Works Department	$20,000	$100,000	FEMA
		STATUS: Deleted - no longer a priority					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Wildfire	Mitigate wildfires by instituting landscaping practices at Forest Hill critical facilities.	Prevent wildfires from spreading to critical facilities by landscaping plants and brush away from buildings.	6 months	Fire Department, Building Department, Public Works Department	$20,000	$100,000	Forestry Service
		STATUS: Deleted - no longer a priority					
Wildfire	Review city ordinances and laws to ensure mitigation practices are in effect in Forest Hill.	Enact building permit process that encourages wildfire resistant construction.	6 months	Fire Department, Building Department	$4,000	$40,000	Forestry Service
		STATUS: Completed					
Wildfire	Ensure adequate Forest Hill wildfire response plans and procedures are in place.	Review current wildfire response plans and procedures.	1 month	Fire Department	$1,000	$10,000	City budget
		STATUS: Completed					
		Develop or update wildfire response plans and procedures.	2 months	Fire Department	$4,000	$$40,000	Forestry Service
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Provide wildfire response training to fire personnel.	2 months	Fire Department, Tarrant County College (TCC)	$2,000	$20,000	Forestry Service
		STATUS: In progress					
Wildfire	Provide information to Forest Hill citizens regarding the hazards posed by wildfires.	Develop a wildfire preparedness education program that provides tips and pertinent information for ensuring the protection of property against wildfires.	3 months	Fire Department, TCC	$10,000	$100,000	FEMA
		STATUS: Deleted - no longer a priority					
Wildfire	Determine the process for becoming a Firewise Community in Forest Hill.	Work with the Texas Department of Emergency Management to become a Firewise Community.	6 months	Fire Department	$20,000	$100,000	FEMA
		STATUS: Deleted - no longer a priority					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Winter Storm	Evaluate winter weather response capabilities in Forest Hill.	Assess winter weather response capabilities.	2 months	Fire Department, Public Works Department	$1,000	$50,000	City budget
		STATUS: Completed					
		Acquire equipment needed as determined by assessment.	1 year	Fire Department, Public Works Department	$1,000	$300,000	FEMA
		STATUS: Completed					
		Provide safety training to first responders on winter weather hazards.	6 months	Fire Department, Public Works Department, Tarrant County	$2,000	$100,000	FEMA
		STATUS: Completed					
Winter Storm	Evaluate winter weather planning capabilities in Forest Hill.	Assess winter weather plans in place for jurisdiction public works.	2 months	Fire Department, Public Works Department	$1,000	$50,000	City budget
		STATUS: Deleted - no longer a priority					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Develop or update winter weather preparedness plan.	3 months	Fire Department, Public Works Department	$5,000	$25,000	FEMA
		STATUS: Completed					
Winter Storm	Develop a winter weather outreach program for Forest Hill citizens.	Evaluate the hazards posed by severe winter weather in Forest Hill.	2 months	Fire Department, FHPD	$2,000	$20,000	City budget
		STATUS: Completed					
		Develop a winter weather outreach program that provides tips and pertinent information for avoiding hypothermia and icy conditions.	6 months	Fire Department, FHPD	$20,000	$100,000	FEMA
		STATUS: Deferred to 2020 HazMAP					
Winter Storm	Distribute winter weather mitigation information to Forest Hill residents.	Provide winter weather mitigation information to Forest Hill citizens	2 months	Fire Department, Court	$2,000.00	Unknown	FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		through a social media campaign.					
		STATUS: Deleted - no longer a priority					
		Ensure the Forest Hill website is updated during winter months to educate citizens on winter weather mitigation activities.	2 months	Fire Department, Court	$2,000	Unknown	FEMA
		STATUS: Deferred to 2020 HazMAP					
Infectious Disease Outbreak	Prepare Forest Hill first responders for mass prophylaxis distribution.	Train first responders in point of distribution (POD) procedures.	2 months	Fire Department	$2,000	Unknown	FEMA
		STATUS: Deleted - no longer a priority					
		Conduct a POD exercise to test plans and procedures.	2 months	Tarrant County Health Department	$2,000	Unknown	FEMA
		STATUS: Deleted - no longer a priority					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Infectious Disease Outbreak	Ensure continuity procedures are in place to prepare for a long-term employee shortage at Forest Hill facilities.	Review continuity of operations (COOP) plans and procedures for city employees and facilities.	1 month	Fire Department	$0	Unknown	City budget
		STATUS: Deleted - no longer a priority					
		Provide COOP training for jurisdiction employees.	2 months	Tarrant County Health Department	$2,000	Unknown	FEMA
		STATUS: Deleted - no longer a priority					
Infectious Disease Outbreak	Develop a public information campaign to educate Forest Hill public about infectious diseases.	Educate the public on pandemics, including isolation, quarantine, triage, and medical care.	Unknown	Fire Department	$4,000	$40,000	FEMA
		STATUS: Deleted - no longer a priority					
Drought	Review Forest Hill water enforcement legislation and update as necessary to mitigate the effects of drought.	Review current legislation for water conservation enforcement in Forest Hill.	2 weeks	Fire Department, Public Works Department	$0	N/A	N/A
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Develop or update water conservation enforcement legislation to ensure effective practices during periods of drought.	4 weeks	Fire Department, Public Works Department	$200	$50,000	City budget
		STATUS: Completed					
Drought	Develop contingency plans for Forest Hill to ensure adequate power and water supply during prolonged periods of drought.	Review current contingency plans.	2 weeks	Fire Department, Public Works Department	$0	N/A	N/A
		STATUS: Completed					
		Develop or update portable water contingency plans.	2 weeks	Fire Department, Public Works Department	$0	N/A	N/A
		STATUS: Completed					
		Develop or update power supply contingency plans.	2 weeks	Fire Department, Public Works Department	$0	N/A	N/A
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Drought	Upgrade water and irrigation system to conserve water on Forest Hill.	Upgrade water and irrigation system.	2 months	Fire Department, Public Works Department	$1,000	Unknown	City budget
		STATUS: Deleted - no longer a priority					
Drought	Develop a drought awareness education program for Forest Hill citizens.	Evaluate the hazards posed by drought in Forest Hill.	2 weeks	Fire Department	$0	N/A	N/A
		STATUS: Deleted - no longer a priority					
		Develop a drought awareness education program that provides tips and pertinent information for ensuring the protection of property and the environments against drought.	4 weeks	Fire Department, Public Works Department, Utilities Department	$2,000	$50,000	FEMA
		STATUS: Deferred to 2020 HazMAP					
Drought	Distribute drought awareness information to Forest Hill citizens.	Provide drought awareness information to Forest Hill citizens	4 weeks	Court	$1,000	$25,000	FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		through a social media campaign.					
		STATUS: Deferred to 2020 HazMAP					
		Provide drought awareness information through the Forest Hill website.	4 weeks	Court	$1,000	$25,000	FEMA
		STATUS: Deferred to 2020 HazMAP					
Lightning	Protect communication infrastructure in Forest Hill from lightning.	Evaluate the need for lightning protection on communications infrastructure in Forest Hill.	1 month	FHPD	$1,000	$50,000	City budget
		STATUS: Deleted - no longer a priority					
		Install lightning rods on existing and future communication infrastructure.	2 months	FHPD	$10,000	$50,000	FEMA
		STATUS: Deleted - no longer a priority					
Lightning	Ensure Forest Hill critical facilities are	Evaluate the need for lightning protection for	1 month	FHPD	$1,000	$50,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	protected against lightning.	Forest Hill critical facilities.					
		STATUS: Deleted - no longer a priority					
		Install lightning rods and other protective equipment on critical facilities.	2 months	FHPD	$10,000	$50,000	FEMA
		STATUS: Deleted - no longer a priority					
Lightning	Develop a lightning outreach program for Forest Hill citizens.	Evaluate the hazards posed by lightning in Forest Hill.	2 months	FHPD	$15,000	$50,000	FEMA
		STATUS: Deleted - no longer a priority					
		Develop a lightning outreach program that provides tips and pertinent information for protecting property against lightning damage.	2 months	Fire Department, FHPD	$4,000	$50,000	FEMA
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Lightning	Distribute lightning mitigation information to Forest Hill citizens.	Provide lightning mitigation information to Forest Hill citizens through a social media campaign.	1 month	Fire Department, Court	$2,000	Unknown	FEMA
		STATUS: Deferred to 2020 HazMAP					
		Provide lightning awareness information at outdoor spaces throughout Forest Hill.	2 months	Fire Department, Public Works Department	$3,000	Unknown	FEMA
		STATUS: Deferred to 2020 HazMAP					
Hazardous Materials Release	Provide Forest Hill fire personnel with the necessary gear to respond to hazmat releases.	Evaluate the hazmat gear currently provided by Forest Hill Fire Department.	2 weeks	Fire Department	$1,000	Unknown	City budget
		STATUS: Completed					
		Acquire the gear needed as identified in the evaluation.	6 months	Fire Department	$25,000	Unknown	FEMA
		STATUS: Deleted - no longer a priority					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Hazardous Materials Release	Ensure Forest Hill fire department has the equipment necessary to respond to hazmat releases.	Evaluate the hazmat equipment currently owned by the Forest Hill Fire Department.	2 weeks	Fire Department	$1,000	Unknown	City budget
		STATUS: Completed					
		Acquire the equipment needed as identified in the evaluation.	6 months	Fire Department	$5,000	Unknown	FEMA
		STATUS: Deleted - no longer a priority					
Hazardous Materials Release	Develop a hazardous materials awareness education program for Forest Hill citizens.	Evaluate hazardous materials that are used or transported in Forest Hill.	2 months	Fire Department, Public Works Department	$2,000	Unknown	City budget
		STATUS: Completed					
		Develop a hazardous materials awareness education program that provides tips and pertinent	2 months	Fire Department	$5,000	$25,000	FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		information for ensuring the protection of property and people from hazardous materials.					
		STATUS: Deleted - no longer a priority					
Hazardous Materials Release	Distribute hazardous materials mitigation information to Forest Hill citizens.	Provide hazardous materials mitigation information to Forest Hill citizens through a social media campaign.	2 months	Fire Department, Court	$5,000	$25,000	FEMA
		STATUS: Deleted - no longer a priority					
		Provide hazardous materials mitigation information through the Forest Hill website.	2 months	Fire Department, Court	$2,000	$15,000	FEMA
		STATUS: Deleted - no longer a priority					
Extreme Temperatures	Ensure the City of Forest Hill has an	Review current plans and procedures	1 week	Fire Department	$0	N/A	N/A

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	extreme heat plan in place.	related to extreme heat.					
		STATUS: Completed					
		Open cooling centers and provide public information.	1 month	Fire Department	$0	N/A	N/A
		STATUS: Deleted - no longer a priority					
Extreme Temperatures	Identify extreme heat plans for critical infrastructure in the City of Forest Hill.	Ensure essential functions continue in the event of high temperatures through mitigation activities.	2 weeks	Fire Department	$0	N/A	N/A
		STATUS: Completed					
		Develop or update mitigation plans and procedures for critical infrastructure when high temperatures are present.	1 month	Fire Department	$500	N/A	N/A
		STATUS: Completed					
Extreme Temperatures	Develop an extreme heat preparedness	Evaluate the hazards posed by	2 weeks	Fire Department	$0	N/A	N/A

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	education program for Forest Hill citizens.	extreme heat in Forest Hill.					
		STATUS: Completed					
		Develop an extreme heat preparedness education program that provides tips and pertinent information for ensuring the health and safety of citizens during extreme heat.	2 months	Fire Department	$2,000	Unknown	FEMA
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Distribute extreme heat mitigation information to Forest Hill citizens.	Provide extreme heat mitigation information to the Forest Hill citizens through a social media campaign.	4 weeks	Forest Hill Court	$1,000	$25,000	FEMA
		STATUS: Deferred to 2020 HazMAP					
		Provide extreme heat mitigation information	4 weeks	Forest Hill Court	$1,000	$25,000	FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		through the Forest Hill's website.					
		STATUS: Deferred to 2020 HazMAP					
Expansive Soils	Mitigate expansive soils in City of Forest Hill.	Improve construction techniques through building code enhancements.	6 months	Fire Department	$2,000	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					
		Educate construction contractors, homeowners, and business owners about mitigation techniques.	6 months	Fire Department	$500	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					

5.3 New Action Items

The City of Forest Hill's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Earthquake, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms**
Adopt and implement most current ICC building codes for new and existing buildings to mitigate the damage from these identified hazards.	
Participating Jurisdiction:	City of Forest Hill
Priority:	1
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Building Department, City Planning, Fire Department
Implementation Schedule:	12 months

Hazard(s) Addressed	**Earthquake, Extreme Heat, Thunderstorms, Tornadoes, Winter Storms**
Ensure new and existing Forest Hill critical facilities have alternate power supply, to include the purchase and installation of generators.	
Participating Jurisdiction:	City of Forest Hill
Priority:	2
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	City budget, mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Drought, Earthquake, Expansive soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Develop and implement a comprehensive public education program that includes recommended actions to mitigate the impacts of each identified hazard.	
Participating Jurisdiction:	City of Forest Hill
Priority:	3
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquake, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Educate city employees on the most "at-risk" populations in the city and how to mitigate the risks to these populations.	
Participating Jurisdiction:	City of Forest Hill
Priority:	4
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Office of Emergency Management, Fire Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Enhance current drought contingency plan for city facilities and property that addresses the use of low flow fixtures and drought tolerant plants.	
Participating Jurisdiction:	City of Forest Hill
Priority:	5
Estimated Cost:	$6,000
Estimated Benefit:	$36,000
Potential Funding Source(s):	City budget, mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Forest Hill
Priority:	6
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Require that the floodplain administrator is certified.	
Participating Jurisdiction:	City of Forest Hill
Priority:	7
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Forest Hill
Priority:	8
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Forest Hill
Priority:	9
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Forest Hill
Priority:	10
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Forest Hill
Priority:	11
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Forest Hill
Priority:	12
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Ordinances	City Council, City Administration	As needed, by topic of concern.	Mitigation actions in all areas of design and construction standards.	Office of Emergency Management will participate in the review process and suggest changes based on mitigation goals.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Planning and Zoning	City Council, Zoning Commission, City Administration, Community Development	As needed, by topic of concern.	Mitigation actions in all areas of design and construction standards.	Office of Emergency Management will participate in the review process and suggest changes based on mitigation goals.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Forest Hill. Supporting material is in Appendix A and B, respectively.

City of Fort Worth

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Fort Worth was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided is for the City of Fort Worth alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Fort Worth will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Fort Worth has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Fort Worth's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Fort Worth. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Fort Worth Local Planning Team Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Fort Worth	Office of Emergency Management	Emergency Management Coordinator	Coordination of planning process, plan development
City of Fort Worth	Office of Emergency Management	Grants Manager	General oversight, hazard identification, and plan development
City of Fort Worth	Office of Emergency Management	Senior Emergency Manager Specialist	General oversight, hazard identification, and plan development
City of Fort Worth	Office of Emergency Management	Administrative Assistant	Administrative coordination
City of Fort Worth	Fire Department	Assistant Fire Chief	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Fort Worth	Transportation Public Works Department	Transportation Public Works Director	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Fort Worth	Transportation Public Works Department - Stormwater Management	Transportation Public Works Assistant Director	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Fort Worth	Transportation Public Works Department - Floodplain Management	Senior Professional Engineer	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Fort Worth	Code Compliance Department - Environmental Management	Code Compliance Director	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Fort Worth	Water Department	Media Relations & Communications Coordinator	Assist in coordinating public education and public meetings
City of Fort Worth	Police Department	Police Analyst	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Fort Worth	Planning and Development Department	Assistant Planning and Development Director	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Fort Worth	City Management Office - Public Information	Communications/ Public Engagement Director	Assist in coordinating public education and public meetings
City of Fort Worth	Performance and Budget Office	Assistant Finance Director	Identify potential funding for mitigation projects and identify budgetary impacts of potential mitigation projects
City of Fort Worth	Financial Management Service Department	Accounting Services Supervisor	Identify potential funding for mitigation projects and identify budgetary impacts of potential mitigation projects
City of Fort Worth	Neighborhood Services Department	Assistant Neighborhood Services Director	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Fort Worth	Park and Recreation Department	Park and Recreation Director	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

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Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: Drier conditions in the western portion of the state have increased wildfire threats to the west, which increases the city's vulnerability, mutual aid requests, and deployment of fire brush resources for weeks at a time through the Texas Intrastate Fire Mutual Aid System. Fort Worth has been the fastest growing large city of more than 500,000 population in the nation since April 1, 2000. The City of Fort Worth has added 19,942 new residents in one year alone (July 2015-July 2016), making it the seventh fasting growing US city according to the US Census. Many of the new residents come from areas of the country that do not experience the severe weather events or the potential for a man-made disaster that are found in the place that they now call home and do not have ways to receive warning when outdoors.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: There has been an increase of public education efforts in multiple languages and new warning methodologies with the addition of specific actions to take. The following plan development led to initiatives to mitigate risk and keep up with infrastructure for the growing population surges. • Floodplain Management Plan (2016) • Stormwater Management Plan (2017) • Stormwater Master Plan (2018) • Flood Response Plan (2018 in DRAFT) Ordinance No 22523-12-2016 – Adoption of new Fort Worth Administrative Building Code pertaining to the administration and enforcement of the Fort Worth building code, residential code, energy code, mechanical code, electrical code, plumbing code, sign code, and existing building code. The zoning ordinance, Floodplain Provisions Ordinance, and the International Building Codes have special provisions regulating construction and other developments within floodplains.

The City of Fort Worth requires by ordinance that any substantial improvement or substantial damage improvement must have a building permit.

- Substantial Improvement – The National Flood Insurance Program requires that if the cost of any reconstruction, rehabilitation, addition or other improvement to a structure exceeds 50 percent of the market value of the structure before the start of the construction, the improvements must conform to or meet the same construction requirements as a new building and satisfy minimum finish floor requirements specified in the Floodplain Provisions Ordinance.
- Substantial Damage – Substantial damage means damage of any origin sustained by a building or structure when the cost of restoring the building to its pre-damaged condition would equal or exceed 50 percent of the market value of the building before the damage occurred. Substantial damage is determined regardless of the actual repair work performed.

Land alteration in excess of 1 acre (effective Oct. 15, 2015) or more will require an approved Integrated Stormwater Management (iSWM) Plan Grading Permit. Previously, this approval was required for new plats. A $50 administrative fee will be charged for processing the grading permit.

Single family and building permits applicants will be required to provide lot grading patterns. Non-standard (other than HUD) patterns will be subject to review. No fee will be charged for this requirement.

A full list of completed mitigation action items are described in Chapter 5 of this annex.

Declared Disaster Code	Incident Period	Date Declared	Description	Impact
DR-4223	May 4-June 23, 2015	May 29, 2015	Severe storms, tornadoes, strait-line winds, and flooding	Severe storms and flooding across the city caused numerous damaged trees, structural damage of the City of Fort Worth Nature Center, water infrastructure damage, and required debris removal caused by extensive flooding (at city facilities).

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Fort Worth.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	854,113
Persons under 5 years (%)	8.3
Persons 65 years and over (%)	9.1
Language other than English spoken at home (%)	33
With a disability, under age 65 (%)	7.8
Person without health insurance, under age 65 (%)	22.5
Persons in poverty (%)	18
Median household income	$54,876
Households, 2012-2016	279,426
Median value of owner-occupied housing units, 2012-2016	$131,100

Major employers in the area are American Airlines, Lockheed Martin Tactical Aircraft Systems, Bell Helicopter Textron, Radio Shack Corporation, Sabre, Pier 1 Imports, and Burlington Northern Santa Fe. Emerging economic sectors in the new century include semiconductor manufacturing, communications equipment manufacturing, corporate offices, and distribution.

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Fort Worth.

City of Fort Worth Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Asset**	**Square Feet**	**Structure Value**	**Content Value**
Alta Mesa 9.2 MG Ground Water Storage Tank 4320 Alta Mesa Boulevard	Water	Unknown	$4,692,000	Unknown
Armstrong 2 MG Elevated Water Storage Tank 7200 Trail Lake Drive	Water	Unknown	$3,900,000	Unknown
Bergh Radio Tower 1450 Westpark Drive	Communication	3,500	Leased	$2,500,000
Brennan Street Fuel Station 2500 Brennan Avenue	Equipment Services	1,600	$180,000	$160,000
Bridge Street Radio Tower 6401 Bridge Street	Communication	128	$17,600	$200,000
Calmont 1 MG Elevated Water Storage Tank Calmont Avenue & Texas Street	Water	Unknown	$1,950,000	Unknown

City of Fort Worth Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Asset**	**Square Feet**	**Structure Value**	**Content Value**
Cantrell-Sansom Pump Station 1600 Cantrell-Sansom Road	Water Department Pump Station	720	$122,000	$55,000
Chapel Creek Pump Station 11066 Dorfan Street	Water Department Pump Station	150	$72,145	$25,000 (estimated)
City Hall 200 Texas Street	Admin Offices	200,000	$30,453,280	$1,230,000
A.D. Marshall Public Safety Building 1000 Throckmorton Street	Admin Offices	101,000	$13,635,000	$750,000
City Hall Radio Tower 1000 Throckmorton Street	Communication	Included in City Hall	Included in City Hall	$500,000
City Hall Annex 908 Monroe Street	Admin Offices	59,035	$8,000,000	$150,000
City Hall Annex South 275 West 13th Street	Admin Offices, EOC	70,000	$7,400,000	$1,450,000
Clear Fork Raw Water Pump Station	Water Department Pump Station	2,400	$275,000	$163,000
Como Pump Station	Water Department Pump Station	2,226	$203,000	$79,000
Como 2 MG Ground Water Storage Tank 5901 Libbey Avenue	Water	Unknown	$1,020,000	Unknown
Como 3 MG Ground Water Storage Tank 5920 Blackmore Avenue	Water	Unknown	$3,060,000	Unknown
Eagle Mountain Radio Tower 6869 Bowman Roberts Road	Communication	4,000	$1,000,000	$3,500,000
Eagle Mountain Raw Water Pump Station #1 8619 Eagle Mountain Circle	Water Department Pump Station	2,372	$2,000,000	$1,838,000
Eagle Mountain Raw Water Pump Station #2 8619 Eagle Mountain Circle	Water Department Pump Station	2,372	$2,265,000	$7,448,000
Eagle Mountain Water Treatment Plant 6801 Bowman Roberts Road	Water Department Water Treatment Plant	Unknown	$20,027,593	$10,010,000
Eastside Pump Station 2511 Avenue B	Water Department Pump Station	Unknown	$168,000	$72,000

City of Fort Worth Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Asset**	**Square Feet**	**Structure Value**	**Content Value**
Eastwood 1.5 MG Elevated Water Storage Tank 4259 Forbes Street	Water	Unknown	$2,925,000	Unknown
Edwards Ranch Pump Station 3211 Overland Park West	Water Department Pump Station	Unknown	$245,000	$83,000
Emergency Communications Center Alternate 1000 Throckmorton Street	Communications	Unknown	Included in City Hall	$3,500,000
Emergency Communications Center Primary Location 3000 West Bolt Street	Communications	Unknown	$1,975,000	$11,000,000
Fire Department Equipment Services 2930 West Bolt Street	Fire/Rescue	Unknown	$2,000,000	$2,000,000
Fire Department Investigation 715 Texas Street	Fire/Rescue	Unknown	$1,176,000	$500,000
Fire Department self-contained breathing apparatus (SCBA)/Air Shop 400 Grand Avenue	Fire/Rescue	7,500	$2,015,000	$5,000,000
Fire Department Supply Depot 2900 West Bolt Street	Fire/Rescue	25,000	$2,500,000	$3,000,000
Fire Station #01 120 North Pecan Street	Fire/Rescue	7,000	$2,015,000	$220,000
Fire Station #02 1000 Cherry Street	Fire/Rescue	25,520	$5,100,000	$750,000
Fire Station #03 4700 Ramey Avenue	Fire/Rescue	6,000	$2,015,000	$120,000
Fire Station #04 2954 Old Mansfield Road	Fire/Rescue	4,200	$1,600,000	$120,000
Fire Station #05 850 Irma Street	Fire/Rescue	10,738	$2,547,000	$250,000
Fire Station #06 205 University Drive	Fire/Rescue	5,000	$1,600,000	$300,000
Fire Station #07 925 Morrison Drive	Fire/Rescue	6,000	$2,015,000	$170,000

City of Fort Worth Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Asset**	**Square Feet**	**Structure Value**	**Content Value**
Fire Station #08 1101 12th Avenue	Fire/Rescue	14,088	$2,430,000	$275,000
Fire Station #09 2575 Polaris Drive	Fire/Rescue	7,000	$1,600,000	$150,000
Fire Station #10 3209 Hemphill Street	Fire/Rescue	8,000	$2,015,000	$150,000
Fire Station #11 1900 Texan Drive	Fire/Rescue	10,775	$2,191,666	$200,000
Fire Station #12 120 North West 22nd Street	Fire/Rescue	6,000	$201,500	$170,000
Fire Station #13 5333 Lea Crest Lane	Fire/Rescue	6,000	$2,015,000	$120,000
Fire Station #14 2737 Meadowbrook Drive	Fire/Rescue	8,000	$2,015,000	$220,000
Fire Station #15 3100 Azle Avenue	Fire/Rescue	6,040	$1,600,000	$150,000
Fire Station #16 5933 Geddes Avenue	Fire/Rescue	5,000	$2,015,000	$170,000
Fire Station #17 5151 Hemphill Street	Fire/Rescue	4,160	$1,600,000	$220,000
Fire Station #18 1908 Carleton Avenue	Fire/Rescue	4,000	$1,600,000	$120,000
Fire Station #19 2605 Carnation Avenue	Fire/Rescue	6,000	$2,015,000	$120,000
Fire Station #20 901 Woodhaven Boulevard	Fire/Rescue	8,000	$2,015,000	$120,000
Fire Station #21 3501 South Hills Avenue	Fire/Rescue	5,373	$1,600,000	$170,000
Fire Station #22 4849 Wilbarger Street	Fire/Rescue	4,500	$1,600,000	$120,000
Fire Station #23 3201 Portales Drive	Fire/Rescue	6,000	$2,015,000	$220,000
Fire Station #24 3101 Forest Avenue	Fire/Rescue	6,000	$2,015,000	$220,000
Fire Station #25 3801 North Main Street	Fire/Rescue	8,000	$2,015,000	$120,000
Fire Station #26 6124 South Hulen Street	Fire/Rescue	5,500	$1,600,000	$170,000

City of Fort Worth Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Asset**	**Square Feet**	**Structure Value**	**Content Value**
Fire Station #27 2940 Precinct Line	Fire/Rescue	10,775	$2,584,573	$200,000
Fire Station #28 1300 Everman Parkway	Fire/Rescue	4,407	$1,600,000	$120,000
Fire Station #29 6400 Westcreek Drive	Fire/Rescue	6,000	$2,015,000	$120,000
Fire Station #30 4416 Southwest Boulevard	Fire/Rescue	8,000	$2,015,000	$150,000
Fire Station #31 4209 Longstraw Drive	Fire/Rescue	8,000	$2,015,000	$120,000
Fire Station #32 10201 White Settlement Road	Fire/Rescue	7,800	$2,015,000	$150,000
Fire Station #33 14650 Statler Boulevard	Fire/Rescue	10,000	$2,015,000	$120,000
Fire Station #34 14101 Sendera Ranch Boulevard	Fire/Rescue	10,738	$2,700,000	$200,000
Fire Station #35 2201 Flight Line Road	Fire/Rescue	15,000	$3,500,000	$220,000
Fire Station #36 5045 Columbus Trail	Fire/Rescue	6,245	$1,600,000	$120,000
Fire Station #37 4701 Ray White Road	Fire/Rescue	5,198	$2,015,000	$120,000
Fire Station #38 13280 Park Vista Boulevard	Fire/Rescue	10,281	$2,075,000	$200,000
Fire Station #39 7655 Oakmont Boulevard	Fire/Rescue	Unknown	$1,600,000	$120,000
Fire Station #40 8510 Spring Street	Fire/Rescue	Unknown	$1,600,000	$120,000
Fire Station #41 11400 Willow Springs Road	Fire/Rescue	Unknown	$2,550,800	$200,000
Fire Station #44 4017 Falcon Way West	Fire/Rescue	Unknown	$2,700,000	$150,000
Fire/Police Training Center 505 West Felix Street	Fire/Rescue, Law Enforcement	Unknown	$9,089,045	$2,500,000
Fleetwood Pump Station 15201 FAA Boulevard	Water Department Pump Station	Unknown	$400,000	$500,000

City of Fort Worth Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Asset**	**Square Feet**	**Structure Value**	**Content Value**
Fleetwood 6 MG Ground Water Storage Tank 15201 FAA Boulevard	Water	Unknown	$3,060,000	Unknown
Forensic Police Laboratory 3136 East Lancaster	Law Enforcement	Unknown	$8,500,000	$1,000,000
Fort Worth Convention Center 1201 Houston Street	Commercial Facilities	Unknown	$113,600,051	$5,450,000
Fort Worth Police Central Division Headquarters 501 Jones Street Fort	Law Enforcement	Unknown	Leased	$775,000
Fort Worth Police East Division Headquarters 5650 East Lancaster Avenue	Law Enforcement	Unknown	$1,000,000	$200,000
Fort Worth Police North Division Headquarters 2500 Houston Street	Law Enforcement	7,379	$627,000	$50,000
Fort Worth Police South Division Headquarters 3128 West Bolt Street	Law Enforcement	15,000	$900,000	$190,000
Fort Worth Police West Division Headquarters 3525 Marquita Street	Law Enforcement	12,500	$700,000	$120,000
Holly House Radio Tower 1519 11th Avenue	Communications	612	$50,000	$450,000
Jenkins Heights Pump Station 6111 Shadydell Drive	Water Department Pump Station	858	$85,000	$31,000
Lago Vista Pump Station 4750 W. Bonds Ranch Road	Water Department Pump Station	500	$315,000	$195,000
Lake Country 0.5 MG Elevated Water Storage Tank 8500 Spring Street	Water	Unknown	$975,000	Unknown
Levee Radio Tower 629 Congress Street	Communications	480	$66,000	$500,000
Macon Street Radio Tower 8889 McCart Avenue	Communications	2,812	Leased	$450,000
Main Telecommunications Building 1515 11th Avenue	Communications	10,500	$500,000	$600,000

City of Fort Worth Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Asset**	**Square Feet**	**Structure Value**	**Content Value**
McCart Pump Station 8889 McCart Avenue	Water Department Pump Station	3,500	$3,932,437	$1,033,000
McCart Street 5 MG Ground Water Storage Tank 8889 McCart Avenue	Water	Unknown	$2,500,000	Unknown
New Northside Pump Station 3213 Northwest 27th Street	Water Department Pump Station	6,692	$900,000	$750,000
North Beach Street 5 MG Ground Water Storage Tank	Water	Unknown	$2,805,000	Unknown
North Beach Pump Station 4809 Ray White Road	Water Department Pump Station	8,241	$400,000	$110,000
North Beach Radio Tower 4705 Ray White Road	Communications	800	$250,000	$2,500,000
North Holly Water Treatment Plant 1000 Fournier Street	Water	73,462	$16,775,000	$3,286,000
Northside 4 MG Ground Water Storage Tank 3213 Northwest 27th Street	Water	Unknown	$3,400,000	Unknown
Northwest 1 MG Elevated Water Storage Tank 3213 Northwest 27th Street	Water	Unknown	$1,950,000	Unknown
Old Northside Pump Station 2710 Rosen Avenue	Water Department Pump Station	2,502	$105,000	$28,000
Police Department Administration Radio Tower 350 West Belknap Street	Communications	5,500	Leased	$450,000
Randol Mill Pump Station 6401 Bridge Street	Water Department Pump Station	2,456	$196,000	$95,000
Randol Mill 6 MG Ground Water Storage Tank 6400 Bridge Street	Water	Unknown	$3,060,000	Unknown
Rolling Hills Radio Tower 2500 Southeast Loop 820	Communications	4,500	$500,000	$42,000,000
Rolling Hills Water Treatment Plant 2500 Southeast Loop 820	Water	96,544	$23,935,400	$15,122,000
Russom Ranch Pump Station 5301 Woodway Drive	Water Department Pump Station	2,304	$134,000	$78,000

City of Fort Worth Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Asset**	**Square Feet**	**Structure Value**	**Content Value**
Seminary Hill 2 MG Elevated Water Storage Tank 2701 Gambrell Street	Water	Unknown	$3,900,000	Unknown
Sendera Ranch 5 MG Ground Water Storage Tank 1000 Rancho Canyon Way	Water	Unknown	$2,500,000	Unknown
Sendera Ranch Pump Station 1000 Rancho Canyon Way	Water Department Pump Station	Unknown	$9,816,123	$1,070,000
South Holly Supervisory Control and Data Acquisitions (SCADA) 1511 11th Avenue	Water	Unknown	$1,613,750	$300,000
South Holly Water Treatment Plant 1500 11th Avenue	Water	Unknown	$4,219,450	$4,470,000
Southside 5 MG Ground Water Storage Tank 3751 Gordon Avenue	Water	Unknown	$4,250,000	Unknown
Stagecoach Pump Station 8608 West Freeway	Water Department Pump Station	Unknown	$258,400	$1,647,000
Sun Country 2 MG Elevated Water Storage Tank 5820 West Stewart Feltz Road	Water	Unknown	$3,900,000	Unknown
Timberline 2 MG Elevated Water Storage Tank 4712 Trueline Road	Water	Unknown	$3,900,000	Unknown
Village Creek Wastewater Treatment Plant 4500 Wilma Lane	Water	Unknown	$27,582,431	$58,435,000
Walsh Ranch 2.5 MG Ground Water Storage Tank 13100 West Interstate Highway 20 South	Water	Unknown	$2,125,000	Unknown
Westland 6 MG Ground Water Storage Tank 11066 Dorfan Street	Water	Unknown	$3,060,000	Unknown
Westland Pump Station 11066 Dorfan Street	Water Department Pump Station	Unknown	$308,000	$100,000

City of Fort Worth Critical and Vulnerable Facility/Asset Inventory				
Facility/Asset Name or Description and Address	**Type of Asset**	**Square Feet**	**Structure Value**	**Content Value**
Westside Pump Station 3731 Camp Bowie Boulevard	Water Department Pump Station	Unknown	$117,000	$42,000
Will Rogers Memorial Center 3401 West Lancaster Avenue	Commercial Facilities	Unknown	$104,377,310	$2,530,000

*The capacity of these assets were unknown.

**MG- million gallons

3.3 Natural Hazard Profiles

The City of Fort Worth's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Fort Worth in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Thunderstorm (includes hail, wind, lightning)
2	Flooding
3	Winter Storms
4	Tornado
5	Wildfire
6	Extreme Heat
7	Drought
8	Expansive Soils
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent for the hazards.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Fort Worth.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of the other sections of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal overall.

Fort Worth has a total treatment capacity of 500 million gallons per day for drinking water and 166 million gallons per day for wastewater; with five water treatment plants and one reclamation facility. There are more than 3,336 miles of pipe in the water distribution system and 3,266 miles in the collection system. The system serves more than 1.2 million people in Fort Worth and surrounding areas, which include 30 water wholesale customers, 23 wastewater wholesale wastewater customers and three wholesale reclaimed water customers.

The City of Fort Worth has a Drought Contingency and Emergency Water Management Plan in order:
- To conserve the available water supply in times of drought and emergency.
- To maintain supplies for domestic water use, sanitation, and fire protection.
- To protect and preserve public health, welfare, and safety.
- To minimize the adverse impacts of water supply shortages.
- To minimize the adverse impacts of emergency water supply conditions.

Jurisdiction's ground-water supply: City of Forth Worth has own ground-water supply.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: Lawn watering is restricted when available water resources reach established thresholds.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Limited
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: On May 1, 2017, a 2.3 magnitude earthquake occurred 1.2 miles southwest of Fort Worth. No damage was reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures. The City of Fort Worth is home to critical facilities that would be vulnerable to the effects of expansive soils. This includes city buildings, water pump stations, water storage facilities, water treatment facilities, hospitals, a naval air station, as well as employers that employ many of the residents of the city.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Unknown.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: Approximately 9.1% of the population in Fort Worth consists of individuals who are 65 years or older and a poverty rate of 17.5%. In addition, there is a homeless population in Fort Worth.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? Fort Worth hosts numerous outdoor special events such as festivals, parades, concerts, and events at the Texas Motor Speedway that prompt emergency response planning specifically for extreme heat exposure during the summer months.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No, but Fort Worth has long term acute care and special need facilities that may require assistance due to power failures due to heat.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused one fatality over the past three years and is expected to have the same results in the future. Commuters and any buildings in a floodplain are considered most at risk.

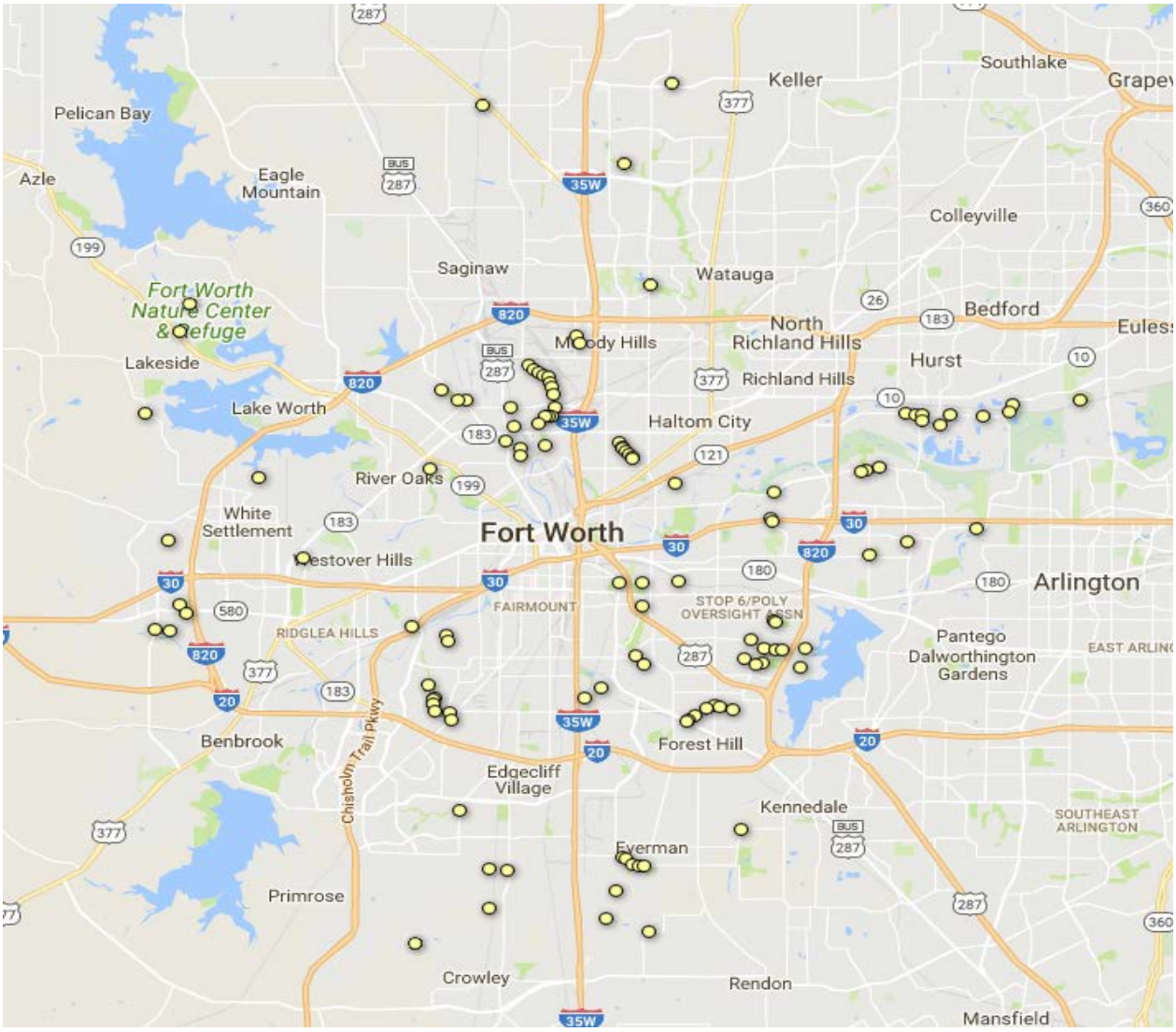
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: See low water crossings below, as these roads have the potential of flooding.

Names of any creeks or rivers that flood: Downtown Fort Worth is situated near the confluence of the two largest rivers in the area – the Clear Fork Trinity River and the West Fork Trinity River. Other major streams in Fort Worth include Mary's Creek, Marine Creek, Sycamore Creek, Village Creek, Dry Branch Creek, Little Fossil Creek, Big Fossil Creek, and White's Branch.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Cravens Road (0.2 miles east Interstate Highway 820 south Spring 303)	Wildcat Branch	Bridge Class
Alta Vista Road	Big Bear Creek	Vented Ford
North Beach Street	Big Fossil Creek	Bridge Class

Road	Flooding Source	Low Water Crossing Type
West Hicks Road (Bonds Ranch Road)	Big Fossil Creek, TRIB Stream BFC-4	Vented Ford
Northwest 35th Street	Cement Creek	Vented Ford
Anglin Drive	Chambers Creek	Vented Ford
Everman Parkway	Chambers Creek South Fork	Vented Ford
Christopher Street	Chambers Creek South Fork	Vented Ford
Michael Street	Chambers Creek South Fork	Vented Ford
Marlene Street	Chambers Creek South Fork	Vented Ford
Everman Parkway	Chambers Creek South Fork	Vented Ford
Vickery Boulevard	Clear Fork Trinity River, TRIB CF-2	Vented Ford
Ranch View Road	Clear Fork Trinity River, TRIB CF-3	Vented Ford
Overton Park Drive	Clear Fork Trinity River, TRIB CF-3	Vented Ford
South Drive	Clear Fork Trinity River, TRIB CF-3	Vented Ford
Trail Lake Drive	Clear Fork Trinity River, TRIB CF-3	Vented Ford
Inwood Road	Stream Cf-3, TRIB CF-3b	Vented Ford
Altura Road	Stream Cf-3, TRIB CF-3b	Vented Ford
Inwood Drive	Stream Cf-3, TRIB CF-3b	Vented Ford
Cooks Lane	Cottonwood Creek	Bridge Class
Sandy Lane	Cottonwood Creek	Vented Ford
Old Cleburne Crowley Junction	Deer Creek North Branch, TRIB	Vented Ford
Haltom Road	Dry Branch	Vented Ford
Carnation Avenue	Dry Branch	Vented Ford
Aster Court	Dry Branch	Vented Ford
Bonnie Brae Avenue	Dry Branch	Vented Ford
Springdale Road	Dry Branch	Vented Ford
Riverside Drive	Dry Branch	Vented Ford
Selma Drive	Dry Branch	Vented Ford
Hollis Street	Dry Branch	Vented Ford
Mccart Avenue	Edgecliff Branch	Vented Ford
Academy Boulevard	Farmers Branch	Vented Ford
Mockingbird Lane	Howards Branch	Vented Ford
Lynncrest Drive	Howards Branch	Vented Ford
Mosier Valley Road	Hurricane Branch	Vented Ford
Ridgemar Meadow Road	Kings Branch	Vented Ford
Great Southwest Parkway	Little Fossil Creek	Bridge Class
Mark Iv Parkway	Little Fossil Creek	Bridge Class
Trinity Boulevard	Lorean Branch	Vented Ford
Northwest 26th Street and Ellis Street	Marine Creek	Vented Ford
Macie Avenue (Northwest 35th Street)	Marine Creek	Vented Ford
Sansom Park Drive	Marine Creek	Vented Ford

Road	Flooding Source	Low Water Crossing Type
Northeast 23rd Street	Marine Creek, TRIB Stream MC-1	Vented Ford
Exchange Avenue	Marine Creek, TRIB Stream MC-1	Vented Ford
Northeast 29th Street	Marine Creek, TRIB Stream MC-1	Vented Ford
Long Avenue	Marine Creek, TRIB Stream MC-1	Vented Ford
Alemeda Street	Marys Creek, TRIB Stream MSC-1	Vented Ford
Santa Monica Drive	Marys Creek, TRIB Stream MSC-1	Vented Ford
Marys Creek School Road	Marys Creek, TRIB Stream MSC-2	Vented Ford
Chapin Road	Marys Creek, TRIB Stream MSC-2	Vented Ford
Silver Creek Road	Silver Creek	Bridge Class
Bedford-Arlington Road (Mosier Valley Road)	Sulphur Branch	Bridge Class
Vickery Boulevard	Sycamore Creek	Bridge Class
Maddox Avenue	Sycamore Creek	Bridge Class
North Crowley Cleburne Road	Sycamore Creek	Vented Ford
Riverside Drive	Sycamore Creek, TRIB Stream SC-2	Vented Ford
East Berry Street	Sycamore Creek, TRIB Stream SC-3	Vented Ford
Glen Gardens Drive	Sycamore Creek, TRIB Stream SC-3	Vented Ford
Butler Street	Sycamore Creek, TRIB Stream SC-5	Vented Ford
Drew Street	Sycamore Creek, TRIB Stream SC-5	Vented Ford
Cunningham Avenue (South Worth Drive)	Sycamore Creek, TRIB Stream SC-7	Vented Ford
Cunningham Avenue	Sycamore Creek, TRIB Stream SC-7	Vented Ford
Trinity Boulevard	Valley View Branch	Vented Ford
Green Oaks Boulevard	Village Creek	Bridge Class
Cravens Road	Village Creek, TRIB Stream VC-1	Vented Ford
Carey Road	Village Creek, TRIB Stream VC-1	Vented Ford
Hilldale Road	Village Creek, TRIB Stream VC-1	Vented Ford
Freshfield Road	Village Creek, TRIB Stream Vc-1	Vented Ford
Parker Henderson Road	Village Creek, TRIB Stream VC-2	Vented Ford
Nell Street	Village Creek, TRIB Stream VC-2	Vented Ford
Miller Avenue	Village Creek, TRIB Stream VC-2	Vented Ford
Trentman Street	Village Creek, TRIB Stream VC-2	Vented Ford
Shackleford Street	Village Creek, TRIB Stream VC-2	Vented Ford
Nolan Street	Village Creek, TRIB Stream VC-2	Vented Ford
BU 287	Village Creek, TRIB Stream VC-2	Vented Ford
Oak Grove Road	Village Creek, TRIB Stream VC-5	Vented Ford
Oak Grove E Road	Village Creek, TRIB Stream VC-6	Vented Ford
Oak Grove Road	Village Creek, TRIB Stream VC-6	Vented Ford
Greenbelt Road	Walker Branch	Vented Ford
Trinity Boulevard	Walker Branch	Vented Ford
Norwood Drive	Walker Branch	Vented Ford
Kemp Road	Walker Branch	Vented Ford
Trinity Boulevard	Walker Branch	Vented Ford

Road	Flooding Source	Low Water Crossing Type
Precinct Line Road	Walker Branch	Vented Ford
Randol Mill Road	Trinity River West Fork, TRIB Stream WF-1	Vented Ford
Randol Mill Road	Trinity River West Fork, TRIB Stream WF-1	Vented Ford
Randol Mill Road	Trinity River West Fork, TRIB Stream WF-1	Vented Ford
Randol Mill Road	Trinity River West Fork, TRIB Stream WF-2	Bridge Class
Bridge Street	Trinity River West Fork, TRIB Stream WF-2	Vented Ford
Brentwood Stair Road	Trinity River West Fork, TRIB Stream WF-2	Vented Ford
Brennan Street	Trinity River West Fork, TRIB Stream WF-4	Vented Ford
Dewey Street	Trinity River West Fork, TRIB Stream WF-4	Vented Ford
Vera Cruz Street	Trinity River West Fork, TRIB Stream WF-4	Vented Ford
Schwartz Avenue	Trinity River West Fork, TRIB Stream WFf-4	Vented Ford
Oscar Avenue	Trinity River West Fork, TRIB Stream WFf-4	Vented Ford
Northeast 33rd Street	Trinity River West Fork, TRIB Stream WFf-4	Vented Ford
Northeast 36th Street	Trinity River West Fork, TRIB Stream WFf-4	Vented Ford
Beaumont Street	Trinity River West Fork, TRIB Stream WFf-4	Vented Ford
Jasper Street	Trinity River West Fork, TRIB Stream WF-4	Vented Ford
Terminal Road	Trinity River West Fork, TRIB Stream WF-4	Vented Ford
Weber Road	Trinity River West Fork, TRIB Stream WF-4	Vented Ford
Hardy Street	Trinity River West Fork, TRIB Stream WF-4	Vented Ford
Decatur Avenue	Trinity River West Fork, TRIB Stream WF-4	Vented Ford
De Ridder Avenue	Trinity River West Fork, TRIB Stream WF-4	Vented Ford
Ohio Garden Road	Trinity River West Fork, TRIB Stream WF-5	Vented Ford
Shoreline Road	Trinity River West Fork, TRIB Stream WF-7	Vented Ford
Nine Mile Bridge Road	Trinity River West Fork, TRIB Stream WF-7	Vented Ford
Shoreview Drive	Trinity River West Fork, TRIB Stream WF-11	Vented Ford
Arcadia Park Drive	Whites Branch	Vented Ford
Burnice Street	Wildcat Branch	Vented Ford
Stalcup Street	Wildcat Branch	Vented Ford
Dillard Street	Wildcat Branch	Vented Ford
Village Creek Road	Wildcat Branch	Vented Ford
Stalcup Avenue	Wildcat Branch, TRIB Stream WC-1	Vented Ford
Ramey Avenue	Wildcat Branch, TRIB Stream WC-1	Vented Ford

Low water crossing types defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented Fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Fort Worth is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480596B
Community Name	City of Fort Worth
County	Denton County/Tarrant County
Initial FHBM Identified	09/17/71
Initial FIRM Identified	06/04/80
Current Effective Map Date	03/21/19
Reg-Emer Date	06/04/80
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? City Floodplain Manager. The Floodplain Management Group maintains information used to protect property from floods and reviews applications to build or remodel in the floodplain.

What specific flooding ordinances and plans does your jurisdiction have? Flood Damage Prevention Ordnance last revised January 12, 2010 by Ordinance No. 10-011. The zoning ordinance, Floodplain Provisions Ordinance and the International Building Codes have special provisions regulating construction and other developments within floodplains.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? New construction must conform to the standards outlined in Section 5.01 of the above-mentioned Ordinance.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? A permit is required prior to commencing construction. Prior to the issuance of a permit, building engineers must show conformity with the standards outlined on Section 5.01. Variances may be approved by the City Council based on a case by case basis when extraordinary situations exist.

Repetitive and Severe Repetitive Loss Properties: There are currently 53 residential and 5 nonresidential repetitive loss properties and 0 severe repetitive loss properties within the City of Fort Worth. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Fort Worth's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 2,490 Insurance in-force: $645,950,800 Written premium in-force: $2,199,603
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 584 claims have been filed, but 156 of the claims closed without payment. $4,651,310.81 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	There are at least 58 structures in the floodplain.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	No data available.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, geographic information system, and inspections. Conduct community workshops to provide information to property owners.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	None.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.

When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		No data available.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	09/17/71
Are the FIRMs digital or paper?	Community FPA	Digital and paper.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes. By building ordinance.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	(1) Application for a Floodplain Development Permit shall be presented to the Floodplain Administrator on forms furnished by him/her and may include, but not be limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to areas of special flood hazard. Additionally, the following information is required: (a) After forms are set for the lowest floor, a letter completed by a licensed engineer or surveyor indicating the proposed lowest floor elevation (in relation to mean sea level), including basement and finished garage of all new and substantially improved structures; (b) After construction and before final inspection, an elevation certificate completed by a licensed engineer or surveyor; (c) Elevation in relation to mean sea level to which any nonresidential structure shall be floodproofed;

		(d) A certificate from a registered professional engineer or architect that the nonresidential floodproofed structure shall meet the floodproofing criteria of Section 5.02 (2); (e) Description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of proposed development; (f) Maintain a record of all such information in accordance with Section 4.02(1).
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	Yes.
What is the community's CRS Class Ranking?	Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual	8.
Does your flood management plan or hazard mitigation plan include CRS planning requirements?	Community FPA, FEMA CRS Coordinator, ISO representative. CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Yes.

The City of Fort Worth will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Major
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Since 2015, there has been millions of dollars' worth of damage related to high winds and hail in thunderstorms, including roof, vehicle, and tree damage.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: $100,000 worth of property damage occurred as a result an EF0 tornado in 2017.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Most vulnerable location (North, East, South, West) of your jurisdiction? There are pockets of open space spread out amongst the city, though past fires have not grown more than 10 acres.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Major
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: The city of Fort Worth monitors/treats 231 bridges and 67 hills within the city vulnerable to slick conditions during winter weather. See the following page for details. Travel, city operations, commerce can all be impacted when these bridges and/or overpasses and hilly areas are impacted by winter storms.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Major traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Fort Worth between 2015 and 2017. The material is organized by location and date.

Historical Events (Since 2015) From The National Centers For Environmental Information (www.ncdc.noaa.gov)								
Begin Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Fort Worth	4/13/2015	Flash Flood		0	0	$1,000	$0	
Fort Worth	4/18/2015	Thunderstorm Wind	51	0	0	$5,000	$0	MG
Fort Worth	4/24/2015	Thunderstorm Wind	61	0	0	$15,000	$0	EG
Fort Worth	11/17/2015	Thunderstorm Wind	35	0	0	$5,000	$0	EG
Fort Worth	3/17/2016	Hail	1.75	0	0	$50,000,000	$0	
Fort Worth	3/17/2016	Hail	1	0	0	$0	$0	
Fort Worth	6/27/2016	Flash Flood		0	0	$0	$0	
Fort Worth	9/25/2016	Flood		0	0	$0	$0	
Fort Worth	4/11/2017	Hail	1	0	0	$0	$0	
Fort Worth	7/9/2017	Hail	1	0	0	$0	$0	
Fort Worth	7/9/2017	Thunderstorm Wind	55	0	0	$10,000	$0	EG
Fort Worth	7/9/2017	Flood		0	0	$0	$0	
Fort Worth	7/9/2017	Flood		0	0	$0	$0	
Fort Worth	7/9/2017	Flood		0	0	$0	$0	
Fort Worth Blue Mound Airport	5/27/2015	Flash Flood		0	0	$0	$0	
Fort Worth Blue Mound Airport	5/27/2015	Flash Flood		0	0	$0	$0	
Fort Worth Blue Mound Airport	3/29/2017	Tornado	EF0	0	0	$100,000	$0	
Fort Worth Blue Mound Airport	4/11/2017	Hail	1	0	0	$0	$0	
Fort Worth Blue Mound Airport	6/2/2017	Flash Flood		0	0	$0	$0	

Begin Location	Date	Event Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Magnitude Type
Fort Worth Blue Mound Airport	7/5/2017	Flash Flood		0	0	$0	$0	
Fort Worth Luck Airport	3/29/2017	Thunderstorm Wind	60	0	0	$5,000	$0	EG
Fort Worth Mangham Airport	12/27/2015	Hail	1.75	0	0	$20,000	$0	
Fort Worth Mangham Airport	3/8/2016	Thunderstorm Wind	52	0	0	$5,000	$0	EG
Fort Worth Oak Grove Airport	11/27/2015	Flash Flood		1	0	$10,000	$0	
Fort Worth Oak Grove Airport	5/31/2016	Flash Flood		0	0	$20,000	$0	
Fort Worth Oak Grove Airport	7/4/2016	Thunderstorm Wind	51	0	0	$0	$0	MG
Fort Worth Russell Airport	3/30/2016	Thunderstorm Wind	56	0	0	$5,000	$0	EG
Fort Worth Saginaw Airport	4/13/2015	Flash Flood		0	0	$500	$0	
Fort Worth Saginaw Airport	4/20/2016	Lightning		0	0	$100,000	$0	
Fort Worth Sycamore Airport	3/23/2016	Hail	1.25	0	0	$0	$0	
TOTAL:				**1**	**0**	**$50,301,500**	**$0**	

*MG- Measured Wind Gusts

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Fort Worth identified their greatest vulnerabilities and concerns:

- Intense and/or prolonged rain events (approximately 2-5 year return period storms) have caused repetitive flooding of homes and streets. Within the past few years, there have been a total of 16 paid insurance claims totaling $342,749 along Western and Carleton Avenue.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Fort Worth's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	2017 Comprehensive Plan (2018 in Draft) No; No; Yes
Capital Improvement Plan	Yes	Within 2017 Comprehensive Plan No; No; Yes
Economic Development Plan	Yes	In draft
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	Yes/Partial	Yes; Yes; Yes
Transportation Plan	Yes	Master Thoroughfare Plan (2016); Street Development Standards (2004) Yes; Yes; Yes
Stormwater Management Plan	Yes	MS4 Permit; Stormwater Management Plan (2017) Stormwater Master Plan (2018 in DRAFT) Flood Response Plan (2018 in DRAFT) Yes; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g.; disaster recovery; climate change adaptation)	Yes	Mobility and Air Quality Plan Floodplain Management Plan (2016) Risk Management Plans (RMPs) (4) Dam Plans Yes; Yes; Yes

Land Use Planning and Ordinances	Have capability?	Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g.; stormwater; wildfire)	Yes	Multi-Department Ordinance Yes; Yes
Acquisition of land for open space and public recreation uses	Yes	Park; Recreation; and Open Space Master Plan (2015) Yes; Yes
Building Code; Permitting; and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year:** ICC/2015
Building Code Effectiveness Grading Schedule (BGEGS) Score	Yes	**Score:** 5 for 1 & 2 family residential property and 4 for commercial & industrial property
Fire Department ISO Rating	Yes	**Rating:** 1
Site Plan Review Requirements	Yes	Type(s) of requirement: Zoning Section conducts reviews based on requirements in the Zoning Ordinance.
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning & Development/Zoning; Yes
Mitigation Planning Committee	Yes	Planning and Hazard Analysis; Yes
Maintenance programs to reduce risk (e.g.; tree trimming; clearing drainage systems)	Yes	Tree trimming, storm drain clearing, flood monitoring; storm spotting, street maintenance, private contractors for tree removal, intercept for piping, stormwater and pipe maintenance; Yes
Mutual Aid Agreements	Yes	Response and assistance; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes (Note: Currently in process of hiring)
Other:	No	

*Full-time (FT) or part-time (PT) position		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g.; Reverse 911; outdoor warning signals)	Yes	Outdoor warning sirens, Nixle Public Notifications, weather radio, emergency alert system, Special Needs Assistance Program (SNAP) and SNAP Spanish, accessible hazard alert system, flood warning system, city email through GovDelivery – email newsletter, Nextdoor – neighborhood subscriber social media tool, Facebook, Twitter, Supervisory Control and Data Acquisition (SCADA), security systems for alerts, leaks, and surveillance Yes
Hazard data and information	Yes	Tier II database, dam plans, law enforcement alert emails, various geographic information system (GIS) layers for mapping, National Weather Service, Collaborative Adaptive Sensing of the Atmosphere (CASA) radar, dam plans Yes
Grant writing	Yes	Hazard Mitigation Assistance, Urban Areas Security Initiative, Neighborhood Services Yes
HaZUS analysis	Yes	Ability to map and display hazard data and evaluate results of damage and economic loss estimates primarily for flooding needs Yes
Other	No	
Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Community Emergency Response Team, SKYWARN Storm Spotters, Radio Amateur Civil Emergency Service, American Red Cross Community Preparedness Programs & Disaster Action Team, Citizens Fire Academy, Code Blue, Code Rangers, Neighborhood Associations, all use citizens to identify hazard and vulnerabilities within the city; Yes
Ongoing public education or information program (e.g.,	Yes	Stormwater Management Flood Safety, Integrated Stormwater Management (iSWM), Disaster Task

responsible water use, fire safety, household preparedness, environmental education)		Force, Texas Department of Transportation deployment and Traffic Management Center, One Address, American Red Cross Home Fire Preparedness Campaign; Yes
Natural disaster or safety related school programs	Yes	KnoWhat2Do helps educate public education of the hazards and strengthen readiness, StormReady program, American Red Cross Pillow Case Project; Yes
StormReady certification	Yes	StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education and awareness. To be officially StormReady, a community must: Establish a 24-hour warning point and emergency operations center. Have more than one way to receive severe weather warnings and forecasts and to alert the public. Create a system that monitors weather conditions locally. Promote the importance of public readiness through community seminars. Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises. Yes
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	Local Emergency Planning Committee (LEPC), various coordination with private entities and special event planning, Texas State Collaborative, Operation Partnership (OPEN) for public/private partnership; Yes
Other	Yes	Education programs for adults – Building Trust, Building Community, Caring for Cowtown Air, City Hall 101, Community Outreach & Recruiting Volunteers, Conquer Your Crud, Keeping our Lakes Clean, Neighborhood Leadership Training, Recycle Right! Education programs for children – What's Wrong With this Picture, Care for Cowtown Air, Freddie the Fish, Journey of a Waterdrop, Recycle Right Yes

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	No; No
Authority to levy taxes for specific purposes	Yes	No; No
Fees for water, sewer, gas, and/or electric services	Yes	No; Yes
Impact fees for new development	Yes	No; Yes
Stormwater utility fee	Yes	Yes. For installation and maintenance of stormwater mitigation activities. Yes.
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	No; No
Incur debt through private activities	No	
Community Development Block Grant	Yes	No; Yes
Other federal funding programs	Yes	Yes. Many of Fort Worth's public safety programs are funded through federally administered grants. Yes.
State funding programs	No	
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates, and additions to existing plans as new needs are recognized. Expansion could include:

- Complete all department Continuity of Operations (COOP) plan development and drill/exercise the city to handle a large recovery incident.
- Adopt a Community Wildfire Protection Plan
- Better engage vulnerable populations.
- Enhance drainage in flood prone areas, enhance monitoring capability.

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Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Fort Worth's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	Develop a program to identify mobile and manufactured home parks and work with park managers to prepare the residents for severe thunderstorms in the City of Fort Worth.	Utilize GIS to identify manufactured and mobile homes in Fort Worth.	4 months	Office of Emergency Management, Information Technology Solutions	$3,500	$150,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Work with manufactured and mobile home park managers to enhance severe weather awareness and preparedness.	8 months	Office of Emergency Management	$2,500	$150,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Ensure City of Fort Worth citizens have access to emergency communications.	Assist citizens with funding for purchase of Weather Alert Radios through rebate program.	6 months	Office of Emergency Management	$100,000	$2,000,000	City budget, private foundation grants, corporate grants
		STATUS: Deleted, no longer feasible					
Severe Thunderstorms	Participate in the Metropolitan	Conduct compliance inspection for the	Continual	Office of Emergency Management	$25,000	$5,000,000	Pre-Disaster

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
and High Winds, Tornadoes	safe rooms in the City of Fort Worth.	safe room rebate programs applications.					Mitigation Grants
		STATUS: In progress					
Severe Thunderstorms and High Winds, Tornadoes	Encourage storm-resistant construction in the City of Fort Worth.	Develop program to encourage builders to install storm-resistant construction such as “hurricane clips”.	6 months	Office of Emergency Management, Planning and Development Department	$10,000	$500,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Flooding	Improve the watershed on Lebow Channel by elimination of dangerous low water crossings, enlargement of restrictive bridges and culverts, channel enlargement, detention, acquisition of flood prone properties, and stream restoration in	Completed construction of Dewey Street Crossing Project (increased capacity of Dewey Street Bridge).	2 months	Stormwater management, Office of Emergency Management	$2,275,000	$15,000,000	FEMA Pre-Disaster Mitigation Grant, city budget
		STATUS: Completed					
		Completed reimbursement process and close the project.	4 months	Stormwater management, Office of Emergency Management	$2,500	$15,000,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	the City of Fort Worth.						
		STATUS: Completed					
Flooding	Prevent and decrease damage from stream bank erosion in the City of Fort Worth.	Survey creeks in Fort Worth and develop a database of locations subject to stream bank erosion.	8 months	Transportation and Public Works Department, Information Technology Solutions, Office of Emergency Management	$5,000	$500,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Determine erosion control techniques to use on area creek banks.	1 year	Transportation and Public Works Department	$10,000	$500,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Implement erosion control techniques to use on area creek banks.	2 months	Transportation and Public Works Department	$250,000	$500,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Dam Failure	Conduct breach analysis for all high hazard	Identify high hazard dams. Work with Texas Commission on Environmental	Continual	Stormwater management	$5,000	$750,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	dams in the City of Fort Worth.	Quality (TCEQ) to identify high hazard dams in areas that may be annexed.					
		STATUS: Deferred to 2020 HazMAP					
		Conduct breach analysis. • Breach analysis for French Lake Completed in 2003. Lake Worth Completed in 2009. • Breach analysis pending for Lake Como, Fosdic Lake, Lake Greenbriar, Luther Lake, White Lake, and Willow Creek Lake.	3 years	Stormwater management	$300,000	$750,000	City budget
		STATUS: Completed					
		Develop emergency action plans for high hazard dams. • Emergency Action Plans for Lake Worth, Lake Como, Fosdic Lake, French Lake, Lake Greenbriar, Luther Lake, White	4 years	Stormwater management	$10,000 per dam	$750,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Lake, and Willow Creek Lake Completed in 2012 • No known pending as of July 2013					
		STATUS: Completed					
Dam Failure	Conduct breach analysis for levees in the City of Fort Worth.	Conduct breach analysis. Tarrant Regional Water District is beginning work on breach analysis.	3 years	Tarrant Regional Water District	$350,000	$500,000	Tarrant Regional Water District
		STATUS: Completed					
		Develop emergency action plans (EAPs). EAPs to be developed in coordination with Fort Worth Office of Emergency Management.	4 years	Tarrant Regional Water District	$75,000	$500,000	Tarrant Regional Water District
		STATUS: Deferred to 2020 HazMAP					
Flooding	Provide flood preparedness information to City of Fort	Determine citizen flood preparedness actions. Actions for flash flooding (as	3 months	Office of Emergency Management	$2,500	$100,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	Worth citizens that address local hazards. Citizens are more likely to read and follow information that is specific to their area.	opposed to riverine flooding).					
		STATUS: Completed					
		Develop preparedness materials.	6 months	Office of Emergency Management	$500	$100,000	City budget
		STATUS: Completed					
		Print preparedness materials.	8 months	Office of Emergency Management	$2,500	$100,000	City budget
		STATUS: Completed					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Provide generator backup capability to City of Fort Worth community centers designated as shelter locations.	Determine electrical service requirements for essential operation of community centers.	4 months	Transportation and Public Works Department, Park and Recreation and Neighborhood Services Department	$5,000	$500,000	City budget
		STATUS: Completed					
		Evaluate best method to provide generator backup capability: • Install generators at facilities. • Retrofit facilities with	6 months	Transportation and Public Works Department, Park and Recreation and Neighborhood Services Department	$10,000	$500,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		connections for portable generators.					
		STATUS: In progress					
		Implement generator backup capability.	1 year	Transportation and Public Works Department, Park and Recreation and Neighborhood Services Department	$350,000	$500,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Hail	Gather costs for installing hail-resistant roofing and window coverings with a focus on critical infrastructure in the City of Fort Worth.	Retrofit City buildings with hail-resistant roofing.	3 month	Transportation and Public Works Department, Facilities Division	$2,500	$100,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Hail	Develop a public education campaign to encourage hail-resistant roofing	Research existing hail-resistant roofing public education materials.	1 month	Office of Emergency Management	$500	$1,000,000	City budget
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	in new construction and roof replacements in the City of Fort Worth.	Research costs/benefits of hail-resistant roofing for private sector structures.	2 months	Office of Emergency Management	$500	$1,000,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Develop public education materials (if existing materials are not sufficient).	4 months	Office of Emergency Management	$2,500	$1,000,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Print and begin distribution of public education materials.	5 months	Office of Emergency Management	$25,000	$1,000,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Ensure City of Fort Worth water systems are adequate for fighting wildfires.	Increase public education on how to reduce the risks from wildfires (construction, landscaping, etc.).	12 months	Office of Emergency Management, Fire Department	$10,000	Unknown	City funds
		STATUS: Completed					
Wildfire	Mitigate wildfires by encouraging wildfire resistant	Enact building permit process that encourages wildfire	12 months	Office of Emergency Management, Planning and	$25,000	Unknown	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	construction practices in the City of Fort Worth.	resistant construction.		Development Department			
		STATUS: Deferred to 2020 HazMAP					
Winter Storms	Improve winter weather winter weather response capabilities in the City of Fort Worth.	Purchase additional street sanding capacity.	6 months	Office of Emergency Management, Transportation and Public Works Department	$250,000	Unknown	City funds
		STATUS: In progress					
Winter Storms	Enhance winter weather preparedness program for Fort Worth citizens.	Increase public education concerning winter storm preparedness and mitigation.	9 months	Office of Emergency Management	$12,000	Unknown	City funds
		STATUS: Completed					
Infectious Disease Outbreak	Prepare City of Fort Worth staff for mass prophylaxis distribution.	Train staff in point of distribution (POD) procedures.	12 months	Office of Emergency Management	$35,000	Unknown	City funds
		STATUS: Completed					
		Conduct a POD exercise to test plans and procedures.	18 months	Office of Emergency Management	$12,000	Unknown	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: In progress					
Infectious Disease Outbreak	Develop a public information campaign to educate Fort Worth public about infectious diseases.	Educate the public on pandemics, including isolation, quarantine, triage, and medical care.	Unknown	Office of Emergency Management	$15,000	Unknown	City funds
		STATUS: Completed					
Drought	Develop public education program to mitigate the effects of drought in the City of Fort Worth.	Participate in the design and implementation of the Fort Worth specific water conservation public education efforts to complement existing programs.	6 months	Office of Emergency Management, Water Department	$10,000	$100,000	City funds
		STATUS: Completed					
Drought	Develop contingency plans to ensure adequate water supply during prolonged periods of drought in the	Develop a contingency plan to identify potential impacts of drought on the community to include utilities such as power generation and drinking water;	8 months	Office of Emergency Management, Water Department	$40,000	$100,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	City of Fort Worth.	health and safety including pre-existing health conditions and special needs; and emergency response such as fire suppression operations.					
		STATUS: Completed					
Terrorism	Ensure Fort Worth Police Department has the appropriate equipment to respond to terrorism incidents.	Evaluate the equipment currently in place at Fort Worth Police Department.	6 months	Office of Emergency Management, Police Department	$5,000	Unknown	City funds
		STATUS: In progress					
		Acquire the equipment identified in the assessment.	12 months	Office of Emergency Management, Police Department	Unknown	Unknown	Homeland Security Grant Program funds
		STATUS: In progress					
Terrorism	Conduct full scale homeland security scenario exercise for Fort Worth.	Conduct a full scale exercise to test terrorist response plans and procedures.	18 months	Office of Emergency Management	$25,000	Unknown	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: In progress					
Lightning	Protect structures from lightning in the City of Fort Worth.	Provide lightning mitigation materials with building permit packets.	6 months	Planning and Development Department	$15,000	Unknown	City funds
		STATUS: Deferred to 2020 HazMAP					
Lightning	Ensure Fort Worth critical facilities are protected against lightning.	Ensure all city critical infrastructure has adequate lightning mitigation in place.	1 year	Office of Emergency Management, Transportation and Public Works Department	$35,000	$1,000,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Hazardous Materials Release	Ensure the City of Fort Worth Fire Department has the equipment necessary to respond to hazmat incidents.	Evaluate the hazmat gear currently used by Fort Worth Fire Department.	6 months	Fire Department	$5,000	Unknown	City funds
		STATUS: In progress					
		Acquire the gear needed as identified in the evaluation.	12 months	Fire Department	Unknown	Unknown	City funds
		STATUS: In progress					
	Develop a hazardous	Develop a hazardous materials awareness	6 months	Office of Emergency Management,	$25,000	Unknown	City funds, Local

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Hazardous Materials Release	materials awareness education program for Fort Worth citizens.	education program that provides tips and pertinent information for protection of property and people from hazardous materials.		Fire Department			Emergency Planning Committee
		STATUS: Completed					
Extreme Temperatures	Identify extreme temperature mitigation plans for critical infrastructure in the City of Fort Worth.	With the Park and Recreation and Neighborhood Services Department and non-profit organizations, provide cooling and warming stations, shelters, assistance with utilities and resources for populations at risk.	1 year	Office of Emergency Management	$5,000	Unknown	City funds
		STATUS: Completed					
Extreme Temperatures	Develop an extreme temperature outreach	Develop an extreme temperature outreach program that provides tips	6 months	Office of Emergency Management	$15,000	Unknown	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	program for City of Fort Worth Citizens.	and pertinent information for ensuring the health and safety of citizens during extreme temperatures.					
		STATUS: Completed					
Expansive Soils	Mitigate expansive soils in the City of Fort Worth.	Improve construction techniques through building code enhancements.	1 year	Office of Emergency Management, Planning and Development Department	$25,000	Unknown	City funds
		STATUS: In progress					
		Educate construction contractors, homeowners, and business owners about mitigation techniques.	6 months	Office of Emergency Management, Planning and Development Department	$10,000	Unknown	City funds
		STATUS: Deferred to 2020 HazMAP					

5.3 New Action Items

The City of Fort Worth's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Extreme Heat**
Develop heat advisory levels and thresholds for activation of public resources (community center and libraries) notice and communication to the public.	
Participating Jurisdiction:	City of Fort Worth
Priority:	1
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	**Extreme Heat, Thunderstorms, Tornadoes, Winter Storms**
Provide generator backup capability to City of Fort Worth community centers designated as shelter locations.	
Participating Jurisdiction:	City of Fort Worth
Priority:	2
Estimated Cost:	$350,000
Estimated Benefit:	$2,100,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Transportation and Public Works Department, Park and Recreation and Neighborhood Services Department
Implementation Schedule:	12 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Extreme Heat
Purchase large fans and cooling station equipment for use at large special events when extreme heat is forecasted and heat stroke/exhaustion would be possible. This would mitigate the need for a potential large number of transports to hospitals and staging of additional assets.	
Participating Jurisdiction:	City of Fort Worth
Priority:	3
Estimated Cost:	$20,000
Estimated Benefit:	$120,000
Potential Funding Source(s):	City general fund, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Winter Storms
Purchase additional blankets for cold winter weather overflow operations.	
Participating Jurisdiction:	City of Fort Worth
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	6 months

Hazard(s) Addressed	Extreme Heat
Purchase cases of water for staging at command post at special events for responders and the public to mitigate the effects of extreme heat.	
Participating Jurisdiction:	City of Fort Worth
Priority:	5
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	1 month

Hazard(s) Addressed	Flooding
Survey creeks in Fort Worth and develop a database of locations subject to stream bank erosion in order to prevent and decrease damage from stream bank erosion in the City of Fort Worth.	
Participating Jurisdiction:	City of Fort Worth
Priority:	6
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Transportation and Public Works Department, Information Technology Services
Implementation Schedule:	8 months

Hazard(s) Addressed	Flooding
Determine erosion control techniques to use on area creek banks.	
Participating Jurisdiction:	City of Fort Worth
Priority:	7
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Transportation and Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Implement erosion control techniques to use on area creek banks.	
Participating Jurisdiction:	City of Fort Worth
Priority:	8
Estimated Cost:	$250,000
Estimated Benefit:	$1,500,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Transportation and Public Works Department
Implementation Schedule:	2 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Develop a program to encourage builders to install storm-resistant construction such as roof tie-downs and impact-resistant material.	
Participating Jurisdiction:	City of Fort Worth
Priority:	9
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Planning and Development Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Work with manufactured and mobile home park managers to enhance severe weather awareness and promote mitigation actions.	
Participating Jurisdiction:	City of Fort Worth
Priority:	10
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	8 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Utilize geographic information systems (GIS) to identify manufactured and mobile homes in Fort Worth to help develop a mitigation program for mobile and manufactured home parks.	
Participating Jurisdiction:	City of Fort Worth
Priority:	11
Estimated Cost:	$3,500
Estimated Benefit:	$21,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Information Technology Services
Implementation Schedule:	4 months

Hazard(s) Addressed	Wildfire
Enact building permit process that encourages wildfire resistant construction.	
Participating Jurisdiction:	City of Fort Worth
Priority:	12
Estimated Cost:	$25,000
Estimated Benefit:	$125,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Planning and Development Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Wildfire
Mitigate wildfires by encouraging wildfire resistant construction practices in the City of Fort Worth.	
Participating Jurisdiction:	City of Fort Worth
Priority:	13
Estimated Cost:	$25,000
Estimated Benefit:	$125,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Planning and Development Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms
Develop a public education campaign to encourage "hail-resistant" roofing in new construction and roof replacements in the City of Fort Worth.	
Participating Jurisdiction:	City of Fort Worth
Priority:	14
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	1 months

Hazard(s) Addressed	Thunderstorms
Research costs/benefits of hail-resistant roofing for private sector structures.	
Participating Jurisdiction:	City of Fort Worth
Priority:	15
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Thunderstorms
Enhance public education materials with mitigation actions for thunderstorms.	
Participating Jurisdiction:	City of Fort Worth
Priority:	16
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	4 months

Hazard(s) Addressed	Thunderstorms
Print and begin distribution of public education materials.	
Participating Jurisdiction	City of Fort Worth
Priority:	17
Estimated Cost:	$25,000
Estimated Benefit:	$125,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	5 months

Hazard(s) Addressed	Thunderstorms
Gather costs for installing hail-resistant roofing and window coverings with a focus on new and existing critical infrastructure in the City of Fort Worth.	
Participating Jurisdiction:	City of Fort Worth
Priority:	18
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Transportation and Public Works Facilities Division
Implementation Schedule:	3 months

Hazard(s) Addressed	Flooding
Develop emergency action plans (EAPs) for City of Fort Worth levees.	
Participating Jurisdiction:	City of Fort Worth
Priority:	19
Estimated Cost:	$75,000
Estimated Benefit:	$450,000
Potential Funding Source(s):	Tarrant Regional Water District, hazard mitigation grants
Lead Agency/Department Responsible:	Tarrant Regional Water District
Implementation Schedule:	48 months

Hazard(s) Addressed	Flooding
Identify high hazard dams. Work with Texas Commission on Environmental Quality (TCEQ) to identify high hazard dams in areas that may be annexed.	
Participating Jurisdiction:	City of Fort Worth
Priority:	20
Estimated Cost:	$10,000 per dam
Estimated Benefit:	$750,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Transportation and Public Works Department, Stormwater Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Determine contingency efforts with identified vulnerabilities.	
Participating Jurisdiction:	City of Fort Worth
Priority:	21
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Better assess the vulnerability to drought risk and integrate results in planning products, mitigation strategies, and public education efforts.	
Participating Jurisdiction:	City of Fort Worth
Priority:	22
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, city funding for staff time, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Thunderstorms
Ensure all new and existing city critical infrastructure has adequate lightning mitigation in place.	
Participating Jurisdiction:	City of Fort Worth
Priority:	23
Estimated Cost:	$35,000
Estimated Benefit:	$210,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Transportation and Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Expansive Soils
Educate construction contractors, homeowners, and business owners about mitigation techniques for expansive soils.	
Participating Jurisdiction:	City of Fort Worth
Priority:	24
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, city funding for staff time, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	6 months

Hazard(s) Addressed	Thunderstorms
Protect new structures from lightning in the City of Fort Worth by providing lightning mitigation materials with building permit packets.	
Participating Jurisdiction:	City of Fort Worth
Priority:	25
Estimated Cost:	$15,000
Estimated Benefit:	$90,000
Potential Funding Source(s):	City general fund, city funding for staff time, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Planning and Development Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Expansive Soils
Develop a public education campaign to recognize, educate, and mitigate effects of expansive soils in the City of Fort Worth.	
Participating Jurisdiction:	City of Fort Worth
Priority:	26
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund, city funding for staff time, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	9 months

Hazard(s) Addressed	Earthquake
Harden new and existing critical infrastructure and facilities with earthquake resistant measures as appropriate.	
Participating Jurisdiction:	City of Fort Worth
Priority:	27
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Planning and Development Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquake
Develop public education materials specifically for earthquake safety for schools, businesses, and general public.	
Participating Jurisdiction:	City of Fort Worth
Priority:	28
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund, city funding for staff time, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	6 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Fort Worth
Priority:	29
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the Stormwater Department and Floodplain Manager to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	City of Fort Worth
Priority:	30
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Fort Worth
Priority:	31
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Fort Worth
Priority:	32
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Expansive Soils, Flooding
Incorporate "Texas SmartScape" in city landscaping.	
Participating Jurisdiction:	City of Fort Worth
Priority:	33
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Fort Worth
Priority:	34
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Fort Worth
Priority:	35
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Fort Worth
Priority:	36
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the state to conduct a study to determine inundation zones, vulnerability to, and potential impacts of a dam failure.	
Participating Jurisdiction:	City of Fort Worth
Priority:	37
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.

5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Zoning Ordnances	Community Development and Planning Department	Every 5 years	Reference this HazMAP when developing the plan.	When reviewing the zoning ordinances the leadership team will review the mitigation action plan to see which action items can be addressed with the fiscal and administrative capabilities of the city.
Strategic Plan updates	Community Development and Planning Department, Public Works Department, Transportation Department, Office of Emergency Management	Annually	Reference this HazMAP when developing the plans for critical infrastructure and resources.	The plan development team will reference the HazMAP when updating this plan, in such areas as strengthening critical infrastructure and key resources based on HazMAP hazard analysis; incorporating vulnerability data and action items.
Capital Improvement Plan	Community Development and Planning Department	Every 5 Years	Reference this HazMAP when developing the plans for critical infrastructure and resources.	The plan development team will review mitigation action items, consider plan revision as necessary, and implement action based on priority given to project over other projects that are also already funded. Projects approved by the Public Works Department, city engineer, and city management are presented to city council for final approval to begin project.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Fort Worth. Supporting material is in Appendix A and B, respectively.

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City of Grapevine

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Grapevine was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided is for the City of Grapevine alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

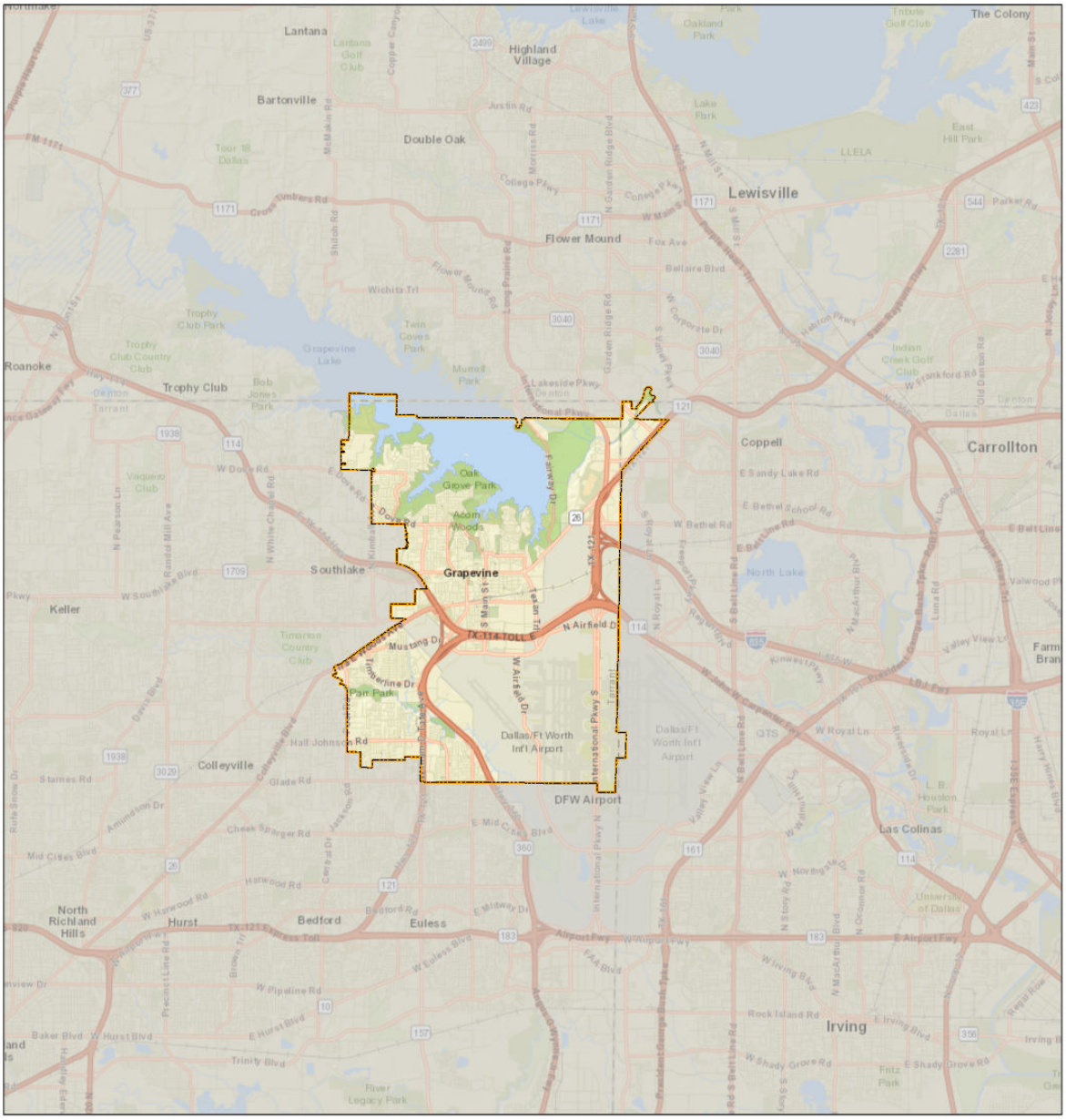
Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Grapevine will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

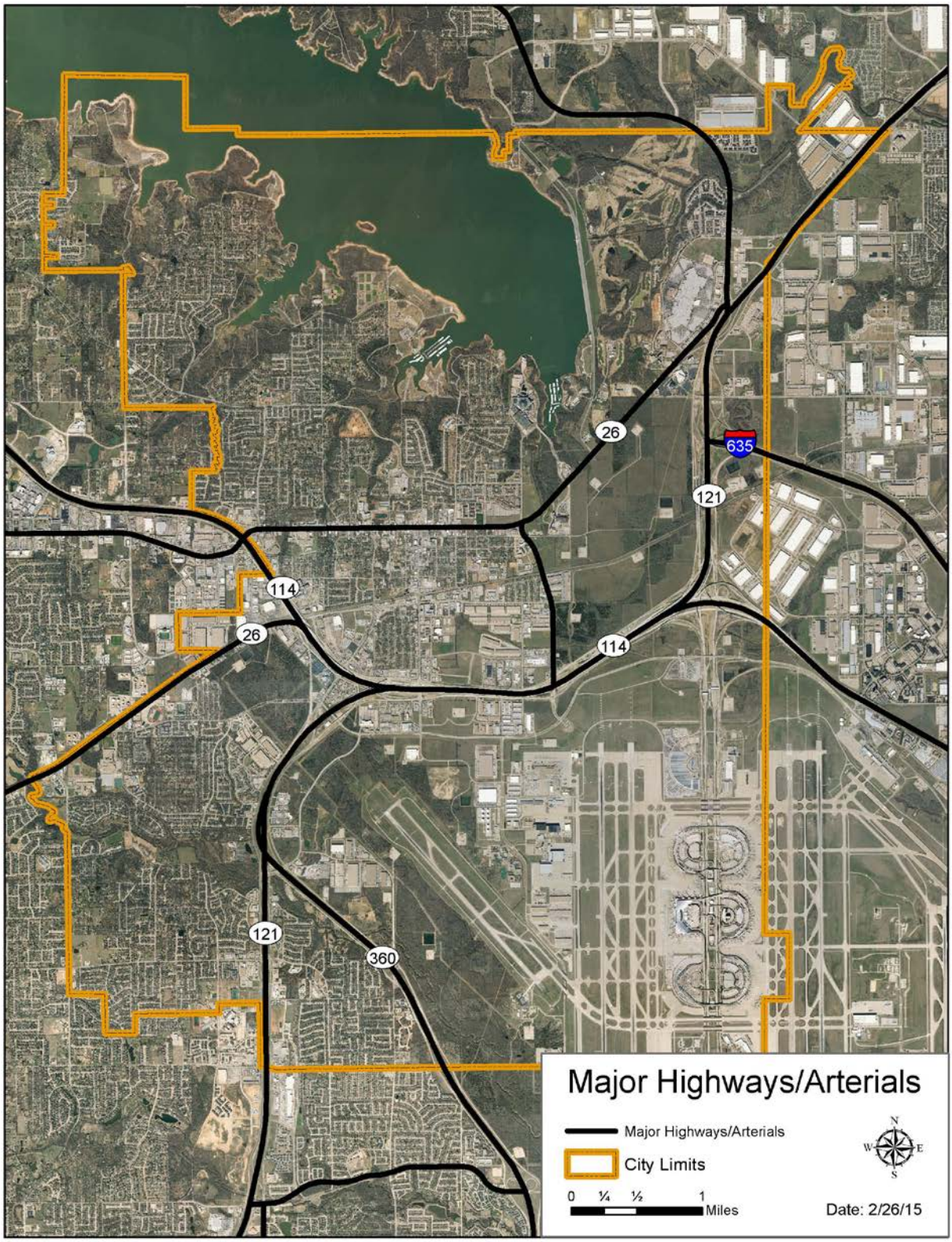
1.4 Supporting Maps

The following maps provide an overview of the City of Grapevine.

- City Boundary
- Major Highways/Arterials
- Historic District Map

Grapevine City Boundary

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Major Highways/Arterials
Major Highways/Arterials
City Limits
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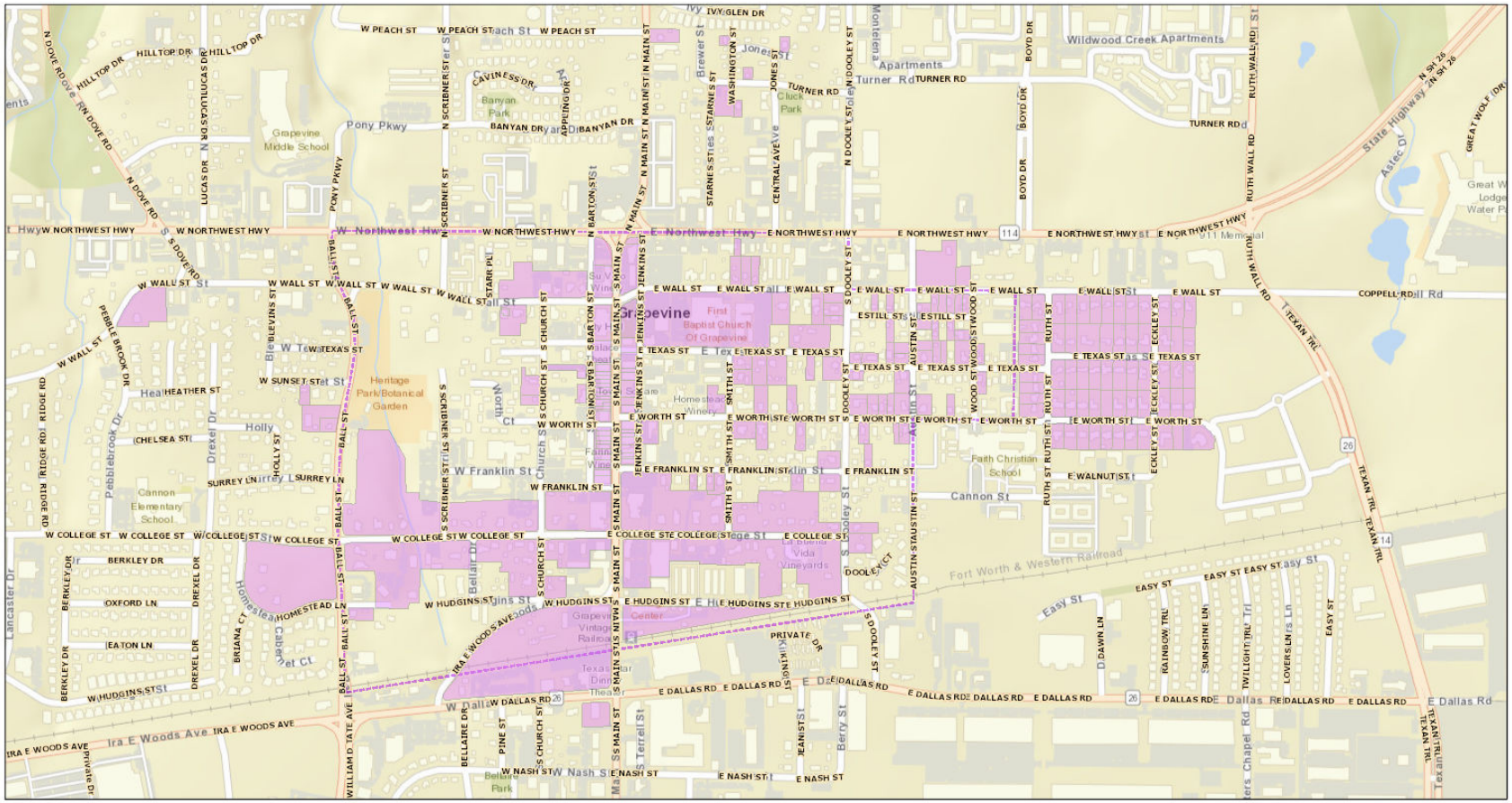
Grapevine Historic Districts



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Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

Grapevine GIS
City of Grapevine, Esri, HERE, Garmin, INCREMENT P, NGA, USGS |

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Grapevine has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Grapevine's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Grapevine. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Grapevine Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Grapevine	Fire Department	Emergency Management Coordinator	Lead city official
City of Grapevine	Public Works Department-Engineering	Floodplain Administrator/Development Engineer	Hazard identification, mitigation project development
City of Grapevine	Information Technology Department	Geographic Information Systems (GIS) Manager	Provide geospatial data and analysis

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There is continued infill development of mixed-use/high population density construction that will increase overall vulnerability to natural hazards.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: There are ongoing capital improvements and newer, stronger construction materials that will decrease vulnerability to natural hazards. A full list of completed mitigation action items are described in Chapter 5 of this annex.

Declared Disaster Code	Incident Period	Date Declared	Description	Impact
DR-4223	May 4-June 23, 2015	May 29, 2015	Severe storms, tornadoes, strait-line winds, and flooding	Throughout the incident period, severe, continuous rains caused flooding in and around Grapevine Lake. Eight public lake parks and the Grapevine Golf Course experienced flooding which resulted in approximately $3.1 million in damages and repair costs.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Grapevine.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	51,971
Persons under 5 years (%)	6.2
Persons 65 years and over (%)	8.6
Language other than English spoken at home (%)	25.1
With a disability, under age 65 (%)	6.3
Persons without health insurance, under age 65 (%)	15.5
Persons in poverty (%)	11.1
Median household income	$81,571
Households, 2012-2016	19,412
Median value of owner-occupied housing units, 2012-2016	$258,400

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Grapevine.

City of Grapevine Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
City Hall 200 South Main Street	Administration	100 people	29,000	$6,500,000	$7,500,000
Public Safety Building 1007 Ira E Woods 1027 Ira E Woods 1017 Ira E Woods	Law Enforcement Dispatch/Communications Fire Administration Information Technology Municipal Court Emergency Operations Center Logistics/Support Services	150 people	104,110	$33,000,000	$5,000,000
Public Works Service Center (and Dove Water Tower) 501 Shady Brook Drive	Public Works	200 people	337,000	$7,800,000	$17,000,000

City of Grapevine Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
The REC 1175 Municipal Way	Recreation/Education/ Administration	2,900 people	108,000	$24,027,342	$1,782,950
Wastewater Treatment Plant 602 Shady Brook Drive	Utilities	25 people	10,000	$1,500,000	$2,000,000
Water Treatment Plant 2600 Fairway Drive	Utilities	15 people	10,000	$2,000,000	$3,000,000
Mustang Water Tower 3051 Ira E. Woods Avenue	Utilities	N/A	Unknown	$700,000	$300,000

3.3 Natural Hazard Profiles

The potential hazards the City of Grapevine experiences are profiled below. Information includes the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard. Extent charts and full ranking tables are located in Appendix B.

The descriptions, illustrations, and indexes for each hazard are provided in Section 3 of this HazMAP.

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Grapevine.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Negative impact on car washes, parks, and pools Negative impact on lake levels Damage to foundations from shrinking soil
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Drought conditions could increase the likelihood of shifting soils underneath roads, homes, and buildings resulting in greater road maintenance costs and more shifting of foundations. Additionally, ongoing drought could alter future development planning due to water shortages.

Jurisdiction's ground-water supply: Grapevine residents receive approximately 70% of their drinking water from the Trinity River Authority, which is supplied by Cedar Creek Reservoir and Richland Chambers Reservoir. Approximately 30% of Grapevine's water comes from the city's water supply, Lake Grapevine. Lake Grapevine's normal conservation pool elevation is 535 feet.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: Irrigation or watering of any lawn or landscape is prohibited between the hours of 10:00 am and 6:00 pm. The city's Drought Contingency Plan Ordinance is outlined in Chapter 25, Article V, Section 25-140 of the Code of Ordinances.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes have damaged roads or infrastructure.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Damage attributed to expansive soils has not been calculated.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Heat exhaustion or heat stroke Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	The elderly and those working outdoors need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Rolling blackouts due to extreme heat would adversely impact the economy and critical facilities and infrastructure.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. People who work outside or in non-air-conditioned buildings are also at high risk to the direct effects of extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? Tourists, festival attendees, and park customers may have greater vulnerability to extreme heat due to increased outdoor activities.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats Damage to improved property and city facilities
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments around Grapevine Lake and in/near floodplains are exposed to this hazard. According to the City of Grapevine, there are six public wastewater lift stations in the 100-year floodplain.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: DR-4223, May/June 2015, throughout the incident period, severe, continuous rains caused flooding in and around Grapevine Lake. Eight public lake parks and the Grapevine Golf Course experienced flooding which resulted in approximately $3.1 million in damages and repair costs. Dove Road was closed near Silvercrest Lane due to flooding. The Grapevine City Council estimated rebuilding efforts would take months.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? Yes, unknown.

Intersections or traffic routes impacted by flooding: Farm to Market 2499 (Northeast), State Highway 121 service roads (Northeast), Lake Ridge at Kimball (Northwest), and Fairway Drive (Northwest) (emergency spillway for Grapevine Dam). See low water crossings below, as these roads have the potential of flooding.

Names of any creeks or rivers that flood: Denton Creek and Bear Creek.

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Residential	4216.53	335.46	7.96%
Industrial	763.08	43.22	5.66
Commercial	2307.76	256.56	11.12%
Total	**7287.37**	**635.24**	**8.72%**

Source: Grapevine Geographic Information Systems (GIS).

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular traffic. These crossings can be dangerous when flooded. There are no low water crossings reported in the City of Grapevine.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Grapevine is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480598#
Community Name	City of Grapevine
Counties	Denton County/Dallas County/Tarrant County
Initial FHBM Identified	06/28/1974
Initial FIRM Identified	11/17/1982
Current Effective Map Date	07/07/2014
Reg-Emer Date	11/17/1982
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Manager of Engineering.

What specific flooding ordinances and plans does your jurisdiction have? Grapevine Master Drainage Plan.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? Application for a floodplain development permit shall be presented to the floodplain administrator on forms furnished by him/her and may include, but not be limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to areas of special flood hazard. Additionally, the following information is required:

- Elevation (in relation to mean sea level), of the lowest floor (including basement) of all new and substantially improved structures.
- Elevation in relation to mean sea level to which any nonresidential structure shall be floodproofed.
- A certificate from a registered professional engineer or architect that the nonresidential floodproofed structure shall meet the floodproofing criteria of section 7-202(b)(2).
- Description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of proposed development.
- Maintain a record of all such information in accordance with section 7-199(1). (b).

Approval or denial of a floodplain development permit by the floodplain administrator shall be based on all of the provisions of this article and the following relevant factors:

- The danger to life and property due to flooding or erosion damage.
- The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.
- The danger that materials may be swept onto other lands to the injury of others.
- The compatibility of the proposed use with existing and anticipated development.
- The safety of access to the property in times of flood for ordinary and emergency vehicles.
- The costs of providing governmental services during and after flood conditions including maintenance and repair of streets and bridges, and public utilities and facilities such as sewer, gas, electrical and water systems.
- The expected heights, velocity, duration, rate of rise and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site.
- The necessity to the facility of a waterfront location, where applicable.
- The availability of alternative locations, not subject to flooding or erosion damage, for the proposed use

What building restrictions, in regards to floodplains, does your jurisdiction enforce? General standards. In all areas of special flood hazards the following provisions are required for all new construction and substantial improvements.

- All new construction or substantial improvements shall be designed (or modified) and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.

- All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damage.
- All new construction or substantial improvements shall be constructed with materials resistant to flood damage.
- All new construction or substantial improvements shall be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.
- All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.
- New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the system and discharge from the systems into flood waters; and, On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

Specific standards. In all areas of special flood hazards where base flood elevation data has been provided as set forth in (i) section 7-192, (ii) section 7-199(8), or (iii) section 7-202(c)(3), the following provisions are required:

- **Residential construction**. New construction and substantial improvement of any residential structure shall have the lowest floor (including basement), elevated to a minimum of two (2) feet above the base flood elevation. All new residential construction shall have an access elevation at or above the base flood elevation. No residential construction shall be permitted in the floodway. A registered professional engineer, architect, or land surveyor shall submit a certification to the Floodplain Administrator that the standard of this subsection as proposed in section 7-200(a)(1), is satisfied.
- **Nonresidential construction**. New construction and substantial improvements of any commercial, industrial or other nonresidential structure shall either have the lowest floor (including basement) elevated to a minimum of two (2) feet above the base flood level or together with attendant utility and sanitary facilities, be designed so that below two (2) feet above the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. A registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify that the design and methods of construction are in accordance with accepted standards of practice as outlined in this subsection. A record of such certification which includes the specific elevation (in relation to mean sea level) to which such structures are floodproofed shall be maintained by the floodplain administrator.

- **Enclosures**. New construction and substantial improvements, with fully enclosed areas below the lowest floor that are usable solely for parking of vehicles, building access or storage in an area other than a basement and which are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of flood waters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria: a. A minimum of two openings on separate walls having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. b. The bottom of all openings shall be no higher than one foot above grade. c. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.
- **Manufactured homes**.
    - Require that all manufactured homes to be placed within Zone A on a community's FHBM or FIRM shall be installed using methods and practices which minimize flood damage. For the purposes of this requirement, manufactured homes must be elevated and anchored to resist flotation, collapse, or lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable state and local anchoring requirements for resisting wind forces.
    - Require that manufactured homes that are placed or substantially improved within Zones A1—30, AH, and AE on the city's FIRM on sites (i) outside of a manufactured home park or subdivision, (ii) in a new manufactured home park or subdivision, (iii) in an expansion to an existing manufactured home park or subdivision, or (iv) in an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as a result of a flood, be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to a minimum of two (2) feet above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.
    - Require that manufactured homes be placed or substantially improved on sites in an existing manufactured home park or subdivision with Zones A1—30, AH and AE on the community's FIRM that are not subject to the provisions of paragraph (4) of this section be elevated so that either: (i) the lowest floor of the manufactured home is at or above a minimum of two feet above the base flood elevation; or (ii) the manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade, and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

Repetitive and Severe Repetitive Loss Properties: There are currently 2 residential and 9 nonresidential repetitive loss properties and 0 severe repetitive loss properties within the City of Grapevine. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
560	4.47%	97	11.73%

Source: Grapevine Geographic Information Systems (GIS).

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Grapevine's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 1184 Insurance in-force: $65,882,600 Written premium in-force: $81,709
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 50 claims have been filed, but 11 of the claims closed without payment. $1,020,289.91 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	769.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	Data unavailable.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes

Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	• Maintain and hold open for public inspection all records pertaining to the provisions of this article. • Review permit application to determine whether to ensure that the proposed building site project, including the placement of manufactured homes, will be reasonably safe from flooding. • Review, approve or deny all applications for development permits required by adoption of this article. • Review permits for proposed development to assure that all necessary permits have been obtained from those federal, state or local governmental agencies (including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334) from which prior approval is required. • Where interpretation is needed as to the exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions) the floodplain administrator shall make the necessary interpretation. • Notify, in riverine situations, adjacent communities and the state coordinating agency which is the Texas Water Development Board (TWDB) and also the Texas Commission on Environmental Quality (TCEQ), prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Emergency Management Agency. • Assure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained. • When base flood elevation data has not been provided in accordance with section 7-192, the floodplain administrator shall obtain, review and reasonably utilize any base flood elevation data and floodway data available from a federal, state or other source, in order to administer the provisions of section 7-202.

		• When a regulatory floodway has not been designated, the floodplain administrator must require that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1—30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the city. • Under the provisions of 44 CFR Chapter 1, Section 65.12, of the National Flood Insurance Program regulations, a community may approve certain development in Zones A1—30, AE, AH, on the community's FIRM which increases the water surface elevation of the base flood by more than one foot, provided that the community first completes all provisions required by Section 65.12 .
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Data unavailable.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Data unavailable.
Is a CAV or CAC scheduled or needed?		Data unavailable.

Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	06/28/1974.
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes. By building ordinance.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Refer to page 24 of this annex.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and structures. Transportation delays Injuries and deaths Debris from trees and damaged property Power outages Communication systems disruption Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard; however, mobile homes and manufactured homes are at greater risk due to not having foundations to anchor to against the wind.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): High winds associated with thunderstorms have caused minor damages to buildings along with vegetation and tree damage.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Displaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard; however, mobile homes and manufactured homes are at greater risk due to not having foundations to anchor to against the wind.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

Is there an area of the town that is the most vulnerable to tornadoes? Mobile home parks, people outdoors, and the travelling public.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Displaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard. Major highways and thoroughfares are adjacent to undeveloped parcels vulnerable to wildfire which may be closed to protect lives and property. Additionally, access to critical infrastructure, such as wastewater lift stations, may be restricted or blocked by wildfire.

Most vulnerable location (North, East, South, West) of your jurisdiction? Vulnerable locations include undeveloped property around the Dallas-Fort Worth Airport, native areas around Grapevine Lake and Dam, and wooded parks near homes.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard. Closures of roads and highways would greatly impact the local, regional, and statewide economy. Additionally, damages suffered by power outages and broken water lines would adversely impact businesses and residents.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: The bridges at Dove Road, Pool Road, Gaylord Texan Bridge, Ruth Wall and Texan Trail, and Scribner at Northwest Highway. State highway flyovers and overpasses are managed by the Texas Department of Transportation.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? During winter storms, frozen precipitation can accumulate on roadways causing vehicle crashes. Additionally, freezing rain can build on power lines causing widespread power outages and frigid temperatures can damage water pipes for homes and businesses.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Grapevine between 2015 and 2017. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environmental Information (ww.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Grapevine	5/4/2015	(Lake) Flooding		0	0	$3,000,000	$0	
Grapevine	11/17/2015	Thunderstorm Wind	50	0	0	$0	$0	EG
Grapevine	3/8/2016	Thunderstorm Wind	52	0	0	$0	$0	EG
Grapevine	5/10/2016	Hail	0.75	0	0	$0	$0	
Grapevine	8/15/2016	Thunderstorm Wind	52	0	0	$2,000	$0	EG
Grapevine	11/7/2016	Flash Flood		0	0	$0	$0	
Total				**0**	**0**	**$3,002,000**	**$0**	

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Grapevine identified their greatest vulnerabilities and concerns:

- Grapevine is within the largest metropolitan area in Tornado Alley and will continue to be threatened by severe weather and tornadoes.
- Lake flooding around and near Grapevine Lake will threaten public and private property when lake levels rise.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Grapevine's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; No; No
Capital Improvement Plan	Yes	Yes; No; No
Economic Development Plan	Yes	Yes; No; No
Local Emergency Operations Plan	Yes	Yes, No, No
Continuity of Operations Plan	No	
Transportation Plan	Yes	Yes; No; No
Storm water Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	Yes	DR-4223 After Action notes outline potential mitigation projects to be included in the mitigation strategy. The 2015 Tarrant County HazMAP includes potential mitigation projects.
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes

Natural Hazard Specific Ordinance (e.g., storm water, wildfire)	Yes	Storm water
Acquisition of land for open space and public recreation uses	Yes	Has not been done.
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year:** 2006 IBC
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating:** 2
Site Plan Review Requirements	Yes	**Type(s) of requirement:** all buildings reviewed
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	The Planning and Zoning Commission recommends the boundaries of original zoning districts and appropriate regulations to be enforced therein, holds public hearings and prepares recommendations for the city council pertaining to changes in zoning district boundaries or regulations, makes recommendations concerning property platting and replatting, and advises the city council on creation of and additions to master land use and master thoroughfare plans for the physical development of Grapevine. Yes
Mitigation Planning Committee	Yes	Hazard identification and risk assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Ongoing/routine park maintenance, drainage clearing, and street sweeping. Yes
Mutual Aid Agreements	Yes	Statewide mutual aid, law enforcement, fire, Arson task force. Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:	No	
***Full-time (FT) or part-time (PT) position**		

Technical	Have capability?	Describe capability. Has capability been used to assess or mitigate risk in the past?
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Notification and warning systems; Yes
Hazard data and information	Yes	National Weather Service data; Yes
Grant writing	Yes	Homeland security grants have been utilized to assess risks associated with urban search and rescue responses; Yes
HaZUS analysis	No	
Other	No	
Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Citizen fire and police academy alumni organizations conduct ongoing community engagement to reduce risk to citizens and first responders; Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	KnoWhat2Do outreach events at schools, businesses, and community meetings; Yes
Natural disaster or safety related school programs	Yes	Ongoing communication with Grapevine-Colleyville Independent School District officials; Yes
StormReady certification	Yes	Yes
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	Grapevine Chamber of Commerce preparedness events; Yes
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Future infrastructure improvements could enhance mitigation activities; Yes
Authority to levy taxes for specific purposes	Yes	General fund revenues could be used to enhance mitigation activities through the operations of city departments; Yes
Fees for water, sewer, gas, and/or electric services	Yes	Revenues ensure infrastructure is maintained resulting in greater resiliency of services; Yes
Impact fees for new development	Yes	Fees ensure capacity is maintained resulting in greater resiliency of services; Yes
Stormwater utility fee	Yes	Fees maintain stormwater system to mitigate flooding incidents; Yes
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Bonds ensure capital improvement projects are funded and maintained; Improved infrastructure through bonds ensure resiliency of city infrastructure; Yes
Incur debt through private activities	No	
Community Development Block Grant	Yes	Infrastructure resiliency; Yes
Other federal funding programs	Yes	Infrastructure projects and response capabilities; Yes
State funding programs	Yes	
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates, and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Grapevine's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Compile a business/ entertainment database specific to emergency warning for severe weather in the City of Grapevine.	Create and compile database of restaurant/businesses /entertainment/hotels that need to warn patrons quickly of severe weather.	6 months	Convention & Visitors Bureau	$5,000	$15,000	Department budget
		STATUS: Completed (businesses can sign up for CodeRed weather warnings)					
		Maintain/update database annually.	1 year	Convention & Visitors Bureau	$0	$10,000	Department budget
		STATUS: Completed (businesses can sign up for CodeRed weather warnings)					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Install new security system in the City of Grapevine police building at allow for better access controls.	Determine appropriate system to meet needs.	1 year	Police Department	$50,000	$150,000	Bonds
		STATUS: Completed at new Public Safety Building					
		Purchase system.	2 years	Purchasing Department	$5,000	$15,000	Department budget
		STATUS: Completed at new Public Safety Building					
		Install system.	3 years	Facility Services Department	$5,000	$10,000	Department budget
		STATUS: Completed at new Public Safety Building					
Severe Thunderstorms and High Winds,	Improve information technology system to incorporate	Determine appropriate system to meet needs.	1 month	Information Technology Department	$50,000	$150,000	City budget
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	laser fiche system into police/fire server systems in the City of Grapevine.	Purchase system.	3 months	Purchasing Department	$5,000	$15,000	Department budget
		STATUS: Completed					
		Install system.	5 months	Information Technology Department	$5,000	$15,000	City budget
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Close fiber loop to City of Grapevine police and fire buildings allowing for redundant network.	Determine appropriate system to meet needs.	1 month	Information Technology Department	$2,000,000	$5,000,000	City bonds
		STATUS: Completed					
		Purchase system.	7 months	Purchasing Department	$10,000	$20,000	Department budget
		STATUS: Completed					
		Install system.	1 year	Information Technology Department	$20,000	$35,000	City bonds
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam	Compile database of all apartment managers/ management in the City of Grapevine.	Create and compile apartment management database.	3 months	Police Department	$5,000	$10,000	Department budget
		STATUS: Completed (businesses can sign up for CodeRed weather warnings)					
		Maintain and update apartment	Annually	Police Department	$1,000	$2,000	Department budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Failure, Wildfires		management database.					
		STATUS: Completed (businesses can sign up for CodeRed weather warnings)					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Compile database of all neighborhood/homeowner associations in Grapevine.	Create and compile neighborhood association database.	3 months	Police Department	$5,000	$10,000	Department budget
		STATUS: Completed (businesses can sign up for CodeRed weather warnings)					
		Maintain and update neighborhood database.	Annually	Police Department	$1,000	$2,000	Department budget
		STATUS: Completed (businesses can sign up for CodeRed weather warnings)					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Develop a program for the low cost purchase of National Oceanic and Atmospheric Administration (NOAA) all-hazard weather radios through utility bills (similar to sprinkler system rain sensor program in place)	Identify vendor for bulk purchase of weather radios with Special Area Message Encoding (SAME) technology.	1 year	Office of Emergency Management	$0	$5,000	Department budget
		STATUS: Deleted- efforts moved to CodeRed outreach					
		Make bulk purchase of radios.	1 year	Office of Emergency Management	$20,000	$50,000	City budget
		STATUS: Deleted- efforts moved to CodeRed outreach					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	for City of Grapevine residents.	Distribute to citizens and allow them to purchase at reduce cost through water bill payment.	1 year	Utility Billing Department	$10,000	$150,000	Department budget
		STATUS: Deleted- efforts moved to CodeRed outreach					
Severe Thunderstorms and High Winds, Tornadoes	Install storm shelter safe rooms for fire department personnel and visitors at all five fire stations in the City of Grapevine.	Determine appropriate size shelter for each fire station.	7 months	Facility Services Department	$200,000	$350,000	Quality of Life funds
		STATUS: Deferred to future remodel/relocation					
		Purchase/order storm shelter for each fire station.	1 year	Purchasing Department	$10,000	$15,000	Department budget
		STATUS: Deferred to future remodel/relocation					
		Deliver and install storm shelters.	1 year	Facility Services Department	$10,000	$15,000	Department budget
		STATUS: Deferred to future remodel/relocation					
Severe Thunderstorms and High Winds, Tornadoes	Install storm shelter safe rooms for city personnel and visitors at all critical facilities in the City of Grapevine.	Determine appropriate size shelter for each location.	1 year	Facility Services Department	$1,500,000	$3,000,000	Quality of Life funds
		STATUS: Deleted due to high cost					
		Purchase/order storm shelter for each location.	2 years	Purchasing Department	$10,000	$15,000	Department budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deleted due to high cost					
		Deliver and install storm shelters.	3 years	Facility Services Department	$10,000	$15,000	Department budget
		STATUS: Deleted due to high cost					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes, Flooding	Have automatic emergency power for the Grapevine City Hall in the event that the main power supply is disrupted.	Identify the appropriate size and type for generator for City Hall.	6 months	Facility Services Department	$0	$100,000	Department budget
		STATUS: Deferred to 2020 HazMAP					
		Purchase/order generator for City Hall.	7 months	Purchasing Department	$175,000	$350,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Deliver and install City Hall generator.	1 year	Facility Services Department	$0	$100,000	Department budget
		STATUS: Deferred to 2020 HazMAP					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Have automatic power generation for the Grapevine community activities center (CAC) in the event that the main power supply is disrupted.	Identify the appropriate size and type for generator for the CAC.	1 year	Facility Services Department	$0	$100,000	Department budget
		STATUS: Completed at new recreation center					
		Purchase/order generator for the CAC.	1 year	Purchasing	$175,000	$350,000	City budget
		STATUS: Completed at new recreation center					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Deliver and install a CAC generator.	2 years	Facility Services Department	$0	$100,000	Department budget
		STATUS: Completed at new recreation center					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Have automatic power generation for the Grapevine municipal service center in the event that the main power supply is disrupted.	Identify the appropriate size and type for generator for the Municipal Service Center.	2 years	Facility Services Department	$0	$100,000	Department budget
		STATUS: In progress					
		Purchase/order generator for the Municipal Service Center.	2 years	Purchasing Department	$175,000	$350,000	City budget
		STATUS: In progress					
		Deliver and install a Municipal Service Center Generator.	3 years	Facility Services Department	$0	$100,000	Department budget
		STATUS: In progress					
Infectious Disease Outbreak	Hire consultant to work with emergency management office to develop robust Continuity of Operations Plan (COOP) for all City	Identify scope of work and bid/select consultant.	1 year	Office of Emergency Management	$75,000	$150,000	City budget
		STATUS: Deleted- will be done in-house					
		Work with selected consultant and each department to develop robust COOP	2 years	All Departments			

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	of Grapevine departments.	plan for provisions of city services during disease outbreak.					
		STATUS: Deleted- will be done in-house					
		Deliver completed plan and test plan in series of tabletop and functional exercises in offsite/remote office locations.	2 years	All Departments	$5,000	$15,000	Department budget
		STATUS: Deleted- will be done in-house					
Hazardous Materials Release	Incorporate hazardous materials/Tier II data layer into Grapevine Geographic Information System (GIS) mapping.	Download and install CAMEO related software.	1 month	Geographic Information System Department	$0	$2,000	City budget
		STATUS: Completed					
		Train Geographic Information System (GIS) Department staff on use of CAMEO for GIS applications.	3 months	Geographic Information System Department	$2,000	$5,000	Department budget
		STATUS: In progress					
		Import Tier II database from Tarrant County into geographic information system	5 months	Geographic Information System Department	$0	$5,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		layer for overlay into City of Grapevine base maps.					
		STATUS: Completed					
Hazardous Materials Release	Incorporate Tier II information into Grapevine fire pre-planning/computer-aided dispatch (CAD) data.	Import and convert Tier II database into Excel format.	1 month	Police Dispatch	$0	$5,000	Department budget
		STATUS: Completed					
		Transcribe database into CRIMES/CAD data base language.	5 months	Police Dispatch	$0	$5,000	Department budget
		STATUS: Completed					
Expansive Soils	Mitigate expansive soils in the City of Grapevine.	Improve construction techniques through building code enhancements.	Ongoing	Building Department	Determined by personnel cost.	Limiting development in identified areas of expansive soils will reduce exposure to the hazardous effects of unstable soils.	General fund
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Educate construction contractors, homeowners, and business owners about mitigation techniques.	Ongoing	Building Department	Determined by personnel cost.	Limiting development in identified areas of expansive soils will reduce exposure to the hazardous effects of unstable soils.	General fund
		STATUS: In progress					
Tornadoes	Compile a business/ entertainment database specific to emergency warning for severe weather in the City of Grapevine.	Create and compile database of restaurants, businesses, entertainment, and hotels that need to warn patrons quickly of severe weather.	6 months	Convention & Visitors Bureau	$5,000	$15,000	Department budget
		STATUS: Completed (businesses can sign up for CodeRed weather warnings)					
Tornadoes	Install storm shelter safe rooms for fire department personnel and visitors at all five	Determine appropriate size shelter for each fire station.	7 months	Facility Services Department	$200,000	$350,000	Quality of Life funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	fire stations in the City of Grapevine.						
		STATUS: Deferred to future remodel/relocation					
Flooding	Compile database of all neighborhood/ homeowner associations.	Create and compile neighborhood association database.	3 months	Police Department	$5,000	$10,000	Department budget
		STATUS: Completed					
Flooding	Compile database of all apartment managers/ management in the City of Grapevine.	Create and compile apartment management database.	3 months	Police Department	$5,000	$10,000	Department budget
		STATUS: Completed (businesses can sign up for CodeRed weather warnings)					
Drought	Enforce water conservation measures during periods of extreme temperatures and limited rainfall in the City of Grapevine.	Lobby legislators for grant funding for water conservation enforcement during high hazard times similar to the same type of grant programs for “click it or ticket”.	1 year	City Manager’s Office	$10,000	$15,000	City budgetary funding
		STATUS: Deleted- no longer a priority					
Drought	Attain grants for water conservation	Legislation changes allow for grant	2 years	Code Enforcement	$0	$10,000	Department budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	measures during periods of extreme temperatures and limited rainfall.	funding of water conservation enforcement.					
		STATUS: Deleted- no longer a priority					
Drought	Install low-flow fixtures at city facilities to conserve water.	Install low-flow fixtures at city facilities.	Unknown	Unknown	Unknown	Unknown	City budgetary funding
		STATUS: In progress for new facilities					
Thunderstorms & High Winds	Install storm shelter safe rooms for fire department personnel and visitors at all five fire stations in the City of Grapevine.	Determine appropriate size shelter for each fire station.	7 months	Facility Services Department	$200,000	$350,000	Quality of Life funds
		STATUS: Deferred to future remodel/re-location					
Thunderstorms & High Wind	Install storm shelter safe rooms for city personnel and visitors at all critical facilities in the City of Grapevine.	Determine appropriate size shelter for each location. Purchase/order storm shelter for each location.	2 years	Facility Services Department	$1,500,000	$3,000,000	Quality of Life funds
		STATUS: Deleted due to high costs					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Hail	Develop a program for the low cost purchase of National Oceanic and Atmospheric Administration (NOAA) all-hazard weather radios through utility bills (similar to sprinkler system rain sensor program in place) for City of Grapevine residents.	Identify vendor for bulk purchase of weather radios with Specific Area Message Encoding (SAME) technology. Make bulk purchase of radios.	1 year	Office Emergency Management	$5,000	$5,000	Department budget
		STATUS: Deleted- efforts moved to CodeRed outreach					
Hail	Implement a program for the low cost purchase of National Oceanic and Atmospheric Administration (NOAA) all-hazard weather radios through utility bills (similar to sprinkler system rain sensor	Distribute to citizens and allow them to purchase at reduce cost through water bill payment.	1 year	Utility Billing Department	$10,000	$150,000	Department budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	program in place) for City of Grapevine residents.						
		STATUS: Deleted- efforts moved to CodeRed outreach					
Lightning	Develop a program for the low cost purchase of National Oceanic and Atmospheric Administration (NOAA) all-hazard weather radios through utility bills (similar to sprinkler system rain sensor program in place) for City of Grapevine residents.	Identify vendor for bulk purchase of weather radios with Specific Area Message Encoding (SAME) technology. Make bulk purchase of radios.	1 year	Office Emergency Management	$5,000	$5,000	Department budget
		STATUS: Deleted- efforts moved to CodeRed outreach					
Lightning	Implement a program for the low cost purchase of National Oceanic and	Distribute to citizens and allow them to purchase at reduce cost through water bill payment.	1 year	Utility Billing Department	$10,000	$150,000	Department budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	Atmospheric Administration (NOAA) all-hazard weather radios through utility bills (similar to sprinkler system rain sensor program in place) for City of Grapevine residents.						
		STATUS: Deleted- efforts moved to CodeRed outreach					
Winter Storms, Extreme Temperatures	Develop a program for the low cost purchase of National Oceanic and Atmospheric Administration (NOAA) all-hazard weather radios through utility bills (similar to sprinkler system rain sensor program in place) for City of Grapevine residents.	Identify vendor for bulk purchase of weather radios with Specific Area Message Encoding (SAME) technology. Make bulk purchase of radios.	1 year	Office Emergency Management	$5,000	$5,000	Department budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deleted- efforts moved to CodeRed outreach					
Winter Storms	Implement a program for the low cost purchase of National Oceanic and Atmospheric Administration (NOAA) all-hazard weather radios through utility bills (similar to sprinkler system rain sensor program in place) for City of Grapevine residents.	Distribute to citizens and allow them to purchase at reduce cost through water bill payment.	1 year	Utility Billing Department	$10,000	$150,000	Department budget
		STATUS: Deleted- efforts moved to CodeRed outreach					
Wildlife	Compile database of all neighborhood/ homeowner associations for wildfire notifications.	Create and compile neighborhood association database.	3 months	Police Department	$5,000	$10,000	Department budget
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Wildlife	Compile database of all apartment managers/ management for wildfire notifications.	Create and compile apartment management database.	3 months	Police Department	$5,000	$10,000	Department budget
		STATUS: Completed (businesses can sign up for CodeRed weather warnings)					
Wildfire	Implement Firewise community program.	Coordinate with Texas A&M Forest Service, our city, and community to establish a Firewise community program. This program will assist us with preplanning for a fire, during and after.	3 years	Fire Department	$50,000	The primary benefit will come in the form of life and property conservation.	General fund, grants
		STATUS: Deleted- no longer feasible					
Extreme Temperatures	Develop and extreme temperature outreach program for City of Grapevine employees that work outside.	Develop an extreme temperature outreach program that provides tips and pertinent information for ensuring the health and safety of employees working outside during	2 months	Office Emergency Management	$2,000	Unknown	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		extreme temperatures.					
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Attain grants for water conservation measures during periods of extreme temperatures and limited rainfall.	Legislation changes allow for grant funding of water conservation enforcement.	2 years	Code Enforcement	$0	$10,000	Department budget
		STATUS: Deleted- no longer a priority					
Dam Failure	Identify inundation areas for dams located in the City of Grapevine.	Completed inundation studies for dams located within the City of Grapevine.	1-2 years	Public Works and Transportation Department	To be determined	To be determined	To be determined
		STATUS: Deferred to 2020 HazMAP					
Dam Failure	Educate citizens regarding risk for dam failure that are located in inundation areas.	Develop and implement information medium to inform citizens in inundation areas.	1-2 years	Office Emergency Management	To be determined	To be determined	To be determined
		STATUS: Completed					

5.3 New Action Items

The City of Grapevine's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for the 2020 HazMAP.

Hazard(s) Addressed	**Earthquakes, Extreme Heat, Thunderstorms, Tornadoes, Wildfires, Winter Storms**
Purchase emergency generators to power new and existing critical facilities, mitigating the effects of power loss to critical infrastructure and allowing continuation of services and government.	
Participating Jurisdiction:	City of Grapevine
Priority:	1
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	City budget, Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM)
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	**Earthquakes, Thunderstorms, Tornadoes**
Implement an individual/residential safe room rebate program.	
Participating Jurisdiction:	City of Grapevine
Priority:	2
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City budget, county funds, Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM)
Lead Agency/Department Responsible:	Emergency Management Office
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Install storm shelter safe rooms for fire department personnel and visitors at new and existing fire stations in the City of Grapevine.	
Participating Jurisdiction:	City of Grapevine
Priority:	3
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	City budget, Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM)
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the state to conduct a study to determine inundation zones, vulnerability to, and potential impacts of a dam failure and water inundation areas above and below Grapevine Lake.	
Participating Jurisdiction:	City of Grapevine
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM)
Lead Agency/Department Responsible:	Emergency Management Office, Geographic Information Systems Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Extreme Heat
Develop an extreme temperature outreach program that provides tips and pertinent information for ensuring the health and safety of employees working outside during extreme temperatures, mitigating medical surge and increased calls for emergency medical service personnel response.	
Participating Jurisdiction:	City of Grapevine
Priority:	5
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Staff time, Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM)
Lead Agency/Department Responsible:	Risk Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Develop and implement a comprehensive public education program that includes recommended actions to mitigate the impacts of each identified hazard.	
Participating Jurisdiction:	City of Grapevine
Priority:	6
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Staff time, Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM)
Lead Agency/Department Responsible:	Emergency Management Office
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Expansive Soils
Implement xeriscaping/water conservation landscaping based upon Texas A&M AgriLife's Earth-Kind project, utilizing drought friendly plants and conserving water for city properties. Public information program will also inform the public and encourage private participation to promote water conservation.	
Participating Jurisdiction:	City of Grapevine
Priority:	7
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	Operating budget, Hazard Mitigation Grant Program (HMGP) , Pre-Disaster Mitigation (PDM)
Lead Agency/Department Responsible:	Parks and Recreation Department, Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Expansive Soils, Flooding, Thunderstorms, Tornadoes
Enforce existing building codes which will mitigate future damages and repair costs.	
Participating Jurisdiction:	City of Grapevine
Priority:	8
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	Staff time
Lead Agency/Department Responsible:	Development Services
Implementation Schedule:	36 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Emergency Management Plan – Hazard Mitigation Annex	Office of Emergency Management	Every 5 years	Reference this HazMAP when developing the plans.	The planning team will reference this HazMAP as part of the update/review process for the Emergency Management Plan.
Departmental Budget Plans	City departments	Annually	Public education, enforcing building codes, and extreme heat employee health.	The planning team will reference this HazMAP when reviewing the budget and identify mitigation activities when applicable.
Capital Improvement Project Plans	Finance Department, Parks and Recreation Department	Annually	Grapevine Lake flooding inundation actions.	Addition of projects into capital improvement budget.
Regulatory Plans	City Administration, department leadership	As needed	Reference this HazMAP when developing the plans.	The HazMAP will be consulted when city departments review or revise their current regulatory planning mechanisms, or in

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
				the development of regulatory plans that are not currently in place.
Drainage Master Plan	Public Works Department	As needed	Notations of potential drainage concerns.	City leadership and public works staff will review identified mitigation action items and consider plan revision as necessary to address them.
2020 Parks Master Plan	Parks and Recreation Department	Every 10 years	Reference this HazMAP when developing the plan.	When reviewing the Parks Master Plan, the Parks and Recreation Department will review the HazMAP to see which action items can be addressed with the fiscal and administrative capabilities of the city.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Grapevine. For additional information, see Appendices A and B.

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City of Haltom City

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Haltom City was the Fire Marshall.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided is for Haltom City alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

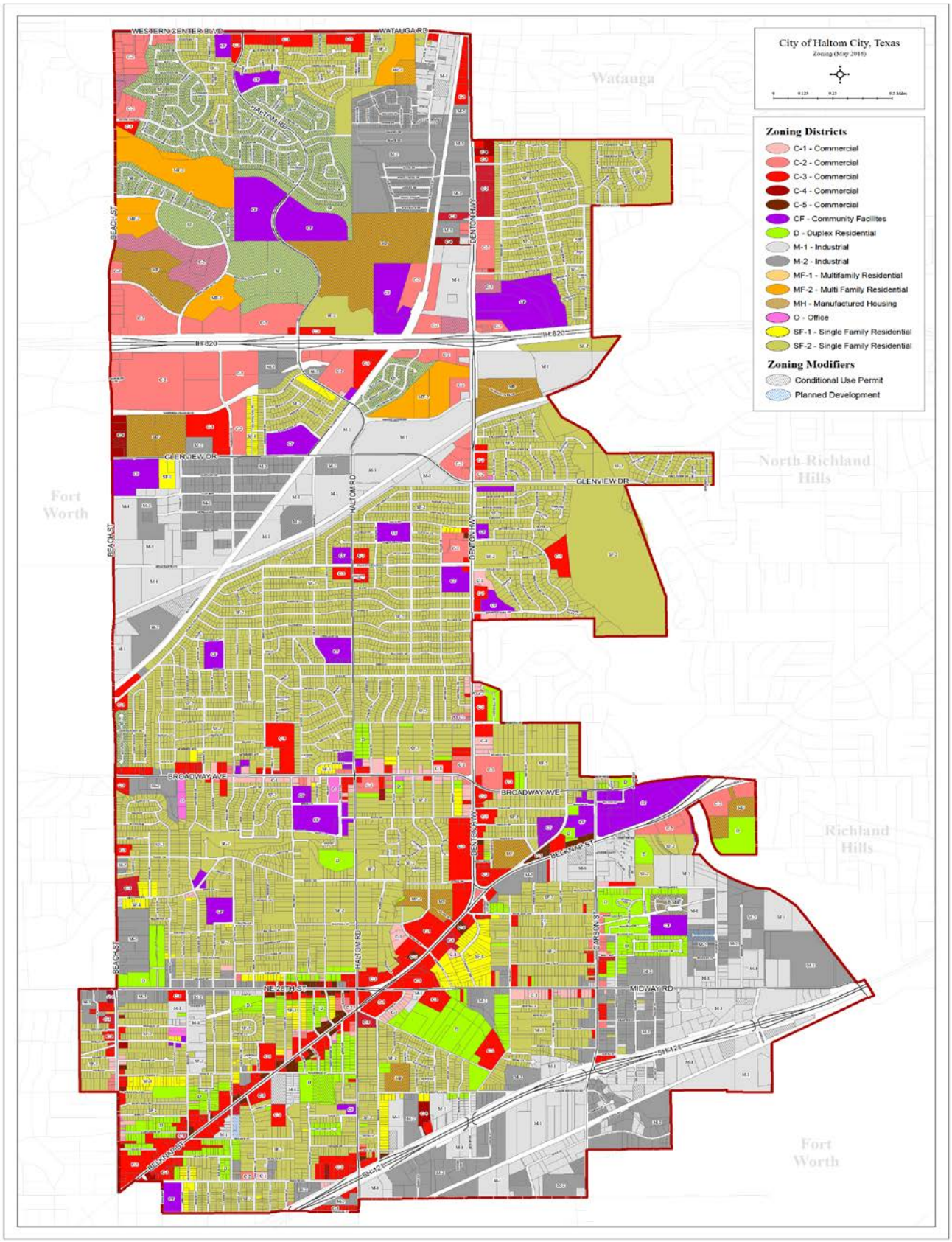
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), Haltom City will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

The following map provides an overview of Haltom City.

- Zoning Map


City of Haltom City, Texas
Zoning (May 2016)
Zoning Districts
C-1 - Commercial
C-2 - Commercial
C-3 - Commercial
C-4 - Commercial
C-5 - Commercial
CF - Community Facilities
D - Duplex Residential
M-1 - Industrial
M-2 - Industrial
MF-1 - Multifamily Residential
MF-2 - Multi Family Residential
MH - Manufactured Housing
O - Office
SF-1 - Single Family Residential
SF-2 - Single Family Residential
Zoning Modifiers
Conditional Use Permit
Planned Development
WESTERN CENTER BLVD
WATAUGA RD
HALTOM RD
BEACH ST
DENTON HWY
IH 820
GLENVIEW DR
BROADWAY AVE
BELKNAP ST
NE 28TH ST
MIDWAY RD
CARSON ST
SH-121
Watauga
Fort Worth
North Richland Hills
Richland Hills

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While Haltom City has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by Haltom City's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Fire Marshall.

The LPT was assembled in 2017 with representatives from Haltom City. The city acted as the plan development consultant, providing hazard mitigation planning services.

Haltom City Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
Haltom City	Fire Department	Fire Marshall	General oversight, hazard identification, and plan development
Haltom City	Fire Department, Office of Emergency Management	Emergency Management Coordinator	Hazard identification and plan development
Haltom City	Fire Department	Fire Chief	Hazard identification and plan development
Haltom City	Public Works Department	Director	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: Adopted 2015 ICC building code and continuing to work on flood/drainage control to improve drainage. A full list of completed mitigation action items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from Haltom City.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	44,361
Persons under 5 years (%)	7.8
Persons 65 years and over (%)	10.1
Language other than English spoken at home (%)	44.1
With a disability, under age 65 (%)	6.9
Persons without health insurance, under age 65 (%)	28
Persons in poverty (%)	17.3
Median household income	$45,767
Households, 2012-2016	14,686
Median value of owner-occupied housing units, 2012-2016	$91,500

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in Haltom City.

Haltom City Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Police Department 5110 Broadway Avenue	Law Enforcement	50 people	8,000	$1,900,000	$300,000
City Hall/Municipal Court 5024 Broadway Avenue	City Hall	50 people	8,000	$1,500,000	$200,000
Fire Station #1 5525 Broadway Avenue	Fire/Rescue	50 people	10,000	$3,800,000	$300,000
Fire Station #2 5700 Midway Road	Fire/Rescue	8 people	20,000	$4,000,000	$300,000
Fire Station #3 4849 Northeast Loop 820	Fire/Rescue	8 people	2,000	$3,000,000	$8,000

3.3 Natural Hazard Profiles

Haltom City's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact Haltom City in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Flooding
2	Tornado
3	Thunderstorm (includes hail, wind, lightning)
4	Extreme Heat
5	Expansive Soils
6	Drought
7	Earthquake
8	Winter Storms
9	Wildfire

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire Haltom City.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Significant
Probability of Future Occurrence	Likely
Maximum Probable Extent	Major
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	There is no historical data for drought damage in the city. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Jurisdiction's ground-water supply: There is no ground water supply in Haltom City.

Describe any water restrictions used in your jurisdiction: Haltom City follows the recommendations from the Tarrant Regional Water District. Under Stage 1 restrictions, households and businesses are limited to sprinkler watering two days per week with the two days determined by the address of the location. No watering, regardless of address, may take place between the hours of 10:00 AM and 6:00 PM on any day.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Significant
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Unknown. The Department of Public Works does not track damage caused by expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. People who work outside or in buildings without air-conditioning are also at high risk to the direct effects of extreme heat. No specific data on type and location of the population was provided.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? No cases have been recorded.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Commuters and any buildings in a floodplain are considered most at risk, though all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

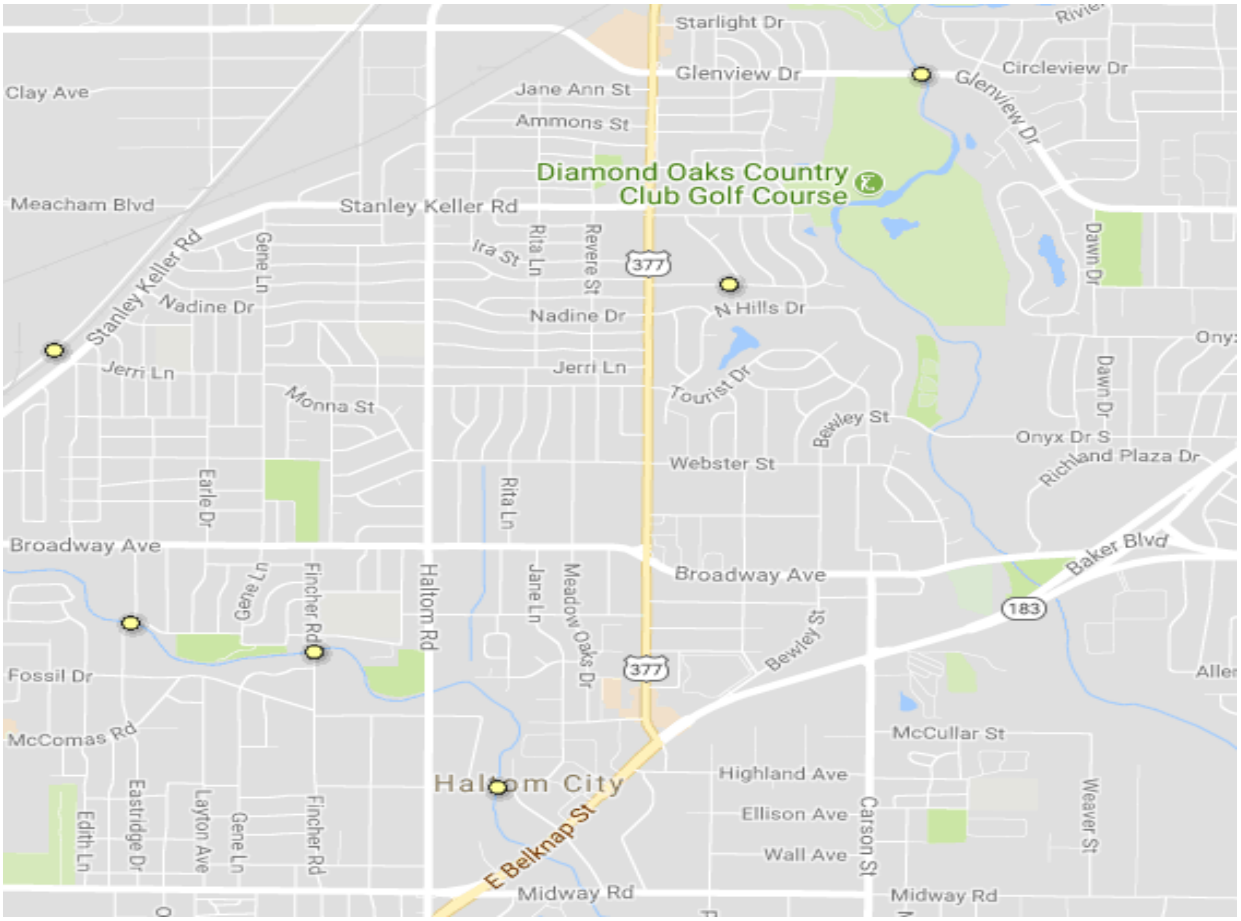
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? Yes, though there have been no reports of flood damage since 2015.

Intersections or traffic routes impacted by flooding: Broadway Avenue/Denton Highway (commercial property), Dana Drive/Fincher Road (commercial and residential property), and Mack Road/Revere Street (residential property). See low water crossings below, as these roads have the potential of flooding.

Names of any creeks or rivers that flood: Big Fossil Creek, White's Branch, and Little Fossil Creek.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Glenview Drive	Big Fossil Creek	Bridge Class
Diamond Oaks Drive	Big Fossil Creek, TRIB Stream BFC-6	Vented Ford
Walthall Drive	Little Fossil Creek	Bridge Class
Fincher Road	Little Fossil Creek	Bridge Class
Eastridge Drive	Little Fossil Creek	Bridge Class
Old Denton Road	Little Fossil Creek, TRIB C	Vented Ford

Road	Flooding Source	Low Water Crossing Type

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

According to the Haltom City Office of Emergency Management, there is one dam within the 100-year floodplain and no other critical infrastructure.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. Haltom City is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480599#
Community Name	City of Haltom City
County	Tarrant County
Initial FHBM Identified	06/28/1974
Initial FIRM Identified	02/01/1978
Current Effective Map Date	09/25/2009
Reg-Emer Date	02/01/1978
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Director of Public Works.

What specific flooding ordinances and plans does your jurisdiction have? Flood Damage Prevention Ordnance last revised January 12, 2010 by Ordinance No. 10-011.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? New construction must conform to the standards outlined in Section 5.01 of the above-mentioned ordinance.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? Building is not permitted in a floodplain.

Repetitive and Severe Repetitive Loss Properties: There are currently 9 residential and 5 nonresidential repetitive loss properties and 0 severe repetitive loss properties within Haltom City. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the Haltom City's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist, https://bsa.nfipstat.fema.gov/reports/1011.htm#TXT	Policies in-force: 262 Insurance in-force: $59,884,800 Written premium in-force: $498,710
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 122 claims have been filed, but 34 of the claims closed without payment. $3,349,909.45 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	Approximately 262 structures are at risk of flooding.
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	Data not available.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, GIS, education or outreach, inspections, and engineering capability.

What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Data not available.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Data not available.
Is a CAV or CAC scheduled or needed?		Data not available.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	1974
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.

Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	(1) Application for a Floodplain Development Permit shall be presented to the Floodplain Administrator on forms furnished by him/her and may include, but not be limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to areas of special flood hazard. Additionally, the following information is required: (a) After forms are set for the lowest floor, a letter completed by a licensed engineer or surveyor indicating the proposed lowest floor elevation (in relation to mean sea level), including basement and finished garage of all new and substantially improved structures; (b) After construction and before final inspection, an elevation certificate completed by a licensed engineer or surveyor; (c) Elevation in relation to mean sea level to which any nonresidential structure shall be floodproofed; (d) A certificate from a registered professional engineer or architect that the nonresidential floodproofed structure shall meet the floodproofing criteria of Section 5.02 (2); (e) Description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of proposed development; (f) Maintain a record of all such information in accordance with Section 4.02(1).
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.
What is the community's CRS Class Ranking?	Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual	7.
Does your flood management plan or hazard mitigation plan include CRS planning requirements?	Community FPA, FEMA CRS Coordinator, ISO representative. CRS Manual: https://www.fema.gov/	Yes.

	media-library/assets/documents/8768?id=2434	

Haltom City will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): The majority of damage was done to trees, fences, and roofs and caused primarily by high winds.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

Is there an area of the town that is the most vulnerable to tornadoes? Haltom City has two neighborhoods that have mobile/manufactured houses, located in the northern and southern portions of the city. In addition, there are nursing facilities located in the center and northern regions of the city. The city has seven elementary, two middle and two high schools located throughout the city.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environment damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environment in the city are exposed to this hazard. Much of the risk to people from wildfires in Haltom City is the result of smoke impacting those with respiratory diseases when smoke from wildfires in surrounding jurisdictions moves over the City of Haltom City.

Most vulnerable location (North, East, South, West) of your jurisdiction? The only major open space within the city include two golf courses on the east side of the city and Buffalo Ridge Park in the north side of the city. These locations all have creeks that run through them and are at a low risk to wildfires.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction:

- Loop 820 Haltom Road Bridge
- Loop 820 Denton Highway Bridge
- 121 Haltom Road Bridge
- 121 Hickory Street Bridge
- 121 Carson Street Bridge
- 121 Minnis Street Bridge
- Denton Highway at Loop 820
- Haltom Road over Big Fossil Creek

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

According to the National Centers for Environmental Information, no natural hazard events have occurred within Haltom City between 2015 and 2017, though the city has experienced unrecorded events over the years. Thunderstorm damage was recorded under the specific hazard.

3.5 Overall Vulnerability

Haltom City identified their greatest vulnerabilities and concerns within the respective hazard sections.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to Haltom City's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; Yes; Yes
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	Yes	No; No; Yes
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	Yes	Yes; Yes; Yes
Transportation Plan	No	No
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	Yes	Yes; Yes; Yes
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	No	No
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	No

Acquisition of land for open space and public recreation uses	Yes	Yes; Yes
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year: 2012 ICC**
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 2**
Site Plan Review Requirements	Yes	Type(s) of requirement: Commercial Land Use Plan.
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Commission is appointed by the Mayor and Council and serve two-year terms; Yes
Mitigation Planning Committee	Yes	Planning and Hazard Assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Members of the Public Works and Transportation Department are tasked with this mission; Yes
Mutual Aid Agreements	Yes	Haltom City has adopted the statewide mutual aid system; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	No	
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	CodeRed; Yes
Hazard data and information	Yes	Per the annual Threat and Hazard Identification and Risk Assessment and other assessments; Yes
Grant writing	Yes	
HaZUS analysis	No	

Other	No	
Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Community Emergency Response Team (CERT)- citizens are trained on local hazards. Yes, but these organizations would not likely be used for mitigation activities.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Fire prevention and preparedness; Yes
Natural disaster or safety related school programs	Yes	Fire prevention and community awareness programming; Yes.
StormReady certification	Yes	StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education and awareness. To be officially StormReady, a community must: Establish a 24-hour warning point and emergency operations center. Have more than one way to receive severe weather warnings and forecasts and to alert the public. Create a system that monitors weather conditions locally. Promote the importance of public readiness through community seminars. Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises. Yes
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	No	
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If Yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Flood mitigation projects. Yes
Authority to levy taxes for specific purposes	Yes	Flood mitigation projects. Yes
Fees for water, sewer, gas, and/or electric services	Yes	Fee for water and drainage impact fees. No
Impact fees for new development	Yes	Drainage and water projects. Yes
Stormwater utility fee	No	
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Large capital projects. Yes
Incur debt through private activities	Yes	Tax increment financing. Yes
Community Development Block Grant	Yes	Yes, through Tarrant County. Yes
Other federal funding programs	Yes	Yes; Yes
State funding programs	Yes	Yes; Yes
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized. Actions include:

- Securing additional flood mitigation funding to focus on completing mitigation projects.
- Purchasing power back up systems for all city buildings.
- A more focused warning system to better communicate to the special needs populations.
- Creating an up-to-date and expandable Emergency Operations Center.
- Increasing mitigation awareness programs by funding a position using mitigation funds to reach out to the community and educate citizens on local hazard mitigation.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

Haltom City's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Enhance warning systems to warn citizens about severe weather in Haltom City.	Implement outdoor warning system (OWS).	Completed	Office of Emergency Management	$52,000	$200,000	General fund
		STATUS: Deferred to 2020 HazMAP					
		Implement CodeRed phone notification system.	Continual	Office of Emergency Management	$7,700 annually	$32,000	General fund
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Haltom City staff will keep an up-to-date list of businesses in the community.	Create and compile business database.	Haltom City	Planning Department	$5,000	$10,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Maintain/update a business database.	Haltom City	Planning Department	$1,000	$2,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Flooding	Enhance flood plain regulations in Haltom City.	Annual repetitive losses due to flooding will continue to be assessed and mapped. Thus make attempts to mitigate	Annual along with a five year reassessment schedule	Engineering Department	$10,000,000	$40,000,000	General fund City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		the effects within the city.					
		STATUS: Deferred to 2020 HazMAP					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes, Extreme Temperatures	Have automatic emergency power generators for all stations in the event that the main power supply is disrupted in Haltom City.	Identify appropriate size and type of generator for Fire Station #3.		Fire Department, Public Works Department	$0	$100,000	Hazard Mitigation Grant Program
		STATUS: Deferred to 2020 HazMAP					
		Purchase generators.		Fire Department	$50,000	$100,000	Hazard Mitigation Grant Program
		STATUS: Deferred to 2020 HazMAP					
		Evaluate power needs to maintain library.		Building Maintenance Department	$1,500	$120,000	Hazard Mitigation Grant Program
		STATUS: Deferred to 2020 HazMAP					
		Advertise for bids for City Hall auxiliary generator.		Building Maintenance Department	$500	$120,000	Hazard Mitigation Grant Program
		STATUS: Deferred to 2020 HazMAP					
Infectious Disease Outbreak	Reduce the effects of and loss of life to various disease populations that may be at risk to	Identify existing current city owned and operated facilities that could be utilized as	As funding is available	Office of Emergency Management, Fire Department	Unknown	Unknown	Grants and other outside funding sources

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	infectious diseases in Haltom City.	distribution points for vulnerable populations to assist with appropriate delivery of preventive measures.					
		STATUS: Deferred to 2020 HazMAP					
Drought	Identify areas where repetitive damages occur in Haltom City during chronic hazard events.	Haltom City water conservation during rainy seasons through rain sensors on sprinkler systems to mitigate the effects during periods of droughts.	Within 2 years of funding	Public Works Department			Annual budget, grant funding, citizens
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Reduce or eliminate loss of life and property damage resulting from severe weather events related to extreme heat in Haltom City.	Haltom City will determine and create cooling centers to allow citizens, especially vulnerable populations, to seek refuge from extreme temperatures.	As funding is available	Parks Department	As the city currently has several facilities that could be utilized for cooling centers, the costs are minimal.	Unknown	Grants or other outside funding sources
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Expansive Soils	Develop and enforce Haltom City ordinances.	Limit development in areas of high hazard expansive soils through enforcement of building codes and standards.	As funding is available.	Building Inspection Department	Determined by personnel costs.	Limiting development in identified areas of expansive soils will reduce exposure to the hazardous effects of unstable soils.	General fund
		STATUS: In progress					
Tornadoes	Enhance warning systems to help warn the citizens of Haltom City, concerning the potential of tornadic activity.	Implement OWS upgrades to address potential areas where growth has and will occur that may impact the ability of the system to reach its intended service area.	Project will be implemented as development occurs.	Office of Emergency Management	$52,000	The impact of warning the population of the impending tornado is difficult to measure with the impact to life and property. This number	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
						could be in the millions of dollars.	
		STATUS: Deferred to 2020 HazMAP					
Tornadoes	Upgrade the CodeRed phone notification system with a more robust system.	Install a robust CodeRed phone system to notify citizens of tornado warnings.	Completed with annual updates as the community grows.	Office of Emergency Management	$7,700	The impact of warning the population of the impending tornado is difficult to measure with the impact to life and property. This number could be in the millions of dollars.	General fund
		STATUS: Deferred to 2020 HazMAP					
Flooding	Add high water warning devices on roadways that are prone to high water.	Install high water warning system along creek beds to notify officials of potential flooding.	3-5 years as funding is available.	Public Works Department	$225,000	$400,000	Certificate of Obligation, bond issues
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Flooding	Enhance and enforce flood plain regulations in Haltom City.	Utilize Flood Insurance Rate Map (FIRM) maps to identify at-risk properties for flooding.	5-10 years as funding becomes available.	Engineering Department	$10,000,000	$40,000,000	Hazard Mitigation Grant Program
		STATUS: Deferred to 2020 HazMAP					
Dam Failure	Improve ability to inform citizens of the risks associated with living near a dam that is a barrier that impounds a body of water.	Inspect the dam's structure integrity.	3-5 years	Engineering Department	$200,000	$800,000	General fund
		STATUS: Deferred to 2020 HazMAP					
Drought	Plan for the delivery of potable water during times of severe drought.	Install above ground storage and portable tanks to increase potable water storage capacity.	3-10 years	Public Works Department	Unknown	The impact is difficult to measure concerning the overall impact of doing nothing.	Bond issuance
		STATUS: Deferred to 2020 HazMAP					
Expansive Soils	Identify areas of the city that have a history of soil related damage to structures and roadways.	Construct new roadways using soil composition data to decrease expansive soil impacts.	By building code adoption with an appendix	Inspections Department	Determined by personnel costs.	Unknown	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
			adopted by ordinance.				
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	During these times of extreme heat we will initiate public service announcements to target the population that may be at the highest risk from the effects of extreme heat.	Open cooling centers in Haltom City to provide relief for citizens affected by the extreme heat.	As funding is available	Parks Department	The city currently has several facilities that could be utilized for cooling centers, the costs are minimal. Mainly additional utility and personnel related costs.	Unknown	General fund
		STATUS: Deferred to 2020 HazMAP					
Thunderstorms and High Wind	Enhance warning systems to help warn the citizens of Haltom City, concerning the potential of severe storms (severe thunderstorms, high winds).	By updating the CodeRed notification system with a more robust process for notifying citizens by way of smart phone applications, texting and other forms of	Completed with annual updates as the community grows.	Office of Emergency Management	$7,700	The impact of warning the population of the impending severe storm is difficult to measure	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		social media. This will have the potential of reaching a more active and social community. This will allow for the whole community to be warned of this potential.				with the impact to life and property. This number could be in the millions of dollars.	
		STATUS: Deferred to 2020 HazMAP					
Thunderstorms and High Wind	Increase awareness through public service announcements (PSAs), such as the KnoWhat2do program, and continue efforts to increase the coverage of indoor warning devices, such as weather radios.	This effort would be to better inform the population of actions they can take to better prepare and ultimately survive the effects of severe storms. Add weather radios for indoor warning devices to all homes and businesses.	3-5 year project	Office of Emergency Management	$200,000	The impact is difficult to measure.	General fund, grants, donations
		STATUS: Deferred to 2020 HazMAP					
Hail	Enhance warning systems to help warn the citizens of Haltom City, concerning the	By updating the CodeRed notification system with a more robust	Completed with annual updates as the	Office of Emergency Management	$7,700	The impact of warning the population	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	potential of severe storms producing large hail.	process for notifying citizens by way of smart phone applications, texting and other forms of social media in an effort to reach a more active and social community. This will further increase the ability to warn the whole community to the potential hazard of hail, associated with severe storms.	community grows.			of the impending severe storm with the potential of hail is difficult to measure with the impact to life and property. This number could be in the millions of dollars.	
		STATUS: Deferred to 2020 HazMAP					
Hail	Increase awareness through public service announcements (PSAs), such as the KnoWhat2do program, and continue efforts to increase the coverage of indoor warning devices, such as weather radios.	This effort would be to better inform the population of actions they can take to better prepare and ultimately survive the effects of hail associated with severe storms by adding weather	3-5 years	Office of Emergency Management	$400,000	The impact of warning the population of the impending severe storm with the potential of hail is difficult to measure	General fund, bond issuance

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		radios for the home and or business.				with the impact to life and property. This number could be in the millions of dollars.	
		STATUS: Deferred to 2020 HazMAP					
Lightning	Enhance warning systems to help warn the citizens of Haltom City, concerning the potential of severe storms producing cloud to ground and cloud-to-cloud lightning.	Install lightning detection capabilities at weather stations.	1-3 years	Office of Emergency Management	$78,000	The impact of warning the population concerning lightning associated with a severe storm is difficult to measure with the impact to life and property. This number could be in the millions of dollars.	General fund, bond issues
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Lightning	Increase awareness through public service announcements (PSAs), such as the KnoWhat2do program, and continue the efforts to increase the coverage of indoor warning devices, such as weather radios.	Distribute lightning mitigation educational materials to the public to encourage installation of lightning rods on homes.	3-5 years	Office of Emergency Management	$400,000	The impact of warning the population of lightning associated with severe storm is difficult to measure with the impact to life and property. This number could be in the millions of dollars.	General fund, bond issuance
		STATUS: Deferred to 2020 HazMAP					
Winter Storms	Enhance warning systems to help warn the citizens of Haltom City, concerning the potential of winter storms. These storms can impact the city in numerous ways from slick roads to loss of	By updating the CodeRed notification system with a more robust process for notifying the citizens by way of smart phone applications, texting and other forms of social media. This	Annual project	Office of Emergency Management	$7,700	The impact of warning the population of a winter storm is difficult to measure with the impact to life	General fund.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	power from down power lines.	will have the potential of reaching a more active and social community. This would also allow for the whole community to be warned of the potential hazard associated with winter storms. The impact of this action will reduce the amount of potential accidents and it would offer the citizen more of advanced warning to prepare for loss of power and heat.				and property. This number could be in the millions of dollars.	
		STATUS: Deferred to 2020 HazMAP					
Winter Storms	Increase awareness through public service announcements (PSAs), such as the KnoWhat2do program, and continue the efforts to increase the coverage of indoor	This effort would be to better inform the population of actions they can take to better prepare and ultimately survive	3-5 years	Office of Emergency Management	$400,000	The impact of warning the population of a winter storm is difficult to	General fund, bond issuance

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	warning devices, such as weather radios.	the effects of winter storms. This action can and does reduce the amount of individuals who may be impacted from the extremes associated with winter storms by adding weather radios for the home and or business.				measure with the impact to life and property. This number could be in the millions of dollars.	
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Reduce the amount of fuel available for the spread of a wildfire.	Aggressively enforce the high weed and grass ordinance to reduce the height of grasses and other natural habitat that does offer fuel for advancing wildfires. This enforcement does offer a great deal of mitigation against the rapid growth of wildfires.	As funding is available	Code Enforcement Division	Cost associated with personnel.	Unknown	General fund
		STATUS: Deleted- wildfires are not a threat					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Wildfire	Increase awareness through public service announcements (PSAs) such as the KnoWhat2do program and other Texas Forest Service programs concerning efforts to inform the community of the dangers of wildfires.	Distribute PSAs and program information on wildfires to Haltom City community.	3-5 years as funding is available.	Fire Department	$145,000	The impact of protecting the population from wildfires is difficult to measure with the impact to life and property. This number could be in the millions of dollars.	General fund, bond Issuance
		STATUS: Deleted- wildfires are not a threat					

5.3 New Action Items

Haltom City's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Flooding**
Improve drainage at low water crossings, to include culverts and or retention ponds.	
Participating Jurisdiction:	Haltom City
Priority:	1
Estimated Cost:	$40,000
Estimated Benefit:	$240,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	36 months

Hazard(s) Addressed	**Flooding**
Enhance high water warning system by adding automatic gates on the streets that normally flood.	
Participating Jurisdiction:	Haltom City
Priority:	2
Estimated Cost:	$15,000
Estimated Benefit:	$90,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Flooding
Replace the bridge on Carson Street so that more water can flow underneath.	
Participating Jurisdiction:	Haltom City
Priority:	3
Estimated Cost:	$4,000,000
Estimated Benefit:	$24,000,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Purchase and install a generator for the City Hall Complex.	
Participating Jurisdiction:	Haltom City
Priority:	4
Estimated Cost:	$250,000
Estimated Benefit:	$1,500,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Build shelters at the city parks so people can be protected from severe weather.	
Participating Jurisdiction:	Haltom City
Priority:	5
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Parks Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Winter Storms
Develop and fund a rebate program for citizens to buy weather alert radios.	
Participating Jurisdiction:	Haltom City
Priority:	6
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Review and enhance the Stormwater Management Plan as needed.	
Participating Jurisdiction:	Haltom City
Priority:	7
Estimated Cost:	$15,000
Estimated Benefit:	$100,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Flooding
Using the enhanced Stormwater Management Plan, improve drainage where flash flooding normally occurs which forces roads to be closed.	
Participating Jurisdiction:	Haltom City
Priority:	8
Estimated Cost:	$10,000,000
Estimated Benefit:	$60,000,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management, Engineering Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes
Purchase two mobile Outdoor Warning Sirens/Public Announcement System.	
Participating Jurisdiction:	Haltom City
Priority:	9
Estimated Cost:	$80,000
Estimated Benefit:	$480,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management, Parks Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Purchase extra portable radios for the Emergency Operations Center (EOC), radio equipment, and retrofit the radio room.	
Participating Jurisdiction:	Haltom City
Priority:	10
Estimated Cost:	$120,000
Estimated Benefit:	$720,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	18 months

Hazard(s) Addressed	Thunderstorms
Provide hail resistant parking for city owned vehicles.	
Participating Jurisdiction:	Haltom City
Priority:	11
Estimated Cost:	$80,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department, Building Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Thunderstorms
Install hail resistant roofing on new and existing Haltom City facilities when the current roof needs to be replaced.	
Participating Jurisdiction:	Haltom City
Priority:	12
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Facilities Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Enhance current outdoor warning system, to include automatic activation for tornado warnings, and secure the radio system.	
Participating Jurisdiction:	Haltom City
Priority:	13
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	18 months

Hazard(s) Addressed	Thunderstorms
Install lightning detection equipment at all city parks.	
Participating Jurisdiction:	Haltom City
Priority:	14
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Parks Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Winter Storms
Survey the fire and police departments served by the joint North Richland Hills-Haltom City-Watauga (NRHW) communications office and ascertain need and want as well as determine the number of users needed to implement a multijurisdictional Automatic Vehicle Location (AVL) system within Haltom City, North Richland Hills, Richland Hills, and Watauga.	
Participating Jurisdiction:	Haltom City
Priority:	15
Estimated Cost:	$200
Estimated Benefit:	$1,200
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	NRHW
Implementation Schedule:	7 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Winter Storms
Purchase hardware/software for participating jurisdictions and NRHW to implement a multijurisdictional Automatic Vehicle Location (AVL) system for both police and fire from Haltom City, North Richland Hills, Richland Hills, and Watauga.	
Participating Jurisdiction:	Haltom City
Priority:	16
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	NRHW
Implementation Schedule:	24 months

Hazard(s) Addressed	Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Purchase satellite phones for the Emergency Operations Center.	
Participating Jurisdiction:	Haltom City
Priority:	17
Estimated Cost:	$6,000
Estimated Benefit:	$36,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Create a database of people with special needs for Haltom City emergency responders.	
Participating Jurisdiction:	Haltom City
Priority:	18
Estimated Cost:	$15,000
Estimated Benefit:	$90,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management, Public Information Office, NRHW
Implementation Schedule:	24 months

Hazard(s) Addressed	Winter Storms
Purchase equipment to clear streets of ice and snow.	
Participating Jurisdiction:	Haltom City
Priority:	19
Estimated Cost:	$25,000
Estimated Benefit:	$1,500,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Drought
Develop a drought awareness program for the citizens of Haltom City. Research and make educational material about drought, a flyer, public service announcements, and social media. Once the education materials are made, distribute the materials to the citizens of Haltom City.	
Participating Jurisdiction:	Haltom City
Priority:	20
Estimated Cost:	$8,000
Estimated Benefit:	$48,000
Potential Funding Source(s):	City budget, grants, city funding for staff time
Lead Agency/Department Responsible:	Public Works Department, Public Information Office
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought
Develop a contingency plan to ensure that the citizens of Haltom City have access to potable water.	
Participating Jurisdiction:	Haltom City
Priority:	21
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City funding for staff time
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Start a social media outlet for the Office of Emergency Management to notify citizens of the potential hazards that may impact them.	
Participating Jurisdiction:	Haltom City
Priority:	22
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City budget, city funding for staff time
Lead Agency/Department Responsible:	Public Information Office, Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Expansive Soils
Educate homeowners on how to care for the soil their homes are built on.	
Participating Jurisdiction:	Haltom City
Priority:	23
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Information Office, Office of Emergency Management, Engineering Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Create and implement a drought contingency plan for city facilities and private property.	
Participating Jurisdiction:	Haltom City
Priority:	24
Estimated Cost:	$7,500
Estimated Benefit:	$45,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Thunderstorms
Distribute educational materials on hail resistant roofing and windows.	
Participating Jurisdiction:	Haltom City
Priority:	25
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Inspections Department, Office of Emergency Management, Public Information Office
Implementation Schedule:	12 months

Hazard(s) Addressed	Extreme Heat
Work with churches and other volunteer organizations to open cooling centers.	
Participating Jurisdiction:	Haltom City
Priority:	26
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	City budget, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management, Public Information Office
Implementation Schedule:	12 months

Hazard(s) Addressed	Winter Storms
Conduct an assessment of the winter weather protocols for city departments and train employees on mitigation actions.	
Participating Jurisdiction:	Haltom City
Priority:	27
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	City funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Extreme Heat, Winter Storms
Distribute extreme temperature preparedness/mitigation literature at community events.	
Participating Jurisdiction:	Haltom City
Priority:	28
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	City budget, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management, Public Information Office
Implementation Schedule:	12 months

Hazard(s) Addressed	Expansive Soils
Manage expansive soils in Haltom City through education and building codes.	
Participating Jurisdiction:	Haltom City
Priority:	29
Estimated Cost:	$8,000
Estimated Benefit:	$48,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Inspections Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Expansive Soils
Educate the occupants of buildings in the areas that are on expansive soils how to care for the soil to prevent damage to their structure.	
Participating Jurisdiction:	Haltom City
Priority:	30
Estimated Cost:	$8,000
Estimated Benefit:	$48,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Inspections Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	Haltom City
Priority:	31
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the floodplain administrator to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	Haltom City
Priority:	32
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	Haltom City
Priority:	33
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	Haltom City
Priority:	34
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	Haltom City
Priority:	35
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes, National Security Incident
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	Haltom City
Priority:	36
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfires
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	Haltom City
Priority:	37
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	Haltom City
Priority:	38
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the state to conduct a study to determine inundation zones, vulnerability to, and potential impacts of a dam failure.	
Participating Jurisdiction:	Haltom City
Priority:	39
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plan	City Administration	Annually	Drainage improvement projects, outdoor warning sirens, shelter areas within city parks.	When reviewing the Capital Improvement Plan, the leadership team will review the HazMAP to see which action items can be addressed with the fiscal and

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
				administrative capabilities of the city.
Future Land Use Plan	City Administration	As needed	Land use.	The contractor and city leadership will review the mitigation action plan for its impact on plan revisions and implementation.
Drainage Master Plan	Public Works Department	As needed	Notations of potential drainage concerns.	City leadership and public works staff will review identified mitigation action items and consider plan revision as necessary to address them.
Flood Hazard Prevention Ordinance	Public Works Department	As needed	Flood hazard prevention activities and processes.	City leadership and public works staff will review identified mitigation action items and consider plan revision as necessary to address them.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for Haltom City. For additional information, see Appendices A and B.

City of Haslet

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Haslet was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided is for the City of Haslet alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

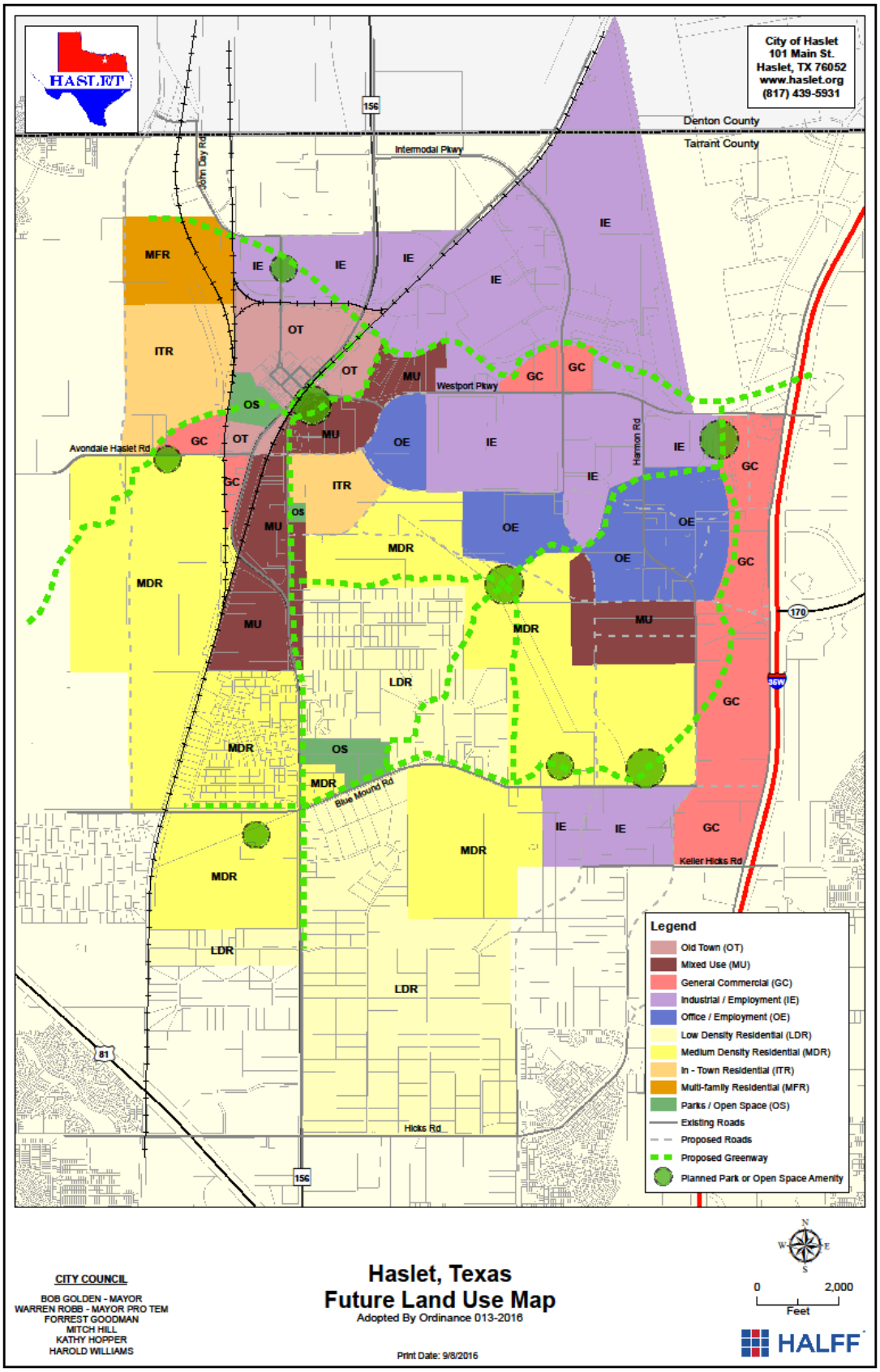
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Haslet will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

The following maps provide an overview of the City of Haslet:

- Future Land Use Map
- Zoning Map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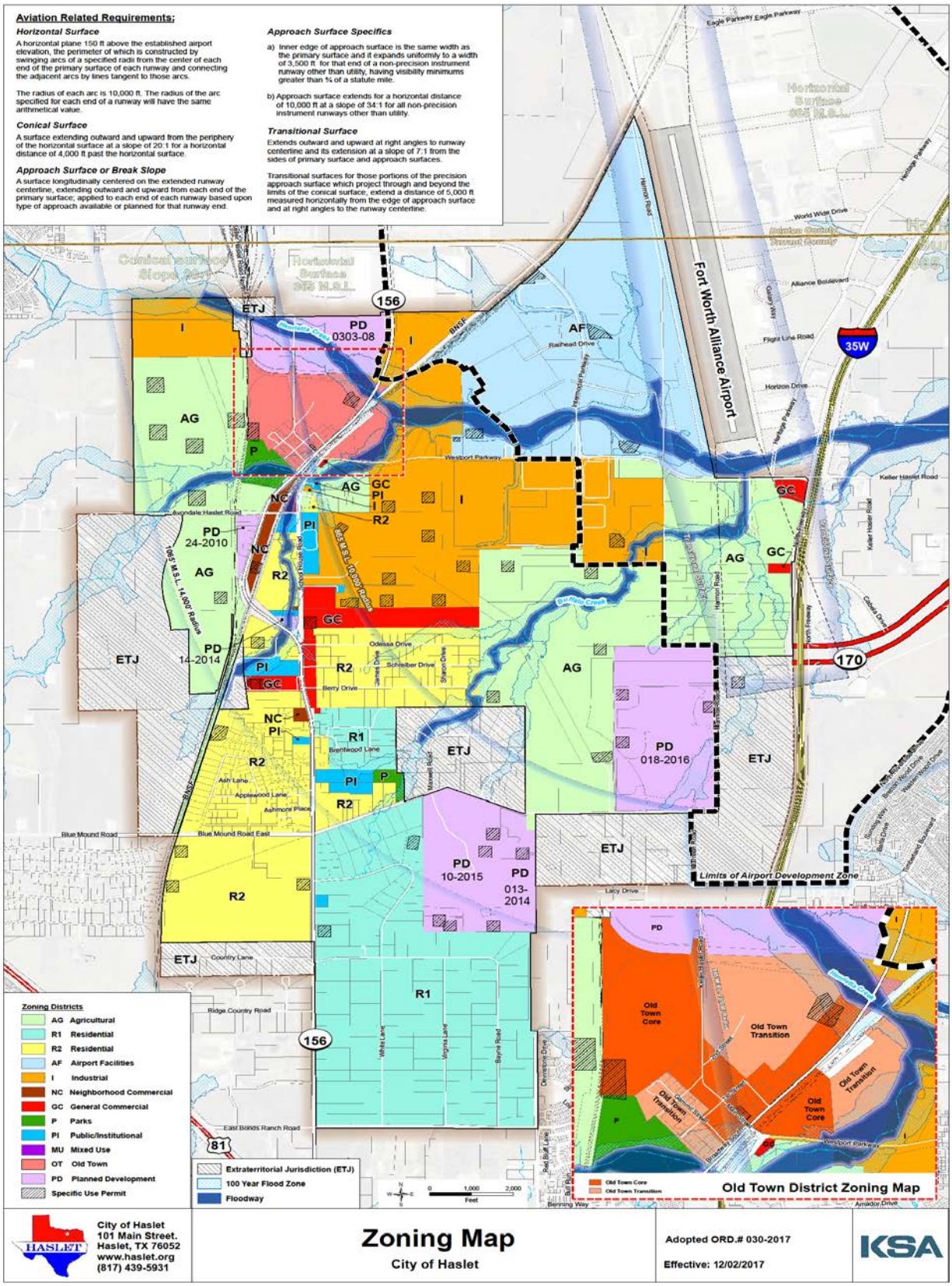
Denton County
Tarrant County
Intermodal Pkwy
John Day Rd
Westport Pkwy
Avondale Haslet Rd
Harmon Rd
Blue Mound Rd
Keller Hicks Rd
Hicks Rd
156
170
35W
81
MFR
ITR
OT
MU
GC
OS
OE
IE
MDR
LDR
Legend
Old Town (OT)
Mixed Use (MU)
General Commercial (GC)
Industrial / Employment (IE)
Office / Employment (OE)
Low Density Residential (LDR)
Medium Density Residential (MDR)
In - Town Residential (ITR)
Multi-family Residential (MFR)
Parks / Open Space (OS)
Existing Roads
Proposed Roads
Proposed Greenway
Planned Park or Open Space Amenity
CITY COUNCIL
BOB GOLDEN - MAYOR
WARREN ROBB - MAYOR PRO TEM
FORREST GOODMAN
MITCH HILL
KATHY HOPPER
HAROLD WILLIAMS
Haslet, Texas
Future Land Use Map
Adopted By Ordinance 013-2016
Print Date: 9/8/2016
0
2,000
Feet
HALFF


Aviation Related Requirements;
Horizontal Surface
A horizontal plane 150 ft above the established airport elevation, the perimeter of which is constructed by swinging arcs of a specified radii from the center of each end of the primary surface of each runway and connecting the adjacent arcs by lines tangent to those arcs.
The radius of each arc is 10,000 ft. The radius of the arc specified for each end of a runway will have the same arithmetical value.
Conical Surface
A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 ft past the horizontal surface.
Approach Surface or Break Slope
A surface longitudinally centered on the extended runway centerline, extending outward and upward from each end of the primary surface; applied to each end of each runway based upon type of approach available or planned for that runway end.
Approach Surface Specifics
a) Inner edge of approach surface is the same width as the primary surface and it expands uniformly to a width of 3,500 ft for that end of a non-precision instrument runway other than utility, having visibility minimums greater than ¾ of a statute mile.
b) Approach surface extends for a horizontal distance of 10,000 ft at a slope of 34:1 for all non-precision instrument runways other than utility.
Transitional Surface
Extends outward and upward at right angles to runway centerline and its extension at a slope of 7:1 from the sides of primary surface and approach surfaces.
Transitional surfaces for those portions of the precision approach surface which project through and beyond the limits of the conical surface, extend a distance of 5,000 ft measured horizontally from the edge of approach surface and at right angles to the runway centerline.
Fort Worth Alliance Airport
Limits of Airport Development Zone
Old Town District Zoning Map
Zoning Districts
AG Agricultural
R1 Residential
R2 Residential
AF Airport Facilities
I Industrial
NC Neighborhood Commercial
GC General Commercial
P Parks
PI Public/Institutional
MU Mixed Use
OT Old Town
PD Planned Development
Specific Use Permit
Extraterritorial Jurisdiction (ETJ)
100 Year Flood Zone
Floodway
City of Haslet
101 Main Street.
Haslet, TX 76052
www.haslet.org
(817) 439-5931
Zoning Map
City of Haslet
Adopted ORD.# 030-2017
Effective: 12/02/2017
KSA

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Haslet has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Haslet's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Haslet. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Haslet Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Haslet	Fire/Office of Emergency Management	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Haslet	Planning and Development Department	Building Official	Hazard identification and plan development
City of Haslet	Fire Department	Captain	Hazard identification and plan development
City of Haslet	Planning/Community Development Department	Director	Hazard identification and plan development
City of Haslet	Public Works Department	Director	Hazard identification and plan development
City of Haslet	Parks and Recreation Department	Director	Hazard identification and plan development
City of Haslet	Economic Development Department	Director	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: A full list of completed mitigation action items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Haslet.

Community Profile from U.S. Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	1,844
Persons under 5 years (%)	Data unavailable
Persons 65 years and over (%)	Data unavailable
Language other than English spoken at home (%)	Data unavailable
With a disability, under age 65 (%)	Data unavailable
Persons without health insurance, under age 65 (%)	8.6
Persons in poverty (%)	1.3
Median household income	$118,281
Households, 2012-2016	Data unavailable
Median value of owner-occupied housing units, 2012-2016	$320,600

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Haslet.

City of Haslet Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Fire Administration, City Emergency Operations Center (EOC) & Fire Station 1 1701 Highway 156 South	Fire Administration, Responders, EOC	50 people	$9,000	$1,000,000	$ 4,000,000
Haslet Elementary School 501 Schoolhouse Road	Education	600 people	$45,000	$3,150,000	$1,000,000
Amazon Fulfillment Center 700 Westport Parkway	Distribution Center	1,500 people	$1,100,000	$79,000,000	$40,000,000

3.3 Natural Hazard Profiles

The City of Haslet's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Haslet in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Thunderstorm (includes hail, wind, lightning)
2	Tornado
3	Winter Storms
4	Expansive Soils
5	Flooding
6	Extreme Heat
7	Drought
8	Wildfire
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Haslet.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	There is no historical data for drought damage in the city. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. The water supply in Haslet comes from surface water and is thus subject to drought.

Jurisdiction's ground-water supply: There are 3 non-active groundwater wells. The city uses surface water.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: Stage I-III drought restrictions as dictated by the Tarrant Regional Water District.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: In 2015, there was a magnitude 3 earthquake reported less than a mile southeast of Haslet, but no damage was reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city is limited to city roads. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Damage to asphalt roadways equates to approximately $65,000 annually.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. The young population at the elementary school and day care center near Original Town Haslet are at risk. People who work outside or in buildings without air-conditioned are also at high risk to the direct effects of extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? The City of Haslet hosts the Wild West Fest, Fourth of July Parade, and National Night Out, but no exposures have been reported.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. 3.36% of the city's residential parcels are located within the 100-year floodplain. Commuters and any buildings in a floodplain are considered most at risk, though all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

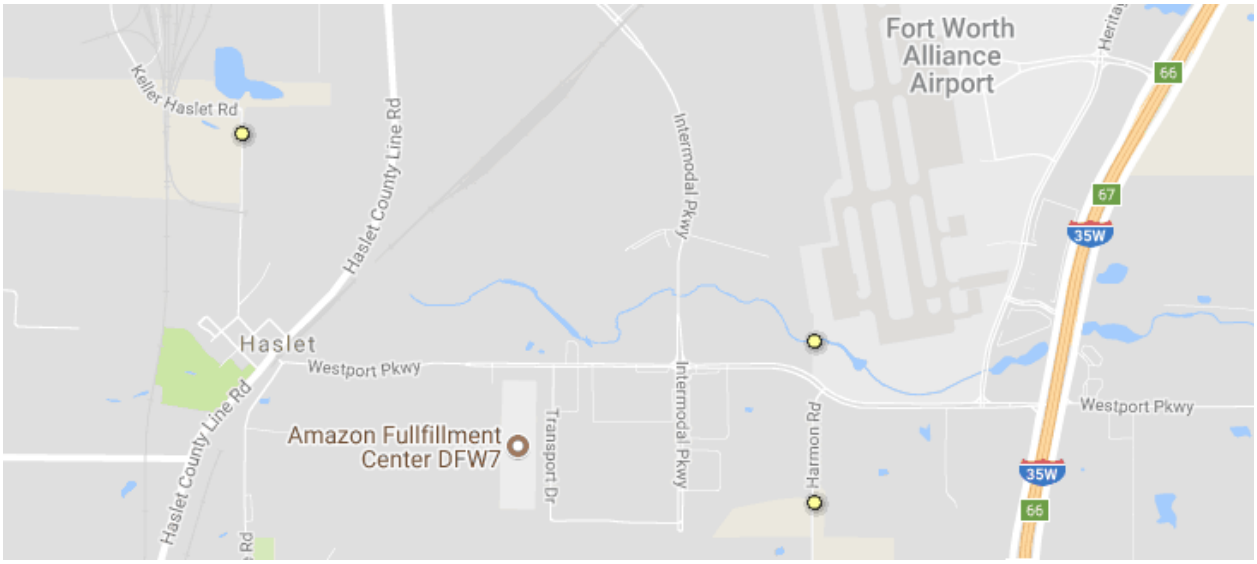
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: The 600 block of Keller Haslet Road. When this road floods, the second entrance to Sendera Ranch, a subdivision in the City of Fort Worth, is blocked. One side of Henrietta Creek is in Haslet and the other side is in Fort Worth. See low water crossings below, as these roads have the potential to flood.

Names of any creeks or rivers that flood: Henrietta Creek.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Harmon Road	Buffalo Creek	Vented Ford
Harmon Road	Henrietta Creek	Vented Ford
Keller-Haslet Road	Henrietta Creek	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Haslet is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480600#
Community Name	City of Haslet
County	Denton/Tarrant
Initial FHBM Identified	11/01/74
Initial FIRM Identified	10/15/85
Current Effective Map Date	09/25/09
Reg-Emer Date	10/15/85
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? City Engineer.

What specific flooding ordinances and plans does your jurisdiction have? Standard floodplain ordinance per NFIP program.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? Finish floor equals base flood elevation plus 2 feet.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? No development in the floodway.

Repetitive and Severe Repetitive Loss Properties: There are currently 0 repetitive loss properties and 0 severe repetitive loss properties within the City of Haslet. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
21	3.36%	1	0.1%

Source: City of Haslet Geographic Information Systems (GIS) Department.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Haslet's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 15 Insurance in-force: $5,049,700 Written premium in-force: $13,442
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 2 claims have been filed, but 1 of the claims closed without payment. $2,645.94 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	21.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	None.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Engineering report, hydraulic and hydrologic model review.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	None.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.

Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Never.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	10/15/85
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes, base plus 2 feet.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP	Floodplain development permit review.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Haslet will expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): No recorded damage has occurred since 2015.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Based on past events, the city can expect an average of zero fatalities and zero injuries per year. Additionally, an expected average of $15,000 per year in property losses is expected from tornadoes.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: The EF0 tornado in 2017 caused $30,000 in property damage.

Is there an area of the town that is the most vulnerable to tornadoes? The Hugh White Subdivision located on the southeast corner of Farm to Market (FM) 156 and Hicks (Bonds Ranch) Road sits high on a hill. This subdivision has been hit twice by EF0 tornadoes in the last several years. There are approximately 100 homes in this area. This area has 3 – 10 acre home sites with horse barns.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Significant
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard. Structures in the wildland-urban interface (WUI) are the most vulnerable to wildfires.

Residential		Commercial		Industrial	
Residential Parcels Within WUI	Percentage (%) Within WUI	Commercial Parcels Within WUI	Percentage (%) Within WUI	Industrial Parcels Within WUI	Percentage (%) Within WUI
625	15%	51	76%	2	12%

Source: www.texaswildfirerisk.com and City of Haslet Geographic Information Systems.

Most vulnerable location (North, East, South, West) of your jurisdiction? The areas of most concern are residential neighborhoods and commercial businesses along School House Road and subdivisions along Farm to Market (FM) 156 South, Blue Mound Road East, and Bonds Ranch Road.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: 100 block of Intermodal Parkway North, 600 block of Farm to Market (FM) 156 North, and 600 block FM 156 South. There is also a steep incline at 900 Blue Mound Road East. Haslet is in the middle of an intermodal hub where 18 wheelers travel through the city. There is a moderate to high potential of accidents blocking the roadway for extended periods of time affecting traffic and delivery of items. Due to limited thoroughfares in the city to move traffic, if these roadways were to be shut down or blocked, major impacts could occur.

3.4 Historical Events

The following, taken from the National Centers for Environments al Information, are natural hazard events that occurred within the City of Haslet between 2015 and 2017. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environments al Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Haslet	5/30/2015	Flash Flood		0	0	$0	$0	
Haslet	7/9/2016	Thunderstorm Wind	52	0	0	$0	$0	MG
Haslet-southern portion	3/29/2017	Tornado	EF0	0	0	$30,000	$0	
Haslet	4/2/2017	Hail	1	0	0	$0	$0	
Total				**0**	**0**	**$30,000**	**$0**	

*MG- Measured Wind Gusts

3.5 Overall Vulnerability

The City of Haslet identified their greatest vulnerabilities and concerns within the respective hazard sections.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Haslet's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; Yes; Yes
Capital Improvement Plan	Yes	No; No; No
Economic Development Plan	Yes	No; No; No
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	No	Tarrant County Emergency Management Plan
Transportation Plan	Yes	Yes; No; No
Stormwater Management Plan	Yes	Yes; No; No
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	Yes	Tarrant County HazMAP: Yes, Yes; Yes
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	

Acquisition of land for open space and public recreation uses	Yes	Yes, Yes
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year: ICC 2015**
Building Code Effectiveness Grading Schedule (BGEGS) Score	Yes	**Score: 7**
Fire Department ISO Rating	Yes	**Rating: 5**
Site Plan Review Requirements	Yes	Type(s) of requirement: with plat application, staff review
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and Zoning; Yes
Mitigation Planning Committee	Yes	Planning and Hazards Assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Tree trimming, clear drainage systems, code enforcement on detention ponds; Yes
Mutual Aid Agreements	Yes	Response and Assistance; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:	FT	Police/Fire Chief/Emergency Manager/Public Works Director: Yes; Yes; Yes
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor warning sirens and Nixel; Yes
Hazard data and information	Yes	Geographic Information System layers; mapping; Yes
Grant writing	Yes	Texas Water Development Board, Texas Parks & Wildlife Department, Community Development Block Grant: Yes
HaZUS analysis	No	Don't use; FEMA software not up to date

Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environments al protection, emergency preparedness, access and functional needs populations, etc.	Yes	Haslet Fire Support Group assists with evacuations; Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environments al education)	Yes	Community newsletter, social media, fire prevention activities, responsible water use sent with utility bill; Yes
Natural disaster or safety related school programs	No	Public education for fire
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	American Red Cross and community center for sheltering
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	No; Yes
Authority to levy taxes for specific purposes	Yes	Yes, street maintenance; No
Fees for water, sewer, gas, and/or electric services	Yes	Yes, water projects; No
Impact fees for new development	Yes	Yes, water and sewer; No
Stormwater utility fee	No	
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes, all city purchases; Yes
Incur debt through private activities	No	

Community Development Block Grant	Yes	Yes, streets, water and sewer; No
Other federal funding programs	Yes	Yes, Transportation Alternatives Program (TAP) trail; Yes
State funding programs	Yes	Yes, Texas Parks and Wildlife; No
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Haslet's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires	Enhance the City of Haslet Emergency Operations Center (EOC) by adding communications capabilities.	Add additional radio frequencies.	1 budget year	Fire Department	$80,000	$320,000	State and federal grant
		STATUS: Deferred to 2020 HazMAP					
		Add video conferencing ability.	1 budget year	Fire Department	$10,000	$40,000	State and federal grant
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires	Enhance City of Haslet audio and visual peripherals.	Increase both size and quantity of real time video monitors.	1 budget year	Fire Department	$10,000	$40,000	State and federal grant
		STATUS: Deferred to 2020 HazMAP					
		Enhance internet access.	1 budget year	Fire Department	$3,000	$12,000	City budget
		STATUS: Completed					
		Add additional work spaces.	1 budget year	Fire Department	$4,500	$18,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms,	Increase City of Haslet emergency operations center (EOC) usage opportunities.	Extend usage to neighboring jurisdictions.	Continual	Fire Department	$1,200	$4,800	City budget
		STATUS: Completed					
		Train neighboring officials on use.	Continual	Fire Department	$6,000	$24,000	City budget
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Flooding, Wildfires		Mock or table top multi-agency EOC operations drills.	Continual	Fire Department	$5,000	$20,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires	Identify significant hazards and develop specific to hazard pre-incident planning in the City of Haslet.	Pre-incident/disaster action planning.	Continual	Fire Department	$5,000	$20,000	Local and regional grants
		STATUS: Completed					
		Identify stakeholder entities.	Continual	Fire Department	$1,500	$6,000	City budget
		STATUS: Completed					
		Involve appropriate entities in planning.	Continual	Fire Department	$2,000	$6,000	Local and regional grants
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires	Determine adequate resources to respond to all-hazards in the City of Haslet.	Establish resource requirements.	Continual	Fire Department	$5,000	$20,000	Local and regional grants
		STATUS: Deferred to 2020 HazMAP					
		Identify available resources.	Continual	Fire Department	$1,500	$6,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Establish method of ascertaining.	Continual	Fire Department	$2,000	$8,000	Local and regional grants
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Examine all incident possibilities.	Continual	Fire Department	$2,000	$8,000	Local and regional grants
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires	Develop contingency and after incident action in the City of Haslet.	Make contingencies based upon possibilities.	Continual	Fire Department	$2,000	$8,000	Local and regional grants
		STATUS: Deferred to 2020 HazMAP					
		Establish after incident review procedures.	Continual	Fire Department	$2,000	$8,000	Local and regional grants
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires	Identify, train and equip capable citizens to form a Community Emergency Response Team (CERT) to assist in the event of a disaster in the City of Haslet.	Determine capable individuals.	30 days	Fire Department	$250	$1,000	City budget
		STATUS: Completed					
		Train selected individuals.	60-90 days	Fire Department	$500	$2,000	City budget
		STATUS: Completed					
		Equip team.	30 days	Fire Department	$1,000	$4,000	Grants
		STATUS: Completed					
Severe Thunderstorms and High	Continue to train CERT team members in City of Haslet.	Conduct mock drills.	Continual	Fire Department	$1,000	$4,000	City budget
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires		Frequent utilization.	Continual	Fire Department	$1,000	$4,000	City budget
		STATUS: Completed					
		Repeat of initial training.	Continual	Fire Department	$1,000	$4,000	City budget
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires	Expand utilization of City of Haslet CERT team.	County and neighboring jurisdiction involvement and deployment.	Continual	Fire Department	$1,000	$4,000	County grant or assistance
		STATUS: Completed					
Flooding	Decrease flood insurance premiums in Haslet by participating in the Federal Emergency Management Agency (FEMA) Community Rating System (CRS) program.	Work with city officials to become a member of the CRS program.	Annually	Tarrant County, all participating jurisdictions	$1,000	$4,000	Tarrant County, individual jurisdiction budgets
		STATUS: Completed					
Flooding	Review and remove repetitive loss properties in Haslet	Review repetitive loss properties and work with	Annually	Tarrant County, all	$0	$0	Tarrant County, individual

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		homeowners to remove them using FEMA funding.		participating jurisdictions			jurisdiction budgets
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes	Ensure outdoors spaces in Haslet have adequate shelter for high wind events such as severe thunderstorms or tornadoes.	Review current jurisdictional ordinances and building codes related to high winds.	Annually	Building Official	$0	$0	City budget
		STATUS: Deferred to 2020 HazMAP					
		Develop or update ordinances and building codes to recommend new developments or facilities are built with high wind resistant windows as needed.	Annually	Building Official	$0	$0	City budget
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes	Ensure critical facilities in Haslet have adequate safe rooms to protect against high wind events and tornadoes.	Evaluate the current conditions of critical facilities to determine which ones, if any, need safe rooms installed.	Annually	Office of Emergency Management	$500	$10,000	City budget
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Determine the size and space needed to shelter the population of the critical facility.	Annually	Office of Emergency Management	$500	$10,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Install safe rooms as needed in critical facilities.	Annually	Office of Emergency Management	$500	$10,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Hail	Develop a hail outreach program for citizens in Haslet.	Develop an outreach program that provides tips and pertinent information for ensuring the protection of property against hail.	Annually	Office of Emergency Management	$500	$10,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Provide hail mitigation information to citizens through a social media campaign and publish the information on the	Annually	Office of Emergency Management	$500	$10,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		City of Haslet's website.					
		STATUS: Deferred to 2020 HazMAP					
Hail	Ensure the City of Haslet's critical facilities have hail-resistant roofing and windows installed.	Evaluate which critical facilities need hail-resistant roofing and windows installed. Install hail-resistant roofing and windows in identified critical facilities.	24 months	Public Works Department	$10,000	$20,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Lightning	Protect communication infrastructure in Haslet from lightning.	Evaluate the need for lightning protection on communications infrastructure in Haslet.	12 months	Office of Emergency Management	$10,000	$20,000	Hazard Mitigation Grant Program (HMPG), city budget
		STATUS: Completed					
		Install lightning rods on existing and future communication infrastructure.	12 months	Office of Emergency Management	$10,000	$20,000	Hazard Mitigation Grant Program (HMPG), city budget
		STATUS: Deferred to 2020 HazMAP					
Lightning	Develop a lightning outreach program for	Develop a lightning outreach program	12 months	Fire Department	$1,000	$1,000,000	City budget,

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	residences and businesses in the City of Haslet.	that provides tips and pertinent information for protecting property against lightning damage.					local grants
		STATUS: Deferred to 2020 HazMAP					
		Provide lightning preparedness mitigation information to citizens of Haslet through a social media campaign and publish information on City of Haslet's website.	12 months	Fire Department	$1,000	$1,000,000	City budget, local grants
		STATUS: Deferred to 2020 HazMAP					
Winter Storm	Develop a winter weather outreach program and distribute the information for the citizens of Haslet.	Evaluate the hazards posed by severe winter weather in the City of Haslet.	12 months	Office of Emergency Management	$500	$10,000	City budget, local grants
		STATUS: Completed					
		Develop a winter weather outreach program that provides tips and pertinent	12 months	Office of Emergency Management	$500	$10,000	City budget, local grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		information for avoiding hypothermia and icy conditions.					
		STATUS: Deferred to 2020 HazMAP					
		Provide winter weather mitigation information to citizens of Haslet through a social media campaign and publish information on City of Haslet's website.	12 months	Office of Emergency Management	$500	$10,000	City budget, local grants
		STATUS: Deferred to 2020 HazMAP					
Drought	Review City of Haslet's water enforcement legislation and update as necessary to mitigate the effects of drought.	Review current legislation for water conservation enforcement in the City of Haslet.	Annually	Public Works Department	$0	$0	City budget
		STATUS: Completed					
		Develop or update water conservation enforcement legislation to ensure effective practices during periods of drought.	Annually	Public Works Department	$0	$0	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
Drought	Develop contingency plans for City of Haslet to ensure adequate power and water supply during prolonged periods of drought.	Review current contingency plans. Develop or update potable water contingency plans.	Annually	Public Works Department	$5,000	$20,000	Hazard Mitigation Grant Program (HMPG), city budget
		STATUS: Deferred to 2020 HazMAP					
		Develop or update power supply contingency plans.	Annually	Public Works Department	$5,000	$20,000	Hazard Mitigation Grant Program (HMPG), city budget
		STATUS: Deferred to 2020 HazMAP					
Drought	Distribute drought awareness information to citizens of Haslet.	Provide drought awareness information to citizens of Haslet through a social media campaign and publish the information of the City of Haslet's website.	Annually	Public Works Department	$5,000	$10,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Review city ordinances and laws to ensure	Enact building permit process that	Annually	Public Works Department	$0	$0	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	mitigation practices are in effect in the City of Haslet.	encourages wildfire resistant construction.					
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Ensure the City of Haslet water systems are adequate for fighting wildfires.	Evaluate the City of Haslet's water system to ensure capacity for fighting wildfires.	Annually	Public Works Department	$0	$0	City budget
		STATUS: Completed					
		Install or upgrade needed equipment to ensure water systems are adequate.	Annually	Public Works Department	$0	$0	City budget
		STATUS: Completed					
Wildfire	Mitigate wildfires by instituting landscaping practices at City of Haslet's critical facilities.	Prevent wildfires from spreading to critical facilities by landscaping plants and brush away from buildings.	Annually	Public Works Department	$0	$0	City budget
		STATUS: Completed					
Extreme Temperatures, Winter Storm	Incorporation of power generator for use at Haslet Community Center. Generator to provide the power necessary to	Purchase electrical generator to power Haslet Community Center for shelter or	12 months	Office of Emergency Management	$75,000	$100,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	operate heating, ventilation, and air conditioning (HVAC) in the event of wide spread power loss during extreme temperatures.	warming/cooling center.					
		STATUS: Completed					
Extreme Temperatures, Winter Storm	Promote mitigation activities for residents and business in the community during extreme weather events in City of Haslet.	Develop an extreme temperature outreach program that provides tips and pertinent information for ensuring the health and safety for the citizens of Haslet.	12 months	Office of Emergency Management	$500	$10,000	City budget, local grants
		STATUS: Deferred to 2020 HazMAP					
		Provide extreme heat mitigation information to the citizens of Haslet through a social media campaign and publish the information of the City of Haslet's website.	12 months	Office of Emergency Management	$75,000	$100,000	City budget, local grants
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Expansive Soils	Mitigate expansive soils in the City of Haslet.	Improve construction techniques through building code enhancements.	Annually	Building Official	$1,000	$10,000	City budget
		STATUS: Deferred to 2020 HazMAP					
		Educate construction contractors, homeowners, and business owners about mitigation techniques.	Annually	Building Official	$1,000	$10,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Expansive Soils	Identify critical infrastructure that may be affected by expansive soils.	Create and implement a plan to repair damage that was caused by expansive soils.	48 months	Building Official	$7,500	$30,000	City budget, Pre-Disaster Mitigation grant funding
		STATUS: Deferred to 2020 HazMAP					

5.3 New Action Items

The City of Haslet's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms**
Add additional radio frequencies to enhance the City of Haslet Emergency Operations Center (EOC) by adding communications capabilities.	
Participating Jurisdiction:	City of Haslet
Priority:	1
Estimated Cost:	$360,000
Estimated Benefit:	$2,160,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	36 months

Hazard(s) Addressed	**Drought, Earthquakes, Extreme Heat, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms**
Establish resource requirements and identify resources to help determine adequate resources to respond to identified hazards.	
Participating Jurisdiction:	City of Haslet
Priority:	2
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	12 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Make contingency plans based upon the possibility of occurrence of the identified hazards.	
Participating Jurisdiction:	City of Haslet
Priority:	3
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Improve road infrastructure in low water areas.	
Participating Jurisdiction:	City of Haslet
Priority:	4
Estimated Cost:	$900,000
Estimated Benefit:	$5,400,000
Potential Funding Source(s):	City budget, Texas Division of Transportation (TxDOT)
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Expansive Soils, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Enhance and enforce building codes and ordinances to include the use of hazard-resistant materials and building techniques in new developments and facilities.	
Participating Jurisdiction:	City of Haslet
Priority:	5
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City funds for staff time
Lead Agency/Department Responsible:	Building Official
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Evaluate the current conditions of critical facilities to determine which ones, if any, need safe rooms installed.	
Participating Jurisdiction:	City of Haslet
Priority:	6
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City funds for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Determine the size and space needed to shelter the population of the critical facility.	
Participating Jurisdiction:	City of Haslet
Priority:	7
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City funds for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Add additional work spaces to the Emergency Operations Center (EOC) to enhance the City of Haslet's audio and visual peripherals in order to better assess situations.	
Participating Jurisdiction:	City of Haslet
Priority:	8
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Create and conduct mock or table top multi-agency EOC operations drills and mitigation scenarios to increase the City of Haslet's Emergency Operations Center (EOC) usage opportunities.	
Participating Jurisdiction:	City of Haslet
Priority:	9
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	36 months

Hazard(s) Addressed	Extreme Heat
Develop and provide extreme heat mitigation information to the citizens of Haslet through a social media campaign and publish the information of the City of Haslet's website.	
Participating Jurisdiction:	City of Haslet
Priority:	10
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Establish after incident review procedures to help develop contingency and after incident action in the City of Haslet.	
Participating Jurisdiction:	City of Haslet
Priority:	11
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Install flood warning devices to low water crossing.	
Participating Jurisdiction:	City of Haslet
Priority:	12
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Thunderstorms
Develop and provide thunderstorm mitigation information to citizens through a social media campaign and publish the information on the City of Haslet's website.	
Participating Jurisdiction:	City of Haslet
Priority:	13
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Thunderstorms
Evaluate which critical facilities need hail-resistant roofing and windows installed. Install hail-resistant roofing and windows in identified critical facilities.	
Participating Jurisdiction:	City of Haslet
Priority:	14
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City funds for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Winter Storms
Develop and provide winter weather mitigation information to citizens of Haslet through a social media campaign and publish information on City of Haslet's website.	
Participating Jurisdiction:	City of Haslet
Priority:	15
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms
Install lightning rods on existing and future communication infrastructure.	
Participating Jurisdiction:	City of Haslet
Priority:	16
Estimated Cost:	$30,000
Estimated Benefit:	$180,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Install safe rooms as needed in existing and future critical facilities.	
Participating Jurisdiction:	City of Haslet
Priority:	17
Estimated Cost:	$500,000
Estimated Benefit:	$3,000,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Incorporate video conferencing ability to the City of Haslet's Emergency Operations Center (EOC) to enhance communications capabilities.	
Participating Jurisdiction:	City of Haslet
Priority:	18
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Increase both size and quantity of real time video monitors to enhance the City of Haslet audio and visual peripherals.	
Participating Jurisdiction:	City of Haslet
Priority:	19
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Expansive Soils
Educate construction contractors, homeowners, and business owners about mitigation techniques for expansive soils.	
Participating Jurisdiction:	City of Haslet
Priority:	20
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Building Official
Implementation Schedule:	36 months

Hazard(s) Addressed	Expansive Soils
Create and implement a plan to repair damage that was caused by expansive soils.	
Participating Jurisdiction:	City of Haslet
Priority:	21
Estimated Cost:	$150,000
Estimated Benefit:	$900,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	48 months

Hazard(s) Addressed	Drought
Provide drought mitigation strategies to citizens of Haslet through a social media campaign and publish the information of the City of Haslet's website.	
Participating Jurisdiction:	City of Haslet
Priority:	22
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes
Provide earthquake mitigation strategies to citizens of Haslet through a social media campaign and publish the information of the City of Haslet's website.	
Participating Jurisdiction:	City of Haslet
Priority:	23
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Haslet
Priority:	24
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the floodplain administrator to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	City of Haslet
Priority:	25
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Haslet
Priority:	26
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Haslet
Priority:	27
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Haslet
Priority:	28
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquake, Thunderstorm, Tornado, National Security Incident
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Haslet
Priority:	29
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Haslet
Priority:	30
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Haslet
Priority:	31
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.

5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
City of Haslet's Vision Plan	City Council, City Administration	As needed, by topic of concern	"Smartscape" design expectations.	The Office of Emergency Management will participate in the review process and suggest changes based on mitigation goals.
Building Ordinances	City Council, Ordinance Committee, City Administration	As needed, by topic of concern	Mitigation actions in all areas of design and construction standards.	The Office of Emergency Management will participate in the review process and suggest changes based on mitigation goals.
Planning and Zoning	City Council, Zoning Commission, City Administration, Community Development Department	As needed, by topic of concern, total review every 4 years	Mitigation actions in all areas of design and construction standards.	The Office of Emergency Management will participate in the review process and suggest changes based on mitigation goals.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Haslet. For additional information, see Appendices A and B.

City of Hurst

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Hurst was the Fire Chief/Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided is for the City of Hurst alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

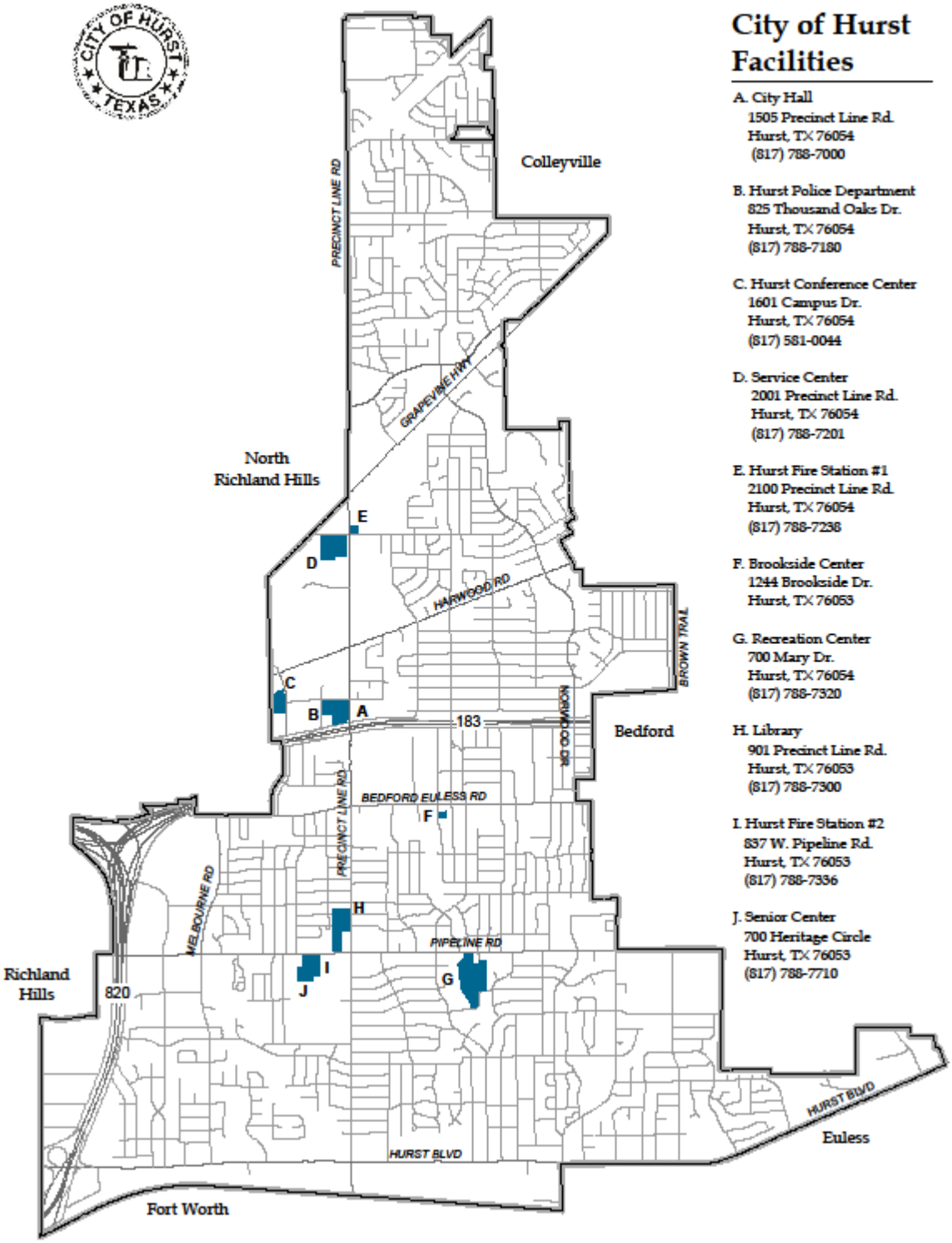
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Hurst will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

The following maps provide an overview of the City of Hurst:

- City of Hurst Facilities Map
- Zoning Map



City of Hurst Facilities

A. City Hall
1505 Precinct Line Rd.
Hurst, TX 76054
(817) 788-7000

B. Hurst Police Department
825 Thousand Oaks Dr.
Hurst, TX 76054
(817) 788-7180

C. Hurst Conference Center
1601 Campus Dr.
Hurst, TX 76054
(817) 581-0044

D. Service Center
2001 Precinct Line Rd.
Hurst, TX 76054
(817) 788-7201

E. Hurst Fire Station #1
2100 Precinct Line Rd.
Hurst, TX 76054
(817) 788-7238

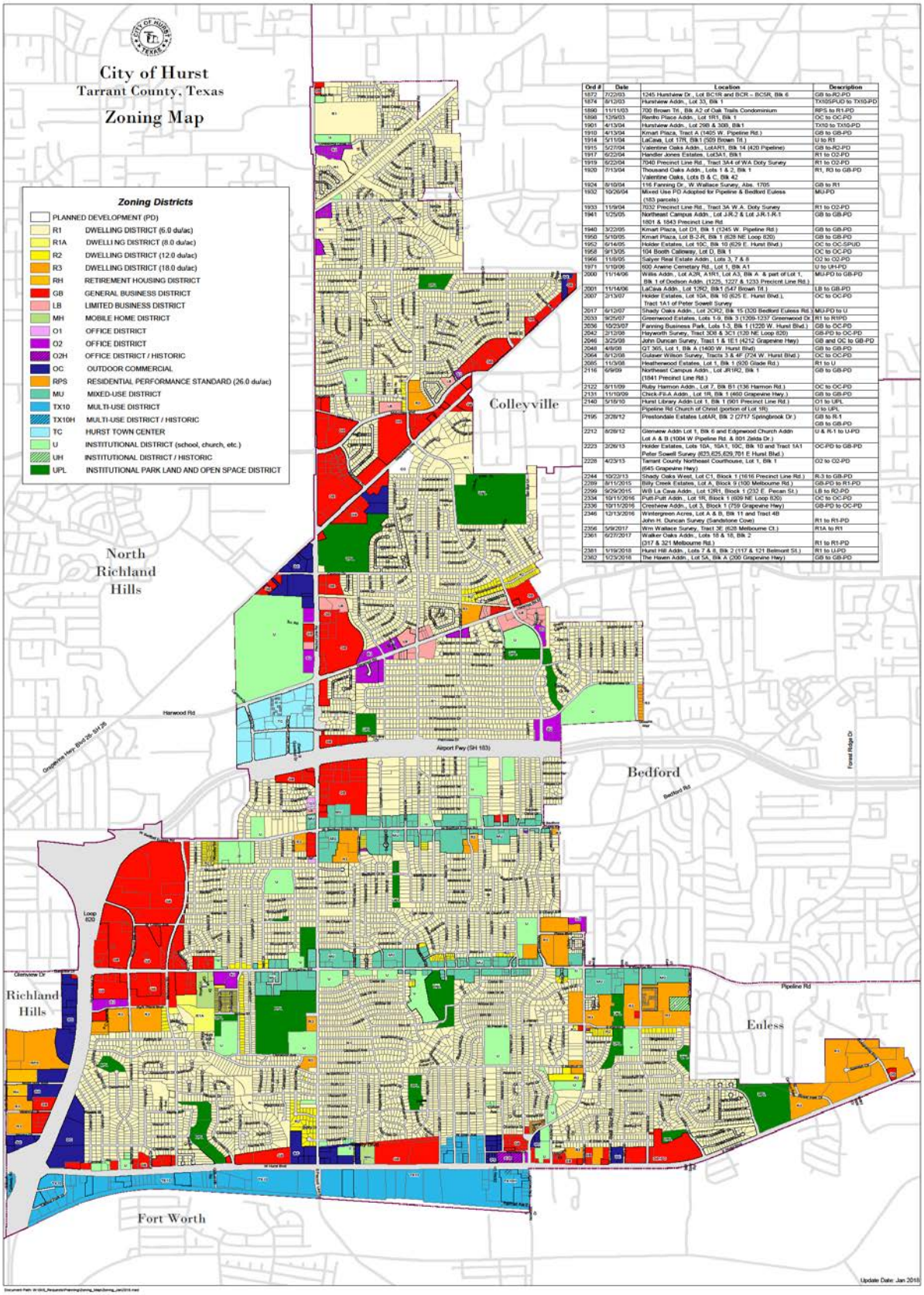
F. Brookside Center
1244 Brookside Dr.
Hurst, TX 76053

G. Recreation Center
700 Mary Dr.
Hurst, TX 76054
(817) 788-7320

H. Library
901 Precinct Line Rd.
Hurst, TX 76053
(817) 788-7300

I. Hurst Fire Station #2
837 W. Pipeline Rd.
Hurst, TX 76053
(817) 788-7336

J. Senior Center
700 Heritage Circle
Hurst, TX 76053
(817) 788-7710


City of Hurst
Tarrant County, Texas
Zoning Map
Zoning Districts
PLANNED DEVELOPMENT (PD)
R1 DWELLING DISTRICT (6.0 du/ac)
R1A DWELLI NG DISTRICT (8.0 du/ac)
R2 DWELLING DISTRICT (12.0 du/ac)
R3 DWELLING DISTRICT (18.0 du/ac)
RH RETIREMENT HOUSING DISTRICT
GB GENERAL BUSINESS DISTRICT
LB LIMITED BUSINESS DISTRICT
MH MOBILE HOME DISTRICT
O1 OFFICE DISTRICT
O2 OFFICE DISTRICT
O2H OFFICE DISTRICT / HISTORIC
OC OUTDOOR COMMERCIAL
RPS RESIDENTIAL PERFORMANCE STANDARD (26.0 du/ac)
MU MIXED-USE DISTRICT
TX10 MULTI-USE DISTRICT
TX10H MULTI-USE DISTRICT / HISTORIC
TC HURST TOWN CENTER
U INSTITUTIONAL DISTRICT (school, church, etc.)
UH INSTITUTIONAL DISTRICT / HISTORIC
UPL INSTITUTIONAL PARK LAND AND OPEN SPACE DISTRICT
Ord # | Date | Location | Description
1872 | 7/22/03 | 1245 Hunstwine Dr., Lot BC1R and BCR – BC5R, Blk 6 | GB to-R2-PD
1874 | 8/12/03 | Hunstview Addn., Lot 33, Blk 1 | TX10SPUD to TX10-PD
1890 | 11/11/03 | 700 Brown Trl., Blk A2 of Oak Trails Condominium | RPS to R1-PD
1898 | 12/9/03 | Renfro Place Addn., Lot 1R1, Blk 1 | OC to OC-PD
1901 | 4/13/04 | Hunstview Addn., Lot 29B & 30B, Blk1 | TX10 to TX10-PD
1910 | 4/13/04 | Kmart Plaza, Tract A (1405 W. Pipeline Rd.) | GB to GB-PD
1914 | 5/11/04 | LaCima, Lot 17R, Blk1 (509 Brown Trl.) | U to R1
1915 | 5/27/04 | Valentine Oaks Addn., LotAR1, Blk 14 (420 Pipeline) | GB to-R2-PD
1917 | 6/22/04 | Handler Jones Estates, Lot3A1, Blk1 | R1 to O2-PD
1919 | 6/22/04 | 7040 Precinct Line Rd., Tract 3A4 of WA Doty Survey | R1 to O2-PD
1920 | 7/13/04 | Thousand Oaks Addn., Lots 1 & 2, Blk 1 Valentine Oaks, Lots B & C, Blk 42 | R1, R3 to GB-PD
1924 | 8/10/04 | 116 Fanning Dr., W Wallace Survey, Abs. 1705 | GB to R1
1932 | 10/26/04 | Mixed Use PD Adopted for Pipeline & Bedford Euless (183 parcels) | MU-PD
1933 | 11/9/04 | 7032 Precinct Line Rd., Tract 3A W.A. Doty Survey | R1 to O2-PD
1941 | 1/25/05 | Northeast Campus Addn., Lot JJR-2 & Lot JJR-1 R-1 1801 & 1843 Precinct Line Rd. | GB to GB-PD
1940 | 3/22/05 | Kmart Plaza, Lot D1, Blk 1 (1345 W. Pipeline Rd.) | GB to GB-PD
1950 | 5/10/05 | Kmart Plaza, Lot B-2-R, Blk 1 (628 NE Loop 820) | GB to GB-PD
1952 | 5/14/05 | Holder Estates, Lot 10C, Blk 10 (625 E. Hurst Blvd.) | OC to OC-SPUD
1958 | 9/13/05 | 104 Booth Calloway, Lot D, Blk 1 | OC to OC-PD
1966 | 11/8/05 | Salyer Real Estate Addn., Lots 3, 7 & 8 | O2 to O2-PD
1971 | 1/10/06 | 600 Arwine Cemetery Rd., Lot 1, Blk A1 | U to UH-PD
2000 | 11/14/06 | Willis Addn., Lot A3R, A1R1, Lot A3, Blk A & a part of Lot 1, Blk 1 of Dodson Addn. (1225, 1227 & 1233 Precinct Line Rd.) | MU-PD to GB-PD
2001 | 11/14/06 | LaCima Addn., Lot 13R2, Blk1 (547 Brown Trl.) | LB to GB-PD
2007 | 2/13/07 | Holder Estates, Lot 10A, Blk 10 (625 E. Hurst Blvd.), Tract 1A1 of Peter Sowell Survey | OC to OC-PD
2017 | 6/12/07 | Shady Oaks Addn., Lot 2CR2, Blk 15 (320 Bedford Euless Rd.) | MU-PD to U
2033 | 9/25/07 | Greenwood Estates, Lots 1-9, Blk 3 (1209-1237 Greenwood Dr. | R1 to R1PD
2036 | 10/23/07 | Fanning Business Park, Lots 1-3, Blk 1 (1220 W. Hurst Blvd.) | GB to OC-PD
2042 | 2/12/08 | Hayworth Survey, Tract 3D8 & 3C1 (120 NE Loop 820) | GB-PD to OC-PD
2046 | 3/25/08 | John Duncan Survey, Tract 1 & 1E1 (4212 Grapevine Hwy) | GB and OC to GB-PD
2048 | 4/8/08 | QT 305, Lot 1, Blk A (1400 W. Hurst Blvd) | GB to GB-PD
2064 | 9/12/08 | Gubner Wilson Survey, Tracts 3 & 4F (724 W. Hurst Blvd.) | OC to OC-PD
2085 | 11/3/08 | Heatherwood Estates, Lot 1, Blk 1 (920 Glade Rd.) | R1 to U
2116 | 6/9/09 | Northeast Campus Addn., Lot JR1R2, Blk 1 (1841 Precinct Line Rd.) | GB to GB-PD
2122 | 8/11/09 | Ruby Harmon Addn., Lot 7, Blk B1 (136 Harmon Rd.) | OC to OC-PD
2131 | 11/10/09 | Chick-Fil-A Addn., Lot 1R, Blk 1 (460 Grapevine Hwy.) | GB to GB-PD
2140 | 5/18/10 | Hurst Library Addn Lot 1, Blk 1 (901 Precinct Line Rd.) | O1 to UPL
2195 | 2/28/12 | Pipeline Rd Church of Christ (portion of Lot 1R) | U to UPL
2212 | 8/28/12 | Prestondale Estates LotAR, Blk 2 (2717 Springbrook Dr.) | GB to R-1 GB to GB-PD
2223 | 2/26/13 | Glenview Addn Lot 1, Blk 6 and Edgewood Church Addn Lot A & B (1004 W Pipeline Rd. & 801 Zelda Dr.) | U & R-1 to U-PD
2228 | 4/23/13 | Holder Estates, Lots 10A, 10A1, 10C, Blk 10 and Tract 1A1 Peter Sowell Survey (623,625,629,701 E Hurst Blvd.) | OC-PD to GB-PD
2244 | 10/22/13 | Tarrant County Northeast Courthouse, Lot 1, Blk 1 (645 Grapevine Hwy.) | O2 to O2-PD
2269 | 8/11/2015 | Shady Oaks West, Lot C1, Block 1 (1616 Precinct Line Rd.) | R-3 to GB-PD
2299 | 9/29/2015 | Billy Creek Estates, Lot A, Block 9 (100 Melbourne Rd.) | GB-PD to R1-PD
2334 | 10/11/2016 | WB La Cava Addn., Lot 12R1, Block 1 (232 E. Pecan St.) | LB to R2-PD
2336 | 10/11/2016 | Putt-Putt Addn., Lot 1R, Block 1 (609 NE Loop 820) | OC to OC-PD
2346 | 12/13/2016 | Creekview Addn., Lot 3, Block 1 (759 Grapevine Hwy) | GB-PD to OC-PD
2356 | 5/9/2017 | Wintergreen Acres, Lot A & B, Blk 11 and Tract 4B John H. Duncan Survey (Sandstone Cove) | R1 to R1-PD
2361 | 6/27/2017 | Wm Wallace Survey, Tract 3E (626 Melbourne Ct.) | R1A to R1
2361 | 1/19/2018 | Walker Oaks Addn., Lots 18 & 18, Blk 2 (317 & 321 Melbourne Rd.) | R1 to R1-PD
2362 | 1/23/2018 | Hurst Hill Addn., Lots 7 & 8, Blk 2 (117 & 121 Belmont St.) | R1 to U-PD
2362 | 1/23/2018 | The Haven Addn., Lot 5A, Blk A (200 Grapevine Hwy) | GB to GB-PD
Colleyville
North Richland Hills
Bedford
Euless
Richland Hills
Fort Worth
Harwood Rd
Airport Fwy (SH 183)
Bedford Rd
Pipeline Rd
Loop 820
Update Date: Jan 2018

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Hurst has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Hurst's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Fire Chief/Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Hurst. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Hurst Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Hurst	Fire Department	Fire Chief/Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Hurst	Public Works Department	Director	Hazard identification and plan development
City of Hurst	Public Works Department	City Engineer	Hazard identification and plan development
City of Hurst	Public Works Department	Field Operations Manager	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: Codes have been adopted on a regular cycle and the city is under the 2015 International Fire Code (IFC) and International Building Code (IBC). A full list of completed mitigation action items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Hurst.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	39,160
Persons under 5 years (%)	7.6
Persons 65 years and over (%)	16
Language other than English spoken at home (%)	20.6
With a disability, under age 65 (%)	8.1
Persons without health insurance, under age 65 (%)	21.9
Persons in poverty (%)	11.9
Median household income	$55,807
Households, 2012-2016	14,512
Median value of owner-occupied housing units, 2012-2016	$150,600

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Hurst.

City of Hurst Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
City Hall Complex 1505 Precinct Line Road	City Administration	500 people	34,000	$7,000,000	$2,000,000
Hurst Police Department 1501 Precinct Line Road	Law Enforcement	200 people	25,000	$4,000,000	$2,000,000
Hurst Main Fire Station 2100 Precinct Line Road	Fire Department	100 people	15,000	$3,500,000	$350,000
Hurst Fire Station 2 837 West Pipeline Road	Fire Department	100 people	17,000	$3,600,000	$300,000
Hurst Fire Station 3 201 Holloway Court	Fire Department	50 people	5,000	$500,000	$100,000
City Library 901 Precinct Line Road	City Library	600 people	50,000	$10,000,000	$5,000,000
City Recreation Center 700 Mary Drive	City Recreation Center (Shelter)	1000 people	48,000	$6,000,000	$400,000
Northeast Mall 1101 Melbourne Road	Regional Mall	Unknown	2,134,000	$155,000,000	Unknown
Cook's Children's Medical Center 6316 Precinct Line Road	Medical Facility	200 people	53,000	$15,000,000	Unknown

3.3 Natural Hazard Profiles

The City of Hurst's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Hurst in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Tornado
2	Thunderstorm (includes hail, wind, lightning)
3	Flooding
4	Extreme Heat
5	Expansive Soils
6	Winter Storms
7	Drought
8	Earthquake
9	Wildfire

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Hurst.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	There is no historical data for drought damage in the city. The City of Hurst is mostly urban, with a large percentage of the city being residential. The population would not be significantly impacted by drought. The city has drought contingency plans and watering restrictions that change as drought conditions change. Although the last drought continued for a number of years, historically speaking, the population was not severely impacted; however, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal due to the minor extent expected.

Jurisdiction's ground-water supply: The City of Hurst purchases over 99% of its water from the City of Fort Worth. The city uses less than one million gallons annually (not even a single percentage of total usage) from the ground water supply wells. The ground water supply is in the Trinity Aquifer and is monitored by the Northern Trinity Groundwater Conservation District.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: The City of Hurst has water restrictions on when commercial and residential irrigation may occur, limiting the number of days per week and the hours of the day. If conditions worsen, there are contingency plans to further reduce residential and commercial irrigation.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Expansive soils are a major consideration to all existing and future structures. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Spot repairs are made annually to roadways due to expansive soils and the damage occurs across all areas of the city. The water system suffers leaks and main breaks due to moving soils in all parts of Hurst. Approximately $50,000 is spent annually for road repairs and approximately $30,000 annually for water system repairs.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by expansive soils? Yes, a permit is required. From January 1, 2016 to December 31, 2017 91 permits were issued for a total cost of $12,000. This would mean the costs of repairs would be approximately $365,000 over two years. It is impossible to state how many of these repairs are due to expansive soils versus lack of maintenance or other repairs to foundations.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from summer heat. People who work outside or in un-air-conditioned buildings are also at high risk to the direct effects of summer heat. Historically the impact on the population has been minimal as there are many locations, including shopping complexes, to escape the heat. Hurst's population is normally able to maintain proper heating, ventilation, and air-conditioning systems in their dwelling places and those that cannot have typically reached out for help.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? No cases have been reported.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Commuters and any buildings in a floodplain are considered most at risk, though all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. There has been no significant property loss in the City of Hurst in the last ten years due to property buyouts (circa 2000) and projects to mitigate flooding along creeks.

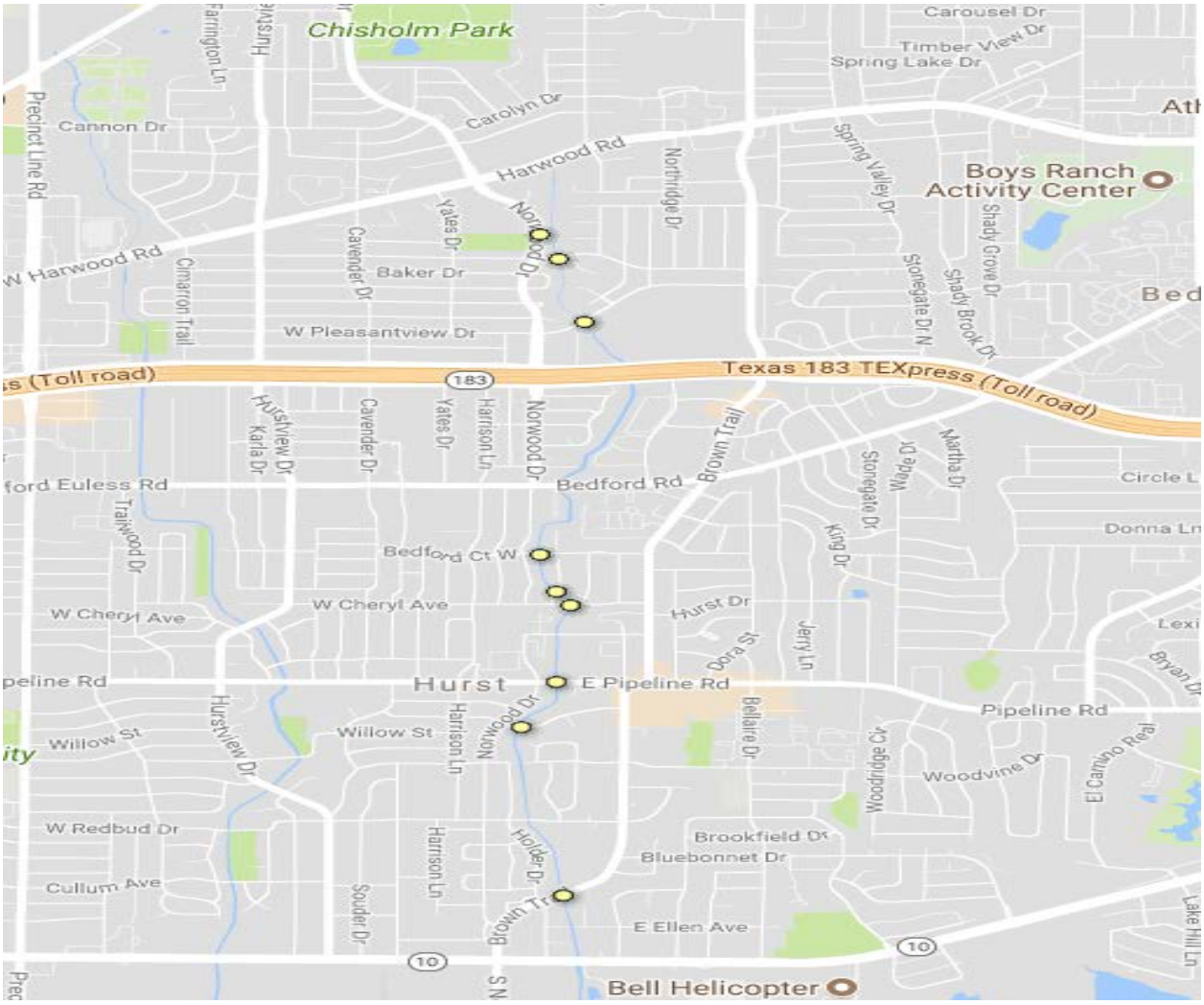
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? Yes, though data is not available.

Intersections or traffic routes impacted by flooding: Precinct Line Road, as it goes into Fort Worth, has recently been rebuilt to raise it to prevent flooding and a bridge along that roadway has been replaced to create better flow. There have been no other reports of flooding since 2015; however, see low water crossings below, as these roads have the potential of flooding.

Names of any creeks or rivers that flood: Little Bear Creek in northern Hurst, Calloway Branch in southwestern Hurst, Walker Branch in southern Hurst, Mesquite Branch in central Hurst, and Sulphur Branch Creek in southeastern Hurst all have the potential of flooding.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Brown Trail	Valley View Branch	Bridge Class
Oak Drive	Valley View Branch	Bridge Class
Pipeline Road	Valley View Branch	Bridge Class
Cheryl Avenue	Valley View Branch	Vented Ford
Valley View Drive	Valley View Branch	Vented Ford

Road	Flooding Source	Low Water Crossing Type
Bedford Court	Valley View Branch	Vented Ford
Pleasantview Drive	Valley View Branch	Vented Ford
Louella Drive	Valley View Branch	Vented Ford
Norwood Drive	Valley View Branch, TRIB Stream VVB-1	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Hurst is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480601#
Community Name	City of Hurst
County	Tarrant
Initial FHBM Identified	6/14/74
Initial FIRM Identified	10/15/85
Current Effective Map Date	9/25/2009
Reg-Emer Date	10/15/85
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? City Engineer.

What specific flooding ordinances and plans does your jurisdiction have? Code of Ordinances, Chapter 9- Flood Hazard Prevention.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? There are approximately 622 structures in the SFHA with a total appraised value of $140,563,704. This makes up 3.76% of the total value of all commercial and residential properties in the city. Requirements are identified in Code of Ordinances, Chapter 9- Flood Hazard Prevention.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? Restrictions are identified in the Code of Ordinances, Chapter 9- Flood Hazard Prevention.

Repetitive and Severe Repetitive Loss Properties: There are currently no repetitive loss properties and severe repetitive loss properties within the City of Hurst. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Commercial	1,656.56	98.28	5.93%
Industrial	227.42	9.91	4.35%
Residential	3,223.79	115.7	3.58%
Total	**5,107.77**	**223.89**	**4.38%**

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Hurst's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	Hurst NFIP (2016 Audit)	Policies in-force: 226, 149 in SFHA Insurance in-force: $59,412,400 Written premium in-force: $236,390
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	City Floodplain Administrator (FPA)	Since 1978: Around 116 claims have been filed, but 28 of the claims closed without payment. $1,240,022.47 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	City Floodplain Administrator (FPA)	677.
Describe any areas of flood risk with limited NFIP policy coverage	City Floodplain Administrator	None.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.

Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	The City of Hurst requires by ordinance that any substantial improvement or substantial damage improvement must have a building permit. The zoning ordinance, flood control ordinance and the international Building Codes have special provisions regulating construction and other developments within floodplains.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	No barriers.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	City Floodplain Administrator	Yes.
Are there any outstanding compliance issues (i.e. current violations)?	City Floodplain Administrator	No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	City Floodplain Administrator	June 2016.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	6/14/74.
Are the FIRMs digital or paper?	Community FPA	Both digital and paper.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes, one foot of freeboard required above base flood elevation for all construction.

Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Permit conditions: 1. Contractor shall have City approved construction plans prior to commencing any site work. 2. Contractor shall acquire all other applicable City permits prior to commencing construction including clearing and grubbing, earthwork, construction, building, mining, etc. 3. Flood study demonstrating that the requirements of the City of Hurst are met shall be approved prior to issuing a Floodplain Development Permit or Earthwork permit in all floodplains. Flood map revision shall be approved by FEMA prior to placing fill in FEMA floodplain. 4. Fill for new building construction shall be compacted to 95% standard proctor density at plus or minus 1. 3% of optimum moisture content, unless specified otherwise on City approved construction plans. 5. Adjoining property owners shall not be adversely affected by increased velocities, significantly increased flows, increased flood elevations, sediment, erosion, etc. 6. For excavation and/or mining, see Public Works' Senior Right-of-Way Agent for a Mining Permit and Road Use Permit. A Reclamation Plan will also have to be submitted to the Floodplain Administrator for approval. 7. For new residential structures, the lowest floor (including basement and garage) shall be at or above the minimum finished floor elevation specified on the plat. If there is not an elevation specified on the plat, the structure shall be elevated so as to be a minimum of one foot above the FEMA FIS 100-year base flood elevation. A building permit shall be acquired prior to commencing any work on structures. 8. For new non-residential structures, the building shall be elevated as specified above or flood-proofed to withstand the flood depths, pressures, velocities, impact and uplift forces associated with the FEMA FIS 100-year base flood. All utility lines

		shall be installed as to minimize damage from potential flooding. 9. Upon completion of construction, submit an Elevation Certificate, Precise Grading Certificate, as-built plans, and certification from a Professional Engineer that flood proofing requirements have been met (if flood proofing is required).
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	Yes.
What is the community's CRS Class Ranking?	Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual	8.
Does your flood management plan or hazard mitigation plan include CRS planning requirements?	Community FPA, FEMA CRS Coordinator, ISO representative. CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Yes.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Major
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. The electrical power grid is the most vulnerable asset but there have been relatively few outages compared to the past as maintenance on the easements (tree limb removal) has greatly reduced the impact of wind events.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): No recorded damage has occurred since 2015.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Those caught in vehicles commuting along the freeways are at a higher potential to be impacted.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: No recorded damage has occurred since 2015.

Is there an area of the town that is the most vulnerable to tornadoes? The City of Hurst has a mix of residential and commercial structures interspersed, along with a corridor of industrial, along the southern border of the city. The entire city is vulnerable to a tornado event. Only the magnitude of the tornado and the path would dictate the damage.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard, though the threat is minimal. There are 277 acres of developed and undeveloped parkland within the city limits, with a plan to add 58 additional acres. There has been no history of a wildfire.

Most vulnerable location (North, East, South, West) of your jurisdiction? City parks are the greatest source of open-space and pose the highest risk to wildfires. The following is the park inventory for the city from the City of Hurst Parks Master Plan and will provide a description of every park.

3.3 PARKS INVENTORY

Inventorying existing parks and open space is an important step in the master planning process since it creates a baseline from which to develop recommendations. Within the City of Hurst, there are 8 neighborhood parks totaling 47 acres, 3 community parks totaling 112 acres, 4 special purpose parks totaling 74 acres, and 44 acres of undeveloped land that is designated as parkland. In total, parkland is 277 acres, or 4% of the entire city. Table 3.1 shows the amenities that Hurst park facilities offer system-wide.

Table 3.1: Hurst Parks System Inventory

NEIGHBORHOOD PARKS:

Bellaire Park
500 Pecan Drive
6.4 acres

Echo Hills
500 Heneretta Drive
7.1 acres

Jaycee Baker Park
500 Belmont Street
4.1 acres

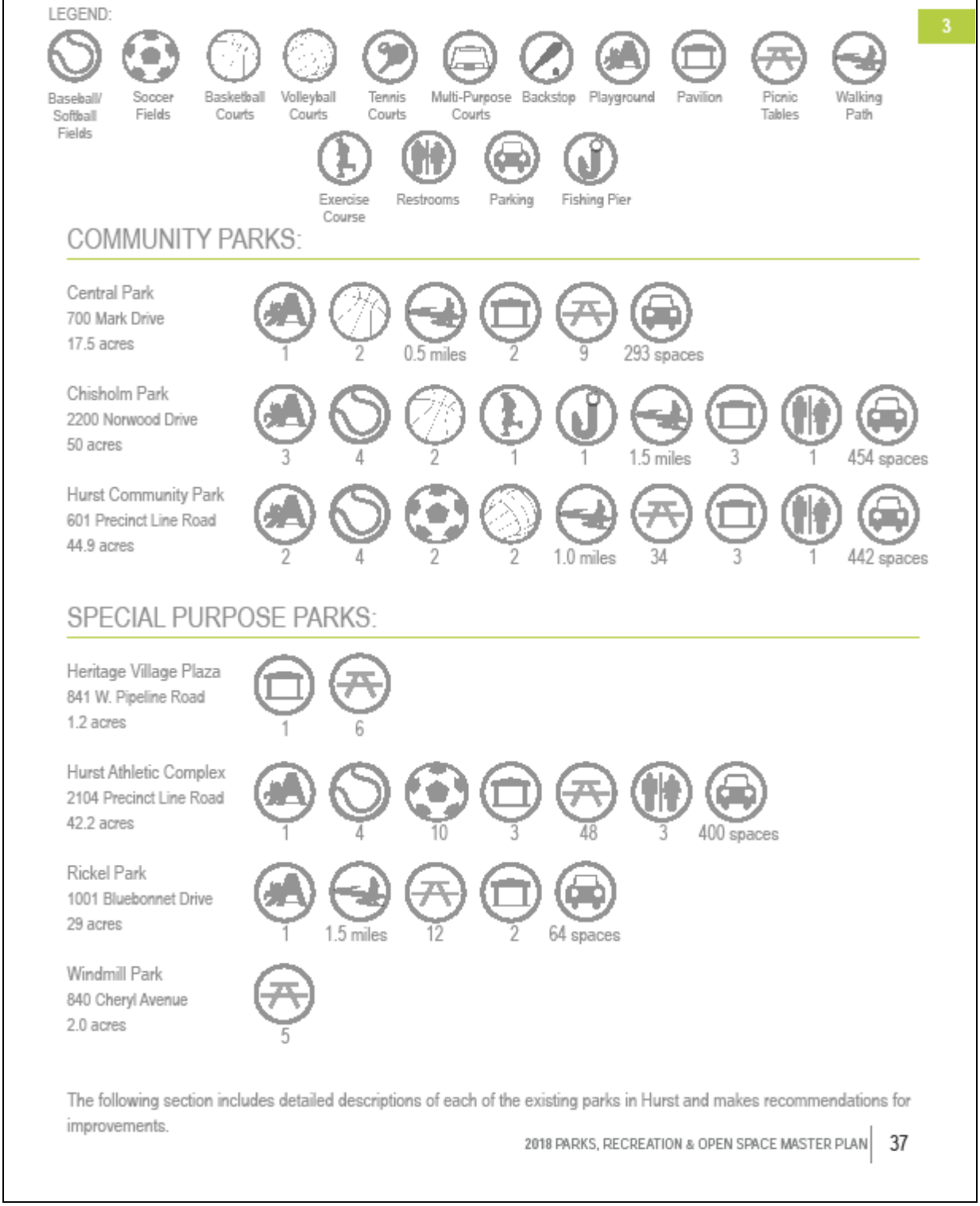
Mayfair Park
1725 Norwood Drive
6.1 acres

Redbud Park
525 Redbud Drive
7.2 acres

Smith/Barfield Park
640 Pleasantview Drive
6.9 acres

Vivagene Copeland Park
501 Pecan Drive
5.2 acres

Wan Ka-Kani Park
748 Shady Lane
4.1 acres



Along with open spaces, residents might have the desire to start recreational fires and use open flame cooking devices. To limit the potential damage from these fires, the Hurst First Department created the following policy:

Definitions

Recreational Fire is the burning of materials other than rubbish for pleasure, religious, ceremonial, warmth, or similar purposes in which the fuel being burned is not contained in a barbeque grill, or a barbecue pit, and the total fuel area does not exceed 3 feet in diameter and 2 feet in height.

Outdoor Fire Pit is a structure or appliance that is designed and approved for the burning of combustible material that does not have a flue, chimney or duct and the combustion gases are emitted directly into the atmosphere. A fire pit shall consist of a fire ring constructed of a metal ring, noncombustible bowl, rocks or bricks.

Outdoor Fireplace is a device or structure designed and constructed in accordance with recognized standards for the burning of natural combustible materials and releases the combustion gases through a flue, chimney, or duct. Example includes patio fireplaces equipped with a metal screen enclosure, chimeneas, etc.

Recreational Fires Policy

• Recreational fires contained in an outdoor fire place should not be conducted within15 feet of a combustible structure.

• Recreational fires contained in an outdoor fire pit shall not be conducted with 25feet of a combustible structure.

• Fire pits shall be clear of combustible vegetation for no less than ten feet in all directions. Grass less than 4 inches is permitted as long as it is green or wet.

• The burning of rubbish, leaves, lumber, manufactured type logs or material other than natural wood logs cut for such purposes is prohibited.

• A fire will NOT be allowed if the winds would create a dangerous situation.

• Fire-extinguishing equipment shall be readily available at all recreational fires and can consist of water hose, shovel, or fire extinguisher.

• Recreational fires shall be constantly attended by a competent person.

Open Flame Cooking Devices Policy

• Charcoal burners and other open flame cooking devices should not be operated on combustible balconies or within 10 feet of combustible structures.

The Fire Chief or Fire Marshal is authorized to require that any use of open flame be immediately discontinued if such fires are determined to constitute a hazardous condition, are emitting obnoxious odors, or are producing visible smoke that may constitute a nuisance or health hazard.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Loop 820 overpasses, Highway 121/183 bridges.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Mainly commuter traffic is impacted for a few hours at a time, not typically more than 24 hours in duration, as the resource to sand and treat roadways is readily available and temperatures usually climb above freezing within a few hours.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Hurst between 2015 and 2017. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Hurst	4/24/2015	Flash Flood		0	0	$0	$0	
Hurst	11/17/2015	Thunderstorm Wind	50	0	0	$0	$0	EG
Hurst	3/8/2016	Thunderstorm Wind	52	0	0	$5,000	$0	EG
Hurst	6/2/2017	Flash Flood		0	0	$0	$0	
Total				**0**	**0**	**$5,000**	**$0**	

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Hurst identified their greatest vulnerabilities and concerns below:

- The Valley View Branch Bridge at Hurst Boulevard has one portion of water flow permanently blocked to reduce flow into an area just south of this location in another city and prevent flooding in a small mobile home park. All of the homes in the low area have been permanently removed. Areas above the bridge are minimally impacted, and the cities of Hurst and Fort Worth are working together to find a solution that would further reduce the risk.
- The Outdoor Warning Siren System is aging, but is maintained and works well. The system is constantly monitored to make sure the system remains reliable.
- The ability to give early warning to residents in the event of a hazard is important, as this feature is paramount to the city's resiliency.
- Continued capital and maintenance programs for the creek systems are key to successful flood mitigation.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Hurst's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Various plans; do not specifically delineate hazards, but the goal of the plans are to identify problems. No, projects are identified in the Capital Improvement Plan; Yes.
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	Yes	No; No; Yes
Local Emergency Operations Plan	Yes	Yes, Yes, Yes. Tarrant County Emergency Operations Plan
Continuity of Operations Plan	Yes	Yes; No; No
Transportation Plan	No	The city participates in planning with other agencies. No; No; Yes
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	Yes	Yes; Yes; Yes – Tarrant County Hazard Mitigation Action Plan
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes

Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	
Acquisition of land for open space and public recreation uses	Yes	Yes; Yes
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year: IBC, 2015**
Building Code Effectiveness Grading Schedule (BGEGS) Score	Yes	**Score: 1 and 2 family dwellings = 6; all other construction =5**
Fire Department ISO Rating	Yes	**Rating: 2**
Site Plan Review Requirements	Yes	Type(s) of requirement: meet IBC, fire codes, and city ordinances
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Looks at all new development and considers the impact including hazard risks; Yes
Mitigation Planning Committee	Yes	Hazard identification and risk assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Public Works crews maintain the drainage systems to keep system from being ineffective; Yes
Mutual Aid Agreements	Yes	Allows for emergency response between local agencies to bolster response when necessary; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	City Engineer. Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:		
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor Warning Siren System, CodeRed, email systems, Collaborative Adaptive Sensing of Atmosphere (CASA); Yes

Hazard data and information	Yes	Information on previous incidents, locations; Yes, determines priorities for mitigation projects.
Grant writing	Yes	Ability to write various types of grants. Yes, Hazard Mitigation Grant Program for buyouts of repetitive flood loss houses.
HaZUS analysis	No	
Other		

Education and Outreach Assessment

Program or Organization	Have capability?	Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Community Emergency Response Team (CERT) – teaches citizens how to prepare for, mitigate against and respond to disasters. Citizens Fire Academy (CFA) – teaches citizens emergency preparedness and mitigation techniques. Radio Amateur Civil Emergency Service (RACES) - helps provide response and preparedness instruction. Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Various programs through CERT, CFA, Fire Department, Police Department, Public Works Department, and city website.
Natural disaster or safety related school programs	Yes	Fire safety is taught to approximately 5,000 children per year.
StormReady certification	Yes	StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education and awareness. To be officially StormReady, a community must: • Establish a 24-hour warning point and emergency operations center • Have more than one way to receive severe weather warnings and forecasts and to alert the public • Create a system that monitors weather conditions locally • Promote the importance of public readiness through community seminars • Develop a formal hazardous weather plan, which includes training severe

		weather spotters and holding emergency exercises. Yes
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	Hospitals, utility companies, and the American Red Cross are all partners with the community in providing mitigation and response capabilities.
Other		
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes, flood mitigation, water, sewer, facilities; Yes
Authority to levy taxes for specific purposes	Yes	Yes, construct Emergency Operations Center and Emergency Operations Plan; Yes
Fees for water, sewer, gas, and/or electric services	Yes	Yes, water and sewer infrastructure to protect against environmental hazards; Yes
Impact fees for new development	Yes	No; No
Stormwater utility fee	Yes	Yes, maintenance of stormwater drainage.
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes, fire stations, police stations, dispatch centers; Yes
Incur debt through private activities	No	
Community Development Block Grant	Yes	No; Yes
Other federal funding programs	Yes	State Homeland Security Program, Urban Area Security Initiative, equipment for police, public works, and fire personnel; Yes
State funding programs	Yes	Hazard Mitigation Grant Program, house buyouts for flood mitigation; Yes
Other		

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Hurst's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	Replace eight outdoor warning systems (OWS) in the City of Hurst.	Evaluate life expectancy of 30+ year old OWS (8 locations).	6 months	Fire Department	$5,000	$20,000	Local
		STATUS: Ongoing (annual assessment)					
		Purchase 8 OWS and control system.	1 year	Fire Department	$300,000	$1,000,000	Local, grants
		STATUS: Deferred to 2020 HazMAP					
		Install 8 OWS systems.	6 months	Fire Department	$50,000	$250,000	Local, grants
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Purchase/maintain community notification system that would allow for more robust communications (voice and digital) that could be used for warning after events and for daily use for various departments in the City of Hurst.	Identify system requirements.	6 months	Fire Department	$1,000	$1,000	Local, grants
		STATUS: Completed- staying with CodeRed					
		Purchase and install system.	6 months	Fire Department	$30,000 per year	$90,000 per year	Local, grants
		STATUS: Completed					
		Educate public on use.	1 year	Fire Department	$10,000	$40,000	Local, grants
		STATUS: Completed- staying with CodeRed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Provide Automated License Plate Readers (ALPR) to increase detection of violators and wanted persons in the City of Hurst.	Identify companies who provide ALPR systems.	July 2013	Police Department	$0	$200,000	Office of the Governor, criminal justice grant
		STATUS: Deleted (political/privacy reasons)					
		Determine most effective system.	July 2013	Police Department	$0	$200,000	Office of the Governor, criminal justice grant
		STATUS: Deleted (political/privacy reasons)					
		Apply for and receive funding.	September 2013	Police Department	$0	$200,000	Office of the Governor, criminal justice grant
		STATUS: Deleted (political/privacy reasons)					
		Purchase ALPR system and equip selected police vehicles.	January 2014	Police Department	$40,000	$200,000	Office of the Governor, criminal justice grant
		STATUS: Deleted (political/privacy reasons)					
Flooding	Open all passages under Highway 10 bridge over the Valley View Branch in the City of Hurst.	Open all waterways under bridge to allow full flow.	3 months	Texas Department Transportation (TxDOT)	$100,000	Unknown	Unidentified
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Flooding	Replace Trinity Railway Express (TRE) Dallas Area Rapid Transit (DART) Line culvert below the TxDOT bridge to stop flooding the homes on Springlake Drive in Hurst.	Improve the water flow rate through the TRE right of way.	1 year	Dallas Area Rapid Transit (DART)/Trinity Rail Express (TRE)	$2,000,000	Unknown	Unidentified
		STATUS: Deferred to 2020 HazMAP					
Flooding	Create upstream detention areas to slow the flow downstream of the Lorean Branch intersection with Highway 121 in the City of Hurst.	Define the needed amount of detention and suitable areas to create the detention areas.	2 years	Hurst, TxDOT, North Tarrant Express (NTE)	$250,000	Unknown	State, grants
		STATUS: Deleted – lack of return on investment					
		Build the detention areas.	1 year	Hurst, TxDOT, NTE	$1,500,000	Unknown	State, grants
		STATUS: Deleted – lack of return on investment					
Flooding	Create Walker Branch detention system above Northeast Mall on	Create a plan for the water detention.	2 years	Hurst, North Richland Hills (NRH), TxDOT	$500,000	Unknown	Local, state, grants
		STATUS: Deleted – lack of return on investment					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	the Walker Branch in the City of Hurst.	Build the detention areas.	1 year	Hurst, NRH, TxDOT	$1,500,000	Unknown	Local, state, grants
		STATUS: Deleted – lack of return on investment					
Infectious Disease Outbreak	Provide physical security at the Hurst- Euless-Bedford (HEB) point of dispensing (POD) site while treating up to 200,000 people within a 48-hour timeframe.	Develop plans for security needs within the POD site.	Completed	Hurst-Euless-Bedford (HEB)	Unknown	Unknown	HEB, Federal Emergency Management Agency (FEMA), Center for Disease Control public health preparedness funds
		STATUS: Completed					
		Calculate police personnel requirements and availability and then prepare a viable plan with schedules and assignments.	Completed	HEB	$49,000	$200,000	HEB, FEMA, Center for Disease Control public health preparedness funds
		STATUS: Completed					
		Estimate fuel needs for police and ICS	December 2013	HEB	Unknown	Unknown	HEB, FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		vehicles, and generators.					
		STATUS: Completed					
Infectious Disease Outbreak	Coordinate the effective traffic flow leading into, out of, and within the Hurst, Euless, and Bedford POD site.	Plan for law enforcement personnel needs for traffic control.	Completed	HEB	$35,000	$140,000	HEB, FEMA
		STATUS: Completed					
		Plan for portable, physical barrier needs (cones, barricades, etc.).	Completed	HEB	Unknown	Unknown	HEB, FEMA
		STATUS: Completed					
		Determine points of ingress/egress to POD site for management purposes.	Completed	HEB	Unknown	Unknown	HEB, FEMA
		STATUS: Completed					
Infectious Disease Outbreak	Complete and disseminate the Hurst, Euless, and Bedford POD site to local agencies, school and hospital	Prepare and disseminate POD plan.	Completed	City of Bedford	Unknown	Unknown	Unknown

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	district, and Tarrant County officials.						
		STATUS: Completed					
Lightning	Mitigate the potential for lightning strikes on city workers.	Purchase and install a lightning detection system that will allow public works and public safety dispatchers to notify personnel of potential lightning in the area.	2 years	Public Works Department, Fire Department, Police Department	$25,000	Unknown	Local
		STATUS: Deferred to 2020 HazMAP					
Hail	Mitigate the effects of hail.	Develop educational materials for citizens to use in making decisions on roofing materials for residences.	2 years	Office of Emergency Management, Public Works Department, Public Information Office	$5,000	Unknown	Local
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Mitigate the effects of extreme heat on citizens.	Educate citizens using the city magazine, social media outlets and	Ongoing	Police Department, Fire Department,	$10,000	Unknown	Local, non-governmental organization (NGO),

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		city website on the availability of shelters and other resources (financial assistance, fans, etc.) to help prevent heat related injuries and deaths.		Public Works Department, Public Information Office, Non-governmental organization (NGO)			electric providers
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Incorporation of power generator for use at public buildings. Generator to provide the power necessary to operate heating, ventilation, and air-conditioning in the event of wide spread power loss during extreme temperatures.	Purchase electrical generator to power public buildings for shelter or warming/cooling center.	12 months	Office of Emergency Management	$75,000	$100,000	City budget
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Winter Storm	Develop a winter weather outreach program and distribute the information for the citizens of Hurst.	Evaluate the hazards posed by severe winter weather in the City of Hurst.	12 months	Office of Emergency Management	$500	$10,000	City budget, local grants
		STATUS: Deleted- no longer a priority					
		Develop a winter weather outreach program that provides tips and pertinent information for avoiding hypothermia and icy conditions.	12 months	Office of Emergency Management	$500	$10,000	City budget, local grants
		STATUS: Deferred to 2020 HazMAP					
		Provide winter weather mitigation information to citizens of Hurst through a social media campaign and publish information on City of Hurst's website.	12 months	Emergency Management	$500	$10,000	City budget, local grants
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Expansive Soils	Mitigate expansive soil problems.	Educate homeowners on mitigation techniques for foundations. Develop materials for social media and city website.	1 year	Public Works Department, Public Information Office	$10,000	$100,000	Local
		STATUS: Deferred to 2020 HazMAP					
Expansive Soils	Mitigate expansive soil problems.	Review codes/ordinances for best practices for building techniques.	Ongoing	Public Works Department	$5,000	Unknown	Local
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Mitigate urban interface wildfires.	Pre-plan all urban interface areas within the city to allow for rapid response and incident control.	Ongoing	Fire Department, Public Works Department	$10,000	$100,000	Local
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Mitigate urban interface wildfires.	Distribute information through the city magazine, social media and city website educating	Ongoing	Fire Department, Public Information Office	$10,000	$100,000	Local

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		citizens concerning safe ways to conduct outdoor burning.					
		STATUS: Completed					
Drought	Educate citizens on water conservation efforts.	Public education through city magazine, social media and city website.	Ongoing	Public Works Department, Public Information Office	$10,000	Unknown	Local
		STATUS: Deferred to 2020 HazMAP					
Drought	Reduce costs to water city parks and city facilities.	Use native and drought resistant plants to reduce watering needs.	Ongoing	Parks Department	$100,000	Unknown	Local
		STATUS: Deferred to 2020 HazMAP					
Dam Failure	Participate in the Federal Emergency Management Agency's (FEMA) Community Rating System (CRS) program.	Work with city officials to become a member of the CRS program.	March 2014	City Planner	$1,000	$2,000	Local
		STATUS: Completed					

5.3 New Action Items

The City of Hurst's action items were determined by the Local Planning Team for the Tarrant County Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Flooding**
Install erosion control in Calloway Branch to eliminate erosion of stream bank.	
Participating Jurisdiction:	City of Hurst
Priority:	1
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	**Flooding**
Study erosion in Calloway Branch.	
Participating Jurisdiction:	City of Hurst
Priority:	2
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes
Purchase and install eight outdoor warning sirens.	
Participating Jurisdiction:	City of Hurst
Priority:	3
Estimated Cost:	$360,000
Estimated Benefit:	$2,160,000
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Study Valley View Branch to create solution for flooding at Texas Highway 10.	
Participating Jurisdiction:	City of Hurst
Priority:	4
Estimated Cost:	$20,000
Estimated Benefit:	$120,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Implement findings of Valley View Branch Study to prevent flooding along Valley View Branch.	
Participating Jurisdiction:	City of Hurst
Priority:	5
Estimated Cost:	$2,000,000
Estimated Benefit:	$12,000,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Flooding
Improve the Community Rating System rating in order to lower flood insurance premiums for residents with flood insurance by using ongoing outreach.	
Participating Jurisdiction:	City of Hurst
Priority:	6
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	General fund, grants
Lead Agency/Department Responsible:	Public Works Department, Planning & Zoning Commission, Economic Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Purchase and install generators for new and existing critical facilities to reduce the damage from power failure due to the identified hazards.	
Participating Jurisdiction:	City of Hurst
Priority:	7
Estimated Cost:	$150,000
Estimated Benefit:	$900,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Purchasing Department, Public Works Department, facility owner
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Enhance and enforce building codes to meet most current ICC standards.	
Participating Jurisdiction:	City of Hurst
Priority:	8
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Building Inspections, Planning & Zoning Commission, Economic Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Install safe rooms in new and existing critical facilities that are most vulnerable to the identified hazards.	
Participating Jurisdiction:	City of Hurst
Priority:	9
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Purchasing Department, Public Works Department, facility owner
Implementation Schedule:	48 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Enhance the comprehensive public education program to include new material and recommended actions to mitigate the impacts of these hazards.	
Participating Jurisdiction:	City of Hurst
Priority:	10
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Fire Department, Community Services Department, Parks Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Enhance the drought contingency plan to address the use of low flow fixtures, xeriscaping or drought-tolerant plants for city facilities and property.	
Participating Jurisdiction:	City of Hurst
Priority:	11
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, grants
Lead Agency/Department Responsible:	Public Works Department, Planning & Zoning Commission, Economic Development Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Hurst
Priority:	12
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Hurst
Priority:	13
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Hurst
Priority:	14
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Hurst
Priority:	15
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfires
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Hurst
Priority:	16
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Hurst
Priority:	17
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans.

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plan	Fire Department, City Administration	Annual	Outdoor Warning Siren System	When reviewing the budget each year, the Fire Department will evaluate the aging Outdoor Warning Siren System (OWS) to prioritize the replacement of the warning system.
Capital Improvement Plan	Public Works Department, City Administration, Fire Department	Annual	Valley View Branch	During annual budget review, the need for prioritizing studies and implementation of projects to reduce the risk of flooding along the Valley View Branch will be assessed.
Capital Improvement Plan	Public Works Department, City Administration	Annual	Erosion Control in Calloway Branch	During annual budget review, the need for assessing the priority of studying erosion and implementing project to stop erosion of the stream bank in the Calloway Branch will be assessed.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Hurst. For additional information, see Appendices A and B.

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City of Keller

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Keller was the Fire Chief/Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Keller alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

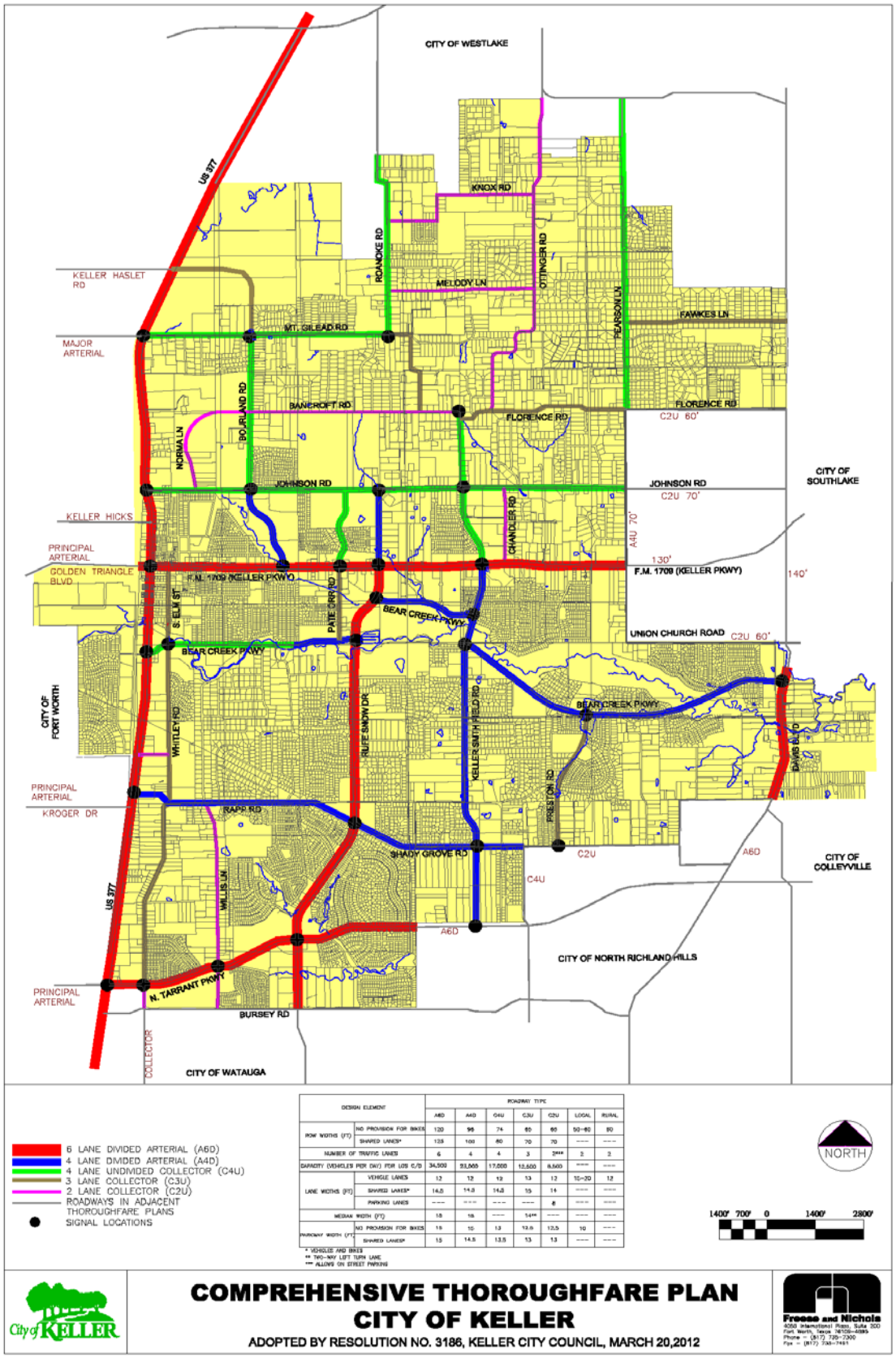
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Keller will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

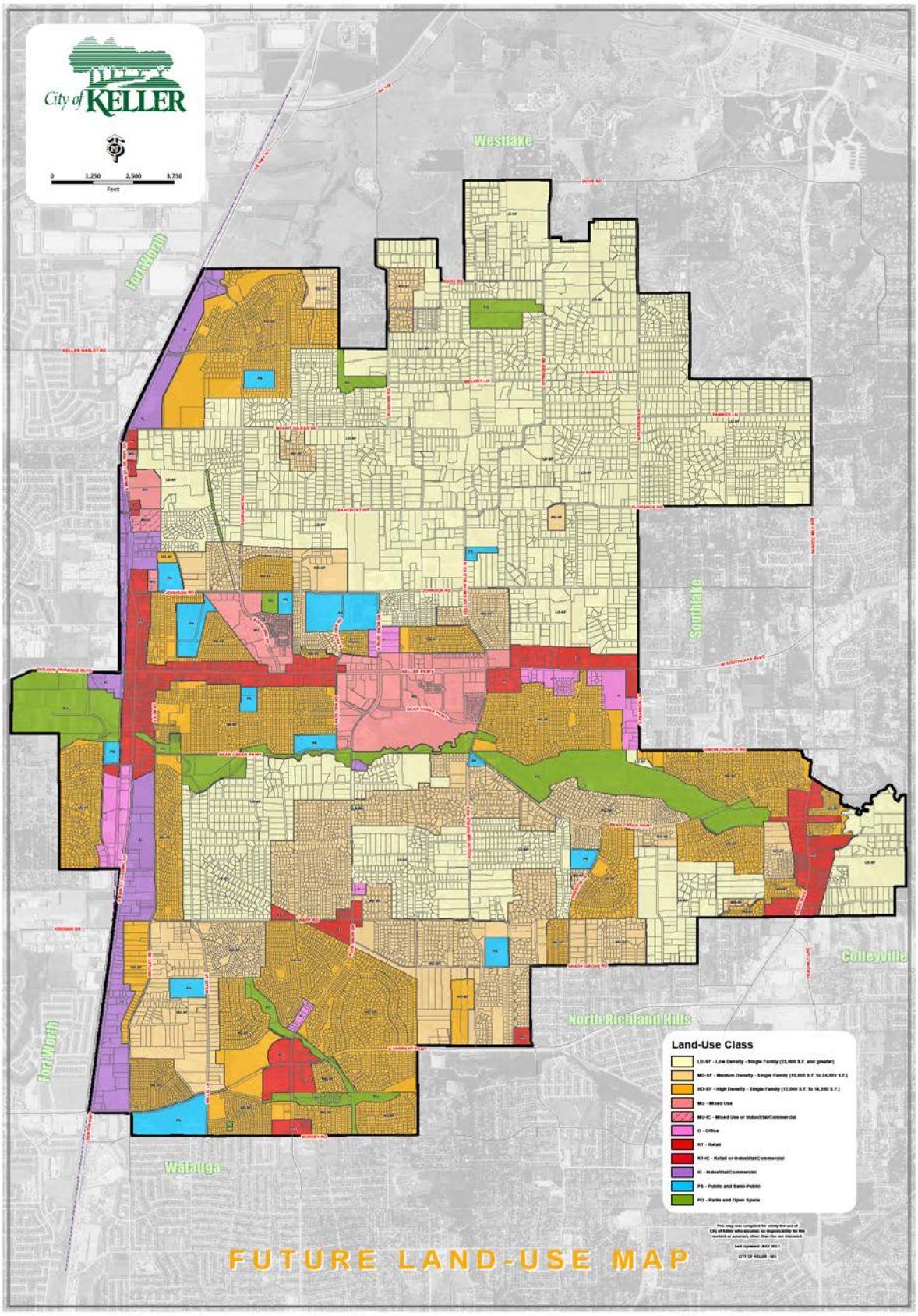
The following maps provide an overview of the City of Keller:

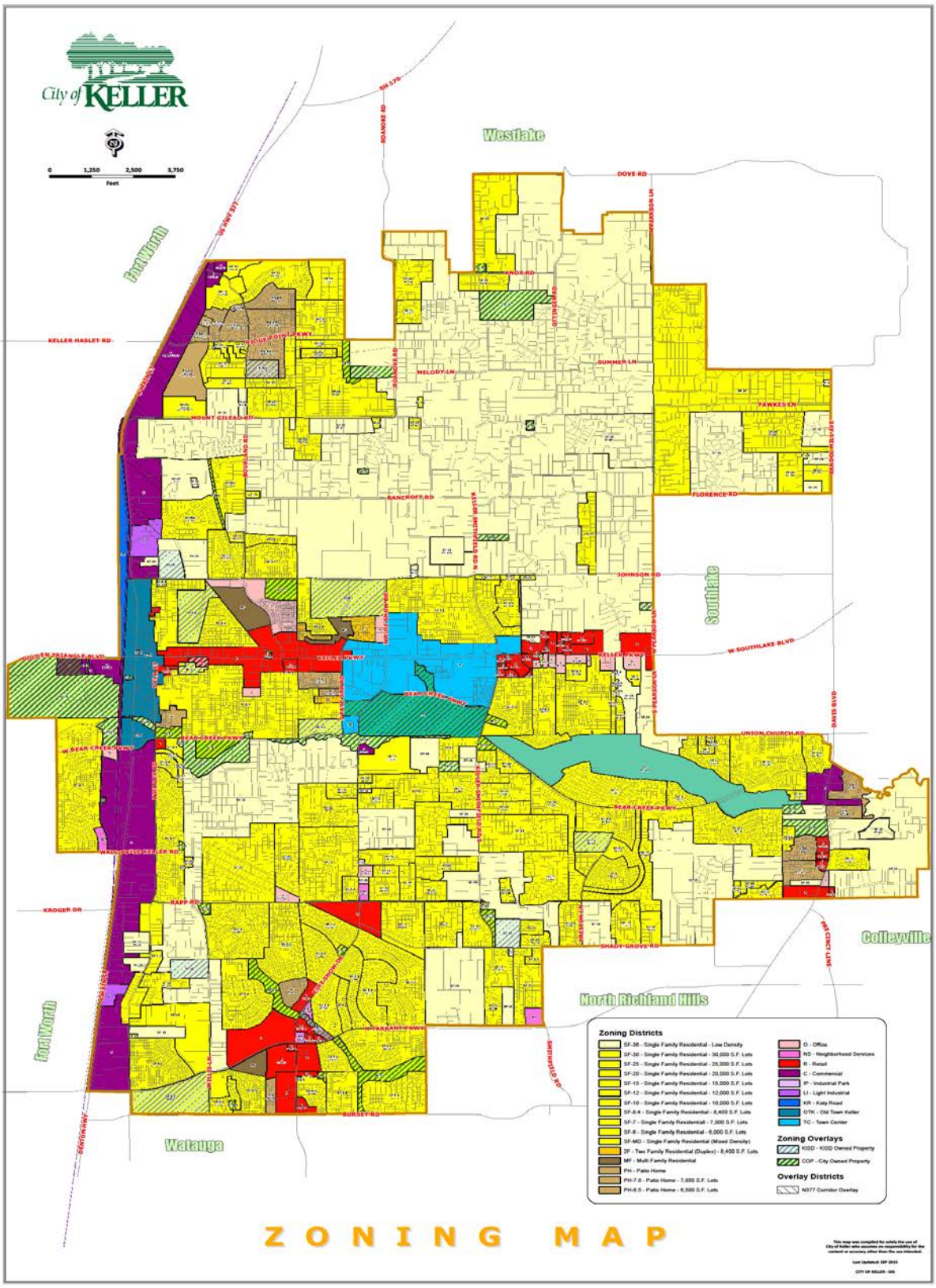
- Comprehensive Thoroughfare Plan Map
- Future Land Use Map
- Zoning Map
- FEMA Floodplain Map



DESIGN ELEMENT		ROADWAY TYPE						
		A6D	A4D	C4U	C3U	C2U	LOCAL	RURAL
ROW WIDTHS (FT)	NO PROVISION FOR BIKES	120	96	74	65	60	50-60	80
	SHARED LANES*	128	100	80	70	70	----	----
NUMBER OF TRAFFIC LANES		6	4	4	3	2***	2	2
CAPACITY (VEHICLES PER DAY) FOR LOS C/D		34,500	23,000	17,000	12,500	8,500	----	----
LANE WIDTHS (FT)	VEHICLE LANES	12	12	12	13	12	10-20	12
	SHARED LANES*	14.5	14.5	14.5	15	14	----	----
	PARKING LANES	----	----	----	----	8	----	----
MEDIAN WIDTH (FT)		18	16	----	14**	----	----	----
PAVEMENT WIDTH (FT)	NO PROVISION FOR BIKES	76	70	52	52.0	32.5	30	----
	SHARED LANES*	76	74.5	52.5	53	33	----	----

* VEHICLES AND BIKES
** TWO-WAY LEFT TURN LANE
*** ALLOWS ON STREET PARKING


City of KELLER
0 1,250 2,500 3,750
Feet
Westlake
Southlake
Colleyville
North Richland Hills
Watauga
Fort Worth
Land-Use Class
FUTURE LAND-USE MAP


City of KELLER
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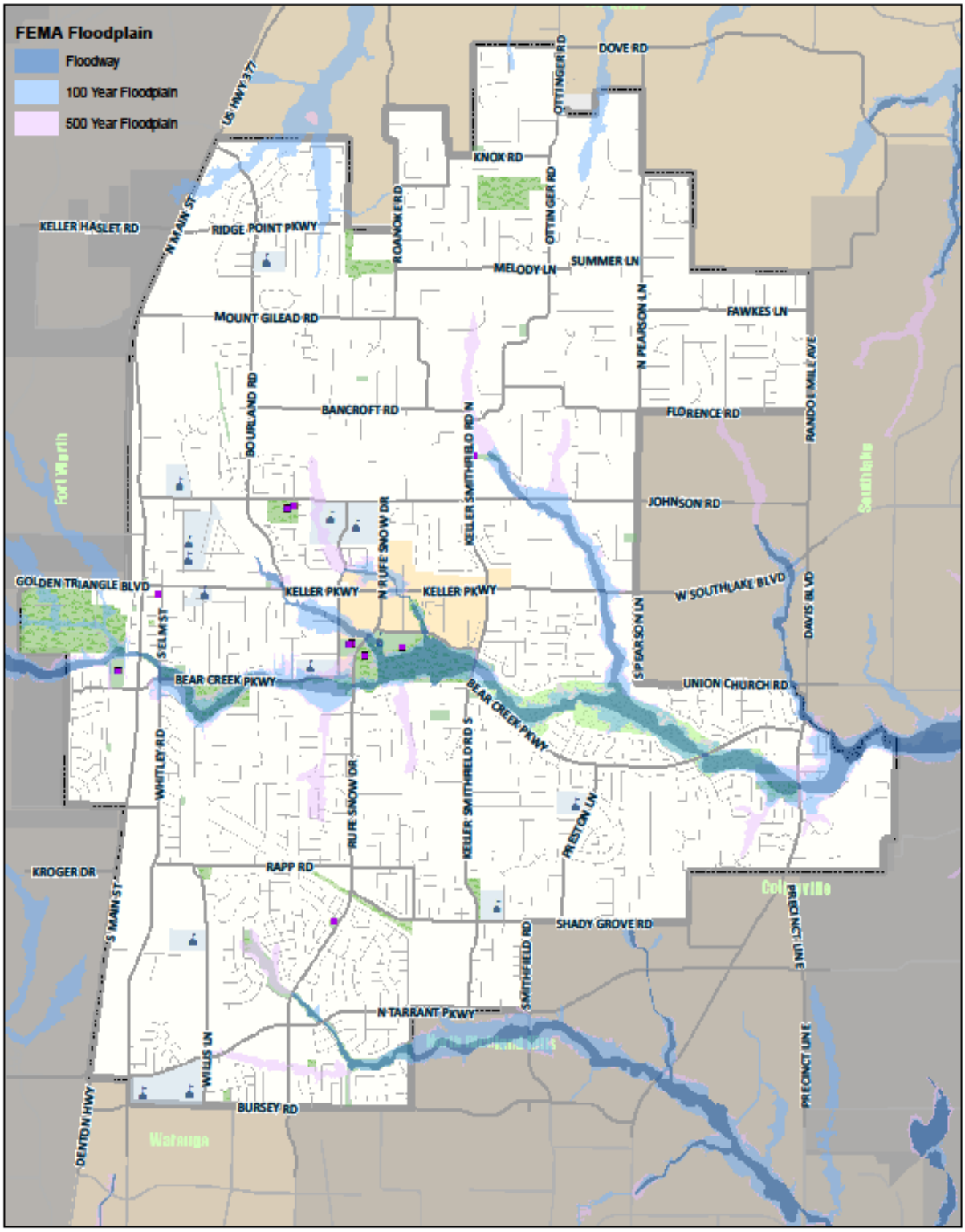
Feet
Westlake
Fort Worth
Southlake
Colleyville
North Richland Hills
Watauga
Fort Worth
DOVE RD
KELLER HASLET RD
MELODY LN
SUMMER LN
TAWKES LN
FLORENCE RD
MOUNT GILEAD RD
RANCROFT RD
JOHNSON RD
W SOUTHLAKE BLVD
UNION CHURCH RD
BEAR CREEK PKWY
SHADY GROVE RD
KROGER DR
RAPP RD
BURSEY RD
Zoning Districts
SF-36 - Single Family Residential - Low Density
SF-30 - Single Family Residential - 30,000 S.F. Lots
SF-25 - Single Family Residential - 25,000 S.F. Lots
SF-20 - Single Family Residential - 20,000 S.F. Lots
SF-15 - Single Family Residential - 15,000 S.F. Lots
SF-12 - Single Family Residential - 12,000 S.F. Lots
SF-10 - Single Family Residential - 10,000 S.F. Lots
SF-8.4 - Single Family Residential - 8,400 S.F. Lots
SF-7 - Single Family Residential - 7,000 S.F. Lots
SF-6 - Single Family Residential - 6,000 S.F. Lots
SF-MD - Single Family Residential (Mixed Density)
2F - Two Family Residential (Duplex) - 8,400 S.F. Lots
MF - Multi Family Residential
PH - Patio Home
PH-7.8 - Patio Home - 7,800 S.F. Lots
PH-6.5 - Patio Home - 6,500 S.F. Lots
O - Office
NS - Neighborhood Services
R - Retail
C - Commercial
IP - Industrial Park
LI - Light Industrial
KR - Katy Road
OTK - Old Town Keller
TC - Town Center
Zoning Overlays
KISD - KISD Owned Property
COP - City Owned Property
Overlay Districts
N377 Corridor Overlay
ZONING MAP



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FEMA Floodplain

City of Keller

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Keller has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Keller's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Fire Chief/Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Keller. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Keller Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Keller	Office of Emergency Management	Fire Chief/Emergency Management Coordinator	Coordination of planning process, plan development
City of Keller	Public Services Department	Director	General oversight, hazard identification, and plan development
City of Keller	Police Department	Police Chief	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Keller	Public Information Office	Public Information Officer	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Keller	Geographic Information Systems (GIS) Department	GIS Manager	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Keller	Community Development Department	Chief Building Official	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Keller	Communications Department	North East Tarrant County Communications (NETCOM) Manager	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Keller	Community Development Department	Planning Manager	Assist in coordinating public education and public meetings
City of Keller	Community Services Department	Director	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects
City of Keller	Engineering Department	City Engineer	Hazard identification, provide jurisdiction local knowledge, identify potential mitigation projects

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

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Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: A full list of completed mitigation action items are described in Chapter 5 of this annex.

Declared Disaster Code	Incident Period	Date Declared	Description	Impact
DR-4255	Dec. 26, 2015-Jan. 21, 2016	Feb. 9, 2016	Severe winter storms, tornadoes, straight-line winds, and flooding.	Flooding damaged a low water crossing on January 8, 2016; repair cost was $12,454.92.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Keller.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	47,266
Persons under 5 years (%)	5.5
Persons 65 years and over (%)	11.6
Language other than English spoken at home (%)	11.6
With a disability, under age 65 (%)	4.7
Persons without health insurance, under age 65 (%)	6.4
Persons in poverty (%)	16.6
Median household income	$122,292
Households, 2012-2016	14,715
Median value of owner-occupied housing units, 2012-2016	$311,700

The taxable valuation of improved properties within the community is $5.4 billion. The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Keller.

City of Keller Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
City Hall/ Fire Administration 1100 Bear Creek Parkway	Administration Fire/Rescue	150 people	55,000	$12,500,000	$1,900,000
Municipal Service Center 151 Bear Creek Parkway West	Public Works Fueling Center	30 people	35,071	$3,500,000	$585,000
Police Department Regional Jail Regional Communications Center 330 Rufe Snow Drive	Law Enforcement Communication	30 people	11,700	$7,300,000	$1,300,000
Fire Station #2 737 Keller Smithfield Road	Fire/Rescue	10 people	4,800	$600,000	$400,000
Fire Station #3 1500 Rufe Snow Drive	Fire/Rescue	10 people	4,800	$600,000	$400,000
Fire Station #4 455 Keller Smithfield Road South	Fire/Rescue	10 people	7,516	$2,000,000	$400,000

City of Keller Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Public Library 640 Johnson Road	Education	100 people	15,700	$2,200,000	Unknown
Sports Park 265 Golden Triangle Boulevard	Recreation	600+ people	109 acres	Unknown	Unknown
Senior Activities Center 660 Johnson Road	Recreation	50 people	4,698	Unknown	Unknown
The Keller Pointe Recreation Center 405 Rufe Snow Drive	Recreation	300 people	43,296	$18,000,000	$500,000
Keller High School 601 North Pate-Orr Road	Education	2,860 people	367,000	$13,900,000	Unknown
Keller Independent School District (KISD) Athletic Complex 500 North Pate-Orr Road	Public Assembly Sports Stadium	8,000 people	270,000	$21,300,000	Unknown
Indian Springs Middle School 305 Bursey Road	Education	1,000 people	112,995	$4,200,000	Unknown
Keller Middle School 300 N. College	Education	1,005 people	196,407	$3,500,000	Unknown
Bear Creek Intermediate School 801 Bear Creek Parkway	Education	900 people	154,360	$2,700,000	Unknown
South Keller Intermediate School 201 Bursey Road	Education	890 people	119,850	$4,200,000	Unknown
Hidden Lakes Elementary School 900 Preston Lane	Education	590 people	77,634	$6,100,000	Unknown
Keller-Harvel Elementary School 635 Normal Lane	Education	520 people	141,050	$1,500,000	Unknown

City of Keller Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Ridgeview Elementary School 1601 Marshall Ridge Parkway	Education	565 people	82,414	$15,400,00	Unknown
Shady Grove Elementary School 1400 Sarah Brooks Drive	Education	565 people	74,555	$2,200,000	Unknown
Willis Lane Elementary School 1620 Willis Lane	Education	610 people	149,350	$4,200,000	Unknown
KISD Learning Center 250 College Street	Education	407 people	30,816	$2,200,000	Unknown
KISD Education Center 350 Keller Parkway	Administration	95 people	120,330	$2,700,000	Unknown
KISD Natatorium 1000 Bear Creek Parkway	Public Assembly Aquatic Center	755 people	31,460	Unknown	Unknown

3.3 Natural Hazard Profiles

The City of Keller's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Keller in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Tornado
2	Thunderstorm (includes hail, wind, lightning)
3	Winter Storms
4	Flooding
5	Expansive Soils
6	Wildfire
7	Extreme Heat
8	Drought
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Keller.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	There is no historical data for drought damage in the city. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal overall.

Jurisdiction's ground-water supply: No ground water supply. Water supply is from Fort Worth/Tarrant Regional Water District and is surface water. Local water storage capacity is 10 million gallons; pumping capacity is 21.7 million gallons.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: As a wholesale water customer of the City of Fort Worth, the City of Keller has adopted water conservation efforts by ordinance. Stage 1 allows twice-weekly outdoor watering. Stage 2 drops watering to once-weekly and Stage 3 restricts watering to hand, soaker, or drip-line only.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Unknown. The Department of Public Works does not track the cause of road damage. New road construction over the past 10 years have been designed to minimize impact from expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Heatstroke or death Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, the elderly, very young, and outdoor laborers need to take proper precautions. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The most vulnerable population are residents of the residential care facilities located within the community. 11.6% of the community is age 65 and older.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? The City of Keller requires all special events to submit for approval through a permitting process. Special events causing an exposure to extreme heat have not historically been approved.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No, critical facilities, assisted-living facilities, and nursing homes have backup generators on site for temporary disruption.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Significant
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Commuters and any buildings in a floodplain are considered most at risk. Based on historical data and the geographic information system (GIS) data, 4.1% of the community is located within the 100-year floodplain. City requirements prevent future structures from being built within the 100-year floodplain. From historical data, no repetitive loss properties are located within the community.

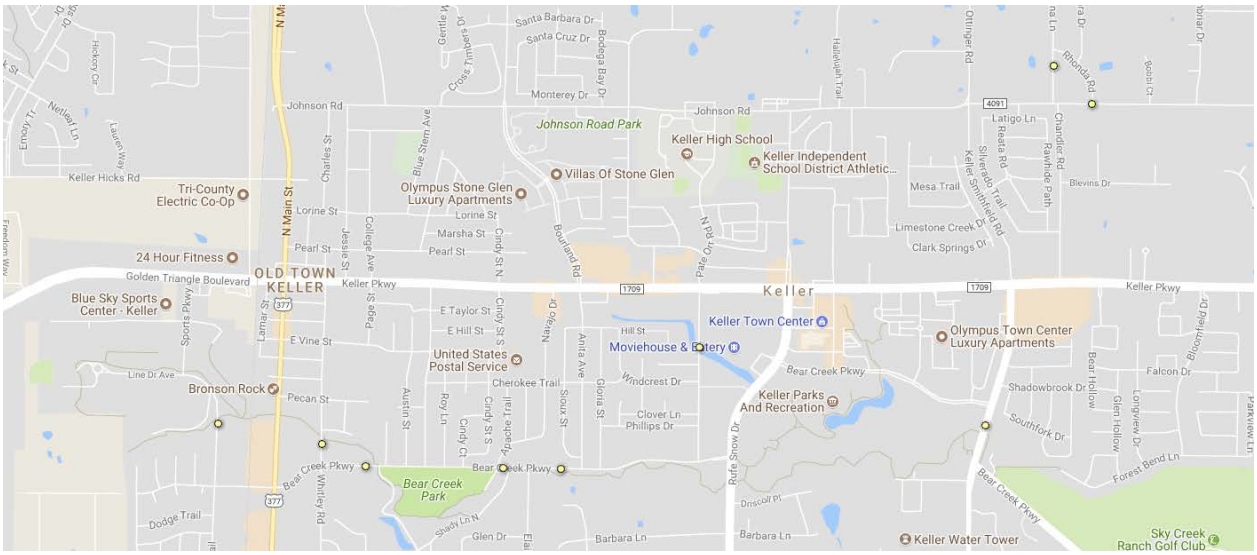
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: On January 8, 2016, a failure occurred to the asphalt surface and guard rails of the low water crossing in Bear Creek Park. $12,454.92 was spent for road surface repair and guard rail replacement.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: Low water crossings, one intersection, and two portions of Main Street (State Highway 377) have the potential to be impacted by a flooding event. The intersection consist of Bear Creek Parkway and Elm Street. The two portions of a roadway not at an intersection include: 1400 block of North Main Street (State Highway 377); and the 600 block of South Main Street (State Highway 377). See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Big Bear Creek, Little Bear Creek, and Marshal Creek tributary.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
County Road 4044 (Keller Smithfield Road)	Big Bear Creek	Bridge Class
Bear Creek Parkway	Big Bear Creek	Vented Ford
Bear Creek Parkway	Big Bear Creek	Vented Ford
Bear Creek Parkway	Big Bear Creek	Vented Ford
Whitley Road (Elm Street)	Big Bear Creek	Vented Ford
Sport Parkway	Big Bear Creek	Vented Ford
Johnson Road	Big Bear Creek, TRIB BB-10	Vented Ford
Dana Drive	Big Bear Creek, TRIB BB -10	Vented Ford
Pate Orr Drive	Big Bear Creek, TRIB BB -12	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

There is only one critical facility, a school, located in the 100-year floodplain.

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Commercial	2,057	158.52	7.71%
Industrial	407	10.9	2.68%
Residential	9,330	314.5	3.37%
Total	**11,794**	**483.92**	**4.10%**

Source: City of Keller Geographic Information Systems (GIS) Department.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Keller is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480602#
Community Name	City of Keller
County	Tarrant County
Initial FHBM Identified	11/19/76
Initial FIRM Identified	9/30/82
Current Effective Map Date	9/25/09
Reg-Emer Date	9/30/82
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Director of Public Works.

What specific flooding ordinances and plans does your jurisdiction have? Drainage Master Plan, Flood Hazard Prevention Ordinance, and FEMA NFIP.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? No new construction allowed in FEMA designated SFHA. Improved buildings in SFHA are required to be in compliance with the city's floodplain ordinance.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? No new construction in a floodplain. Improved buildings in a floodplain are required to be in compliance with the city's floodplain ordinance.

Repetitive and Severe Repetitive Loss Properties: There are currently 6 residential repetitive loss properties and 0 severe repetitive loss properties within the City of Keller. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Keller's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 178 Insurance in-force: $55,162,500 Written premium in-force: $83,474
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 53 claims have been filed, but 10 of the claims closed without payment. $1,137,017.37 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	Around 178 structures are exposed to flood risks.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	No data available.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.

Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, geographic information system, and inspections.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	No data available.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		No data available.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	11/19/76
Are the FIRMs digital or paper?	Community FPA	Digital and paper.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes. By building ordinance.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP	Permit conditions: 1. Contractor shall have City approved construction plans prior to commencing any site work.

		2. Contractor shall acquire all other applicable City permits prior to commencing construction including clearing and grubbing, earthwork, construction, building, mining, etc. 3. Flood study demonstrating that the requirements of the City of Hurst are met shall be approved prior to issuing a Floodplain Development Permit or Earthwork permit in all floodplains. Flood map revision shall be approved by FEMA prior to placing fill in FEMA floodplain. 4. Fill for new building construction shall be compacted to 95% standard proctor density at plus or minus 1. 3% of optimum moisture content, unless specified otherwise on City approved construction plans. 5. Adjoining property owners shall not be adversely affected by increased velocities, significantly increased flows, increased flood elevations, sediment, erosion, etc. 6. For excavation and/or mining, see Public Works' Senior Right-of-Way Agent for a Mining Permit and Road Use Permit. A Reclamation Plan will also have to be submitted to the Floodplain Administrator for approval. 7. For new residential structures, the lowest floor (including basement and garage) shall be at or above the minimum finished floor elevation specified on the plat. If there is not an elevation specified on the plat, the structure shall be elevated so as to be a minimum of one foot above the FEMA FIS 100-year base flood elevation. A building permit shall be acquired prior to commencing any work on structures. 8. For new non-residential structures, the building shall be elevated as specified above or flood-proofed to withstand the flood depths, pressures, velocities, impact and uplift forces associated with the FEMA FIS 100-year base flood. All utility lines

		shall be installed as to minimize damage from potential flooding. Upon completion of construction, submit an Elevation Certificate, Precise Grading Certificate, as-built plans, and certification from a Professional Engineer that flood proofing requirements have been met (if flood proofing is required).
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Keller will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Major
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of thunderstorms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Since 2015, 34 structures have been damaged from lightning, with six structures sustaining damage from fire related to the lightning strike, and $178,000 worth of damage from hail and high wind has also occurred.

Number of homes lost due to lightning-induced fires: None, though six structures were damaged.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. One fire station and one school facility sustained damage from EF0 tornadoes in 2015 and 2017.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: The southwest portion of Keller, with a line moving to the east/northeast, has experienced two EF0 tornadoes. The first occurred on November 17, 2015 with the second occurring on March 29, 2017. The area consists of commercial and residential properties and critical facilities. Damage to trees, fences, homes and cars, but no infrastructure or roadway damage. Damage to residential, commercial and critical facilities was estimated at $385,000.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard, but property within the Wildland Urban Interface is most at risk.

Most vulnerable location (North, East, South, West) of your jurisdiction? Based upon the Texas A&M Texas Wildfire Risk Assessment for Keller, approximately 56.1% of the population lives within the Wildland Urban Interface. The primary area is north of the community, extending to the southwest. Some pockets are indicated in the south and southwest portions of the city as well. Geographic information system (GIS) data indicates an approximate value of $3,264,939,891 of structures located within the Wildland Urban Interface, however the wildfire threat is moderate to low.

Assessed Value of Improvements	
In the WUI	**Percentage in the WUI**
$3,264,939,891	56.1%

Source: City of Keller Geographic Information Systems (GIS) Department.

Residential		Commercial		Industrial	
Residential Parcels Within WUI	Percentage (%) Within WUI	Commercial Parcels Within WUI	Percentage (%) Within WUI	Industrial Parcels Within WUI	Percentage (%) Within WUI
8,776	58.7%	609	56.8%	83	56.5%

Source: Texas A&M Forest Service; City of Keller Geographic Information Systems (GIS) Department.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard; however, the impact is primarily to roadways and parking lots with a minimal impact on existing and future structures.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Although 18 bridges and low water crossings are located throughout the community, six have been identified as a treatment priority due to the impact of a winter storm: Bear Creek Bridge on Bear Creek Parkway; Bear Creek Bridge on Keller Smithfield Road South; Bear Creek Bridge on Rufe Snow Drive; Bear Creek Parkway and Rufe Snow Drive; Bear Creek Bridge on North Main (State Highway 377); and Bear Creek Bridge on Davis Boulevard.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents. Impact is minimal due to the City of Keller Public Works Winter Storm Plan.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Keller between 2015 and 2017. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Keller	11/17/2015	Tornado	EF0	0	0	$210,000	$0	
Keller	3/8/2016	Thunderstorm Wind	52	0	0	$3,000	$0	EG
Keller	3/23/2016	Hail	1	0	0	$0	$0	
Keller	3/29/2017	Thunderstorm Wind	70	0	0	$80,000	$0	EG
Keller	3/29/2017	Tornado	EF0	0	0	$175,000	$0	
Keller	3/29/2017	Thunderstorm Wind	54	0	0	$35,000	$0	EG
Keller	3/29/2017	Thunderstorm Wind	72	0	0	$60,000	$0	MG
Keller	4/2/2017	Hail	1	0	0	$0	$0	
Total				**0**	**0**	**$563,000**	**$0**	

*MG- Measured Wind Gusts

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Keller identified their greatest vulnerabilities and concerns:

- Two EF0 tornadoes have impacted the southern to southwestern portions of the community within a 16-month period, each causing damage to residential and commercial properties as well as a fire station and a school.
- Lightning historically causes damage and fire to structures within the whole community.
- While the potential for wildfire is low, 56.1% of the property in the community has been identified to lie within the Wildland Urban Interface and no planning has occurred to mitigate the impact from this hazard.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Keller's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	N/A	No formal plan
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	No	
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	N/A	No formal plan
Transportation Plan	No	
Stormwater Management Plan	No	
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	Yes	Drainage Master Plan: Yes; Yes; Yes Future Land Use Plan: Yes; Yes; Yes
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Yes; Yes

Acquisition of land for open space and public recreation uses	Yes	Yes; Yes
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year:** ICC 2015
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating:** 2
Site Plan Review Requirements	Yes	Type(s) of requirement: Development Review Committee
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning & Zoning; Yes
Mitigation Planning Committee	Yes	Planning and hazard analysis; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Tree trimming, maintain & clear draining systems; Yes
Mutual Aid Agreements	Yes	Response and Assistance; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor warning siren system, SirenGPS; Yes
Hazard data and information	Yes	Mapping, GIS Layers; Yes
Grant writing	Yes	As needed
HaZUS analysis	No	Do not use
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Community Emergency Response Team (CERT) assists with storm spotting, severe weather monitoring, and evacuations. Volunteers in Police Services (VIPS) assists with evacuations; Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	We promote fire safety and general preparedness via social media, the city's website, ad campaigns, and public events; Yes
Natural disaster or safety related school programs	Yes	Weather radios in all schools; Yes
StormReady certification	Yes	StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education and awareness. To be officially StormReady, a community must: • Establish a 24-hour warning point and emergency operations center. • Have more than one way to receive severe weather warnings and forecasts and to alert the public. • Create a system that monitors weather conditions locally. • Promote the importance of public readiness through community seminars. • Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises. Yes
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	No	
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	No
Authority to levy taxes for specific purposes	Yes	No
Fees for water, sewer, gas, and/or electric services	Yes	No
Impact fees for new development	Yes	No
Stormwater or Drainage utility fee	Yes	Yes, small drainage projects not included in CIP Project funds; Yes.
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes; Funding for CIP draining projects; Yes
Incur debt through private activities	No	
Community Development Block Grant	Yes	No
Other federal funding programs	Yes	Yes, many of Keller's public safety programs are funded through federally administered grants; yes.
State funding programs	No	
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized. The city could budget for mitigation actions; revise plans to include mitigation focus as applicable; develop and implement a formal Continuity of Operations Plan (COOP); review Firewise Community program criteria and consider developing a Community Wildfire Protection Plan; consider participating in the ISO Building Code Evaluation Grading program; continue public education and communication efforts; and update the Drainage Master Plan as planned for in fiscal year 2019.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Keller's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	Add an outdoor warning siren in the Big Bear Creek Park area in City of Keller.	Conduct a study to determine if an additional outdoor warning siren is warranted for Big Bear Creek Park.	2 months	Office of Emergency Management	$1,000	$4,000	City funds
		STATUS: Completed					
		Purchase and install an outdoor warning siren in Big Bear Creek Park.	12 months	Office of Emergency Management	$35,000	$140,000	Hazard Mitigation Grant Program, city funds
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Purchase and implement of a mass public notification system for cell phones and texting in the City of Keller.	Purchase mass notification system for residents to sign up for cell phone/text alerts.	12 months	Office of Emergency Management	$25,000	$100,000	Hazard Mitigation Grant Program, city funds
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Implement a multijurisdictional Automatic Vehicle Location (AVL) system for both police and fire from Colleyville, Keller, Southlake, and Westlake (NETCOM).	Survey the eight departments and ascertain need and want as well as determine the number of users needed.	7 months	North East Tarrant County Communications (NETCOM)			
		STATUS: Deferred to 2020 HazMAP					
		Determine vendor for purchase.	1 year	NETCOM, with a representative from all cities	Unknown	Unknown	Unknown
		STATUS: Deferred to 2020 HazMAP					
		Purchase hardware for all jurisdictions.	16 months	NETCOM	$90,000	$360,000	Individual city budgets
		STATUS: Deferred to 2020 HazMAP					
		Purchase software for dispatch center and each unit.	2 years	NETCOM	$10,000	$40,000	Individual city budgets
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam	Assist City of Keller citizens with funding for purchase of weather alert radios.	Develop and fund rebate program for residents purchasing weather alert radios.	18 months	Office of Emergency Management	$10,000	$40,000	Hazard Mitigation Grant Program, city funds, private foundations

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Failure, Wildfires							
		STATUS: Deferred to 2020 HazMAP					
Flooding	Improve the drainage system of the City of Keller.	Robin Court Drainage Improvements Project.	12 months	Public Works Department	$600,000	$2,400,000	Hazard Mitigation Grant Program, city funds
		STATUS: Completed					
		Conduct study to reduce stream bank erosion impacts along Big Bear Creek, Little Bear Creek, and Marshall Branch.	3 years	Public Works Department	$100,000	$400,000	Hazard Mitigation Grant Program, city funds
		STATUS: Deferred to 2020 HazMAP					
Flooding	Develop effective flood mitigation public education in the City of Keller.	Develop informational brochure.	12 months	Office of Emergency Management	$2,500	$10,000	Hazard Mitigation Grant Program, city funds
		STATUS: Deferred to 2020 HazMAP					
Dam Failure	Educate citizens regarding risk for dam failure.	Complete inundation studies for dams located	1-2 years	Public Works and Transportation Department	To be determined	To be determined	To be determined

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		within the City of Keller.					
		STATUS: Deleted- there are no dams in Keller					
Infectious Disease Outbreak	Prepare City of Keller first responders for mass prophylaxis distribution.	Train first responders in point of distribution (POD) procedures.	3 months	Office of Emergency Management	$1,500	$6,000	City funds
		STATUS: Deleted- no longer identifying technological hazards					
		Conduct a POD exercise to test plans and procedures.	6 months	Office of Emergency Management	$3,000	$12,000	City funds
		STATUS: Deleted- no longer identifying technological hazards					
Infectious Disease Outbreak	Ensure continuity procedures are in place to prepare for a long-term employee shortage at City of Keller facilities.	Review continuity of operations (COOP) plans and procedures for city employees and facilities.	12 months	Office of Emergency Management	$6,000	$24,000	City funds
		STATUS: Deleted- no longer identifying technological hazards					
		Provide COOP training for city employees.	3 months	Office of Emergency Management	$1,500	$6,000	City funds
		STATUS: Deleted- no longer identifying technological hazards					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Infectious Disease Outbreak	Develop a public information campaign to educate City of Keller public about infectious diseases.	Educate the public on pandemics, including isolation, quarantine, triage, and medical care.	12 months	Office of Emergency Management	$6,000	$24,000	City funds
		STATUS: Deleted- no longer identifying technological hazards					
Drought	Review City of Keller Water Conservation Plan and update as necessary to mitigate the effects of drought.	Review City of Keller Ordinance No. 1454, City of Keller Water Conservation Plan.	3 months	Environmental Services Department	$1,500	$6,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Update water conservation enforcement to ensure effective practices during periods of drought.	3 months	Environmental Services Department	$1,500	$6,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Drought	Review Drought Contingency and Emergency Water Management Plan	Review current contingency plans.	6 months	Environmental Services Department	$3,000	$12,000	City funds
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	for the City of Keller to ensure adequate power and water supply during prolonged periods of drought.	Develop or update potable water contingency plans.	12 months	Environmental Services Department	$6,000	$24,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Develop or update power supply contingency plans.	12 months	Environmental Services Department	$6,000	$24,000	City Funds
		STATUS: Deferred to 2020 HazMAP					
Drought	Develop landscape and irrigation system review plans to be included in the approval process planned developments to increase conservation efforts in the City of Keller.	Develop plan to institute landscape and irrigation system reviews for new developments.	6 months	Environmental Services Department	$3,000	$12,000	City funds
		STATUS: In progress					
Drought	Review and revise the City of Keller's drought awareness education program.	Review the drought awareness campaign to ensure it addresses current and future water conservation needs and revise as needed.	3 months	Environmental Services Department	$1,500	$6,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
Drought	Distribute drought awareness information to the citizen and business water customers within the City of Keller.	Provide drought awareness information to City of Keller citizens and business customers through a social media campaign.	6 months	Environmental Services Department	$3,000	$12,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Implement the use of public service announcement videos on the City of Keller cable access channel.	6 months	Environmental Services Department	$3,000	$12,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Develop water conservation packets for landscaping vendors to provide their customers with new system installations.	12 months	Environmental Services Department	$4,000	$16,000	City funds
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Lightning	Mitigate against lightning damage in the City of Keller.	Ensure city critical infrastructure has adequate lightning mitigation in place and upgrade protection as necessary.	12 months	Office of Emergency Management	$5,000	$20,000	Hazard Mitigation Grant Program, city funds
		STATUS: Deferred to 2020 HazMAP					
		Provide lightning mitigation information with building permit packets.	6 months	Community Development Department	$2,500	$10,000	Hazard Mitigation Grant Program, city funds
		STATUS: Deferred to 2020 HazMAP					
Hazardous Materials Release	Identify potential hazard areas in the City of Keller associated with a railroad incident.	Identify materials commonly carried by the railroad that travels through the community.	3 months	Fire Department, Union Pacific Rail Road	$500	$2,000	Unknown
		STATUS: Completed					
		Develop hazard incident overlay for the small, medium, and worse-case incidents based upon materials	6 months	Fire Department, Geographic Information System Staff	$10,000	$40,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		commonly carried on the railway.					
		STATUS: In Progress					
		Identify the roadway infrastructure, residences, commercial buildings, and open land/park areas located within the hazard incident overlay.	6 months	Fire Department, Geographic Information System (GIS) Department	$5,000	$20,000	City Funds
		STATUS: In Progress					
Hazardous Materials Release	Identify evacuation routes for areas in the City of Keller potentially affected by railroad incidents.	Identify roadways within the hazard areas to be used as potential egress points.	6 months	Fire Department, Public Works Department	$5,000	$20,000	City funds
		STATUS: In Progress					
		Develop map indicating egress routes out of the hazard area.	6 months	Fire Department, GIS Department	$10,000	$40,000	City funds
		STATUS: Deleted- no longer identifying technological hazards					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Communicate egress/evacuation maps and information with residents and businesses located within the hazard overlay area through social media, online information, and brochures.	6 months	Fire Department, City Communications Specialist	$2,500	$10,000	City funds
		STATUS: Deleted- no longer identifying technological hazards					
Extreme Temperatures	Ensure the City of Keller has an extreme heat plan in place.	Review current plans and procedures related to extreme heat.	6 months	Office of Emergency Management	$3,000	$12,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Develop or update extreme heat plans and ensure they provide procedures for opening cooling centers and providing public information.	12 months	Office of Emergency Management	$6,000	$24,000	City funds
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Extreme Temperatures	Identify extreme heat plans for critical infrastructure in the City of Keller.	Evaluate the need for extreme heat plans for critical infrastructure to ensure essential functions continue in the event of high temperatures.	6 months	Office of Emergency Management	$3,000	$12,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Develop or update plans and procedures for critical infrastructure when high temperatures are present.	12 months	Office of Emergency Management	$3,000	$12,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Develop an extreme heat preparedness education program for City of Keller citizens and visitors.	Evaluate the hazards posed by extreme heat in the City of Keller.	6 months	Office of Emergency Management	$3,000	$12,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Develop an extreme heat preparedness education program.	12 months	Office of Emergency Management	$6,000	$24,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Distribute extreme heat preparedness information to City of Keller citizens.	Provide extreme heat preparedness information to the City of Keller citizens through a social media campaign.	6 months	Office of Emergency Management	$3,000	$12,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Provide extreme heat preparedness information through the City of Keller's website.	6 months	Office of Emergency Management	$3,000	$12,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Expansive Soils	Mitigate against expansive soils in the City of Keller.	Improve construction techniques through building code enhancements.	12 months	Community Development Department	$5,000	$20,000	City funds, permit fees
		STATUS: Deferred to 2020 HazMAP					
		Educate construction contractors, home owners, and business owners	12 months	Community Development Department	$1,000	$4,000	Hazard Mitigation Grant Program,

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		about mitigation techniques.					city funds, permit fees
		STATUS: Deferred to 2020 HazMAP					
Flooding	Develop effective hazard mitigation public education in the City of Keller related to flooding.	Develop informational brochure related to flooding and provide to the community.	12 months	Office of Emergency Management	$2,500	$10,000	City funds, grant source
		STATUS: Deferred to 2020 HazMAP					
Thunderstorms and High Wind	Increase shelter space at the city parks for people to seek protection when a storm arrives.	Build a shelter location at the baseball fields and soccer fields where people can seek shelter from severe storms.	3 Years	Parks Department	$100,000	$400,000	City funds, grants
		STATUS: Deferred to 2020 HazMAP					
Thunderstorms and High Wind	Ensure that city facilities have adequate safe locations for people to take shelter.	Evaluate each building owned by the City of Keller to locate shelter locations. If there is no safe location within the building install a safe room. Educate occupants	3 Years	Office of Emergency Management	$100,000	$400,000	Hazard Mitigation Grant Program, city funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		of the building of the safe room locations.					
		STATUS: In progress					
Hail	Increase awareness to the citizens on how the can protect themselves and their property from the effects of hail.	Develop and provide educational materials on what type of roofs and windows stand up to hail the best. Use other forms of media to teach people how to protect themselves from hail.	12 months	Office of Emergency Management	$2,500	$10,000	Hazard Mitigation Grant Program, city funds
		STATUS: Deferred to 2020 HazMAP					
Winter Storm	Enhance the snow removal capability for the City of Keller.	Purchase one snow plow attachment for the public works department and outline its use within the city's winter weather protocol.	12 months	Public Works Department	$7,000	$28,000	City funds
		STATUS: Complete					
		Purchase one sand spreading unit for	12 months	Public Works Department	$13,000	$52,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		the public works department and outline its use within the city's winter weather protocol					
		STATUS: Complete					
Winter Storm	Provide information to the citizens of Keller about road conditions and school and city office closings.	Utilize the city web site, emails, CodeRed, and social media to keep the citizens and visitors of Keller informed on how a winter storm is impacting city services.	6 months	Public Information Office, Office of Emergency Management	$1,000	$4,000	City funds
		STATUS: In progress					
Winter Storm	Conduct an assessment of the winter weather protocols for city departments.	Update current city-wide winter weather protocol to ensure it meets identified hazards and infrastructure priorities of the community.	6 months	Public Works Department	$1,000	$4,000	City funds
		STATUS: Complete					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Provide training to all employees that work outside on the dangers of winter weather and ways that they need to protect themselves from the effects of the cold, wet, dark, and icy conditions.	12 months	Risk Management Department	$5,000	$20,000	City funds
		STATUS: In progress					
Wildfire	Reduce the amount of fuel available for the spread of a wildfire.	Reduce fuel load from high weed and grass through the use and enforcement of current city ordinance.	6 months	Code Enforcement	$2,500	$10,000	City funds
		STATUS: In progress					
		Develop and distribute public education material to reduce wildfire impact on residential properties.	12 months	Fire Department	$2,500	$10,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Ensure the fire department's wildfire plan and personnel capabilities are current and match identified hazards of the community.	Update current policies and procedures related to wildfire response within the community.	6 months	Fire Department	$1,000	$4,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Provide annual training to first responders.	12 months	Fire Department	$3,000	$12,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Ensure the City of Keller has an extreme heat mitigation plan in place.	Open cooling centers and provide public information.	12 months	Office of Emergency Management	$6,000	$24,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Thunderstorms and High Wind	Develop effective hazard mitigation public education in the City of Keller related to thunderstorms and high wind incidents.	Develop informational brochure related to thunderstorms and high wind incidents and provide to the community.	12 months	Office of Emergency Management	$2,500	$10,000	City funds, grants
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Tornadoes	Develop effective hazard mitigation public education in the City of Keller related to tornadoes.	Develop informational brochure related to tornadoes and provide to the community.	12 months	Office of Emergency Management	$2,500	$10,000	City funds, grants
		STATUS: Deferred to 2020 HazMAP					
Winter Storm	Develop effective hazard mitigation public education in the City of Keller related to winter storms.	Develop informational brochure related to winter storms and provide to the community.	12 months	Office of Emergency Management	$2,500	$10,000	City funds, grants
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Develop effective hazard mitigation public education in the City of Keller related to wildfire threats.	Develop informational brochure related to wildfires and provide to the community.	12 months	Office of Emergency Management	$2,500	$10,000	City funds, grants
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Develop effective hazard mitigation public education in the City of Keller related to extreme temperatures.	Develop informational brochure related extreme temperatures and	12 months	Office of Emergency Management	$2,500	$10,000	City funds, grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		provide to the community.					
		STATUS: Deferred to 2020 HazMAP					

5.3 New Action Items

The City of Keller's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[2] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for the HazMAP.

Hazard(s) Addressed	**Flooding, Thunderstorms, Tornadoes, Wildfire**
Purchase and install an outdoor warning siren in Big Bear Creek Park.	
Participating Jurisdiction:	City of Keller
Priority:	1
Estimated Cost:	$40,000
Estimated Benefit:	$240,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	**Earthquakes, Extreme Heat, Thunderstorms, Tornadoes**
Build a shelter location at the baseball fields and soccer fields where people can seek shelter from severe storms.	
Participating Jurisdiction:	City of Keller
Priority:	2
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	36 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Flooding
Conduct study to reduce stream bank erosion impacts along Big Bear Creek, Little Bear Creek, and Marshall Branch to improve drainage within the City of Keller.	
Participating Jurisdiction:	City of Keller
Priority:	3
Estimated Cost:	$6,000
Estimated Benefit:	$36,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Develop and provide an integrated outreach program with public education material on the hazards in Keller and what mitigation techniques can be taken to reduce the impact from the identified hazards on residents and properties, to include the use of social media, the city cable access channel, and the city website.	
Participating Jurisdiction:	City of Keller
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Extreme Heat, Winter Storms
Review current City of Keller plans and procedures related to extreme temperatures and enhance as needed.	
Participating Jurisdiction:	City of Keller
Priority:	5
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City funds for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	6 months

Hazard(s) Addressed	Extreme Heat, Winter Storms
Evaluate the hazards posed by extreme temperatures in the City of Keller.	
Participating Jurisdiction:	City of Keller
Priority:	6
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City funds for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	6 months

Hazard(s) Addressed	Wildfire
Ensure the fire department's wildfire plan and personnel capabilities are current and match identified hazards of the community by updating current policies and procedures related to wildfire response within the community.	
Participating Jurisdiction:	City of Keller
Priority:	7
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City funds
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Review City of Keller Ordinance No. 1454, City of Keller Water Conservation Plan, and enhance as necessary to mitigate the effects of drought.	
Participating Jurisdiction:	City of Keller
Priority:	8
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	City funds
Lead Agency/Department Responsible:	Environmental Services Department
Implementation Schedule:	3 months

Hazard(s) Addressed	Drought
Review current drought contingency plans to ensure adequate water supply during prolonged periods of drought and enhance as needed.	
Participating Jurisdiction:	City of Keller
Priority:	9
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Environmental Services Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Drought
Develop or enhance potable water contingency plans to ensure adequate water supply during prolonged periods of drought.	
Participating Jurisdiction:	City of Keller
Priority:	10
Estimated Cost:	$6,000
Estimated Benefit:	$36,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Environmental Services Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Thunderstorms, Tornadoes, Winter Storms
Develop or enhance power supply contingency plans to ensure power supply during prolonged periods of power outage caused by hazards.	
Participating Jurisdiction:	City of Keller
Priority:	11
Estimated Cost:	$6,000
Estimated Benefit:	$36,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Environmental Services Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes
Conduct an earthquake risk assessment within the community using HaZUS data and geographic information system (GIS) mapping.	
Participating Jurisdiction:	City of Keller
Priority:	12
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Public Works Department, GIS Department, Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes
Develop an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage, including pre-1940 homes.	
Participating Jurisdiction:	City of Keller
Priority:	13
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Public Works Department, Community Development Department, GIS
Implementation Schedule:	12 months

Hazard(s) Addressed	Wildfire
Provide annual wildfire training to first responders.	
Participating Jurisdiction:	City of Keller
Priority:	14
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	City funds
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Expansive Soils
Outside of the normal public education, educate construction contractors, home owners, and business owners about mitigation techniques for expansive soils.	
Participating Jurisdiction:	City of Keller
Priority:	15
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds, city permit fees
Lead Agency/Department Responsible:	Community Development Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Enhance water conservation enforcement to ensure effective practices during periods of drought.	
Participating Jurisdiction:	City of Keller
Priority:	16
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Environmental Services Department
Implementation Schedule:	3 months

Hazard(s) Addressed	Wildfire
To prevent wildfires, reduce the fuel load from high weed and grass through the use and enforcement of current city ordinance.	
Participating Jurisdiction:	City of Keller
Priority:	17
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City funds
Lead Agency/Department Responsible:	Code Enforcement
Implementation Schedule:	6 months

Hazard(s) Addressed	Earthquakes, Expansive Soils, Thunderstorms, Tornadoes, Wildfire
Improve construction techniques through building code enhancements in the City of Keller to mitigate future damage from hazards.	
Participating Jurisdiction:	City of Keller
Priority:	18
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds, city permit fees
Lead Agency/Department Responsible:	Community Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Thunderstorms
Provide thunderstorm mitigation information with building permit packets.	
Participating Jurisdiction:	City of Keller
Priority:	19
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Community Development Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Drought
Outside of the normal public education program, develop water conservation packets for landscaping vendors to provide their customers with new system installations.	
Participating Jurisdiction:	City of Keller
Priority:	20
Estimated Cost:	$4,000
Estimated Benefit:	$24,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Environmental Services Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms
Ensure new and existing city critical infrastructure has adequate thunderstorm mitigation in place and upgrade protection as necessary.	
Participating Jurisdiction:	City of Keller
Priority:	21
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Develop and fund a rebate program for City of Keller residents to purchase weather alert radios.	
Participating Jurisdiction:	City of Keller
Priority:	22
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds, private foundation
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	18 months

Hazard(s) Addressed	Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Survey the fire and police departments served by the joint NETCOM communications office and ascertain need and want as well as determine the number of users needed to implement a multijurisdictional Automatic Vehicle Location (AVL) system within Colleyville, Keller, Southlake, and Westlake.	
Participating Jurisdiction:	City of Keller
Priority:	23
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City funds for staff time
Lead Agency/Department Responsible:	North East Tarrant County Communications (NETCOM)
Implementation Schedule:	7 months

Hazard(s) Addressed	Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Determine vendor for purchase of a multijurisdictional Automatic Vehicle Location (AVL) system for both police and fire from Colleyville, Keller, Southlake, and Westlake (NETCOM).	
Participating Jurisdiction:	City of Keller
Priority:	24
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	Staff time
Lead Agency/Department Responsible:	North East Tarrant County Communications (NETCOM)
Implementation Schedule:	12 months

Hazard(s) Addressed	Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Purchase hardware for participating jurisdictions to implement a multijurisdictional Automatic Vehicle Location (AVL) system for both police and fire from Colleyville, Keller, Southlake, and Westlake (NETCOM).	
Participating Jurisdiction:	City of Keller
Priority:	25
Estimated Cost:	$90,000
Estimated Benefit:	$540,000
Potential Funding Source(s):	Individual city budgets
Lead Agency/Department Responsible:	North East Tarrant County Communications (NETCOM)
Implementation Schedule:	16 months

Hazard(s) Addressed	Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Purchase software for the NETCOM dispatch center and each participating jurisdiction fire and police unit to implement a multijurisdictional Automatic Vehicle Location (AVL) system within Colleyville, Keller, Southlake, and Westlake.	
Participating Jurisdiction:	City of Keller
Priority:	26
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	Individual city budgets
Lead Agency/Department Responsible:	North East Tarrant County Communications (NETCOM)
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Keller
Priority:	27
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the floodplain administrator to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	City of Keller
Priority:	28
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Keller
Priority:	29
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Keller
Priority:	30
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Keller
Priority:	31
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Keller
Priority:	32
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfires
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Keller
Priority:	33
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Keller
Priority:	34
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.

5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plan	City Administration	Annually	Drainage improvement projects, Outdoor Warning Sirens, and shelter areas within city parks.	When reviewing the Capital Improvement Plan, the leadership team will review the HazMAP to see which action items can be addressed with the fiscal and administrative capabilities of the city.
Future Land Use Plan	City Administration	As needed	Land use	The contractor and city leadership will review the HazMAP for its impact on plan revisions and implementation.
Drainage Master Plan	Public Works Department	As needed	Notations of potential drainage concerns.	City leadership and public works staff will review identified mitigation action items and consider plan revision as necessary to address them.
Flood Hazard Prevention Ordinance (2009)	Public Works Department	As needed	Flood hazard prevention activities and processes.	City leadership and public works staff will review identified mitigation action items and consider plan revision as necessary to address them.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Keller. For additional information, see Appendices A and B.

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2020

City of Kennedale

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Kennedale was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Kennedale alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

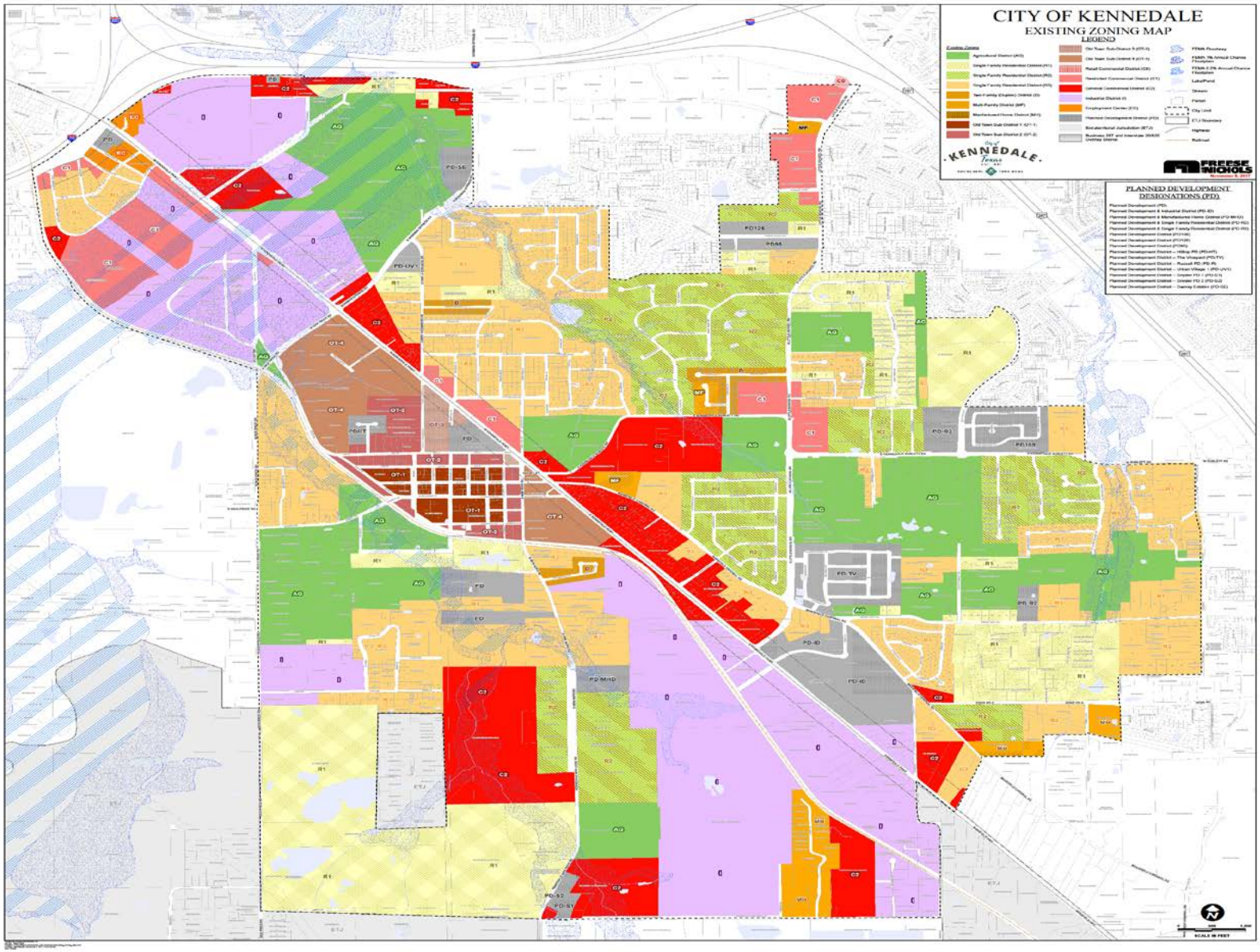
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

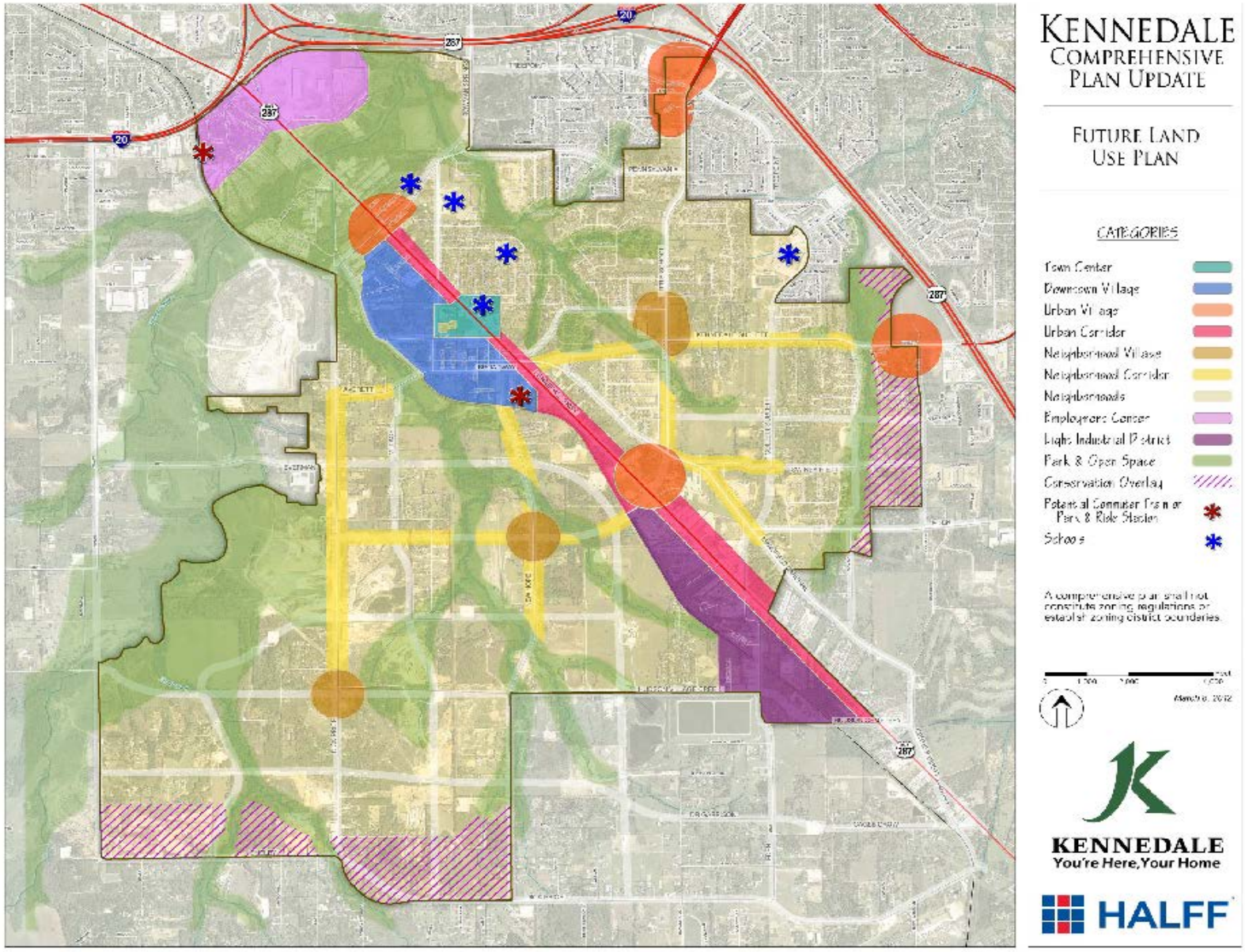
Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Kennedale will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

The following maps provide an overview of the City of Kennedale:

- Existing Zoning Map
- Comprehensive Map


CITY OF KENNEDALE
EXISTING ZONING MAP
LEGEND
PLANNED DEVELOPMENT DESIGNATIONS (PD)


KENNEDALE
COMPREHENSIVE
PLAN UPDATE
FUTURE LAND
USE PLAN
CATEGORIES
Town Center
Downtown Village
Urban Village
Urban Corridor
Neighborhood Village
Neighborhood Corridor
Neighborhoods
Employment Center
Light Industrial District
Park & Open Space
Conservation Overlay
Potential Commuter Train or
Park & Ride Station
Schools
A comprehensive plan shall not
constitute zoning regulations or
establish zoning district boundaries.
KENNEDALE
You're Here, Your Home
HALFF

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Kennedale has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Kennedale's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Kennedale. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Kennedale Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Kennedale	Fire Department	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Kennedale	Development Services Department	Building Official	Stormwater hazard prevention, and remediation
City of Kennedale	Streets and Parks Department	Director	Stormwater hazard prevention, and remediation
City of Kennedale	Public Works Department	Director	Stormwater hazard prevention, and remediation
City of Kennedale	Public Works Department	Building Official	Stormwater hazard prevention, and remediation
City of Kennedale	Public Works Department	Floodplain Manager	Stormwater hazard prevention, and remediation

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: On September 1, 2016 the City of Kennedale adopted the 2015 International Codes including: • International Fire Code • International Building Code • International Residential Code • International Fuel Gas Code • International Plumbing Code • International Mechanical Code • International Energy Conservation Code A full list of completed mitigation action items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Kennedale.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	6,738
Persons under 5 years (%)	6.1
Persons 65 years and over (%)	12.7
Language other than English spoken at home (%)	16.8
With a disability, under age 65 (%)	7.4
Persons without health insurance, under age 65 (%)	23.6
Persons in poverty (%)	8.4
Median household income	$71,875
Households, 2012-2016	2,599
Median value of owner-occupied housing units, 2012-2016	$170,900

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Kennedale.

City of Kennedale Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Kennedale City Hall 405 Municipal Drive	Administrative and Civic Offices	150 people	40,000	$8,000,000	$500,000
Kennedale Police Station 401 Municipal Drive	Law Enforcement	50 people	20,000	$4,000,000	$100,000
Kennedale Fire Station 405 Municipal Drive	Fire/Rescue	100 people	60,000	$4,000,000	$100,000
Kennedale Public Works elevated water storage tank 500 Block of Gail Drive	Utility	30 people	40,000	$2,000,000	$1,000,000
Kennedale Public Works elevated water storage tank	Utility	5 people	50,000	$2,000,000	$1,000,000
Kennedale water storage tank and well pumps Border Lane	Utility	5 people	30,000	$1,5000,000	$1,000,000

3.3 Natural Hazard Profiles

The City of Kennedale's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Kennedale in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Tornado
2	Thunderstorm (includes hail, wind, lightning)
3	Flooding
4	Winter Storms
5	Drought
6	Wildfire
7	Extreme Heat
8	Expansive Soils
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Kennedale.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	There is no historical data of drought damage in the city. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal overall.

Jurisdiction's ground-water supply: City of Kennedale receives its water supply from the City of Fort Worth, City of Arlington, and City of Kennedale ground-water wells.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: There are 10 zoning districts in the city that allow agricultural usage.

Describe any water restrictions used in your jurisdiction: There are currently no water restrictions in the City of Kennedale.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the total amount of damages in the city was unavailable, only road damage. Expansive soils are a major consideration to all existing and future structures as most legacy structures eventually require maintenance to foundations to remain habitable.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: The City of Kennedale spends approximately $30,000 per year rebuilding roads due to cracking, heaving, and buckling caused by expansive soils. The road damage is spread evenly throughout the city. City buildings have no documented damages directly attributable to expansive soils. The city does not require foundation repair permits so it is unknown the amount of damage expansive soils have caused to homes.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, the elderly, very young, and outdoor laborers need to take proper precautions. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: Extreme heat generally effects the entire population, but the very young, elderly, and citizens without air-conditioning are most vulnerable. Most houses on the north side of the city are much older and have older residents, making them more vulnerable to extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? There have been no reported cases of heat exposure.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Commuters and any buildings in a floodplain are considered most at risk. In the northwest area of the city, a mobile home park, industrial buildings, and roadways have the most potential of being impacted and the estimated potential dollar loss is $200,000. It is estimated that up to 35 structures and 50 people may be impacted by flooding.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: There was approximately $300,000 of damage to Valley Lane when it was undermined by floodwater from an adjacent waterway.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: Traffic routes impacted include those on Valley Lane, New Hope Road, and Kennedale Sublett Road.

Names of any creeks or rivers that flood: Village Creek and Key Branch Creek.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. There are no low water crossings in the City of Kennedale.

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Commercial	110.8	1	0.9 %
Industrial	1,058.8	31	2.9 %
Residential	1,977.2	2	0.1 %
Total	**3,146.8**	**34**	**3.9 %**

Source: Kennedale Comprehensive Plan; 03/01/2012 HALFF Associates; 2008 FEMA Floodplain Map.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Kennedale is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480603#
Community Name	City of Kennedale
County	Tarrant
Initial FHBM Identified	02/01/74
Initial FIRM Identified	11/15/84
Current Effective Map Date	09/25/09
Reg-Emer Date	11/15/84
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Building Official.

What specific flooding ordinances and plans does your jurisdiction have? Unified Development Code (UDC).

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? Section 19.2 General Ability applies to all areas of special flood hazard within the jurisdiction of the City of Kennedale.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? No new construction in a floodplain. Improved buildings in a floodplain are required to be in compliance with the City's Floodplain Ordinance.

Repetitive and Severe Repetitive Loss Properties: There are currently 2 residential repetitive loss properties and 0 severe repetitive loss properties within the City of Kennedale. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

According to the 10/03/2008 FEMA Floodplain Map, there are three residential parcels and 27 commercial parcels located in the100-year floodplain.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Kennedale's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 36 Insurance in-force: $11,317,100 Written premium in-force: $58,678
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 20 claims have been filed, but 3 of the claims closed without payment. $118,404.88 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	Less than 50.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	Unknown.

Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, inspections, and utilization of contract engineering as needed.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	N/A.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Unknown.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	02/01/1974
Are the FIRMs digital or paper?	Community FPA	Paper.

Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Building Official reviews all applicable building/site plans to ensure compliance before permits are issued.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	Undetermined.
What is the community's CRS Class Ranking?	Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual	Unknown.
Does your flood management plan or hazard mitigation plan include CRS planning requirements?	Community FPA, FEMA CRS Coordinator, ISO representative. CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Yes.

The City of Kennedale will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Four mobile home parks in the community (Cactus Acres, Green Oaks, Avalon, and Kennedale Mobile Home Parks) could be severely impacted.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Since 2015, hail has impacted one school, one fire station, one police station, one city hall, and one strip mall.

Number of homes lost due to lightning-induced fires: In total, the City of Kennedale has lost three homes to lightning since 2015.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Four mobile home parks in the community (cactus Acres, Green Oaks, Avalon, and Kennedale Mobile Home Parks) could be severely impacted.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There has been no reports of a since 2015.

Is there an area of the town that is the most vulnerable to tornadoes? Mobile Home Parks in Kennedale: Cactus Acres Mobile Home Park, Green Oaks Mobile Home Park, Avalon Mobile Home Park, and Kennedale Mobile Home Park. There are also homes located off Danny Drive in Kennedale that are mostly mobile homes.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard, but property within the Wildland Urban Interface is most at risk.

Most vulnerable location (North, East, South, West) of your jurisdiction? Sonora Park is a potential source of a wildfire due to the open space of the park. According to the Texas A&M Forest Service, 12 residential parcels are located in the WUI.

Assessed Value of Improvements	
In the WUI	**Percentage in the WUI**
120 housing units	4.6%

Source: City of Kennedale Geographic Information Systems (GIS) Department.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard. Frozen water pipes in schools and churches pose an estimated potential dollar loss of $1,000,000.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Bridges located off of Valley Lane could be impacted.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

According to the National Centers for Environmental Information, no natural hazard events have occurred within the City of Kennedale between 2015 and 2017, though the City of Kennedale has identified past events within the hazard profiles.

3.5 Overall Vulnerability

The City of Kennedale identified their greatest vulnerabilities and concerns:

- Based on historical events within the last ten years, tornadoes, thunderstorms, and flooding pose the biggest threat to the City of Kennedale, especially to mobile home parks.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Kennedale's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; Yes; Yes
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	Yes	No; No; No
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	No	
Transportation Plan	No	
Stormwater Management Plan	Yes	Yes; No; No
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	

Acquisition of land for open space and public recreation uses	Yes	Yes; Yes
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year:** ICC 2015
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating:** 3
Site Plan Review Requirements	Yes	Plan review required for all new construction
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and Zoning; Yes
Mitigation Planning Committee	Yes	Planning and hazard analysis: Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Tree trimming, maintain and clear draining systems; Yes
Mutual Aid Agreements	Yes	Response and assistance; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other: Public Works Director	FT	Yes; Yes; Yes
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor sirens, Blackboard Connect system; Everbridge Emergency Notification System; Yes
Hazard data and information	Yes	Geographic information system (GIS) layers, mapping; Yes
Grant writing	Yes	As needed; Yes
HaZUS analysis	No	Don't use; FEMA software out of date
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Rotary Club provides grants and charitable contributions that supplement government and religious organizations' outreach programs during local and regional disasters that impair poor families' access to basic goods and services. Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Provide Hazard Mitigation Action Plan information during Chamber of Commerce events appealing to small business owners and local franchisees of national brands. Yes
Natural disaster or safety related school programs	Yes	Free local access to Everbridge Emergency Notification System provides telephone, email, text notification for Emergency Warnings and advice about protective actions, weather alert radios, and fire prevention training. Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	American Red Cross, partnered to install smoke detectors in citizen's homes. Yes.
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes, road and drainage projects; Yes
Authority to levy taxes for specific purposes	Yes	Yes, not used in past; Yes
Fees for water, sewer, gas, and/or electric services	Yes	Only for water and sewer; Yes
Impact fees for new development	Yes	Yes, water and sewer infrastructure; Yes
Stormwater or Drainage utility fee	No	

Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes, road, water, and sewer; Yes
Incur debt through private activities	No	
Community Development Block Grant	Yes	Yes, replace sewer piping; Yes
Other federal funding programs	Yes	Assistance to Firefighters Grant (AFG); No
State funding programs	Yes	Roads, bridges, landscaping and sidewalk construction; Yes
Other	Yes	County road construction

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Kennedale's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires	Form a multijurisdictional tactical unit with Forest Hill, Kennedale, and Crowley.	Develop inner-local agreement (ILA) and planning.	3 months	Forest Hill Police Department (FHPD), Kennedale Police Department, Crowley Police Department			Forest Hill, Crowley, city funds
		STATUS: Deleted-no longer feasible					
		Acquire appropriate equipment.	8 months	FHPD	$25,000	$50,000	Forest Hill
		STATUS: Deleted-no longer feasible					
		Train law enforcement officers and implement.	1 year	FHPD	$50,000	$50,000	Forest Hill
		STATUS: Deleted-no longer feasible					
Severe Thunderstorms and High Winds, Tornadoes	Ensure outdoors spaces in Kennedale have adequate shelter for high wind events such as severe	Evaluate current shelters in outdoor spaces in Kennedale.	April 2014	Park Department	$100	$200	City funds
		STATUS: Completed					
		Determine the size and space	April 2014	Park Department	$100	$200	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	thunderstorms or tornadoes.	needs for shelters in outdoor spaces in Kennedale.					
		STATUS: Completed					
		Install outdoor storm shelters at Sonora Park, Town Center Park, Rodgers Farm Park, and Kennedale Ball Fields.	April 2014	Park Department	$100,000	$200,000	Federal Emergency Management Agency (FEMA)
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes	Ensure critical facilities in Kennedale have adequate safe rooms to protect against high wind events and tornadoes.	Evaluate the current conditions of critical facilities to determine which ones, if any, need safe rooms installed.	April 2014	Fire Department	$300	$600	City funds
		STATUS: Completed					
		Determine the size and space needed to shelter the population of	April 2014	Building Official	$300	$600	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		the critical facility.					
		STATUS: Completed					
		Install safe rooms as needed in critical facilities.	April 2015	Building Official	$200,000	$400,000	City funds
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes	Ensure City of Kennedale ordinances and building codes reflect the need for high wind resistant windows in new developments and facilities.	Review current jurisdictional ordinances and building codes related to high winds.	April 2014	Building Official	$300	$600	City funds
		STATUS: Completed					
		Develop/update ordinances and building codes to recommend new facilities are built with high wind resistant windows.	January 2015	Building Official	$2,500	$2,500	City funds
		STATUS: Completed					
Severe Thunderstorms	Ensure City of Kennedale critical facilities, including	Evaluate the need for high wind resistant	April 2014	Building Official	$2,000	$4,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
and High Winds, Tornadoes	schools, have high wind resistant windows in place.	windows in critical facilities.					
		STATUS: Completed					
		Install high wind resistant windows as necessary in critical facilities, including schools.	May 2015	Kennedale Independent School District (ISD)	$100,000	$200,000	Kennedale ISD budget
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes	Ensure continuity of operations at Kennedale City Hall during a natural or man-made disaster.	Determine a suitable site and estimate cost for a tornado resistant Emergency Operations Center (EOC).	January 2017	Contracted architect	$10,000	$1,010,000	FEMA, city funds
		STATUS: Deleted-no longer feasible					
		Request for proposals to prepare a site and construct a tornado resistant EOC in Kennedale.	October 2017	Contracted architect	Included in above estimate	$1,010,000	FEMA, city funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deleted-no longer feasible					
		Construct a tornado resistant EOC.	January 2018	General Contractor	$1,010,000	$1,010,000	FEMA, city funds
		STATUS: Deleted-no longer feasible					
Severe Thunderstorms and High Winds, Tornadoes	Develop a severe thunderstorm and tornado preparedness education program for Kennedale citizens.	Evaluate the hazards posed by high wind events in Kennedale.	April 2015	Fire Department	$500	$1,000	City funds
		STATUS: Completed					
		Develop a severe weather preparedness education program that provides tips and pertinent information for protecting property against high wind damage.	April 2014	Fire Department	$300	$600	City funds
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms	Distribute severe weather preparedness	Provide severe weather preparedness	March 2014	Fire Department	$9,000	$9,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
and High Winds, Tornadoes	information to City of Kennedale citizens.	information to Kennedale citizens through a social media campaign, including severe thunderstorms and tornadoes.					
		STATUS: Deferred to 2020 HazMAP					
		Ensure the Kennedale website is updated during tornado season to educate citizens on severe weather preparedness.	March 2014	City Secretary	$300	$600	City funds
		STATUS: Deferred to 2020 HazMAP					
Flooding	Decrease flood insurance premiums in Kennedale by participating in the Federal Emergency Management Agency's (FEMA) Community Rating	Work with city officials to become a member of the CRS program.	March 2014	City Planner	$1,000	$2,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	System (CRS) program.						
		STATUS: Completed					
Flooding	Review and remove repetitive loss properties in the City of Kennedale.	Review repetitive loss properties and work with homeowners to remove them using FEMA funding.	September 2019	City Manager	$3,000,000	$6,000,000	FEMA
		STATUS: Deferred to 2020 HazMAP					
Flooding	Acquire all private property located within the Village Creek 100 year floodplain in the City of Kennedale.	Submit historic flood analysis reports to support a request for flood mitigation analysis by the U.S. Army Corps Of Engineers.	Submitted July 2012	City of Kennedale	$80,000	$200,000	FEMA
		STATUS: Completed					
		Submit engineering reports to support flood mitigation funding for the	August 2016	City of Kennedale	$200,000	$5,000,000	FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		purchase of land and structures located in the Village Creek 100 year floodplain.					
		STATUS: Completed					
		Acquire all privately owned land and structures located in the Village Creek 100 year floodplain.	August 2022	City of Kennedale	$5,000,000	$10,000,000	FEMA
		STATUS: Deferred to 2020 HazMAP					
Power Failure	Ensure continuity of operations at Kennedale City Hall during a disruption of the main power supply.	Identify size and type of emergency generator needed to power City Hall.	December 2013	Office of Emergency Management	$0	$100,000	FEMA, city funds
		STATUS: Completed					
		Purchase an emergency generator for Kennedale City Hall.	September 2016	Office of Emergency Management	$95,000	$100,000	FEMA, city funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
		Deliver and installation of generator at Kennedale City Hall.	December 2016	Contractor	$5,000	$100,000	FEMA, city funds
		STATUS: Completed					
Hail	Develop a hail preparedness education program for City of Kennedale citizens.	Evaluate the hazards posed by hail in the city.	November 2014	Building Official	$500	$1,000	City funds
		STATUS: Completed					
		Develop hail preparedness education program that provides tips and pertinent information for ensuring the protection of property against hail.	December 2014	Fire Department	$500	$1,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Hail	Distribute hail mitigation information to City	Provide hail preparedness information to	March 2014	City Secretary	$100	$1,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	of Kennedale citizens.	citizens through a social media campaign.					
		STATUS: Deferred to 2020 HazMAP					
		Provide hail preparedness information through the city website.	March 2014	City Secretary	$100	$1,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Hail	Provide hail-resistant parking areas for City of Kennedale vehicles.	Evaluate the need for covered parking for city vehicles to protect them against hail.	2 weeks	Fire Department, Police Department, Building Department	$2,000	$50,000	City funds
		STATUS: Deleted-no longer feasible					
		Install awnings as needed to protect city vehicles against hail.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: Deleted-no longer feasible					
Wildfire	Ensure Kennedale water systems are	Evaluate the Kennedale water system to ensure	April 2014	Kennedale Fire Department	$300	$1,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	adequate for fighting wildfires.	capacity for fighting wildfires.					
		STATUS: Completed					
		Install or upgrade needed equipment to ensure water systems are adequate.	October 2015	Fire Department	$300,000	$300,000	City funds
		STATUS: Completed					
Wildfire	Mitigate wildfires by instituting landscaping practices at Kennedale critical facilities.	Prevent wildfires from spreading to critical facilities by keeping landscaping plants and brush away from buildings.	May 2014	Public Works Department	$2,000	$10,000	City funds
		STATUS: Completed					
		Prevent wildfires from spreading to critical facilities by enforcing the Kennedale mowing ordinance.	May 2014	Code Enforcement Department	$2,000	$10,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
Wildfire	Review city ordinances and laws to ensure mitigation practices are in effect in Kennedale.	Enact building permit process that encourages wildfire resistant construction.	October 2014	Building Official	$2,000	$2,000	City funds
		STATUS: Completed					
		Enforce building codes to ensure compliance with conditions of building permits.	September 2014	Building Official	$2,000	$1,999	City funds
		STATUS: Completed					
Wildfire	Ensure adequate wildfire response plans and procedures are in place for Kennedale.	Review, develop, or update wildfire response plans and procedures.	April 2014	Fire Department	$500	$2,000	City funds
		STATUS: Completed					
		Provide wildfire response training to Kennedale fire personnel.	April 2014	Fire Department	$2,000	$2,000	City funds
		STATUS: Completed					
Wildfire	Provide information to	Develop a wildfire	May 2014	Fire Department	$500	$1,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	Kennedale citizens regarding the hazards posed by wildfires.	preparedness education program for Kennedale's newsletter insert for water bills.					
		STATUS: Deferred to 2020 HazMAP					
		Use social media to distribute tips and pertinent information for ensuring the protection of citizens and their property against wildfires.	May 2014	Fire Department	$500	$1,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Determine the process for becoming a Firewise Community in Kennedale.	Work with the National Fire Protection Association to become a Firewise Community.	April 2014	Fire Department	$500	$1,000	City funds
		STATUS: Deleted-no longer feasible					
Winter Storm	Evaluate winter weather response	Assess winter weather	November 2014	Police Department,	$500	$2,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	capabilities in the City of Kennedale.	response capabilities.		Fire Department			
		STATUS: Completed					
		Acquire equipment needed as determined by assessment.	November 2014	Police Department, Fire Department	$5,000	$5,000	City funds
		STATUS: Completed					
		Provide safety training to first responders on winter weather hazards.	November 2014	Police Department, Fire Department	$3,000	$6,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Winter Storm	Evaluate winter weather planning capabilities in the City of Kennedale.	Assess winter weather plans in place for jurisdiction public works.	November 2014	Public Works Department	$500	$2,000	City funds
		STATUS: Completed					
		Develop or update winter weather preparedness plan.	November 2014	Public Works Department	$500	$2,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
Winter Storm	Develop a winter weather preparedness program for Kennedale citizens.	Evaluate the hazards posed by severe winter weather in the city of Kennedale.	October 2014	Fire Department	$500	$2,000	City funds
		STATUS: Completed					
		Develop a winter weather preparedness education program that provides tips and pertinent information for avoiding hypothermia and icy conditions.	October 2014	Fire Department	$500	$2,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Winter Storm	Distribute winter weather preparedness information to the City of Kennedale residents.	Provide winter weather preparedness information to Kennedale citizens through a social media campaign.	November 2014	Fire Department	$500	$2,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
		Ensure the Kennedale city website is updated during winter months to educate citizens on winter weather preparedness.	November 2014	Fire Department	$500	$2,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Infectious Disease Outbreak	Prepare City of Kennedale first responders for mass prophylaxis distribution.	Train first responders in point of distribution (POD) procedures.	December 2014	Tarrant County Health Department	$1,000	$1,000	Tarrant County Health Department
		STATUS: Completed					
		Conduct a POD exercise to test plans and procedures.	December 2014	Tarrant County Health Department	$1,000	$1,000	Tarrant County Health Department
		STATUS: Completed					
Infectious Disease Outbreak	Ensure continuity procedures are in place to prepare	Review continuity of operations (COOP) plans and	March 2014	Human Resource Director	$300	$600	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	for a long-term employee shortage at City of Kennedale facilities.	procedures for city employees and facilities.					
		STATUS: Deferred to 2020 HazMAP					
		Provide COOP training for jurisdiction employees.	April 2014	Human Resource Director	$1,000	$2,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Infectious Disease Outbreak	Develop a public information campaign to educate City of Kennedale public about infectious diseases.	Educate the public on pandemics, including isolation, quarantine, triage, and medical care.	February 2014	Tarrant County Health Department	$3,000	$3,000	Tarrant County Health Department
		STATUS: Deleted-no longer feasible					
		Push information to social media.	February 2014	Tarrant County Health Department	$3,000	$3,000	Tarrant County Health Department
		STATUS: Deleted-no longer feasible					
Drought	Review Kennedale water enforcement legislation and update as	Review current legislation for water conservation	March 2014	Public Works Department	$100	$100	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	necessary to mitigate the effects of drought.	enforcement in Kennedale.					
		STATUS: Completed					
		Develop or update water conservation enforcement legislation to ensure effective practices during periods of drought.	March 2014	Public Works Department	$100	$100	City funds
		STATUS: Completed					
Drought	Develop contingency plans for Kennedale to ensure adequate power and water supply during prolonged periods of drought.	Review current contingency plans.	March 2014	Public Works Department	$100	$1,000	City funds
		STATUS: Completed					
		Develop or update potable water contingency plans.	March 2014	Public Works Department	$100	$1,000	City funds
		STATUS: Completed					
		Develop or update power supply	March 2014	Public Works Department	$100	$1,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		contingency plans.					
		STATUS: In progress					
Drought	Upgrade water and irrigation systems to conserve water at Kennedale police and fire stations.	Upgrade fixtures at fire station.	December 2014	Fire Department	$2,000	$2,000	City funds
		STATUS: Deleted-no longer feasible					
		Upgrade fixtures at police station.	December 2014	Police Department	$2,000	$2,000	City funds
		STATUS: Deleted-no longer feasible					
Drought	Develop a drought awareness education program for Kennedale citizens.	Evaluate the hazards posed by drought in Kennedale.	April 2014	Public Works Department	$1,000	$1,000	City funds
		STATUS: Completed					
		Develop a drought awareness education program that provides tips and pertinent information for ensuring the protection of property and the	April 2014	Public Works Department	$1,000	$1,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		environments against drought.					
		STATUS: Deferred to 2020 HazMAP					
Drought	Distribute drought awareness information to Kennedale citizens.	Provide drought awareness information to Kennedale citizens through a social media campaign.	April 2014	Public Works Department	$100	$1,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Provide drought awareness information through the Kennedale website.	April 2014	Public Works Department	$100	$1,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Terrorism	Provide the necessary equipment to combat terrorism to Kennedale law enforcement.	Evaluate the equipment currently in place at Kennedale police department.	April 2014	Police Department	$200	$4,000	City funds
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Acquire the equipment identified in the assessment.	April 2015	Police Department	$100,000	$100,000	Homeland Security Grant Program
		STATUS: Completed					
Terrorism	Ensure security and surveillance equipment is in place at Kennedale critical facilities.	Assess security systems at critical facilities in Kennedale.	April 2014	Police Department	$200	$4,000	City funds
		STATUS: Completed					
		Install the systems necessary to provide security at Kennedale critical facilities.	April 2015	Police Department	$100,000	$100,000	Homeland Security Grant Program
		STATUS: Completed					
Terrorism	Provide an anti-terrorism training program at Kennedale Police Department.	Train officers in the detection of suspicious devices.	October 2014	Police Department	$2,000	$4,000	City funds
		STATUS: Completed					
		Conduct exercises to test terrorist response	April 2015	Police Department	$4,000	$4,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		plans and procedures.					
		STATUS: In progress					
Terrorism	Educate the Kennedale community about terrorism through public education.	Increase terrorism awareness fort the public through public speaking events.	October 2014	Police Department	$1,000	$2,000	City funds
		STATUS: Completed					
		Increase awareness of active shooter events by presenting in the school district.	October 2014	Police Department	$1,000	$2,000	City funds
		STATUS: Completed					
Lightning	Protect communication infrastructure in Kennedale from lightning.	Evaluate the need for lightning protection on communications infrastructure in Kennedale.	November 2014	Building Official	$1,000	$2,000	City funds
		STATUS: Completed					
		Install lightning rods on existing	November 2015	Building Official	$10,000	$20,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		and future communication infrastructure.					
		STATUS: Completed					
Lightning	Ensure Kennedale critical facilities are protected against lightning.	Evaluate the need for lightning protection for Kennedale critical facilities.	November 2014	Building Official	$1,000	$2,000	City funds
		STATUS: Completed					
		Install lightning rods and other protective equipment on critical facilities.	November 2015	Public Works	$30,000	$60,000	City funds
		STATUS: Completed					
Lightning	Develop a lightning preparedness education program for City of Kennedale citizens.	Evaluate the hazards posed by lightning in Kennedale.	November 2014	Fire Department	$500	$1,000	City funds
		STATUS: Completed					
		Develop a lightning outreach program that provides tips and	December 2014	Fire Department	$500	$1,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		pertinent information for protecting property against lightning damage.					
		STATUS: Deferred to 2020 HazMAP					
Lightning	Distribute lightning preparedness information to City of Kennedale citizens.	Provide lightning mitigation information to Kennedale citizens through a social media campaign.	November 2014	Fire Department	$500	$1,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Provide lightning mitigation information at outdoor spaces throughout Kennedale.	December 2014	Fire Department	$500	$1,000	City funds
		STATUS: Completed					
Hazardous Materials Release	Provide Kennedale fire personnel with the necessary gear to respond to hazmat releases.	Evaluate the HAZMAT gear currently provided by Kennedale Fire Department.	May 2015	Fire Department	$300	$300	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
		Acquire the gear needed as identified in the evaluation.	December 2017	Fire Department	$20,000	$40,000	Homeland Security Grant Program
		STATUS: Completed					
Hazardous Materials Release	Ensure Kennedale Fire Department has the equipment necessary to respond to HAZMAT releases.	Evaluate the HAZMAT equipment currently owned by Kennedale.	May 2014	Fire Department	$300	$300	City funds
		STATUS: Completed					
		Acquire the equipment needed as identified in the evaluation.	December 2017	Fire Department	$40,000	$80,000	Homeland Security Grant Program
		STATUS: Completed					
Hazardous Materials Release	Develop a hazardous materials awareness education program for Kennedale citizens.	Evaluate hazardous materials that are used or transported in Kennedale.	November 2014	Fire Department	$1,000	$10,000	City funds
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Provide hazardous materials awareness information to Kennedale citizens through a social media campaign.	November 2014	Fire Department	$1,000	$10,000	City funds
		STATUS: Deleted-no longer identifying technological hazards					
Hazardous Materials Release	Distribute hazardous materials awareness information to Kennedale citizens.	Evaluate public awareness of hazardous materials.	May 2014	Fire Department	$300	$600	City funds
		STATUS: Deleted-no longer identifying technological hazards					
		Provide hazardous materials awareness information through the Kennedale website.	Unknown	Fire Department	$300	$600	City funds
		STATUS: Deleted-no longer identifying technological hazards					
Hazardous Materials Release	Improve the evacuation of Kennedale citizens	Partner with the American Red Cross to locate	April14	Fire Department	$300	$600	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	during a hazardous event.	shelter locations within Kennedale.					
		STATUS: Completed					
		Secure agreements with the American Red Cross and the school district for shelters.	April 2014	Fire Department	$300	$600	City funds
		STATUS: Completed					
Hazardous Materials Release	Identify potential hazard areas in the City of Kennedale associated with a railroad incident.	Identify materials commonly carried by the railroad that travels through the community.	May 2014	Fire Department	$300	$600	City funds
		STATUS: Deleted-no longer feasible					
		Develop hazard incident overlay for the small, medium, and worst-case incidents based upon materials commonly	December 2014	Fire Department	$300	$600	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		carried on the railway.					
		STATUS: Deleted-no longer feasible					
Extreme Temperatures	Ensure the City of Kennedale has an extreme heat plan in place.	Review current plans and procedures related to extreme heat.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: Completed					
		Develop or update extreme heat plans and ensure they provide procedures for opening cooling centers and providing public information.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: Completed					
Extreme Temperatures	Identify extreme heat plans for critical infrastructure in the City of Kennedale.	Evaluate the need for extreme heat plans for critical infrastructure to ensure essential functions	Unknown	Fire Department, Police Department, Public Works, Parks Department,	$500	$1,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		continue in the event of high temperatures.		Library, Administration Department			
		STATUS: Completed					
		Develop or update plans and procedures for critical infrastructure when high temperatures are present.	May 2014	Fire Department, Police Department, Public Works, Parks Department, Library, Administration Department	$1,000	$2,000	City funds
		STATUS: Completed					
Extreme Temperatures	Develop an extreme heat preparedness education program for Kennedale citizens.	Evaluate the hazards posed by extreme heat in Kennedale.	May 2014	Fire Department	$100	$500	City funds
		STATUS: Completed					
		Develop an extreme heat preparedness education program that provides tips and pertinent	Unknown	Unknown	Unknown	Unknown	Unknown

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		information for ensuring the health and safety of citizens during extreme heat.					
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Distribute extreme heat mitigation information to Kennedale citizens.	Provide extreme heat mitigation information to the Kennedale citizens through a social media campaign.	May 2014	Human Resources Department	$100	$1,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Provide extreme heat mitigation information through the Kennedale's website.	May 2014	City Secretary	$100	$1,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Expansive Soils	Mitigate expansive soils in Kennedale.	Improve construction techniques through building code enhancements.	October 2015	Building Official	$1,000	$10,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
		Educate construction contractors, homeowners, and business owners about mitigation techniques.	October 2015	Building Official	$1,000	$10,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Provide a cooling station in the Kennedale Community Center.	Extreme heat emergency: provide a cooling station in the Kennedale Community Center.	June 2015	Fire Department, Police Department, Public Works, Parks Department, Library, Administration Department	$5,000	$10,000	City funds, American Red Cross, donations
		STATUS: Deleted-no longer feasible					
Extreme Temperatures	Provide a warming station in the Kennedale Community Center.	Extreme cold emergency: provide a warming station in the Kennedale	January 2015	Fire Department, Police Department, Public Works, Parks	$5,000	$10,000	City funds, American Red Cross, donations

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Community Center.		Department, Library, Administration Department			
		STATUS: Deleted-no longer feasible					
		Use emergency notification system to inform public during events having the potential to cause weakening or failure of dams at Sonora Park and Tarrant Regional Water District (TRWD) Balancing Reservoirs.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: Completed					
Hail	Use emergency notification system to inform public about approaching severe thunderstorms which have a	Hail emergency: use emergency notification system to inform public about approaching severe thunderstorms	January 2015	Office of Emergency Management	$5,500 for annual notification contract	$100,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	history of producing hail.	which have a history of producing hail.					
		STATUS: Completed					
Winter Storm	Use emergency notification system to inform public about approaching winter storm which may cause hazardous driving conditions, expose people and animals outdoors to extreme cold, and freeze exterior water pipes and pipes in unheated spaces within buildings.	Winter storm emergency: use emergency notification system to inform public about approaching winter storm which may cause hazardous driving conditions, expose people and animals outdoors to extreme cold, and freeze exterior water pipes and pipes in unheated spaces within buildings.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: Completed					

5.3 New Action Items

The City of Kennedale's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[2] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Flooding**
Review repetitive loss properties and work with homeowners to remove them using FEMA funding.	
Participating Jurisdiction:	City of Kennedale
Priority:	1
Estimated Cost:	$3,000,000
Estimated Benefit:	$180,000,000
Potential Funding Source(s):	Flood Mitigation Assistance, city funds
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	18 months

Hazard(s) Addressed	**Drought, Earthquakes, Extreme Heat, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms**
Enhance the public education program with mitigation techniques to protect property, life, and the environments against these identified hazards.	
Participating Jurisdiction:	City of Kennedale
Priority:	2
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	36 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Eliminate potential loss of power to municipal buildings from these identified hazards with the installation of backup generators for electrical power in new and existing municipal buildings.	
Participating Jurisdiction:	City of Kennedale
Priority:	3
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Extreme Heat, Wildfire
Provide strict enforcement of Kennedale's high grass and weed ordinance to reduce wildfire risk.	
Participating Jurisdiction:	City of Kennedale
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, city funds
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Acquire all private property located within the Village Creek 100-year floodplain in the City of Kennedale.	
Participating Jurisdiction:	City of Kennedale
Priority:	5
Estimated Cost:	$5,000,000
Estimated Benefit:	$30,000,000
Potential Funding Source(s):	Flood Mitigation Assistance, city funds
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought
Create and implement a water conservation program for public and residential property.	
Participating Jurisdiction:	City of Kennedale
Priority:	6
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, Public Works budget
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought
Create and implement a drought contingency plan for city facilities and property.	
Participating Jurisdiction:	City of Kennedale
Priority:	7
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, Public Works budget
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Earthquakes, Expansive Soils, Thunderstorms, Tornadoes, Wildfire
Improve construction techniques through building code enhancements and enforcement in the City of Kennedale to mitigate future damage from hazards.	
Participating Jurisdiction:	City of Kennedale
Priority:	8
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, Public Works budget
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Expansive Soils
Educate construction contractors, home owners, and business owners about mitigation techniques for expansive soils.	
Participating Jurisdiction:	City of Kennedale
Priority:	9
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	Hazard Mitigation Grant Program, Public Works budget
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Kennedale
Priority:	10
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the floodplain administrator to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	City of Kennedale
Priority:	11
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Kennedale
Priority:	12
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Kennedale
Priority:	13
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Kennedale
Priority:	14
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Kennedale
Priority:	15
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfires
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Kennedale
Priority:	16
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Kennedale
Priority:	17
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

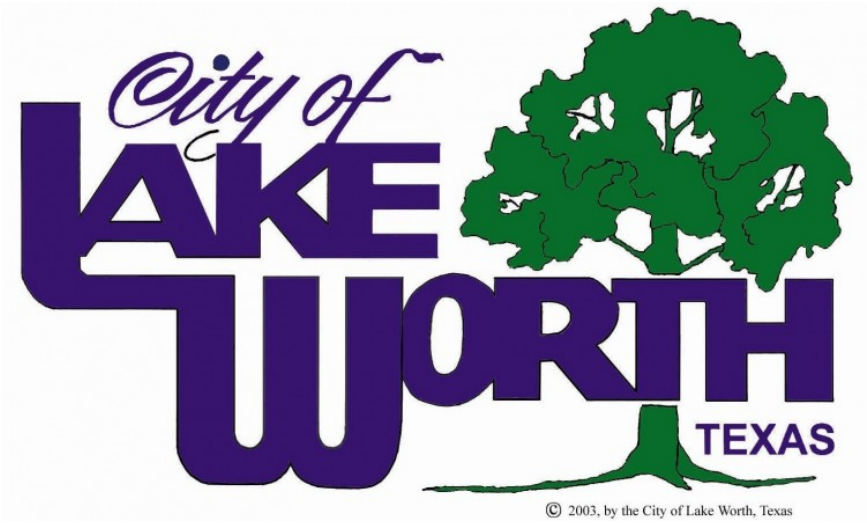
Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plan	City Administration, Public Works Department	Annually	Drainage improvement projects, Everbridge Warnings, shelter areas within city facilities	The leadership team will review the HazMAP to see which action items can be addressed with the fiscal and administrative capabilities of the city.
Future Land Use Plan	Public Works Department	As needed	Land use	City leadership will review the HazMAP for its impact on plan revisions and implementation.
Drainage Master Plan	Public Works Department	As needed	Notations of potential drainage concerns	City leadership and public works staff will review identified mitigation action items and consider plan revision as necessary to address them.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Flood Hazard Prevention	Public Works Department	As needed	Flood hazard prevention activities and processes	City manager and Director of Public Works will review identified mitigation action items and consider plan revision as necessary to address them.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Kennedale. For additional information, see Appendices A and B.



City of Lake Worth

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Lake Worth was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Lake Worth alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

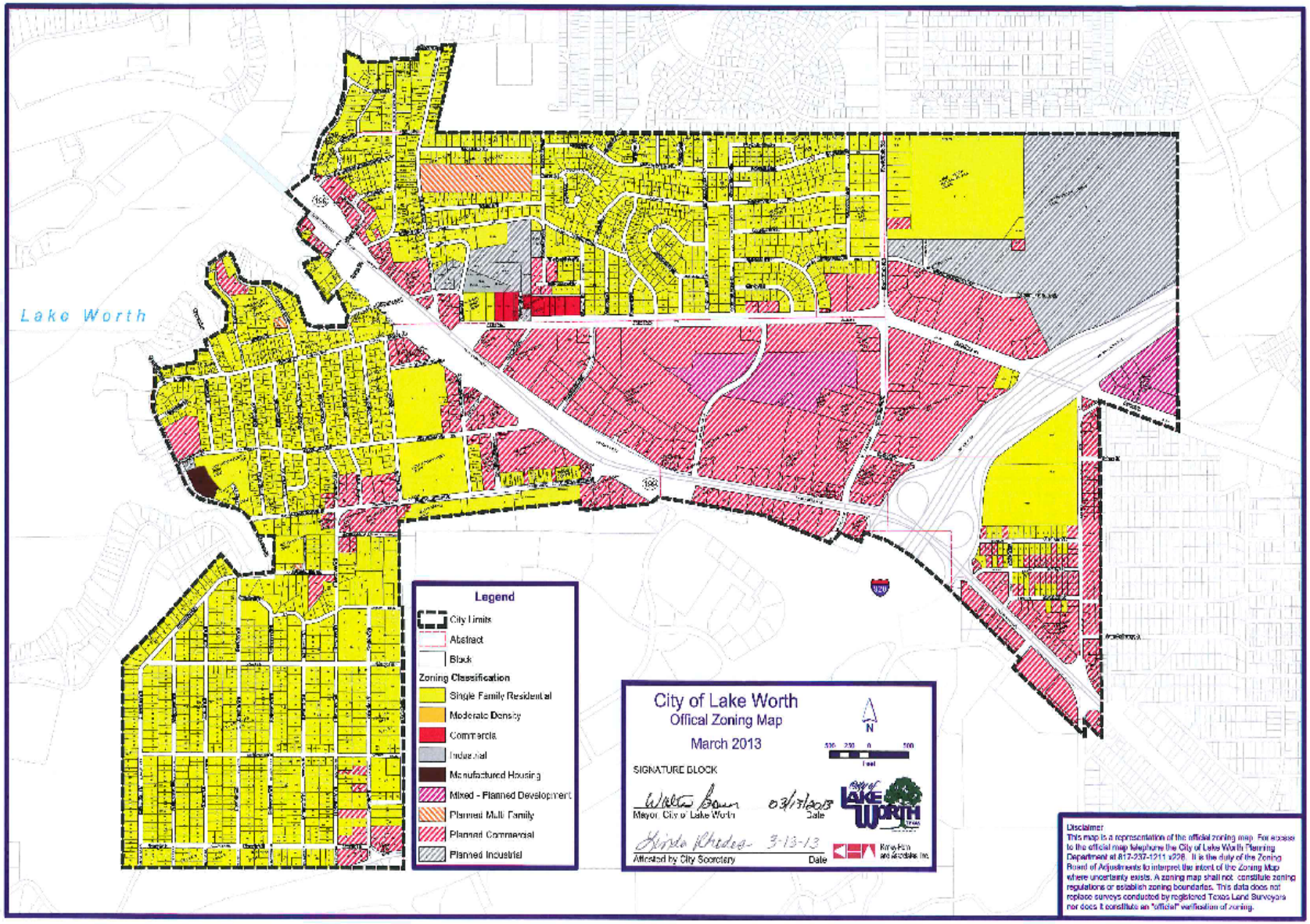
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Lake Worth will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

The following map provides an overview of the City of Lake Worth:

- Zoning Map


Lake Worth
Legend
City Limits
Abstract
Block
Zoning Classification
Single Family Residential
Moderate Density
Commercial
Industrial
Manufactured Housing
Mixed - Planned Development
Planned Multi Family
Planned Commercial
Planned Industrial
City of Lake Worth
Offical Zoning Map
March 2013
N
SIGNATURE BLOCK
Mayor, City of Lake Worth
03/7/2013
Date
Attested by City Secretary
3-13-13
Date
Disclaimer
This map is a representation of the official zoning map. For access to the official map telephone the City of Lake Worth Planning Department at 817-237-1211 x208. It is the duty of the Zoning Board of Adjustments to interpret the intent of the Zoning Map where uncertainty exists. A zoning map shall not constitute zoning regulations or establish zoning boundaries. This data does not replace surveys conducted by registered Texas Land Surveyors nor does it constitute an "official" verification of zoning.

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Lake Worth has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Lake Worth's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Lake Worth. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Lake Worth Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Lake Worth	City Manager's Office	City Manager	General oversight, hazard identification, and plan development.
City of Lake Worth	Fire Department	Division Chief/Emergency Management Coordinator	Hazard identification and plan development. General oversite, local administrator of plan.
City of Lake Worth	Public Works Department	Director	Hazard identification and plan development.
City of Lake Worth	Fire Department	Chief	Hazard Identification and plan development.

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: A full list of completed mitigation action items are described in Chapter 5 of this annex.

Declared Disaster Code	Incident Period	Date Declared	Description	Impact
DR-4266	March 7-29, 2016	March 19, 2016	Severe storms, tornadoes, and flooding.	Minor, temporary street flooding, and small tree limb debris.
Dr-4272	May 26-June 24, 2016	June 11, 2016	Severe storms and flooding.	Minor, temporary street flooding, and small tree limb debris.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Lake Worth.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	4,960
Persons under 5 years (%)	Data unavailable
Persons 65 years and over (%)	Data unavailable
Language other than English spoken at home (%)	Data unavailable
With a disability, under age 65 (%)	Data unavailable
Persons without health insurance, under age 65 (%)	18.6
Persons in poverty (%)	7.2
Median household income	$53,242
Households, 2012-2016	1,796
Median value of owner-occupied housing units, 2012-2016	$90,100

The daytime population of Lake Worth is 20,000. The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Lake Worth. Also, City of Lake Worth, Walmart, Target, Lake Worth ISD, and Richie Brothers Auctioneers are the largest employers in the city.

City of Lake Worth Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Fire Station 3801 Fire Hall Drive	Fire Administration and Responders, Emergency Operations Center, Emergency Management Office	112 people	7,280	$1,600,000	$ 5,000,000
Police Department, City Hall 3805 Adam Grubb Drive	Police Department, City Administration	300 people	16,674	$2,500,000	$ 1,000,000
Effie Morris Elementary School 3801 Merrett Drive	Education	3900 people	77,355	$8,100,000	$1,000,000
N.A. Howery Intermediate School 4005 Dakota Trail	Education	2800 people	107,541	$8,000,000	$1,000,000
Lake Worth High School 4210 Boat Club Road	Education	10,000 people	300,000	$42,300,000	$6,200,000

City of Lake Worth Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Lake Lodge Nursing Home 3800 Marina Drive	Nursing Home	Unknown	Unknown	$1,600,000	Unknown
Lake Worth Nursing Home 4220 Wells	Nursing Home	Unknown	Unknown	$700,000	Unknown

3.3 Natural Hazard Profiles

The City of Lake Worth's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Lake Worth in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
N/A	Wildfire
1	Thunderstorm (includes hail, wind, lightning)
2	Extreme Heat
3	Tornado
4	Expansive Soils
5	Flooding
6	Winter Storms
7	Drought
8	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Lake Worth.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	There is no historical data for drought damage in the city. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal overall.

Jurisdiction's ground-water supply: Lake Worth has two pumping stations that provide about 30% of needed fresh water. The additional 70% comes from City of Fort Worth.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: Lake Worth Ordinance #1023 Sec.4 Drought Contingency and Emergency Water Management Plan. This plan describes precautions and rules during or foreseen drought conditions.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data. The two main water lines in the city would cost $2 million to replace.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Expansive soils are a major consideration to all existing and future structures as most legacy structures eventually require maintenance to foundations to remain habitable. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Lake Worth spends approximately $250,000 on street repair and maintenance per year. Approximately 25% of those funds are used rebuilding roads due to cracking, heaving, and buckling caused by expansive soils. The road damage is spread evenly throughout the city. City buildings have no documented damages directly attributable to expansive soils.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by expansive soils? There have been significant funds spent by property owners to repair foundations of homes and businesses throughout the city. The city does require a permit for foundation repairs under a miscellaneous permit. Over the last 5 years, on average, the city issues 5 to 10 permits a year for foundation repair at the average cost of $125 for repairs, costing an average $5,000 to $10,000 over the last 5 years.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, the elderly, very young, and outdoor laborers need to take proper precautions. People should stay indoors to prevent heatstroke; elderly people who cannot afford air-conditioning are at greatest risk.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young, and outdoor laborers need to take proper precautions.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? Cases of heat exposure have been minimal.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Commuters and any buildings in a floodplain are considered most at risk.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: Since 2015, there has been no damage to report.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? Yes, though there is no data on damage done by flooding available.

Intersections or traffic routes impacted by flooding: See information on the low water crossing below. This area has the potential to flood.

Names of any creeks or rivers that flood: There are no creeks or rivers in Lake Worth.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Lake Worth has one low water crossing due to excessive rain runoff. This waterway serpentines through the cities of Lake Worth and Fort Worth, discharging in Fort Worth's jurisdiction in the actual Lake Worth. No areas are cut-off from this water crossing. All areas impacted are still accessible through other routes. This low water crossing is located on Comanche Trail. Though the City of Lake Worth has identified this crossing, it is not recognized by any other entity. The map below identifies Comanche Trail and the City of Lake Worth in red. The green space and lake are in the City of Fort Worth.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Lake Worth is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480605#
Community Name	City of Lake Worth
County	Tarrant
Initial FHBM Identified	11/19/1976
Initial FIRM Identified	01/06/1993
Current Effective Map Date	09/25/2009
Reg-Emer Date	01/06/1993
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? City Manager.

Repetitive and Severe Repetitive Loss Properties: There are currently 0 repetitive loss properties and 0 severe repetitive loss properties within the City of Lake Worth. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Lake Worth's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 6 Insurance in-force: $1,346,200 Written premium in-force: $5,098
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: 1 claim has been filed, $3,951.81 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	9.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	Unknown.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	No.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Unknown.
What are the barriers to running an effective NFIP	Community FPA	None.

program in the community, if any?		
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Unknown.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	11/19/1976
Are the FIRMs digital or paper?	Community FPA	Paper.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Unknown.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative	Unknown.

	CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Lake Worth will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): There has been $20,000 worth of property damage due to high winds since 2015.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	N/A
Probability of Future Occurrence	N/A
Maximum Probable Extent	N/A
Potential Impact	N/A
Vulnerabilities	The city has less than 0.1% of undeveloped land within city limits. Therefore, the city is not vulnerable to wildfires.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard; however, the impact is primarily to roadways and parking lots with a minimal impact on existing and future structures.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: There are overpasses at Azle Avenue and Northwest Loop 820 and at Northwest Loop 820 and State Highway 199. Both of these intersections are major traffic routes linking Northwest Tarrant County to Northwest Texas.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Lake Worth between 2015 and 2017. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Lake Worth	4/18/2015	Thunderstorm Wind	60	0	0	$15,000	$0	EG
Lake Worth	3/8/2016	Thunderstorm Wind	60	0	0	$5,000	$0	EG
Lake Worth	5/10/2016	Hail	0.88	0	0	$0	$0	
Total				**0**	**0**	**$20,000**	**$0**	

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Lake Worth identified their greatest vulnerabilities and concerns:

- The City of Lake Worth's greatest threat is severe thunderstorms due to the unknown frequency and strength of storms that might take place.
- Overall, the city is fairly resilient. The city drains well and with all new commercial building in the last decade, detention ponds are required. Commercial property must drain at the single residential rate. The City of Lake Worth has no jurisdiction on the actual lake itself. The City of Fort Worth has jurisdiction over Lake Worth and surrounding land of the lake. City of Lake Worth is landlocked. The City of Lake Worth is 98% built out. Areas that were prone to flash floods within city limits have been purchased by the city and turned into park areas.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Lake Worth's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Currently being updated to address hazards
Capital Improvement Plan (CIP)	Yes	No; No; Yes
Economic Development Plan	Yes	No; No; Yes
Local Emergency Operations Plan	Yes	Yes; No; Yes: A part of the Tarrant County Plan
Continuity of Operations Plan	No	
Transportation Plan	Yes	No; No; Yes
Stormwater Management Plan	Yes	No; No; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	Yes	Yes; Yes; Yes: City is a part of the Tarrant County Hazard Mitigation Action Plan
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	No	Have floodplain maps on hand. All property in flood zone owned by the city.
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	

Acquisition of land for open space and public recreation uses	Yes	All flood zone property bought by city and reallocated to parks and other public use.
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year: IBC 2012**
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 2**
Site Plan Review Requirements	Yes	Type(s) of requirement: staff review
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and Zoning Board; Yes
Mitigation Planning Committee	Yes	Develops HazMAP; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Public Works monitored; Yes
Mutual Aid Agreements	Yes	With municipalities and non-governmental organizations; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Additional role of City Manager; Yes; Yes; Yes
Emergency Manager	FT	Additional role of Fire Marshall; Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	Third Party	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	City has CodeRed and outdoor warning sirens; Yes
Hazard data and information	Yes	Tier II reports; No
Grant writing	No	
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	KnoWhat2Do, special project with non-governmental organizations, and public school education; Yes
Natural disaster or safety related school programs	Yes	KnoWhat2Do; Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	No	
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project (CIP) funding	Yes	No; Yes
Authority to levy taxes for specific purposes	Yes	No; No
Fees for water, sewer, gas, and/or electric services	Yes	No; No
Impact fees for new development	Yes	No; No
Stormwater or Drainage utility fee	Yes	Yes, small drainage projects not included in CIP project funds; Yes.
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes, funding for CIP draining projects; Yes

Incur debt through private activities	No	No
Community Development Block Grant	Yes	No
Other federal funding programs	Yes	Yes, many of Lake Worth's public safety programs are funded through federally administered grants; Yes.
State funding programs	No	
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Lake Worth's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds	Ensure critical facilities in Lake Worth have adequate safe rooms to protect against high wind events and tornadoes.	Evaluate the current conditions of critical facilities to determine which ones, if any, need safe rooms installed.	90 days	Lake Worth Office of Emergency Management	$1,000	$3,000	General fund
		STATUS: Completed and on going					
Severe Thunderstorms and High Winds	Ensure Lake Worth critical facilities, including schools, have high wind resistant windows in place.	Evaluate the need for high wind resistant windows in critical facilities.	90 days	Lake Worth Office of Emergency Management	$1,000	$3,000	General fund
		STATUS: In progress					
Severe Thunderstorms and High Winds	Distribute severe weather preparedness information to Lake Worth citizens.	Provide severe weather preparedness information to Lake Worth citizens through a social media campaign, including severe thunderstorms and tornadoes.	30 days	Lake Worth Office of Emergency Management	$1,000	$3,000	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
		Ensure the Lake Worth website is updated during tornado season to educate citizens on severe weather preparedness.	45 days	Lake Worth Office of Emergency Management	$1,000	$3,000	General fund
		STATUS: Completed					
Power Failure	Ensure Lake Worth critical facilities have alternate power supply.	Identify appropriate size and type of generator for critical facilities.	30 days	Lake Worth Office of Emergency Management	$1,000	$3,000	General fund
		STATUS: Completed					
		Purchase/order generator for critical facilities.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: Deferred to 2020 HazMAP					
		Deliver and install critical facility generators.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: Deferred to 2020 HazMAP					
Power Failure	Ensure Lake Worth critical facilities	Evaluate emergency lighting	180 days	Lake Worth Office of	$2,000	$5,000	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	have emergency lighting systems in place.	systems in critical facilities.		Emergency Management			
		STATUS: Completed					
		Install emergency lighting systems in critical facilities.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: Completed					
Hail	Ensure Lake Worth critical facilities have hail-resistant roofing and windows installed.	Evaluate which critical facilities need hail-resistant roofing and windows installed.	90 days	Lake Worth Office of Emergency Management	$1,000	$3,000	General fund
		STATUS: In progress					
Hail	Develop a hail preparedness education program for Lake Worth citizens.	Evaluate the hazards posed by hail in the city.	90 days	Lake Worth Office of Emergency Management	$1,000	$3,000	General fund
		STATUS: In progress					
Wildfire	Ensure Lake Worth water systems are adequate for fighting wildfires.	Evaluate the Lake Worth water system to ensure capacity for fighting wildfires.	30 days	Lake Worth Office of Emergency Management	$1,000	$3,000	General fund
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Wildfire	Ensure adequate Lake Worth wildfire response plans and procedures are in place.	Review current wildfire response plans and procedures.	90 Days	Lake Worth Fire Department	1	3,000	General fund
		STATUS: Completed					
		Provide wildfire response training to fire personnel.	365 Days	Lake Worth Fire Department, Texas A&M Engineering Extension Service (TEEX)	5,000	9,000	General fund, TEEX
		STATUS: In progress					
Winter Storms	Evaluate winter weather response capabilities in Lake Worth.	Assess winter weather response capabilities.	90 days	Lake Worth Office of Emergency Management, Lake Worth Public Works Department, Fire Department	$3,000	$6,000	General fund
		STATUS: Completed					
		Acquire equipment needed as determined by assessment.	Unknown	Unknown	Unknown	Unknown	Unknown

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
		Provide safety training to first responders on winter weather hazards.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: Completed					
Winter Storms	Evaluate winter weather mitigation capabilities in Lake Worth.	Conduct an assessment of winter weather mitigation plans in place for jurisdiction public works.	30 days	Lake Worth Public Works Department	$1,000	$3,000	General fund
		STATUS: In progress					
		Develop or update winter weather mitigation plan.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: Deferred to 2020 HazMAP					
Infectious Disease Outbreak	Prepare Lake Worth first responders for mass prophylaxis distribution.	Train first responders in point of distribution (POD) procedures.	180 days	Lake Worth Fire Department, Tarrant County Public Health	$2,000	$4,000	General fund
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Conduct a POD exercise to test plans and procedures.					
		STATUS: In progress					
Infectious Disease Outbreak	Ensure continuity procedures are in place to prepare for a long-term employee shortage at Lake Worth facilities.	Review continuity of operations (COOP) plans and procedures for city employees and facilities.	180 days	All Lake Worth departments	$4,000	$9,000	General fund
		STATUS: In progress					
		Provide COOP training for jurisdiction employees.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: In progress					
Infectious Disease Outbreak	Develop a public information campaign to educate Lake Worth public about infectious diseases.	Educate the public on pandemics, including isolation, quarantine, triage, and medical care.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: In progress					
Drought	Review Tarrant Regional Water	Review current legislation for	365 Days	Joint efforts with Tarrant	$3,000	$9,000	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	District/Lake Worth water enforcement legislation and update as necessary to mitigate the effects of drought.	water conservation enforcement in Lake Worth.		County Regional Water District and members.			
		STATUS: Completed					
		Develop or update water conservation enforcement legislation to ensure effective practices during periods of drought.	365 Days	Joint efforts with Tarrant County Regional Walter District and members.	Unknown	Unknown	Unknown
		STATUS: Completed					
Drought	Develop contingency plans for Lake Worth to ensure adequate power and water supply during prolonged periods of drought.	Review current contingency plans.	Ongoing	Lake Worth Public Works Department	$2,000	$6,000	General fund
		STATUS: In progress					
		Develop or update potable water contingency plans.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: In progress					
		Develop or update power supply contingency plans.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Drought	Develop a drought awareness education program for Lake Worth citizens.	Evaluate the hazards posed by drought in Lake Worth.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: In progress					
		Develop a drought awareness education program that provides tips and pertinent information for ensuring the protection of property and the environments against drought.	Ongoing	Lake Worth Public Works Department	$2,000	$6,000	General fund
		STATUS: Deferred to 2020 HazMAP					
Drought	Distribute drought awareness information to Lake Worth citizens.	Provide drought awareness information through the Lake Worth website.	Ongoing	Public Works Department, Information Technology Department, City Secretary	$2,000	$6,000	General fund
		STATUS: Deferred to 2020 HazMAP					
Terrorism	Provide the necessary equipment to	Evaluate the equipment currently in place	180 days	Lake Worth Police Department	$1,000	$3,000	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	combat terrorism to Lake Worth law enforcement.	at Lake Worth Police Department.					
		STATUS: Completed					
Terrorism	Provide an anti-terrorism training program at Lake Worth Police Department.	Conduct exercises to test terrorist response plans and procedures.	365 Days	Lake Worth Fire Department, Lake Worth Police Department	$8,000	$11,000	Budgeted training funds
		STATUS: In progress					
Lightning	Protect communication infrastructure in Lake Worth from lightning.	Evaluate the need for lightning protection on communications infrastructure in Lake Worth.	90 Days	Lake Worth Fire Department, Lake Worth Police Department	$1,000	$3,000	General fund
		STATUS: Completed					
Lightning	Ensure Lake Worth critical facilities are protected against lightning.	Evaluate the need for lightning protection for Lake Worth critical facilities.	90 Days	Lake Worth Office of Emergency Management	$1,000	$3,000	General fund
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Lightning	Distribute lightning mitigation information to the City of Lake Worth citizens.	Provide lightning mitigation information to Lake Worth citizens through a social media campaign.	Ongoing	Public Information Office	$10,000	N/A	General fund
		STATUS: Deferred to 2020 HazMAP					
Hazardous Materials Release	Provide Lake Worth fire personnel with the necessary gear to respond to HAZMAT releases.	Evaluate the HAZMAT gear currently provided by Lake Worth Fire Department.	30 days	Lake Worth Fire Department	$1,000	$3,000	General fund
		STATUS: In progress					
Hazardous Materials Release	Ensure Lake Worth Fire Department has the equipment necessary to respond to HAZMAT releases.	Evaluate the HAZMAT equipment currently owned by Lake Worth.	30 days	Lake Worth Fire Department	$1,000	$3,000	General fund
		STATUS: In progress					
		Acquire the equipment needed as identified in the evaluation.	365 days	Lake Worth Fire Department	$1,000	$3,000	General fund
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Extreme Temperatures	Ensure the Lake Worth has an extreme heat plan in place.	Review current plans and procedures related to extreme heat.	90 days	Lake Worth Office of Emergency Management	$1,000	$3,000	General fund
		STATUS: In progress					
		Develop or update extreme heat plans and ensure they provide procedures for opening cooling centers and providing public information.	90 days	Lake Worth Office of Emergency Management	$1,000	$3,000	General fund
		STATUS: In progress					
Extreme Temperatures	Identify extreme heat plans for critical infrastructure in Lake Worth.	Evaluate the need for extreme heat plans for critical infrastructure to ensure essential functions continue in the event of high temperatures.	Unknown	Unknown	Unknown	Unknown	Unknown
		STATUS: In progress					
		Develop or update plans and procedures for	Unknown	Unknown	Unknown	Unknown	Unknown

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		critical infrastructure when high temperatures are present.					
		STATUS: In Progress					
Extreme Temperatures	Distribute extreme heat preparedness information to Lake Worth citizens.	Provide extreme heat preparedness information through the Lake Worth website.	60 days	Lake Worth Office of Emergency Management, Information Technology Department, City Secretary	$2,000	$6,000	General fund
		STATUS: Deferred to 2020 HazMAP					
Expansive Soils	Mitigate expansive soils in Lake Worth.	Improve construction techniques through building code enhancements.	Ongoing	Lake Worth Building Official	$1,000	$3,000	General fund
		STATUS: In progress					
		Educate construction contractors, homeowners, and business owners	Ongoing	Lake Worth Building Official	$1,000	$3,000	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		about mitigation techniques.					
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes, Hail	Install safe rooms in Lake Worth critical facilities.	Install safe rooms in Lake Worth critical facilities.	12-18 months	Lake Worth Office of Emergency Management	To be determined	To be determined	Local funds, Pre-Disaster Mitigation, Hazard Mitigation Grant Program
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Flooding, Hail, Winter Weather	Develop and distribute severe weather mitigation information to Lake Worth citizens to encourage private mitigation activities.	Develop and distribute severe weather mitigation information to Lake Worth citizens to encourage private mitigation activities.	6 months	Lake Worth Office of Emergency Management	To be determined	To be determined	Local funds, Pre-Disaster Mitigation, Hazard Mitigation Grant Program
		STATUS: Deferred to 2020 HazMAP					
Flooding	Improve drainage and erosion control in nonresidential	Improve drainage and erosion control in nonresidential	12 months	Lake Worth Office of Emergency Management	To be determined	To be determined	Local funds,

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	areas of the City of Lake Worth.	areas of the City of Lake Worth.					Pre-Disaster Mitigation, Hazard Mitigation Grant Program
		STATUS: In progress					
Lightning	Harden Lake Worth critical facilities to protect against lightning.	Harden Lake Worth critical facilities to protect against lightning.	12 months	Lake Worth Office of Emergency Management	To be determined	To be determined	Local funds, Pre-Disaster Mitigation, Hazard Mitigation Grant Program
		STATUS: In progress					
Lightning	Harden communication infrastructure in Lake Worth from lightning.	Harden communication infrastructure in Lake Worth from lightning.	12 months	Lake Worth Office of Emergency Management	To be determined	To be determined	Local funds, Pre-Disaster Mitigation, Hazard Mitigation Grant Program

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: In progress					
Winter Storms	Expand winter weather planning capabilities in Lake Worth.	Expand winter weather planning capabilities in Lake Worth.	As Needed	Lake Worth Office of Emergency Management	To be determined	To be determined	Local funds, Pre-Disaster Mitigation, Hazard Mitigation Grant Program
		STATUS: In progress					
Wildfire	Protect the City of Lake Worth critical facilities and vulnerable populations from the effects of wildfire incidents.	Implement defensive space practices and enforce ordinances to maintain minimum distances from fuels.	Continuously	Community Development and Planning Department, Building Inspection and Code Compliance Department	$150,000	$500,000	General fund
		STATUS: In progress					
Wildfire	Develop a Community Wildfire Protection Plan to develop further targeted mitigation actions.	Develop a Community Wildfire Protection Plan to develop further	18 months	Lake Worth Office of Emergency Management	To be determined	To be determined	Local funds, Pre-Disaster Mitigation,

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		targeted mitigation actions.					Hazard Mitigation Grant Program
		STATUS: In progress					
Wildfire	Develop a wildfire outreach program City of Lake Worth citizens.	Develop a wildfire outreach program City of Lake Worth citizens.	12 months	Lake Worth Office of Emergency Management	To be determined	To be determined	Local funds, Pre-Disaster Mitigation, Hazard Mitigation Grant Program
		STATUS: Deleted- no longer a priority					
Extreme Temperatures	Develop and adopt an extreme temperature mitigation plan.	Develop and adopt an extreme temperature mitigation plan.	12 months	Lake Worth Office of Emergency Management	To be determined	To be determined	Local funds, Pre-Disaster Mitigation, Hazard Mitigation Grant Program
		STATUS: In progress					
Extreme Temperatures	Distribute extreme temperature public	Distribute extreme temperature	6-8 months	Lake Worth Office of	To be determined	To be determined	Local funds,

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	education and mitigation information to Lake Worth citizens.	public education and mitigation information to Lake Worth citizens.		Emergency Management			Pre-Disaster Mitigation, Hazard Mitigation Grant Program
		STATUS: Deferred to 2020 HazMAP					

5.3 New Action Items

The City of Lake Worth's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[2] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Earthquakes, Expansive Soils, Flooding, Thunderstorms, Tornadoes**
Enhance and enforce building codes to meet most current ICC standards.	
Participating Jurisdiction:	City of Lake Worth
Priority:	1
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Code Compliance, Planning & Zoning Commission, Economic Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	**Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms**
Purchase and install generators for new and existing critical facilities to reduce the damage from power failure due to the identified hazards.	
Participating Jurisdiction:	City of Lake Worth
Priority:	2
Estimated Cost:	$150,000
Estimated Benefit:	$900,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Purchasing Department, Public Works Department, facility owner
Implementation Schedule:	12 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Install safe rooms in new and existing critical facilities as needed.	
Participating Jurisdiction:	City of Lake Worth
Priority:	3
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Purchasing Department, Public Works Department, facility owner
Implementation Schedule:	48 months

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Winter Storms
Enhance the current comprehensive public education program to include recommended actions to mitigate the impacts of these hazards.	
Participating Jurisdiction:	City of Lake Worth
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Fire Department, Community Services Department, Parks Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Build a larger culvert and retention wall for watershed over low crossing on Comanche Drive.	
Participating Jurisdiction:	City of Lake Worth
Priority:	5
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	Flood Mitigation Assistance, general fund
Lead Agency/Department Responsible:	Public Works Department, Planning & Zoning Commission, Economic Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Create and implement drought contingency plan for the city facilities and property that addresses the use of low flow fixtures, xeriscaping or drought-tolerant plants.	
Participating Jurisdiction:	City of Lake Worth
Priority:	6
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Hazard mitigation grants, city budget
Lead Agency/Department Responsible:	Public Works Department, Planning & Zoning Commission, Economic Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Lake Worth
Priority:	7
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Require that the floodplain administrator is certified.	
Participating Jurisdiction:	City of Lake Worth
Priority:	8
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Lake Worth
Priority:	9
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Lake Worth
Priority:	10
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Lake Worth
Priority:	11
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Lake Worth
Priority:	12
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Promote conservation of open space to alleviate pressure on stormwater runoff and to promote water absorption through the soil.	
Participating Jurisdiction:	City of Lake Worth
Priority:	13
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Lake Worth
Priority:	14
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the state to conduct a study to determine inundation zones, vulnerability to, and potential impacts of a dam failure.	
Participating Jurisdiction:	City of Lake Worth
Priority:	15
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plan	City Administration	Every 10 years	Reference this HazMAP when developing the plan.	When reviewing the Capital Improvement Plan, the leadership team will review the HazMAP to see which action items can be addressed with the fiscal and administrative capabilities of the city.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Emergency Operations Plan (EOP)	Office of Emergency Management	Annually	Reference the HazMAP.	The emergency manager and planning team will refer to the HazMAP while updating the EOP to make sure goals are aligned.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Lake Worth. For additional information, see Appendices A and B.

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Town of Lakeside

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the Town of Lakeside was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the Town of Lakeside alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

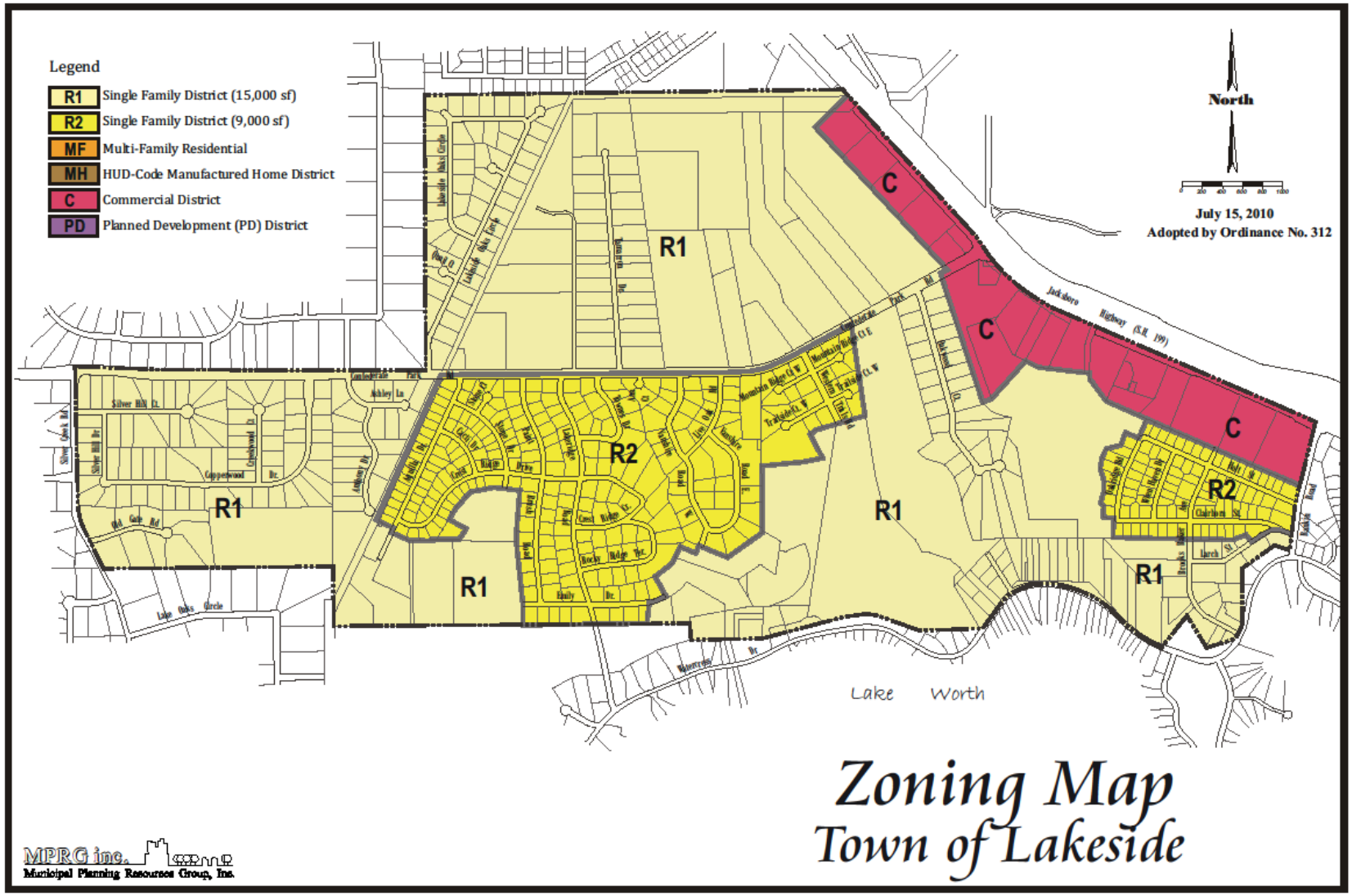
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the Town of Lakeside will take the HazMAP to Town Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

The following map provides an overview of the Town of Lakeside:

- Zoning Map


Legend
R1 Single Family District (15,000 sf)
R2 Single Family District (9,000 sf)
MF Multi-Family Residential
MH HUD-Code Manufactured Home District
C Commercial District
PD Planned Development (PD) District
North
July 15, 2010
Adopted by Ordinance No. 312
Jacksboro Highway (S.H. 199)
Lake Worth
Zoning Map
Town of Lakeside
MPRG inc.
Municipal Planning Resources Group, Inc.

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the Town of Lakeside has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped town officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The town's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The town developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the Town of Lakeside's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the town's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the Town of Lakeside. The town acted as the plan development consultant, providing hazard mitigation planning services.

Town of Lakeside Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
Town of Lakeside	Administration	Town Administrator	General oversight, hazard identification, and plan development
Town of Lakeside	Police Department	Police Chief	Hazard identification and plan development
Town of Lakeside	Office of Emergency Management	Emergency Management Coordinator	General oversight, hazard identification, and plan development
Town of Lakeside	Public Works	Superintendent	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the town, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the town in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: The town annexed approximately 150 acres, though it does not have an impact on the vulnerability of the town.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: A full list of completed mitigation action items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. Due to the small size of the Town of Lakeside, the United States Census did not have data to develop a community profile.

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the Town of Lakeside.

Town of Lakeside Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Town Hall 9830 Confederate Park Road	Administration
Water Pump Station 1 9842 Confederate Park Road	Utility
Water Pump Station 2 9217 Watercress Drive	Utility
Waste Water Facility 300 Aquilla Drive	Utility

Town of Lakeside Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
1H Gas Well 920 Western Trails	Utility
Noland 1H Gas Well 9382 Confederate Park Road	Utility

*The capacity, square footage, and structure value of these assets are unavailable.

3.3 Natural Hazard Profiles

The Town of Lakeside's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the Town of Lakeside in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Thunderstorm (includes hail, wind, lightning)
2	Tornado
3	Extreme Heat
4	Drought
5	Expansive Soils
6	Wildfire
7	Flooding
8	Winter Storms
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire Town of Lakeside.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Significant
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	There is no historical data for drought damage in the town. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal overall.

Jurisdiction's ground-water supply: Supply comes from town wells and the City of Fort Worth.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: At times, water restrictions can be implemented with fines for non-compliance. Lawn watering is restricted when available water resources reach established thresholds.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, only road damage is recorded. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: The Town of Lakeside spends approximately $10,000 per year rebuilding roads due to cracking, heaving, and buckling caused by expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young, and those working outdoors are most at risk.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? There have been no cases of extreme heat reported since 2015.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Commuters and any buildings in low areas are considered most at risk.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: None.

Names of any creeks or rivers that flood: None.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. No low water crossings have been identified in the Town of Lakeside.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The Town of Lakeside is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480604#
Community Name	Town of Lakeside
County	Tarrant County
Initial FHBM Identified	04/13/73
Initial FIRM Identified	08/23/00
Current Effective Map Date	(NSFHA)
Reg-Emer Date	08/03/84
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Building Official.

What specific flooding ordinances and plans does your jurisdiction have? None.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? N/A.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? N/A.

Repetitive and Severe Repetitive Loss Properties: There are currently 0 repetitive loss properties and 0 severe repetitive loss properties within the Town of Lakeside. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the Town of Lakeside's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 2 Insurance in-force: $700,000 Written premium in-force: $746

How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: 1 claim has been filed, but was closed without payment. $0 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	None.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	None.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	No.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	None.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	None.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Unknown.
Is a CAV or CAC scheduled or needed?		No.

Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	04/13/73
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes: community is not in or effected by the floodplain.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Not applicable.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The Town of Lakeside will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of thunderstorms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Various structures have experienced damage from hail, high wind, and lightning.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Significant
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, the populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments around the perimeter of town are exposed to this hazard, as there are two major sources of open space along the border, though not in the Town of Lakeside.

Most vulnerable location (North, East, South, West) of your jurisdiction? The Fort Worth Nature Refuge is to the northeast of the town and Wildwood Park is southwest, though there is no wildland-urban interface identified. There have been no fires reported in the past.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the town are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Confederate Park Road Bridge.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

According to the National Centers for Environmental Information, there has been no report of natural hazard events between 2015 and 2017 in the Town of Lakeside, though the town has experienced hazards and hazard damage that is recorded in the specific hazard sections.

3.5 Overall Vulnerability

The Town of Lakeside identified their greatest vulnerabilities and concerns within the respective hazard profiles.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the town to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the Town of Lakeside's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	No	
Capital Improvement Plan	No	
Economic Development Plan	No	
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	No	
Transportation Plan	No	
Stormwater Management Plan	Yes	2013
Community Wildfire Protection Plan	No	
Other Plans (e.g.; disaster recovery; climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	2010 Yes; Yes
Subdivision Ordinance	No	
Floodplain Ordinance	No	
Flood Insurance Rate Maps	No	
Natural Hazard Specific Ordinance (e.g.; stormwater; wildfire)	No	Texas Intrastate Fire Mutual Aid System (TIFMAS) – Wildfire; Yes; Yes;

Acquisition of land for open space and public recreation uses	No	
Building Code; Permitting; and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year: ICC 2003**
Building Code Effectiveness Grading Schedule (BGEGS) Score	Yes	**Score**: 1 residential and commercial
Fire Department ISO Rating	Yes	**Rating**: 2
Site Plan Review Requirements	Yes	**Type(s) of requirement:** Planning and Zoning Committee
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and Zoning Committee; Yes
Mitigation Planning Committee	Yes	Completes the HazMAP; Yes
Maintenance programs to reduce risk (e.g.; tree trimming; clearing drainage systems)	Yes	Public Works; Yes
Mutual Aid Agreements	Yes	Response and assist; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	PT	Yes; Yes; Yes
Floodplain Administrator	No	
Emergency Manager	PT	Yes; Yes; Yes
Community Planner	No	
Civil Engineer	PT	Yes; Yes; Yes
GIS Coordinator	No	
Other:		
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g.; Reverse 911; outdoor warning signals)	Yes	CodeRed; Yes
Hazard data and information	No	
Grant writing	Yes	State and federal grant experience; No
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	General preparedness and safety promoted in monthly newsletter, Lakeside website, Code Red; Yes
Natural disaster or safety related school programs	No	
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	No	
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	No	
Authority to levy taxes for specific purposes	Yes	Yes, street repair; No
Fees for water, sewer, gas, and/or electric services	No	
Impact fees for new development	No	
Stormwater utility fee	No	
Incurrence of debt through general obligation bonds and/or special tax bonds	No	
Incur debt through private activities	No	
Community Development Block Grant	Yes	No; No

Other federal funding programs	No	
State funding programs	No	
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized. Considering creating and adopting specific Community Protection Plans as identified and creating partnerships with other local communities for the sharing of services and resources that fall outside the normal mutual aid policies. Current recognized needs are as follows: institute a formal Continuity of Operations (COOP) plan and adopt updated building codes.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The Town of Lakeside's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires	Improve the Town of Lakeside's first responder capabilities to prepare for and respond to all-hazard events in Lakeside.	Conduct annual disaster exercises involving all response agencies and own departments.	12 months	County Emergency Management Agency (EMA), first responder agencies, town departments	$20,000	$1,000,000	Town budget, Federal Emergency Management Agency Homeland Security Grant Program (FEMA HSGP)
		STATUS: Deferred to 2020 HazMAP					
		Train first responders and town department representatives annually on Emergency Operation Center (EOC) procedures.	3 months	County EMA, first responder agencies, town departments	$5,000	$100,000	Town budget, FEMA HSGP
		STATUS: Completed					
		Conduct annual continuity of operations exercise for all town departments.	9 months	County EMA, town departments	$10,000	Unknown	Town budget, FEMA HSGP
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High	Increase Lakeside citizen emergency awareness,	Distribute severe weather preparedness	1 month	County EMA	$2,000	$20,000	Town budget, FEMA

Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires	preparedness, and response.	literature at appropriate/identified events.					
		STATUS: Deferred to 2020 HazMAP					
		Provide weather radios to identified special needs citizens (for example, elderly, rural, low-income).	6 months	County EMA	$15,000	$200,000	Grants, town budget, FEMA
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes	Minimize losses of life and property due to high winds from severe thunderstorms in the Town of Lakeside.	Explore alert, warning, and notification options for visually impaired and hearing impaired citizens.	12 months	County EMA	Unknown	Unknown	Grants, town budget, FEMA
		STATUS: Deferred to 2020 HazMAP					
Power Failure	Improve the Town of Lakeside's information distribution and warning capabilities to citizens.	Acquire a generator for running wastewater lift station and irrigation field.	6 months	Public Works Department	Unknown	Unknown	Town budget, FEMA HSGP, United States Department of Housing and Urban Development (HUD), Community Development Block Grant (CDBG)

		STATUS: Deferred to 2020 HazMAP					
Hail	Ensure Lakeside critical facilities have hail-resistant roofing and windows installed.	Evaluate which critical facilities need hail-resistant roofing and windows installed.	8 months	Town Administration Department	$8,000	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					
		Install hail-resistant roofing and windows in identified critical facilities.	24 months	Town Administration Department	$75,000	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					
Hail	Provide hail-resistant parking areas for Lakeside's town vehicles.	Evaluate the need for covered parking for town vehicles to protect them against hail.	8 months	Town Administration Department	$3,000	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					
		Install covered parking areas as needed to protect town vehicles against hail.	36 months	Town Administration Department	$25,000	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					
Hail	Develop a hail preparedness education program for Lakeside citizens.	Evaluate the hazards posed by hail in the town.	6 months	Town Administration Department	$5,000	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					

		Develop hail preparedness education program that provides tips and pertinent information for ensuring the protection of property against hail.	12 months	Town Administration Department	$5,000	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					
Hail	Distribute hail mitigation information to Lakeside citizens.	Provide hail mitigation information to citizens through a social media campaign.	6 months	Town Administration Department	$5,000	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					
		Provide hail mitigation information through the town website.	4 months	Town Administration Department	$100	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					
Hail	Improve the Town of Lakeside's hailstorm information distribution and warning to citizens.	Distribute hailstorm mitigation literature at community events.	1 month	County EMA, town officials	$2,500	$100,000	Town budget
		STATUS: Deferred to 2020 HazMAP					
Wildfires	Ensure Lakeside water systems are	Evaluate the Lakeside water system to	24 months	Town Administration Department	$15,000	Unknown	Line item budget

	adequate for fighting wildfires.	ensure capacity for fighting wildfires.					
		STATUS: Deferred to 2020 HazMAP					
		Install or upgrade needed equipment to ensure water systems are adequate.	24 months	Town Administration Department	Unknown	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					
Wildfires	Mitigate wildfires by instituting landscaping practices at Lakeside critical facilities.	Prevent wildfires from spreading to critical facilities by landscaping plants and brush away from buildings.	24 months	Town Administration Department	Unknown	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					
Wildfires	Protect critical facilities and vulnerable populations from the effects of urban grass/wildfires in Lakeside.	Identify critical facilities in wildfire hazard areas, develop an awareness program, and take appropriate remedial action.	6 months	County EMA	Unknown	Unknown	Town budget, FEMA Fire Management Assistance Grant Program
		STATUS: Deferred to 2020 HazMAP					
Wildfires	Review town ordinances and laws to ensure mitigation practices are in effect in Lakeside.	Enact building permit process that encourages wildfire resistant construction.	36 months	Town Administration Department	$15,000	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					

Wildfires	Ensure adequate Lakeside wildfire response plans and procedures are in place.	Review current wildfire response plans and procedures.	12 months	County Fire Marshal	Unknown	Unknown	Line item budget
		STATUS: In progress					
		Develop or update wildfire response plans and procedures.	18 months	County Fire Marshal	Unknown	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					
		Provide wildfire response training to fire personnel.	24 months	County Fire Marshal	Unknown	Unknown	Unknown
		STATUS: Deferred to 2020 HazMAP					
Wildfires	Provide information to Lakeside citizens regarding the hazards posed by wildfires.	Develop a wildfire preparedness education program that provides tips and pertinent information for ensuring the protection of property against wildfires.	24 months	County Fire Marshal	Unknown	Unknown	Unknown
		STATUS: Deferred to 2020 HazMAP					
Wildfires	Determine the process for becoming a Firewise Community in Lakeside.	Work with the Texas Department of Emergency Management to become a Firewise Community.	24 months	County Fire Marshal	Unknown	Unknown	Line item budget
		STATUS: Deferred to 2020 HazMAP					

Infectious Disease Outbreak	Improve the Town of Lakeside's first responder capabilities to prepare for and respond to pandemic/epidemic events.	Train all first responders on pandemic flu response.	6 months	Tarrant County Health and Human Services Department	$5,000	$50,000	Town budget, FEMA HSGP
		STATUS: Deleted- no longer identifying technological hazards					
		Participate in Strategic National Stockpile drills and exercises.	24 months	County EMA, Tarrant County Health and Human Services Department	$5,000	$50,000	Town budget, FEMA HSGP
		STATUS: Deleted- no longer identifying technological hazards					
		Acquire infectious disease personal protective equipment for all first responders.	8 months	County EMA, Environmental Services Department, Fire Department	$5,000	$50,000	Town budget, FEMA HSGP
		STATUS: Deleted- no longer identifying technological hazards					
Infectious Disease Outbreak	Improve the Town of Lakeside's pandemic/epidemic information distribution and warning to citizens.	Educate the public on pandemics, including isolation, quarantine, triage, and medical care.	6 months	County EMA, Environmental Services Department, Tarrant County Health and Human Services Department	$2,000	$20,000	Town Budget, public health grants (Centers for Disease Control and Prevention)
		STATUS: Deleted- no longer identifying technological hazards					

Drought	Protect Lakeside critical facilities and vulnerable agriculture from effects of drought conditions.	Continue to identify and implement water conservations efforts before, during, and after times of drought.	Ongoing Program	County EMA	$2,500	$50,000	Town budget
		STATUS: In progress					
Drought	Protect Lakeside critical facilities and vulnerable agriculture from effects of drought conditions.	Educate citizens in the Town about the potential negative effects that arise from extended drought conditions.	1 month	County EMA	$1,000	$50,000	Town budget
		STATUS: Deferred to 2020 HazMAP					
Terrorism	Increase Town of Lakeside citizen domestic and international terrorism awareness, preparedness, and response.	Install security-related equipment (CCTV) at Town Hall.	6 months	Public Works Department	$5,000	$100,000	Town
		STATUS: Deleted- no longer identifying technological hazards					
Terrorism	Reduce the Town of Lakeside's risk of and vulnerability to domestic and international terrorism incidents.	Train all first responders on CBRNE response.	18 months	Departments	$2,000	$6,000	Town budget, FEMA, competitive training grant
		STATUS: Deleted- no longer identifying technological hazards					

Lightning	Increase Lakeside citizen lightning awareness.	Install lightning and electric arrestors at town sites; lift stations and pump stations.	12 months	Public Works Department	Unknown	Unknown	Town budget, FEMA Hazard Mitigation Grant Program (HMGP)
		STATUS: Deferred to 2020 HazMAP					
		Provide lightning protection systems for outdoor facilities.	24 months	County EMA	Unknown	Unknown	Unknown
		STATUS: Deferred to 2020 HazMAP					
Lightning	Increase Lakeside citizen lightning awareness.	Distribute lightning awareness literature at appropriate/ identified community events.	1 month	County EMA	$2,000	$20,000	Town budget
		STATUS: Deferred to 2020 HazMAP					
Hazardous Materials Release	Improve the Town of Lakeside's capability to prepare for, respond to, and recover from hazardous material events.	Provide first responders air monitoring equipment and calibration.	9 months	County EMA	Unknown	Unknown	Town budget, FEMA Commercial Equipment Direct Assistance Program, Superfund Amendments and Reauthorization Act (SARA), Title III
		STATUS: Deleted- no longer identifying technological hazards					

Extreme Temperatures	Improve the Town of Lakeside's first responder capabilities mitigation against extreme heat events.	Open cooling centers for Lakeside citizens in extreme heat events.	24 months	County EMA	Unknown	Unknown	Town budget
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Improve the Town of Lakeside's extreme heat information distribution and warning to citizens.	Distribute extreme temperature mitigation literature at community events.	1 month	County EMA, Town officials	$2,500	$100,000	Town budget
		STATUS: Deferred to 2020 HazMAP					
Expansive Soils	Mitigate expansive soils in Lakeside.	Improve construction techniques through building code enhancements.	Ongoing	Town Building Officials	$5,000	Unknown	Line item budget
		STATUS: In progress					
		Educate construction contractors, homeowners, and business owners about mitigation techniques.	Ongoing	Town Building Officials	$2,000	Unknown	Line item budget
		STATUS: In progress					
Severe Thunderstorms and High Winds,	Provide weather radios to identified special needs citizens (for	Provide weather radios to identified special needs citizens (for example, elderly,	6 months	Town Administration Department,	$15,000	$200,000	Local funds, Pre-Disaster Mitigation (PDM), HMGP

Tornadoes, Hail, Lightning, Winter Storms, Flooding, Wildfires, Dam Failure	example, elderly, rural, low-income) and/or critical infrastructure to expand early warning capabilities.	rural, low-income) and/or critical infrastructure to expand early warning capabilities.		Police Department			
		STATUS: Deferred to 2020 HazMAP					
Tornadoes, Flooding, Thunderstorms and High Winds, Hail	Install storm-resistant windows in critical infrastructures.	Install storm-resistant windows in critical infrastructures.	6-12 months	Public Works Department	$500 per building	2,000 per building	Local funds, PDM, HMGP
		STATUS: Deferred to 2020 HazMAP					
Lightning	Protect and harden Lakeside critical infrastructure from lightning.	Protect and harden Lakeside critical infrastructure from lightning.	6 months	Public Works Department	15,000 per building	60,000 per building	Local funds, PDM, HMGP
		STATUS: Deferred to 2020 HazMAP					
Flooding	Improve drainage and erosion control in nonresidential areas of the Town of Lakeside.	Improve drainage and erosion control in nonresidential areas of the Town of Lakeside.	12 months	Emergency Management	To be determined	To be determined	Local funds, PDM, HMGP
		STATUS: Deferred to 2020 HazMAP					
Drought	Expand water conservations ordinances during times of drought.	Expand water conservations ordinances during times of drought.	As needed	Town Administration Department	$1,000	$4,000	Local funds, PDM, HMGP
		STATUS: Deferred to 2020 HazMAP					

Drought	Upgrade water/irrigation systems for the Town of Lakeside.	Upgrade water/irrigation systems for the Town of Lakeside.	12-18 months	Public Works Department	$20,000	$80,000	Local funds, PDM, HMGP
		STATUS: Deferred to 2020 HazMAP					

5.3 New Action Items

The Town of Lakeside's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the town has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[2] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Drought, Earthquake, Expansive Soils, Extreme Heat, Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm**
Enhance public outreach programs for hazard mitigation to the citizens of Lakeside through a social media campaign, publications, and the Town of Lakeside's website.	
Participating Jurisdiction:	Town of Lakeside
Priority:	1
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	**Earthquakes, Expansive Soils, Thunderstorms, Tornadoes, Wildfire**
Improve construction techniques through building code enhancements.	
Participating Jurisdiction:	Town of Lakeside
Priority:	2
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Building Official
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Flooding
Install flood warning devices to low water crossings that citizens identify.	
Participating Jurisdiction:	Town of Lakeside
Priority:	3
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	Town budget, Flood Mitigation Assistance
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Improve road infrastructure in low water areas.	
Participating Jurisdiction:	Town of Lakeside
Priority:	4
Estimated Cost:	$900,000
Estimated Benefit:	$5,400,000
Potential Funding Source(s):	Town budget, Flood Mitigation Assistance, Texas Division of Transportation (TxDOT)
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Install safe rooms in existing and future critical facilities, as needed.	
Participating Jurisdiction:	Town of Lakeside
Priority:	5
Estimated Cost:	$500,000
Estimated Benefit:	$3,000,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	2 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Install impact-resistant roofing and windows in existing and future critical facilities and new development.	
Participating Jurisdiction:	Town of Lakeside
Priority:	6
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquake, Expansive Soils, Extreme Heat, Flooding, Thunderstorm, Tornado, Wildfire, Winter Storm
Review, update, and enforce current jurisdictional ordinances and building codes.	
Participating Jurisdiction:	Town of Lakeside
Priority:	7
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	Town funding for staff time
Lead Agency/Department Responsible:	Building Official
Implementation Schedule:	24 months

Hazard(s) Addressed	Thunderstorms
Install lightning rods on existing and future communication infrastructure, as needed.	
Participating Jurisdiction:	Town of Lakeside
Priority:	8
Estimated Cost:	$30,000
Estimated Benefit:	$180,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Distribute weather radios to existing and future homes, facilities, and businesses.	
Participating Jurisdiction:	Town of Lakeside
Priority:	9
Estimated Cost:	$30,000
Estimated Benefit:	$180,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Develop a power supply contingency plan.	
Participating Jurisdiction:	Town of Lakeside
Priority:	10
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Develop potable water contingency plans.	
Participating Jurisdiction:	Town of Lakeside
Priority:	11
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Enact building permit process that encourages wildfire resistant construction.	
Participating Jurisdiction:	Town of Lakeside
Priority:	12
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	Town funding for staff time
Lead Agency/Department Responsible:	Building Official
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Develop a floodplain ordinance and floodplain restrictions.	
Participating Jurisdiction:	Town of Lakeside
Priority:	13
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Require that the floodplain administrator is certified.	
Participating Jurisdiction:	Town of Lakeside
Priority:	14
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	Town of Lakeside
Priority:	15
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	Town of Lakeside
Priority:	16
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	Town of Lakeside
Priority:	17
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	Town of Lakeside
Priority:	18
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfires
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	Town of Lakeside
Priority:	19
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	Town of Lakeside
Priority:	20
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the town were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the town, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Zoning Ordnances	Community Development and Planning Department	Every 5 years	Reference this HazMAP when developing the plan.	When reviewing the zoning ordinances, the leadership team will review the HazMAP to see which action items can be addressed with the fiscal and administrative capabilities of the town.
Future Land Use Planning	Town Administration Department	As needed	Land use.	The contractor, town staff, and town leadership will review the HazMAP for its impact on plan revisions and implementation.
Drainage Master Planning	Public Works Department	As needed	Notations of potential drainage concerns.	Town leadership and staff will review identified mitigation action items and consider plan revision as necessary to address them.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the Town of Lakeside. For additional information, see Appendices A and B.

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City of Mansfield*

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

The City of Mansfield is a new participant in the Tarrant County Hazard Mitigation Action Plan (HazMAP); however, the city has a previous mitigation plan that was approved in 2010.

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County HazMAP planning process for the City of Mansfield, a new participant in the HazMAP, was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Mansfield alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

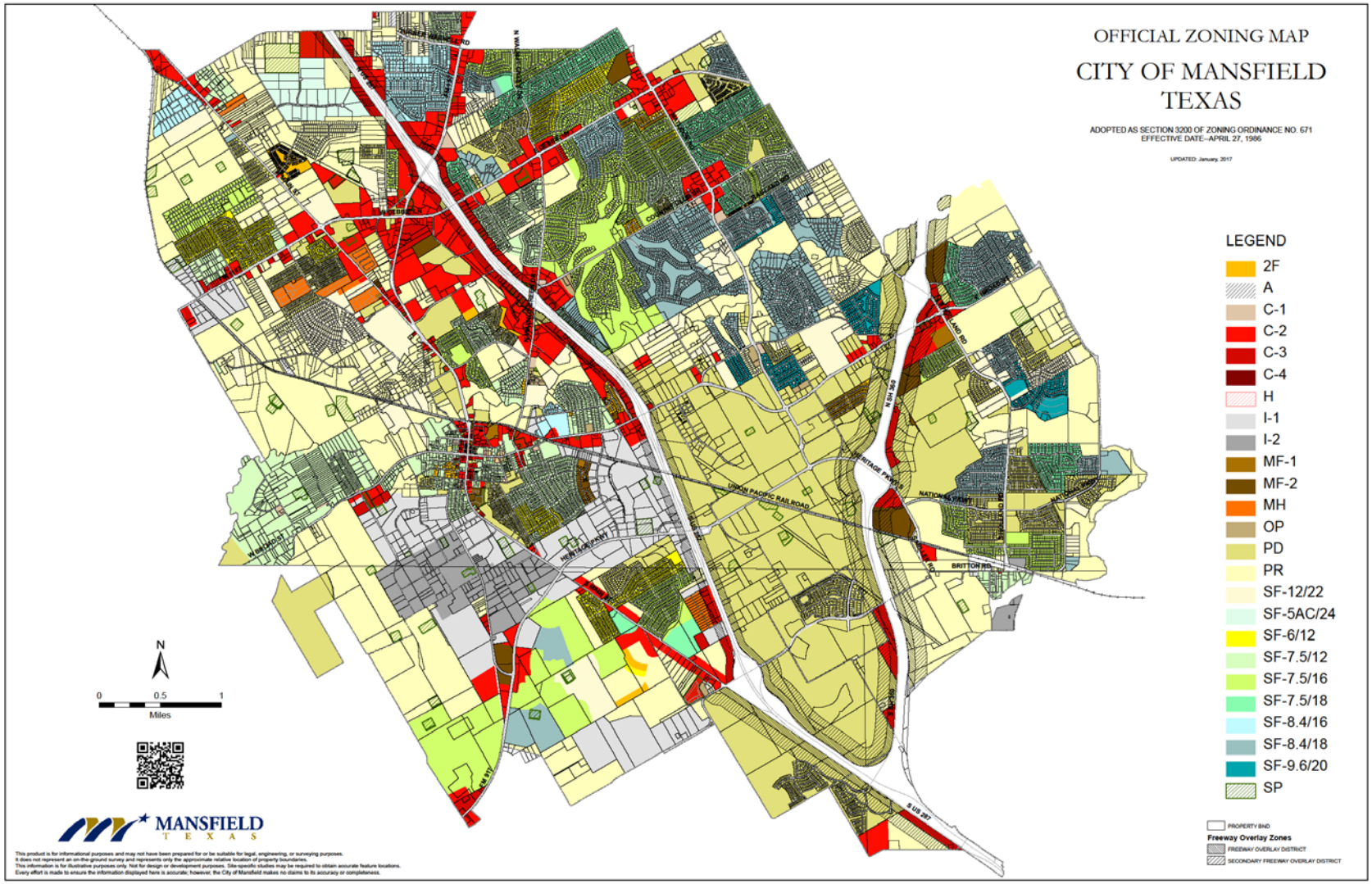
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Mansfield will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

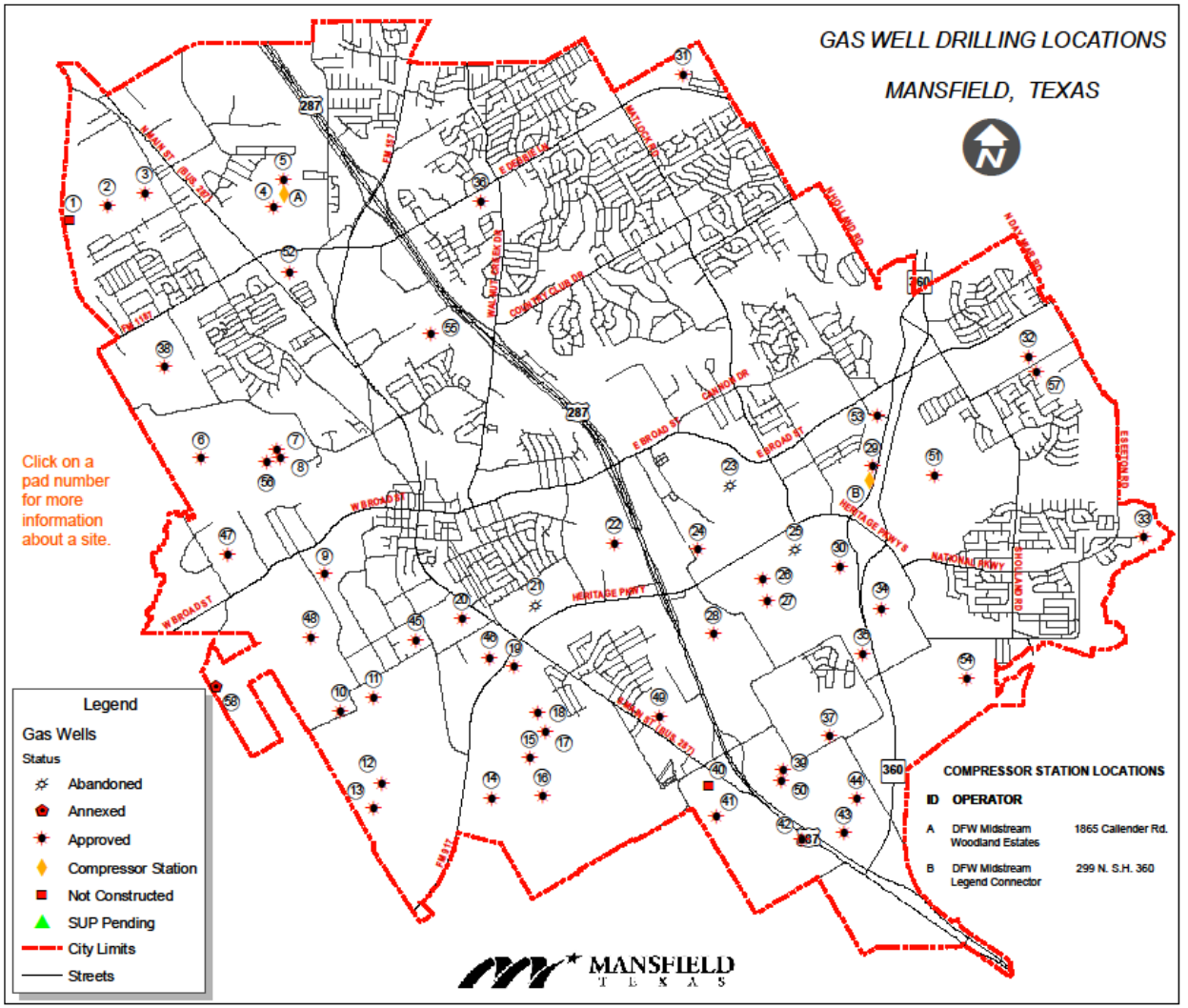
1.4 Supporting Maps

The following maps provide an overview of the City of Mansfield:

- Official Zoning Map
- Gas Well Drilling Locations


OFFICIAL ZONING MAP
CITY OF MANSFIELD
TEXAS
ADOPTED AS SECTION 3200 OF ZONING ORDINANCE NO. 671
EFFECTIVE DATE--APRIL 27, 1986
UPDATED: January, 2017
LEGEND
2F
A
C-1
C-2
C-3
C-4
H
I-1
I-2
MF-1
MF-2
MH
OP
PD
PR
SF-12/22
SF-5AC/24
SF-6/12
SF-7.5/12
SF-7.5/16
SF-7.5/18
SF-8.4/16
SF-8.4/18
SF-9.6/20
SP
PROPERTY BND
Freeway Overlay Zones
FREEWAY OVERLAY DISTRICT
SECONDARY FREEWAY OVERLAY DISTRICT
N
0
0.5
1
Miles
MANSFIELD
TEXAS
UNION PACIFIC RAIL ROAD
BRITTON RD
HEARICAN WAY
N US 287
S US 287

ID	PAD NAME	OPERATOR	PAD ADDRESS
1	Knapp West	XTO Energy	2401 Gertie Barrett Rd. #1 2401
2	Knapp Central	XTO Energy	Gertie Barrett Rd. #2 2401
3	Knapp East	XTO Energy	Gertie Barrett Rd. #3 1865
4	Woodland Estates South Pad	EagleRidge	Callender Rd.
5	Woodland Estates North Pad	EagleRidge	1867 Callender Rd.
6	Flashback	XTO Energy	1671 Newt Patterson Rd.
7	Rochlin Unit	XTO Energy	1671 Newt Patterson Rd. #3
8	Southern Rochlin	Atlas	1671 Newt Patterson Rd. #4
9	Cain Unit	Atlas	205 S. 6th Ave.
10	Brown-Johnson Unit 1H	EnerVest	401 Hanks Dr.
11	Luttrell Unit	EnerVest	300 Easy Dr.
12	Kimbrough Unit	EnerVest	2101 Jessica Dr. #1
13	Set/Back A Unit 2H, Set/Back D 2H	EnerVest	2101 Jessica Dr. #2
14	Set/Back D Unit 1H	EnerVest	2001 FM 917 #6
15	Set/Back B Unit 2H	EnerVest	2001 FM 917 #4
16	Set/Back C Unit 1H	EnerVest	2001 FM 917 #5
17	Casstevens 4H	EnerVest	2001 FM 917 #3
18	Casstevens Unit 1H	EnerVest	2001 FM 917 #2
19	Casstevens 7H	EnerVest	2001 FM 917 #1
20	Kennedy	Atlas	101 Airport Dr.
21	Flowers	XTO Energy	1201 Heritage Pkwy.
22	Premier	Atlas	1739 Commerce Dr.
23	Lockwood North (site abandoned)	Total E&P	2000 E. Broad St.
24	Regency	Total E&P	101 S. Mitchell Rd.
25	Lockwood South (site abandoned)	Total E&P	2401 Heritage Pkwy.
26	MEDC	Total E&P	2301 Heritage Pkwy.
27	Mathis Coal Car	XTO Energy	839 S. Mitchell Rd.
28	Copper Car	XTO Energy	840 S. Mitchell Rd.
29	Mansfield Partners North Pad	EagleRidge	301 N. SH 360
30	Mansfield Partners South Pad	EagleRidge	151 S. SH 360
31	Erving Unit	Saddle Operating	1751 E. Debbie Ln.
32	Keep A Steppin	Total E&P	4444 E. Broad St.
33	Lester Levy	Atlas	5300 Shelter Point Ct.
34	Westerfeld Mathis	Total E&P	698 Heritage Parkway S.
35	Walking T Unit 3H-5H	EnerVest	3000 Mathis Rd.
36	Debbie Lane Unit 1V	Edge Resources	300 E. Debbie Ln.
37	Walking T Ranch 11H	EnerVest	3001 Harmon Rd.
38	Rockerfeller Unit	XTO Energy	1201 N. Hyview Rd.
39	Walking T Ranch 16H-23H	EnerVest	1700 Johnson St.
40	Eagle Ford B Unit 1H	EnerVest	1800 S. Main St. (Bus Hwy 287)
41	Eagle Ford B Unit 2H	EnerVest	2201 Chambers St.
42	Eagle Ford C Unit 2H-5H, 11H	EnerVest	2901 Ellis St.
43	Eagle Ford A Unit 4H-5H	EnerVest	2100 Matlock Rd. #2
44	Eagle Ford A Unit 6H-8H	EnerVest	2100 Matlock Rd Dr. #1
45	Trinity Forge	Total E&P	950 S. 2nd Ave.
46	Shioleno	Total E&P	1101 FM 917
47	Washington	Total E&P	373 Retta Rd.
48	Brown-Johnson Unit 2H	EnerVest	401 Hanks Dr. #2
49	Freight Train	XTO Energy	1299 S. Main St. (Bus Hwy 287)
50	Eagle Ford A 1H	EnerVest	1700 Johnson St. #2
51	Mansfield Sports Complex 1H-5H	XTO Energy	450 N SH 360
52	Dalton	XTO Energy	1640 N. Main St. (Bus Hwy
53	360/Broad Site	Total E&P	287) 3200 Conifer St.
54	Britton Unit	EagleRidge	1600 S. SH 360
55	Overstreet Unit	GHA Barnett	500 Mouser Way
56	Rawdon Unit	FDL Energy	1671 Newt Patterson Rd. #2
57	SE Mansfield Unit	GHA Barnett	4500 Grand Meadow Blvd.
58	Buford Tindle #2H Unit	FDL Energy	1301 Lillian Rd.



This information is for illustrative purposes only. Not for design or development purposes. Site-specific studies may be required to obtain accurate feature locations. Every effort is made to ensure the information displayed here is accurate; however, the City of Mansfield makes no claims to its accuracy or completeness.

Updated: January 11, 2016

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Mansfield has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Mansfield's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Mansfield. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Mansfield Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Mansfield	Office of Emergency Management	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Mansfield	Public Works Department	Director	Hazard identification and plan development
City of Mansfield	Water Utilities Department	Director	Hazard identification and plan development
City of Mansfield	Fire Department	Assistant Fire Chief	Hazard identification and plan development
City of Mansfield	Street Department	Assistant Director of Public Works	Hazard identification and plan development
City of Mansfield	Environmental Services Department	Environmental Manager	Hazard identification and plan development
City of Mansfield	Planning Department	Acting Director of Planning	Hazard identification and plan development
City of Mansfield	Geographic Information Systems (GIS) Department	GIS Manager	Hazard identification and plan development
City of Mansfield	Engineering Department	City Engineer	Hazard identification and plan development
City of Mansfield	Parks and Recreation Department	Parks Director	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

This chapter provides a factual basis for the action items described in Chapter Five. The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.
The City of Mansfield had an individual hazard mitigation plan from 2010, thus they has marked changes in development and historical events since that year.

3.1 Changes in Development since 2010

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: The city is in an expansion phase with new subdivisions and businesses being built in the wildland-urban interface (WUI), increasing the number of people at risk to hazards and possibly changing areas that flood.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: Portions of Walnut Creek have been reinforced with gabion walls and new concrete aprons have been poured around utilities crossing the creek channel. The city is currently using the 2006 building and fire codes. A full list of completed mitigation action items are described in Chapter 5 of this annex.

Declared Disaster Code	Incident Period	Date Declared	Description	Impact
DR-4223	May 4-June 23, 2015	May 29, 2015	Severe storms, tornadoes, straight-line winds, and flooding.	The City of Mansfield suffered from several flooding events during this time which caused damage to parks and utilities. The city received a Public Assistance Grant to offset some of the cost.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Mansfield.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	68,928
Persons under 5 years (%)	6.8
Persons 65 years and over (%)	9.1
Language other than English spoken at home (%)	15.5
With a disability, under age 65 (%)	5.9
Persons without health insurance, under age 65 (%)	10
Persons in poverty (%)	5.7
Median household income	$90,216
Households, 2012-2016	21,069
Median value of owner-occupied housing units, 2012-2016	$204,800

The critical and vulnerable facilities listed below are potentially exposed to all the hazards identified in the City of Mansfield.

City of Mansfield Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
City Hall 1200 East Broad Street	Government Facility
Public Safety Building 1305 East Broad Street	Emergency Services
Fire Station 1 202 South Main Street	Emergency Services
Fire Station 2 1711 Country Club Drive	Emergency Services
Fire Station 3 3100 East Broad Street	Emergency Services
Fire Station 4 1954 North Main Street	Emergency Services
Mansfield Law Enforcement Center 1601 Heritage Parkway	Government Facility
Mansfield Activity Center 106 South Wisteria	Community Facility
Chris W. Burkett Service Center 620 South Wisteria Street	Government Facility
Downtown Mansfield Main Street	Historic District

City of Mansfield Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Mansfield Historic Museum and Heritage Center 102 North Main Street	Historic Property
StarCenter 1715 East Broad Street	Entertainment
Walnut Creek Country Club 1151 Country Club Drive	Entertainment
Mansfield National Golf Club 3750 National Parkway	Entertainment
Vernon Newsome Stadium 3700 East Broad Street	Entertainment
The Lot Amphitheatre 110 South Main Street	Entertainment
Hawaiian Falls Water Park 490 Heritage Parkway South	Entertainment
Mansfield Methodist Medical Center 2700 East Broad Street	Hospital
Kindred Hospital 1802 Highway 157 North	Hospital
MISD Transportation Fuel Depot 1910 North Main Street	Fuel Depot

*The capacity, square footage, and structure value of these assets are unavailable.

Klein Tools, Mouser Electronics, Methodist Mansfield Medical Center, and Hoffman Cabinets are some of the major employers within the city. A list of schools in the Mansfield Independent School District and other critical or vulnerable facilities in the city can be obtained by contacting the Mansfield Emergency Management Coordinator.

3.3 Natural Hazard Profiles

The City of Mansfield's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Mansfield in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Thunderstorm (includes hail, wind, lightning)
2	Flooding
3	Expansive Soils
4	Tornado
5	Winter Storms
6	Drought
7	Extreme Heat
8	Wildfire
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent of each hazard.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Mansfield.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	There is no historical data for drought damage in the city. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Affected areas include all city recreational parks including the Oliver Nature Park, Hawaiian Falls, and two 18-hole golf courses.

Jurisdiction's ground-water supply: Mansfield utilizes surface water treatment and does not rely on any ground-water for potable water supply to its residents or wholesale customers. The Tarrant Regional Water District (TRWD) contractually supplies raw water to Mansfield as part of the TRWD system.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: The City of Mansfield has adopted year-round, outdoor watering restrictions between the hours of 10AM and 6PM. This measure is consistent with the majority of cities in North Texas and is considered a long term water conservation strategy. During times of drought conditions, the following restrictions are implemented as adopted by the City of Mansfield Drought Contingency Plan and are consistent with the Tarrant Regional Water District Water Conservation and Drought Contingency Plan.

Details of outdoor watering restrictions by drought stage:

- At 75% capacity (Stage 1, Water Watch) landscape watering reduced to twice per week.
- At 60% capacity (Stage 2, Water Warning) landscape watering reduced to once per week.
- At 45% capacity (Stage 3, Emergency Water Use) landscape watering banned.

3.3.2 Earthquake

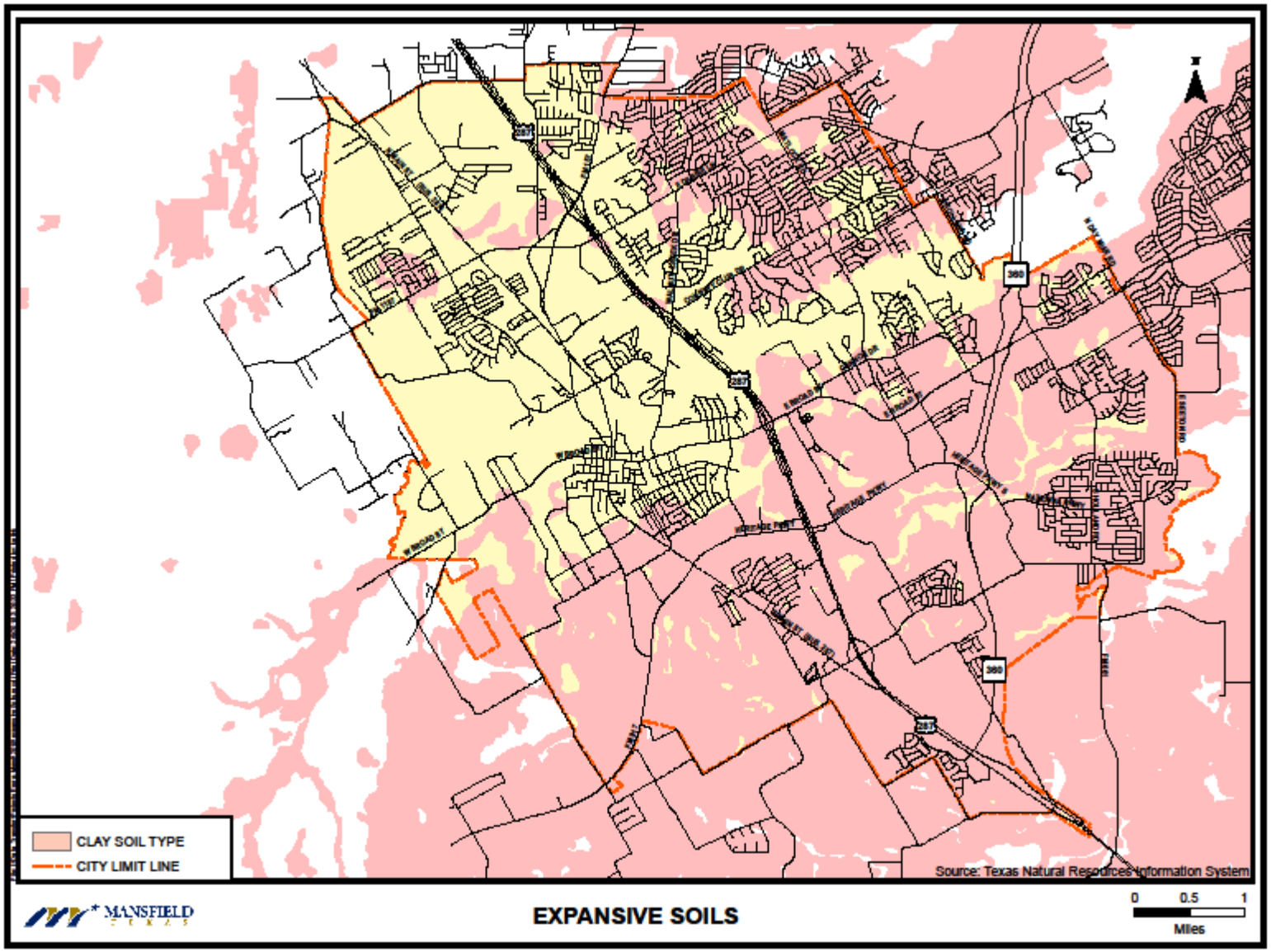
Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Significant
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data. Building codes have not required construction techniques to mitigate against this hazard and it can be assumed that a sizable earthquake could cause a great deal of damage.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: A 2.7 magnitude earthquake, at a depth of 9.3 km, occurred February 4, 2016. The epicenter was located approximately 4.5 miles southwest of downtown Mansfield, outside the city limits in Johnson County. A 2.4 magnitude earthquake occurred less than 5 miles southeast of Mansfield June 15, 2015. No damage was reported for either event.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Expansive soils are a major consideration to all existing and future structures. The city has incurred substantial cost in rebuilding and repairing roadways and underground utilities due to expansive soils over the years. There have been 76 main breaks costing $179,000 and roadway repairs costing approximately $1 million a year.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Approximately 90% of street repairs are due to expansive soils. Mansfield's soil structure consists of approximately 54% clay soils, which are located mainly in the southern and eastern parts of the city- see the included map. Each year, approximately $1 million of the Street Department's $2 million budget is spent repairing roadways.


CLAY SOIL TYPE
CITY LIMIT LINE
Source: Texas Natural Resources Information System
MANSFIELD
TEXAS
EXPANSIVE SOILS
0 0.5 1
Miles

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The most vulnerable populations within the community would be those participating in outdoor activities and the elderly.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? Each year there are cases of people at the Pickle Parade and fireworks show who need medical attention or hydration for heat related issues.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Damage to pump stations Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	92 structures are currently located within the floodplain. Three properties are commercial- one church and two apartments. Although these properties are elevated, the maps indicate the structures are affected by the floodplain. The floodplain includes 1 lift station at 1600 Moody Lane. Of the total assessed value improvement in the city, 21.62% is at risk from a 100-year flood event. Flooding causes soil erosion along the banks of Walnut Creek and Hogpen Branch and over time causes directional changes in the flow of water in the creek channel and surrounding areas. $1 million in repairs was done to the aerial sewer lines crossing Walnut Creek to fix damage done by streambank erosion caused by flooding.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: Flooding events have caused damage to the railroad tracks halting all railway traffic. Additionally, these flooding events have caused damage to the city's sewer collection infrastructure. Several sewer lines were damaged on Walnut Creek, and one sewer main break occurred on a tributary to Walnut Creek to the east of North Street causing sewage to flow into the creek. Nichols Branch has the potential to flood the street crossing at Newt Patterson Road. An emergency repair to a damaged sewer line that occurred during the November 2015 flooding cost $187,104.64. Damage that occurred during the flows of 2015 to four aerial sewer crossings on Walnut Creek were repaired for a total cost of $1,038,098. $178,734.49 in additional funds were used to design the project.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? A remodel permit is required, under which foundation repairs can be done but the city does not track foundation repairs specifically.

Intersections or traffic routes impacted by flooding: Walnut Creek has the potential to flood the following street crossings from west to east: Retta Road, Wilson Drive, North Street, South Parkridge Drive, North Walnut Creek Drive, Palm Street, Palm Court, Carlin Road, and a section of North Holland Road.

Hogpen Branch has the potential to flood the following street crossings from upstream to downstream: Country Meadow Drive, the intersection of the United States Route (US) 287 Frontage Road and Callender Road, Farm to Market (FM) 157, North Walnut Creek Drive, and Country Club Drive.

Low Branch has the potential to flood the following street crossings from upstream to downstream: FM 917, South Main Street/Business 287, and South Mitchell Road.

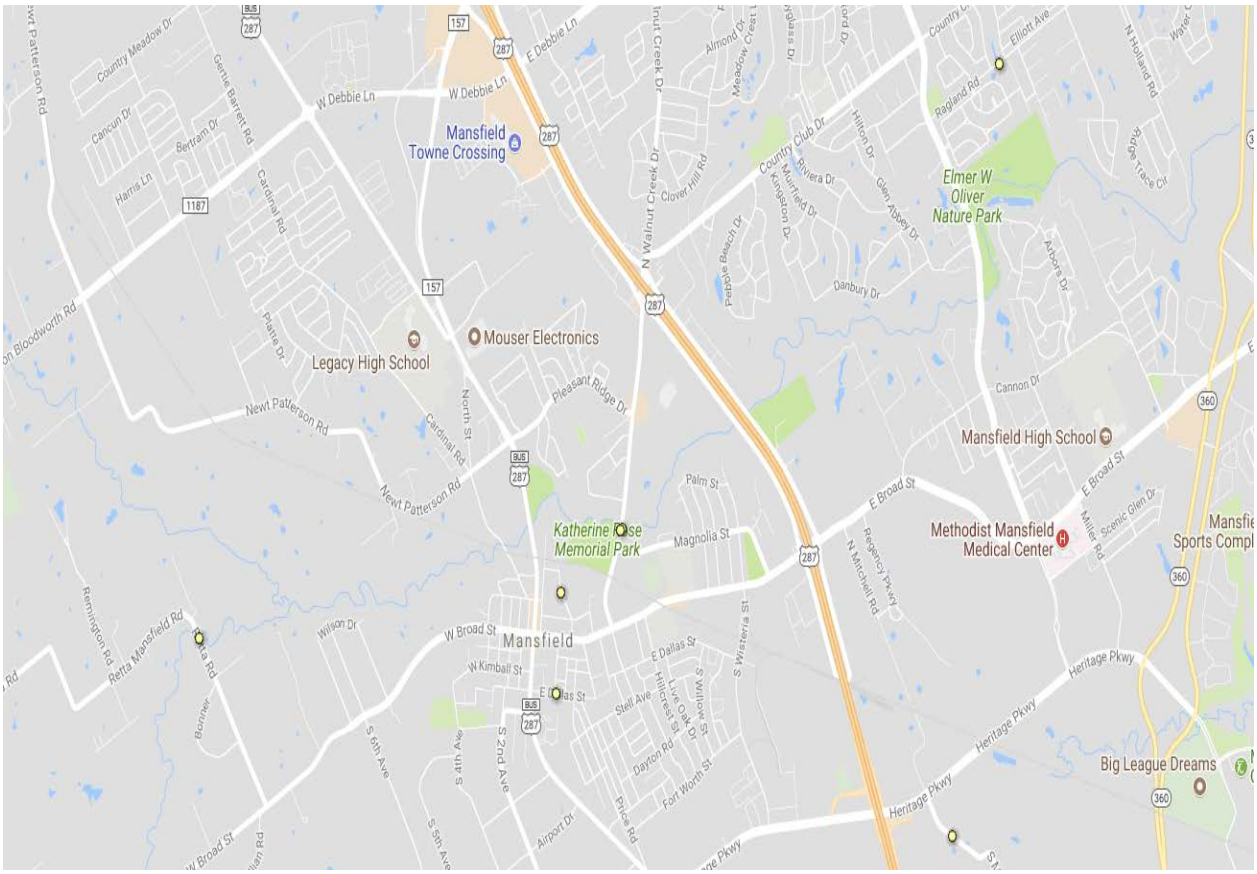
Pond Branch has the potential to flood the following street crossings from upstream to downstream: South Main Street/Bus 287, East Dallas Street, East Broad Street, Elm Street, and Sycamore Street.

Reece Branch has the potential to flood the street crossing at FM 917.

Watson Branch has the potential to flood the following street crossings from upstream to downstream: Russel Lane and FM 157. See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Walnut Creek, Hogpen Branch, Low Branch, Nichols Branch, Reece Branch, and Watson Branch.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Walnut Creek Drive, Southbound (1.0 mile south of US 287)	Walnut Creek	Bridge Class
Walnut Creek Drive, Northbound (1.0 mile south of US 287)	Walnut Creek	Bridge Class
Mitchell Road	Low Branch	Vented Ford
Sycamore Street	Pond Branch	Vented Ford
Dallas Street And Pond Street	Pond Branch	Vented Ford
Ragland Road	Ragland Branch	Vented Ford
Retta Road	Walnut Creek	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

According to the City of Mansfield Geographic Information Systems (GIS) Department, the only critical facility located in the 100-year floodplain is one school.

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Commercial	4,230.49	563.41	13.32%
Industrial	529.01	8.78	1.66%
Residential	8,610.62	571.86	6.64%
Total	**13,370.12**	**1,144.05**	**21.62%**

Source: City of Mansfield Geographic Information Systems (GIS) Department.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Mansfield is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480606#
Community Name	City of Mansfield
Counties	Johnson/ Ellis/ Tarrant
Initial FHBM Identified	2/22/74
Initial FIRM Identified	12/18/85
Current Effective Map Date	6/3/13
Reg-Emer Date	12/18/85
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Director of Public Works.

What specific flooding ordinances and plans does your jurisdiction have? Flood Damage Prevention Ordnance.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? 3 feet above Federal Emergency Management Agency (FEMA) study base flood elevation (BFE) and 2 feet above BFE for ultimate condition study.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? All permitted activities in a special flood hazard area are required to submit a Floodplain Development Permit as part of permitting process.

Repetitive and Severe Repetitive Loss Properties: Known repetitive loss properties and severe repetitive loss properties within the City of Mansfield are listed below. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Repetitive Loss Properties		
Type (residential, commercial, institutional, etc.)	**Location (N,E,S,W in jurisdiction)**	**Claim Amount ($)**
Residential	West	$7,426.12
Residential	Central	$21,901.08
Residential	Central	$84,595.83
Residential	Central	$30,841.13
Residential	Central	$128,430.41
Residential	Central	$4,081.15
Total		**$277,275.72**

Source: Federal Emergency Management Agency (FEMA) Flood Claims Database, as of February 17, 2016.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
775	3.67%	182	12.18%

Source: City of Mansfield Geographic Information Systems (GIS) Department.

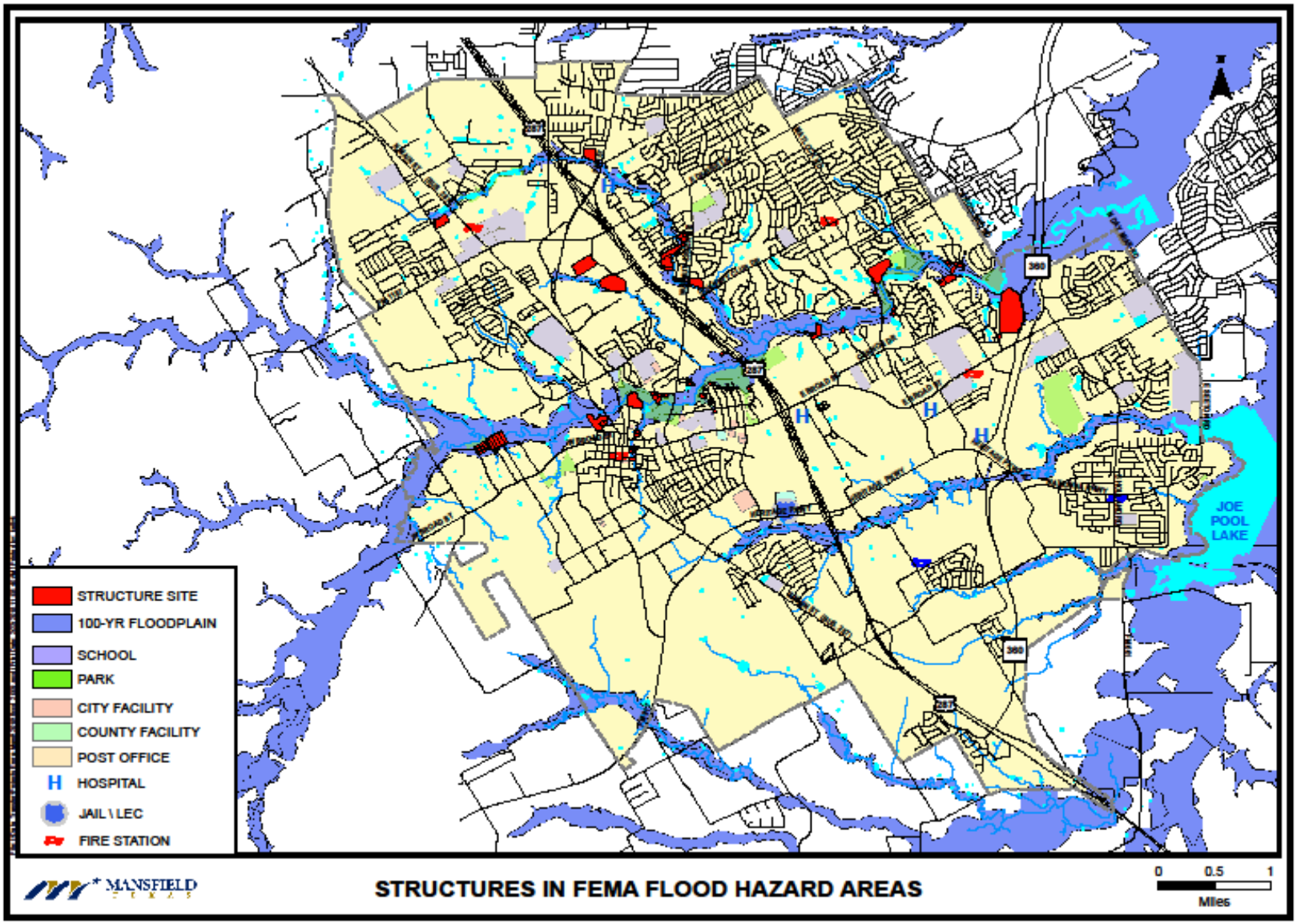
The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Mansfield's ability.

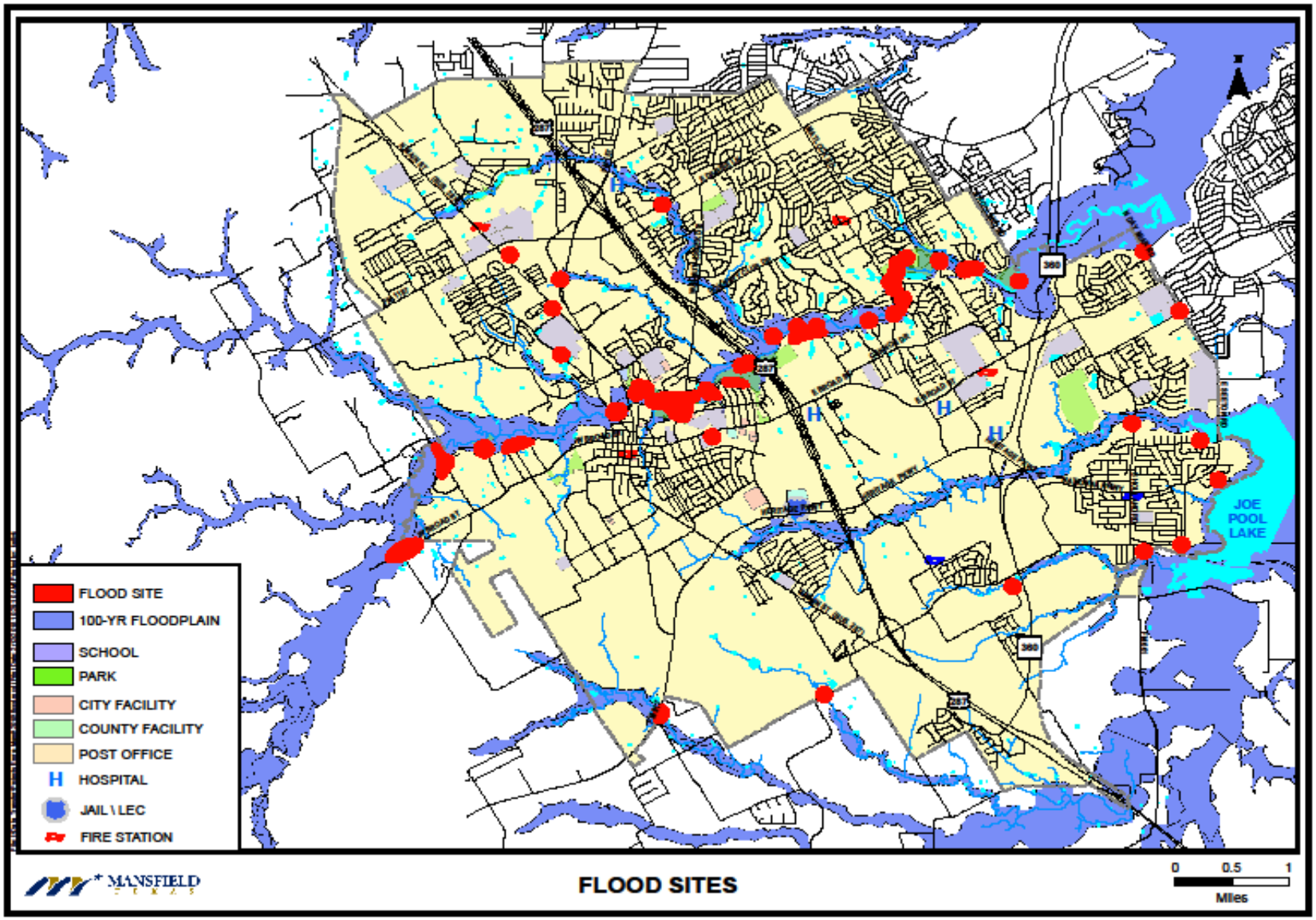
Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist Flood Claims Database Dated 2/17/16	Policies in-force: 216 Insurance in-force: $63,277,300 Written premium in-force: $109,461
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist Flood Claims Database dated 2/17/16; Property Purchase records	Since 1978: 123 claims have been filed, but 22 have closed without payment. $3,792,120.40 has been paid.

NFIP Topic	Source of Information	Comments
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	92.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	Areas within the city limits exist where limited overflow capacity or underground system size result in water flowing over the curb and into structures.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes, 2 staff members have Certified Floodplain Manager (CFM) certifications.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	All permitted activities that occur within a special flood hazard area are required to submit a Floodplain Development Permit for review. All new development adjacent to drainage ways are required to elevate structures 2 feet above ultimate drainage study Base Flood Elevations (BFEs) or 3 feet above current effective BFEs. FEMA elevation certificates are required to be submitted for new construction where a minimum finished floor elevation is specified in proximity to a SFHA. All street crossings with a potential to overtop have high water signs. Some streets are able to be closed with gates when flooded. The city has a specialist on staff who is able to evaluate submitted studies.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Staff time, development resistance, public understanding of full flood risk
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.

When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	Community Official	9/15/16
Is a CAV or CAC scheduled or needed?	Community Official	No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	12/18/85
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	All permitted construction activities are handled through our permitting department under Development Services. The permit intake personnel receive the paperwork and distribute to the other departments for their review. A component of the Engineering Department review is to check for proximity to SFHA or other drainage concerns. All new construction is required to meet the elevation requirements in the Flood Damage Prevention Ordinance.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The following maps illustrate structures in the City of Mansfield that are in FEMA flood hazard areas and flood sites within the city.


STRUCTURE SITE
100-YR FLOODPLAIN
SCHOOL
PARK
CITY FACILITY
COUNTY FACILITY
POST OFFICE
HOSPITAL
JAIL \ LEC
FIRE STATION
JOE POOL LAKE
MANSFIELD
TEXAS
STRUCTURES IN FEMA FLOOD HAZARD AREAS
0 0.5 1
Miles


FLOOD SITE
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COUNTY FACILITY
POST OFFICE
HOSPITAL
JAIL \ LEC
FIRE STATION
JOE POOL LAKE
MANSFIELD
TEXAS
FLOOD SITES
0 0.5 1
Miles

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Due to the dynamic nature of thunderstorms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Many rooftops in Mansfield have been damaged due to high winds and hail, trees blowing down into houses, and power lines. Since 2010, high wind and hail has caused the most significant damages to homeowners, with winds measuring from 50-74 knots and hail measuring .88-1.25" in diameter.

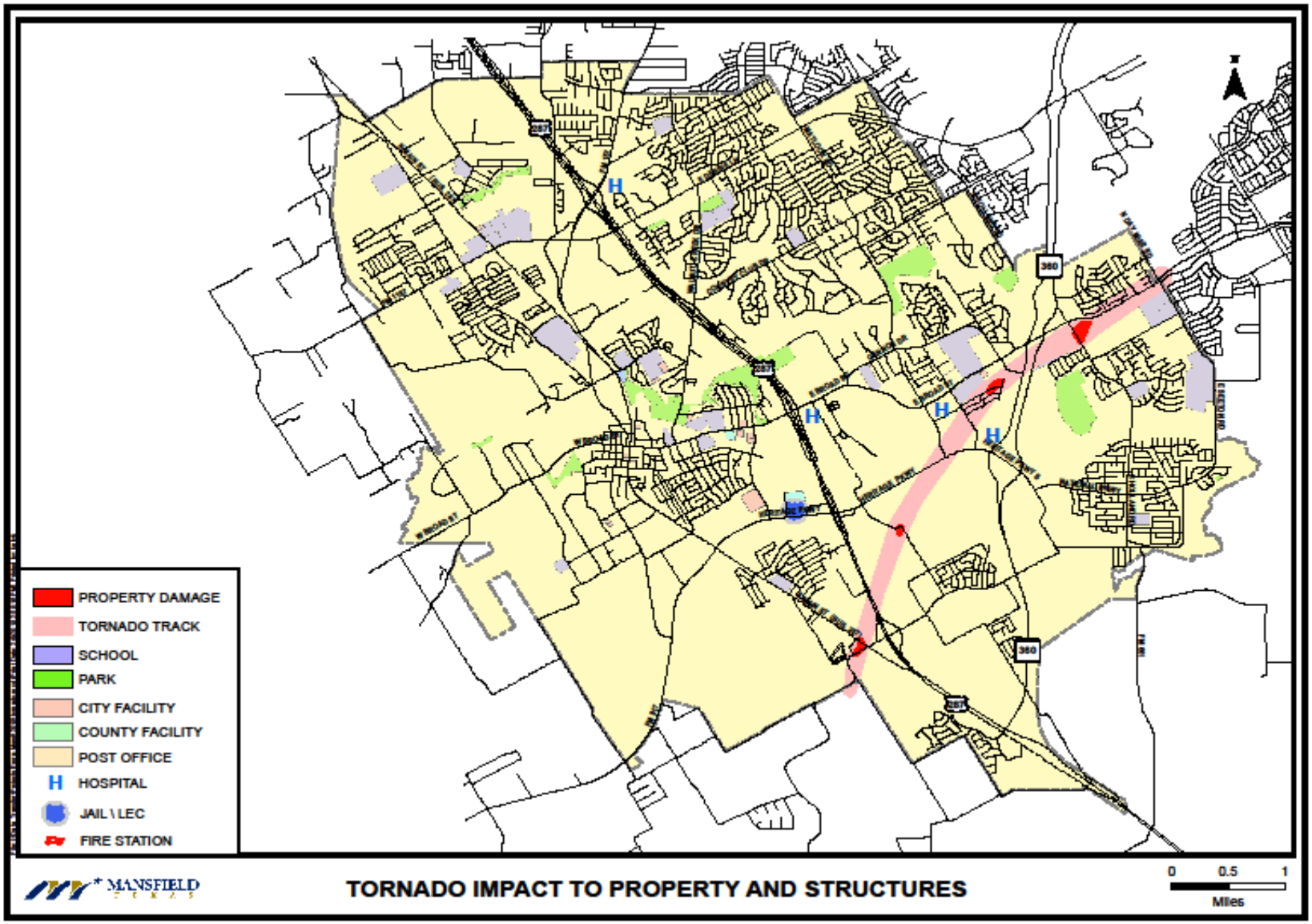
Number of homes lost due to lightning-induced fires: This information is not tracked.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Due to the dynamic nature of tornadoes, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: Mansfield experienced an EF0 tornado in January of 2015 which caused approximately $75,000 in damages. This tornado and all previous tornadoes have started in the southwest part of the city and travelled to the northwest.

Is there an area of the town that is the most vulnerable to tornadoes? The most vulnerable areas of town would include a diagonal path from the southwest to northeast part of the city and would include the industrial sector in southwest Mansfield, a water treatment plant, public safety building, public works service center, and dispatch and the law enforcement center, which are all located in close proximity to each other. Mansfield Methodist Hospital is also in the possible path and was almost struck by the January 2015 tornado. The following map shows the path of the 2015 tornado and the damaged locations.


PROPERTY DAMAGE
TORNADO TRACK
SCHOOL
PARK
CITY FACILITY
COUNTY FACILITY
POST OFFICE
HOSPITAL
JAIL \ LEC
FIRE STATION
MANSFIELD
TORNADO IMPACT TO PROPERTY AND STRUCTURES
0 0.5 1
Miles

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Most vulnerable location (North, East, South, West) of your jurisdiction? The most vulnerable locations for wildfires are the unoccupied portions of land bordering Mansfield's west, east and southern boundaries. These are the areas where new home construction is occurring and creating a wildland-urban interface (WUI). There has been $144,825 of damage based off of fire department reporting estimates from previous years.

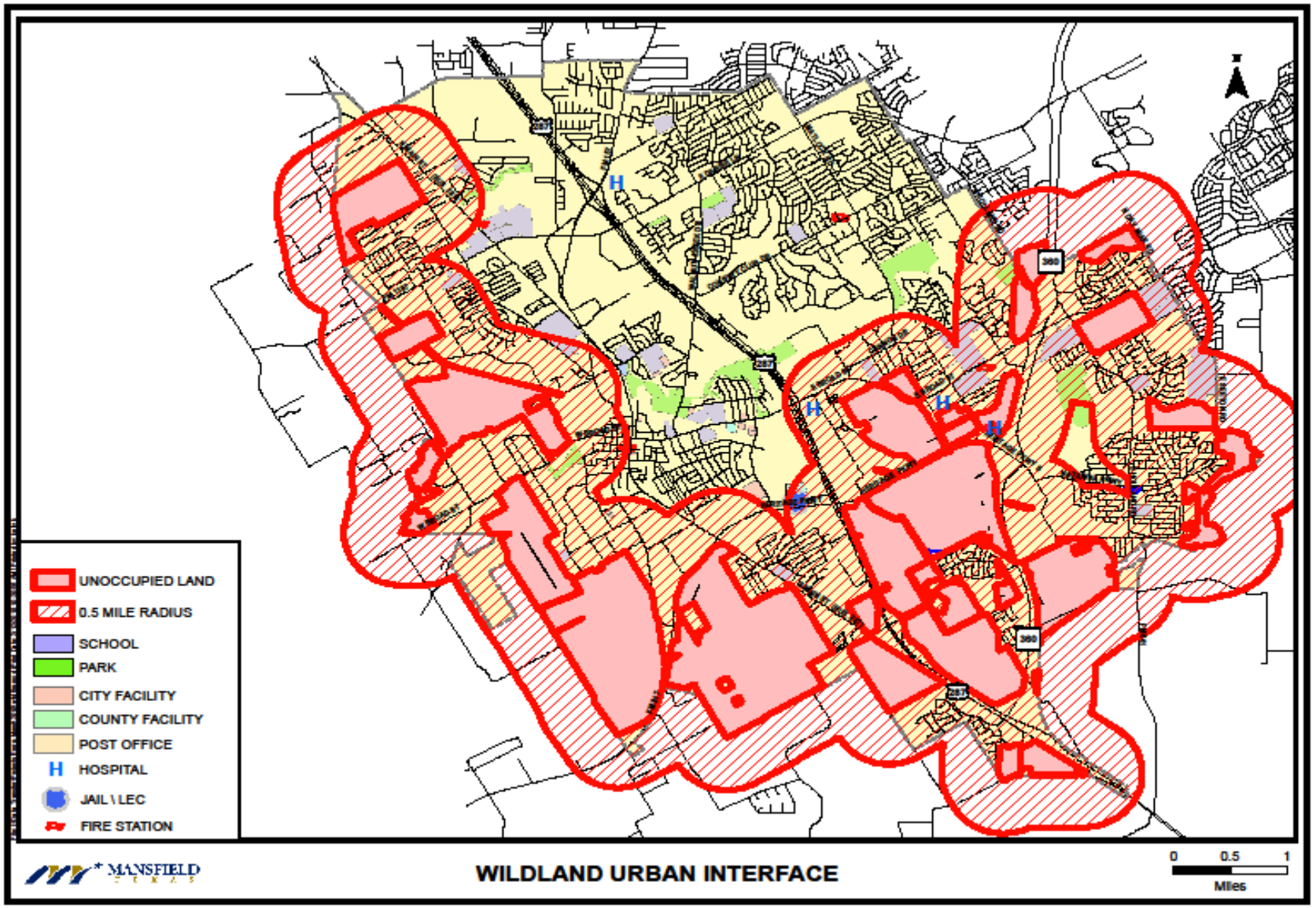
Assessed Value of Improvements	
In the WUI	**Percentage in the WUI**
$2,326,207,373	42.03%

Source: Mansfield Fire Department.

Residential		Commercial		Industrial	
Residential Parcels Within WUI	Percentage (%) Within WUI	Commercial Parcels Within WUI	Percentage (%) Within WUI	Industrial Parcels Within WUI	Percentage (%)Within WUI
9,088	43.26%	508	37.49%	94	78.99%

Source: Mansfield Fire Department.

The following map reflects the WUI within the city.

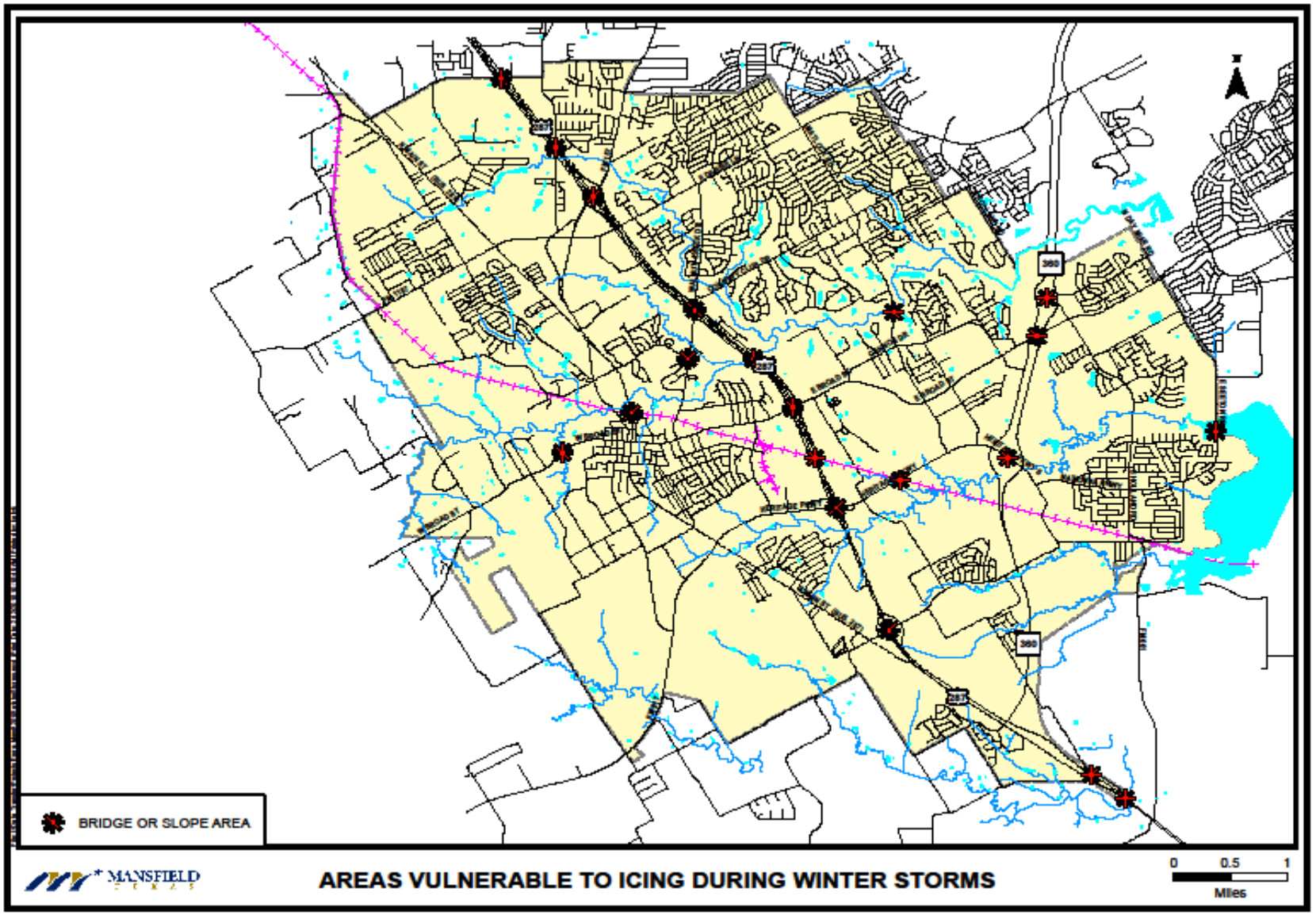

UNOCCUPIED LAND
0.5 MILE RADIUS
SCHOOL
PARK
CITY FACILITY
COUNTY FACILITY
POST OFFICE
H HOSPITAL
JAIL \ LEC
FIRE STATION
MANSFIELD
TEXAS
WILDLAND URBAN INTERFACE
0 0.5 1
Miles

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: There are many bridges and overpasses within the city, including but not limited to those connected to the Highway 360 Tollway project. See map of areas in Mansfield that are vulnerable to icing during winter storms.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Major traffic issues and accidents have and will occur due to iced over bridges and limited visibility.


BRIDGE OR SLOPE AREA
MANSFIELD
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AREAS VULNERABLE TO ICING DURING WINTER STORMS
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Miles

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Mansfield between 2010 and 2017. The material is organized by location and date.

Historical Events (Since 2010) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Mansfield	4/4/2011	Hail	0.75	0	0	$0	$0	
Mansfield	4/11/2011	Thunderstorm Wind	53	0	0	$0	$0	MG
Mansfield	10/17/2011	Hail	1	0	0	$0	$0	
Mansfield	3/23/2013	Hail	1.25	0	0	$2,000	$0	
Mansfield	3/30/2013	Hail	0.88	0	0	$0	$0	
Mansfield	5/29/2013	Thunderstorm Wind	52	0	0	$20,000	$0	EG
Mansfield	5/12/2014	Hail	1.25	0	0	$0	$0	
Mansfield	5/12/2014	Hail	2	0	0	$20,000	$0	
Mansfield	10/2/2014	Thunderstorm Wind	50	0	0	$1,000	$0	EG
Mansfield	5/24/2015	Flash Flood		0	0	$500	$0	
Mansfield	5/26/2015	Thunderstorm Wind	52	0	0	$0	$0	EG
Mansfield	12/27/2015	Hail	0.88	0	0	$0	$0	
Mansfield	12/27/2015	Hail	1	0	0	$0	$0	
Mansfield	1/15/2017	Hail	1	0	0	$0	$0	
Mansfield	1/15/2017	Tornado	EF0	0	0	$75,000	$0	
Mansfield	1/15/2017	Hail	1	0	0	$1,000	$0	
Mansfield	1/15/2017	Thunderstorm Wind	52	0	0	$2,000	$0	EG
Mansfield	3/29/2017	Thunderstorm Wind	74	0	0	$0	$0	EG
Mansfield	3/29/2017	Thunderstorm Wind	60	0	0	$5,000	$0	EG
Total				**0**	**0**	**$126,500**	**$0**	

*MG- Measured Wind Gusts

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Mansfield identified their greatest vulnerabilities and concerns:

- The city has had multiple bouts of severe weather with high winds, lightning, and hail. These weather events have caused substantial damage to the properties of citizens living in the community.
- The city has had multiple flooding events, causing roads to be shut down, people to be stranded and in need of rescue, and damage to city parks and utilities. The city was part of the presidential disaster declaration DR-4223 in 2015.
- The City of Mansfield has had one EF0 tornado which occurred in January of 2017.
- The City of Mansfield has rebuilt numerous roads and repaired many of the underground utilities due to expansive soils.
- Mansfield has many assisted living and nursing home facilities with more being built. The elderly population is growing, increasing vulnerability.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Mansfield's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Land Use, Water and Sewer, Thoroughfare, Parks Master Plans. Yes; Yes; Yes
Capital Improvement Plan	Yes	Water, sewer, roadway, drainage, parks. Yes; Yes; Yes
Economic Development Plan	Yes	No; No; Yes in industrial areas
Local Emergency Operations Plan	Yes	Yes; No; Yes
Continuity of Operations Plan	No	
Transportation Plan	Yes	No; Yes; Yes
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	Yes	Disaster Debris Management Plan. Yes; Yes; Yes
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Yes; Yes

Acquisition of land for open space and public recreation uses	Yes	Yes; Yes
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year:** 2006 International Codes, working on 2018 code amendments
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 2**
Site Plan Review Requirements	Yes	Planning and Zoning Commission, Fire Prevention, Building Inspection
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Land use, zoning, platting, subdivision regulation authority; Yes
Mitigation Planning Committee	Yes	Planning and hazard analysis; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Vegetation control and drainage way debris removal; Yes
Mutual Aid Agreements	Yes	Building Official Association of Texas, Fire Department and Police Response Agreements; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:	No	
***Full-time (FT) or part-time (PT) position**		

Technical	Have capability?	Describe capability. Has capability been used to assess or mitigate risk in the past?
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Yes, Code Red has been used to warn people of flooding for evacuations and severe weather.
Hazard data and information	Yes	Geographic information system (GIS) layers, mapping, Computer-Aided Management of Emergency Operations (CAMEO) Tier II, floodplain data, historical disaster data tracking; Yes
Grant writing	Yes	One full time person with the police department to write grants; No
HaZUS analysis	No	
Other	No	
Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Citizen Fire Academy, Citizen Police Academy, and Citizens Emergency Response Team (CERT) for assisting during disasters and emergencies with search and rescue, emergency medical services, demolition, debris removal. Common Ground – a network of churches within our city with disaster response teams. Muck out crews, damage assessment, chain saw teams, and sheltering. Keep Mansfield Beautiful. Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Water Department ongoing public education for water usage, flood damage, and storm water. Fire safety events, Code Red public education, and hazardous waste disposal. Yes
Natural disaster or safety related school programs	No	
Storm Ready certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	Wesley Mission Center- assist disaster victims with clothing, federal funding, school enrollment, and new identification cards. Yes
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Full funding for roadways, water, sewer and drainage infrastructure; Yes
Authority to levy taxes for specific purposes	Yes	Economic development, park development, Tax Increment Reinvestment Zones (TIRZ) Districts for public infrastructure, land acquisition; Yes
Fees for water, sewer, gas, and/or electric services	Yes	Water, sewer; Yes
Impact fees for new development	Yes	Roadway, water, and sewer; Yes
Stormwater utility fee	Yes	Drainage department operations and management, infrastructure, mitigation property purchase; Yes
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Roadway and drainage; Yes
Incur debt through private activities	No	
Community Development Block Grant	Yes	Roadway, drainage, water, and sewer infrastructure; Yes
Other federal funding programs	Yes	Severe Repetitive Loss, Transportation Alternatives Program; Yes
State funding programs	No	
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized.

Staffing is needed: Assistant Emergency Manager, Planning Specialist, Hazardous Materials and Tier II Reporting Specialist, and Training and Exercise Development Specialist. The city can increase training to include a broader spectrum of hazards. The city needs to add new unmanned aerial systems and software for damage assessment and hazard identification/response. Improve existing or add a new Emergency Operations Center. Add creek monitoring/flooding sensors. Develop disaster safety program for assisted living facilities, nursing homes, and schools. As the ordinances are updated, the city could make modifications to target a wider range of specific hazards.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2010 Action Items

City of Mansfield had a stand-alone plan and was not a participant in the 2015 Tarrant County HazMAP. The City of Mansfield's action items in the previous City of Mansfield HazMAP were determined by the 2010 Local Planning Team (LPT). Below are the action items from the 2010 plan and the status of each action.

Note that due to different requirement in 2010, action items were not required to include objectives, projected timelines, responsible departments or agency, estimated cost and benefit, or funding sources.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Action/Project Description
Thunderstorm	Building code improvements, increase standards for roof and building construction as well as wind/hail resistant windows.
	STATUS: Deferred to 2020 HazMAP
Thunderstorm	Public education, weather awareness program.
	STATUS: Deferred to 2020 HazMAP
Thunderstorm	Hurricane clips, higher glass standards for new construction.
	STATUS: Deleted- no longer a priority
Thunderstorm	Backup power for City of Mansfield critical facilities.
	STATUS: Completed
Thunderstorm	Expand weather radio program to install radios in all city-owned facilities, Mansfield Independent School District facilities, and residences of key city employees.
	STATUS: Deferred to 2020 HazMAP
Thunderstorm	Develop city-wide weather monitoring and video camera system for the Emergency Operations Center (EOC).
	STATUS: Deferred to 2020 HazMAP
Flooding	Design and construct improvement projects utilizing funds from federal and state capital improvement programs, city stormwater utility fee, and other sources.
	STATUS: In progress
Flooding	Acquisition or elevation of repetitive loss and flood prone properties.
	STATUS: In progress
Flooding	"Higher standard" flood damage prevention ordinances and standards.
	STATUS: Completed
Flooding	Provide training for community floodplain managers and emergency managers.
	STATUS: Completed
Flooding	Participation in the Federal Emergency Management Agency’s (FEMA's) Community Rating System (CRS) Program.
	STATUS: Deleted- no longer a priority
Tornado	Construction of tornado safe rooms in public buildings, schools, and residential structures.

	STATUS: Deferred to 2020 HazMAP
Tornado	Building code improvements.
	STATUS: Deferred to 2020 HazMAP
Extreme Heat	Building code improvements.
	STATUS: Deferred to 2020 HazMAP
Extreme Heat	Reduce impacts on elderly, low-income, disabled persons, and infants through a public education outreach program.
	STATUS: Deferred to 2020 HazMAP
Drought	Institute City of Mansfield water conservation measures that comply with the Tarrant Regional Water District Drought Contingency Plan.
	STATUS: Completed
Drought	Launch a drought public awareness campaign.
	STATUS: Completed
Drought	Plan, design and construct Texas Water Plan Regions "C" and "D" water supply projects.
	STATUS: Completed

5.3 New Action Items

The City of Mansfield's action items were determined by the Local Planning Team (LPT) for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[2] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Flooding**
Streambank Stabilization Projects: Design and construct projects to protect public infrastructure and private property from damages due to streambank erosion. Projects could include Saddlehorn/Walnut Creek sewer interceptor aerial crossing and Brookfield Hogpen sewer interceptor.	
Participating Jurisdiction:	City of Mansfield
Priority:	1
Estimated Cost:	$1,500,000
Estimated Benefit:	$9,000,000
Potential Funding Source(s):	Utility fund, hazard mitigation grants
Lead Agency/Department Responsible:	Engineering Department, Environmental Department, Utilities Department
Implementation Schedule:	12 months

Hazard(s) Addressed	**Drought, Flooding, Thunderstorms**
Install creek level monitoring systems and weather stations at Retta Road, North Street, Walnut Creek Road, Highway 1187, County Road 2738, Farm to Market 157 and Country Club Drive.	
Participating Jurisdiction:	City of Mansfield
Priority:	2
Estimated Cost:	$182,000
Estimated Benefit:	$1,092,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Environmental Department, Office of Emergency Management
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Flooding
Drainage Capital Improvement Project Plan: Design and construct projects to protect structures and roadways from flooding. Projects include Hogpen Branch flood study update, Day Miar Road channel, Callendar Road and Debbie Lane regional detention ponds, Nichols Branch at Newt Patterson street crossing, and Watson Branch upper reach projects.	
Participating Jurisdiction:	City of Mansfield
Priority:	3
Estimated Cost:	$4,450,000
Estimated Benefit:	$26,700,000
Potential Funding Source(s):	Impact fees, hazard mitigation grants
Lead Agency/Department Responsible:	Engineering Department, Environmental Department, Utilities Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Purchase and install three mobile generators for water department pump stations located in floodplain.	
Participating Jurisdiction:	City of Mansfield
Priority:	4
Estimated Cost:	$150,000
Estimated Benefit:	$900,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Parks Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Purchase and install eight fixed location and one mobile outdoor warning sirens for parks located in the city.	
Participating Jurisdiction:	City of Mansfield
Priority:	5
Estimated Cost:	$230,000
Estimated Benefit:	$1,380,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	2 months

Hazard(s) Addressed	Drought
Enhance drought contingency plan and align it with regional plan.	
Participating Jurisdiction:	City of Mansfield
Priority:	6
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Water Utilities Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Adopt and implement most current International Building Codes and enforce the installation of safe rooms and the use of impact-resistant material, as needed.	
Participating Jurisdiction:	City of Mansfield
Priority:	7
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Development Services Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Winter Storms
Improve road sanding operations through purchase of three additional sanding trucks.	
Participating Jurisdiction:	City of Mansfield
Priority:	8
Estimated Cost:	$600,000
Estimated Benefit:	$3,600,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Street Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Enhance the city's public education program to include best practices for use of mitigation techniques for drought.	
Participating Jurisdiction:	City of Mansfield
Priority:	9
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Water Utilities Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Develop and install city-wide weather/street monitoring and video camera system in the Emergency Operations Center.	
Participating Jurisdiction:	City of Mansfield
Priority:	10
Estimated Cost:	$150,000
Estimated Benefit:	$900,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Street Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
At risk property acquisition: Acquire properties at risk of flooding and permanently remove them from special flood hazard areas. The city has six remaining repetitive loss properties, according to the flood claims database. At risk structures are located along Laurel Court, South Parkridge Drive, Palm Street, Newt Patterson Drive, Wilson Road, Bonner Drive, and Brookfield Lane.	
Participating Jurisdiction:	City of Mansfield
Priority:	11
Estimated Cost:	$2,250,000
Estimated Benefit:	$22,250,000
Potential Funding Source(s):	Drainage utility fund, hazard mitigation grants
Lead Agency/Department Responsible:	Environmental Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Assist multi-families in new and existing residential structures and/or facilities that house at-risk special needs populations (nursing homes) with funding for building tornado safe rooms. Approximately 30 safe rooms at $8,000 each.	
Participating Jurisdiction:	City of Mansfield
Priority:	12
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	Hazard mitigation grants, private foundations, Community Development Block Grant (CDBG)
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	36 months

Hazard(s) Addressed	Earthquakes
Conduct a seismic vulnerability study to assess seismic sources, soil conditions and related potential hazards as well as the impacts to our community.	
Participating Jurisdiction:	City of Mansfield
Priority:	13
Estimated Cost:	$20,000
Estimated Benefit:	$120,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Become a National Weather Service (NWS) StormReady community.	
Participating Jurisdiction:	City of Mansfield
Priority:	14
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Extreme Heat
Develop a city program to purchase fans to distribute to at-risk or elderly populations who do not have access to air conditioning in the summer months. Approximately 20 fans at $10 each.	
Participating Jurisdiction:	City of Mansfield
Priority:	15
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	36 months

Hazard(s) Addressed	Wildfire
Enhance the City of Mansfield municipal code, if necessary, and restrict excessive fuel build up, including tree trimmings, brush, and cuttings to establish a clear zone and reduce wildland fire risk in residential areas.	
Participating Jurisdiction:	City of Mansfield
Priority:	16
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Fire Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Establish a Firewise Community Program.	
Participating Jurisdiction:	City of Mansfield
Priority:	17
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Fire Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Develop a Wildland-Urban Interface (WUI) Protection Plan.	
Participating Jurisdiction:	City of Mansfield
Priority:	18
Estimated Cost:	$15,000
Estimated Benefit:	$90,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Fire Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Extreme Heat
Design and conduct a public awareness campaign in the late spring and early summer months regarding the dangers of extreme heat and what can be done to mitigate the effects.	
Participating Jurisdiction:	City of Mansfield
Priority:	19
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	6 months

Hazard(s) Addressed	Earthquakes
Enhance the public education program to include various mitigation techniques for earthquakes.	
Participating Jurisdiction:	City of Mansfield
Priority:	20
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Expansive Soils
Create a public education program to include various mitigation techniques for expansive soils.	
Participating Jurisdiction:	City of Mansfield
Priority:	21
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Expand weather radio program to all new and existing city-owned facilities, Mansfield Independent School District facilities, and residences of key city employees.	
Participating Jurisdiction:	City of Mansfield
Priority:	22
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.

6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Budget/Capital Plan	City Council	Annually	Reference this HazMAP when developing the plan.	The plan development team will review the HazMAP to see which action items can be addressed with the fiscal and administrative capabilities of the city.
Emergency Operations Plan	Office of Emergency Management	Once every 5 years	Reference this HazMAP when developing the plan.	The plan development team will reference the HazMAP when updating this plan, in such areas as strengthening key resources based on HazMAP hazard analysis, incorporating vulnerability data, and action items.
Comprehensive Plan	Planning Zoning Department, Public Works Department, Water Department, Parks Department	Once every 5 years	2018 building codes, storm drainage improvements, creek erosion utility protection.	The plan development team will review mitigation action items and implement actions based on priority given to project over other projects that are also already funded.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Mansfield. For additional information, see Appendices A and B.

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JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the North Central Texas Council of Governments (NCTCOG) was the Emergency Preparedness Specialist.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the North Central Texas Council of Governments alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

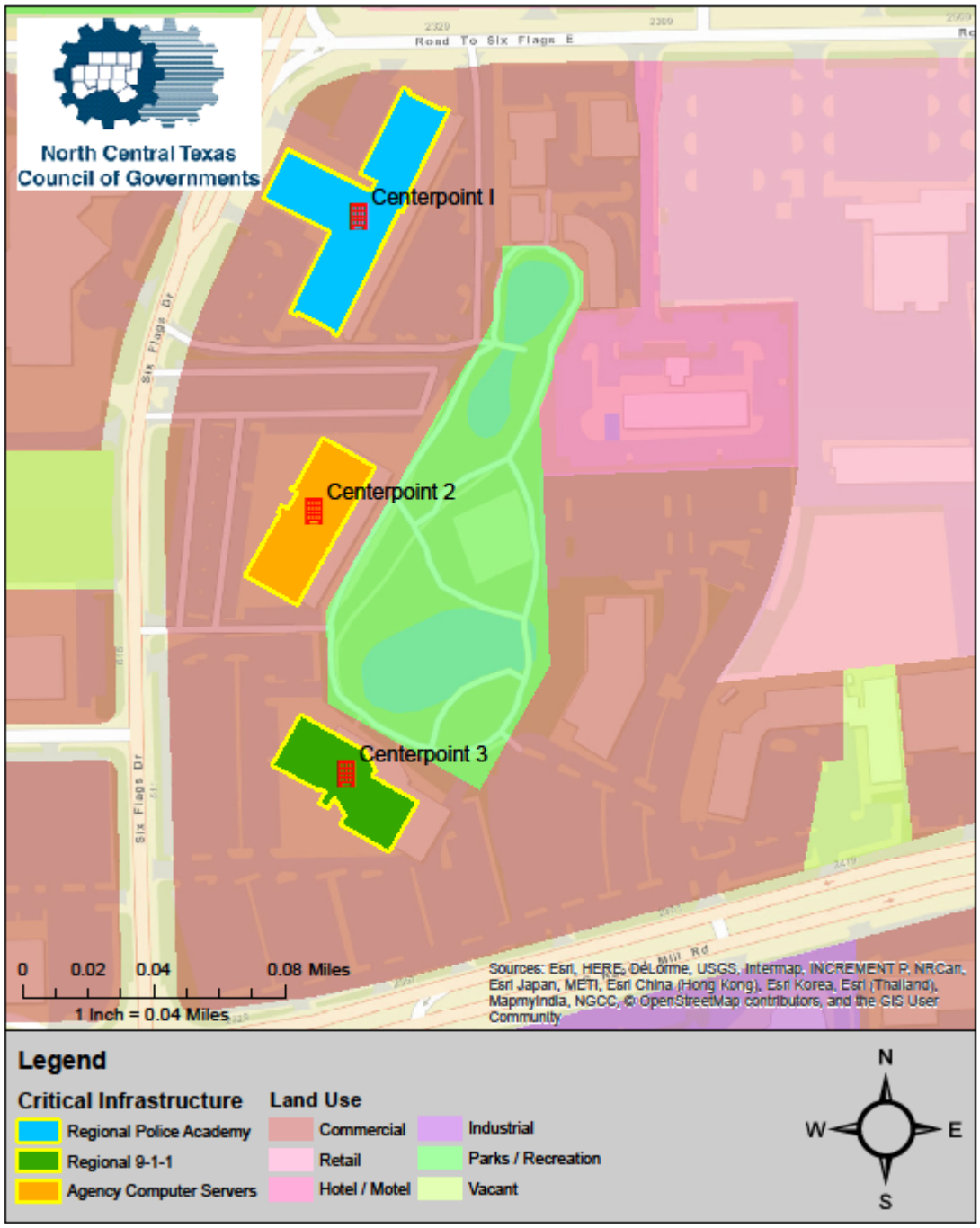
Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), NCTCOG will take the HazMAP to the Executive Board for final comment and adoption. A copy of the resolution will be inserted into the HazMAP and held on file at NCTCOG.

1.4 Supporting Maps

The following maps provide an overview of NCTCOG:

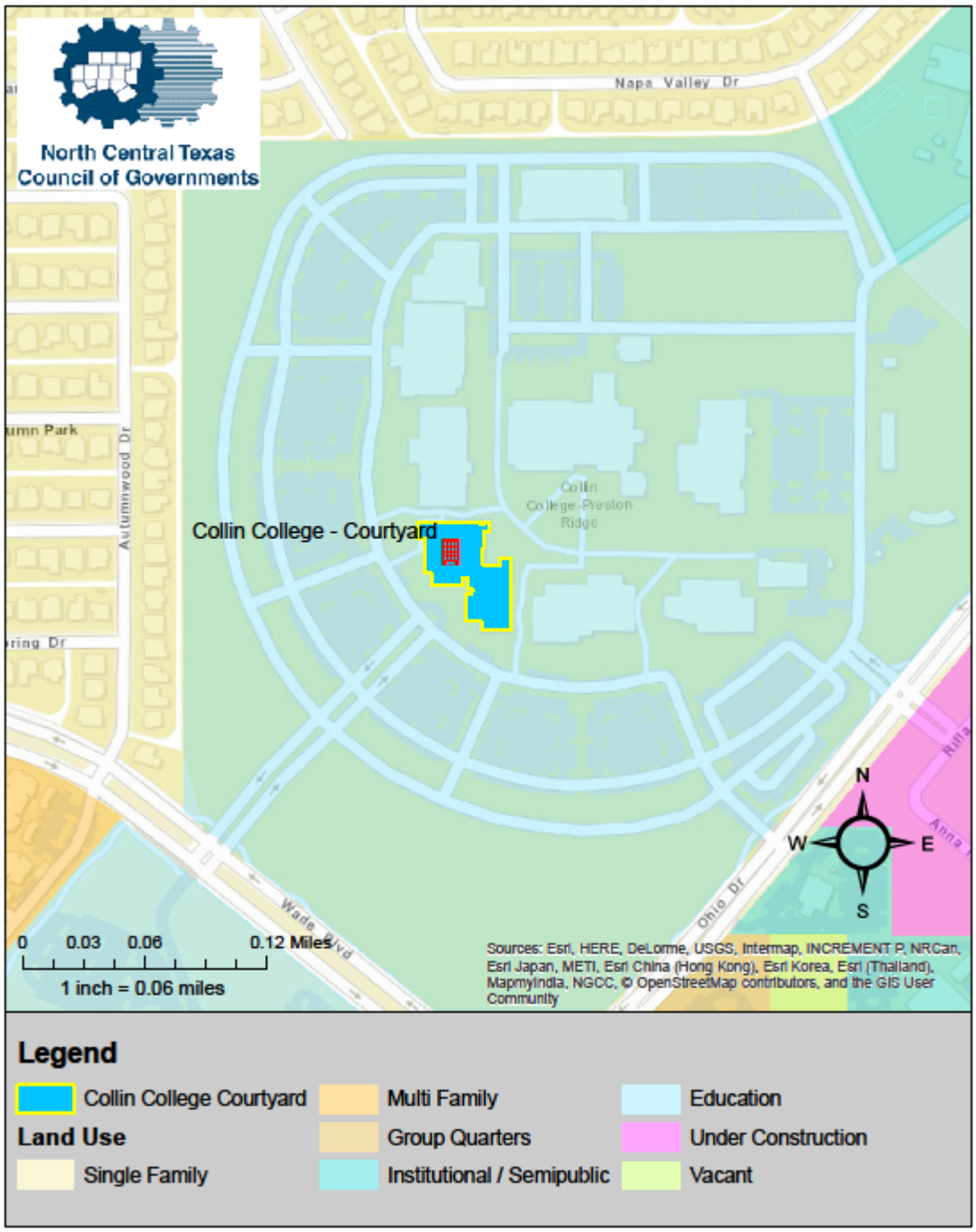
- Land Use Maps for NCTCOG properties

COG Land Use 2015 - 2017



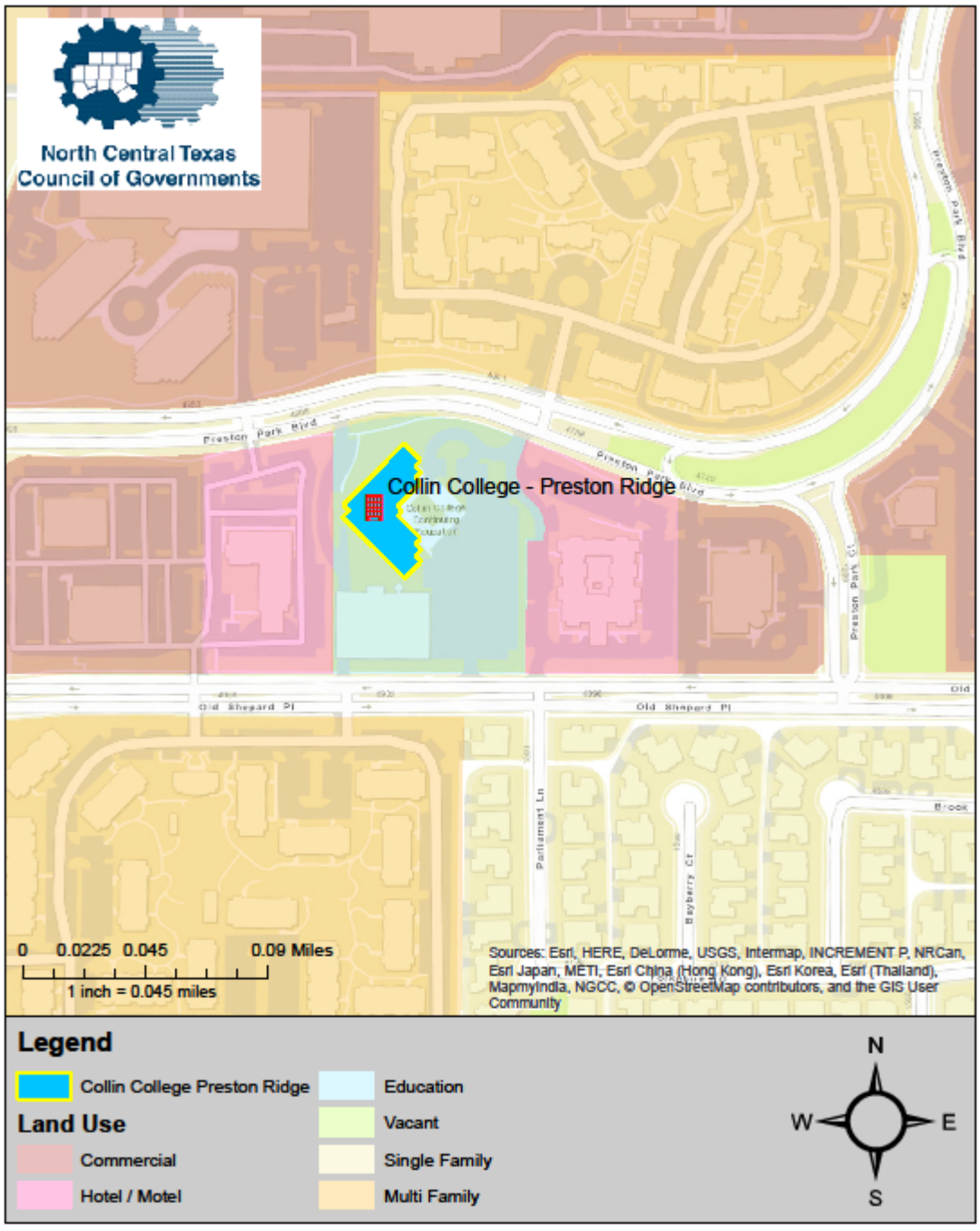
Source: NCTCOG, NCTCOG Spatial Data Cooperative Program, NCTCOG 2015 Land Use

Land Use Collin College Courtyard 2015 - 2017



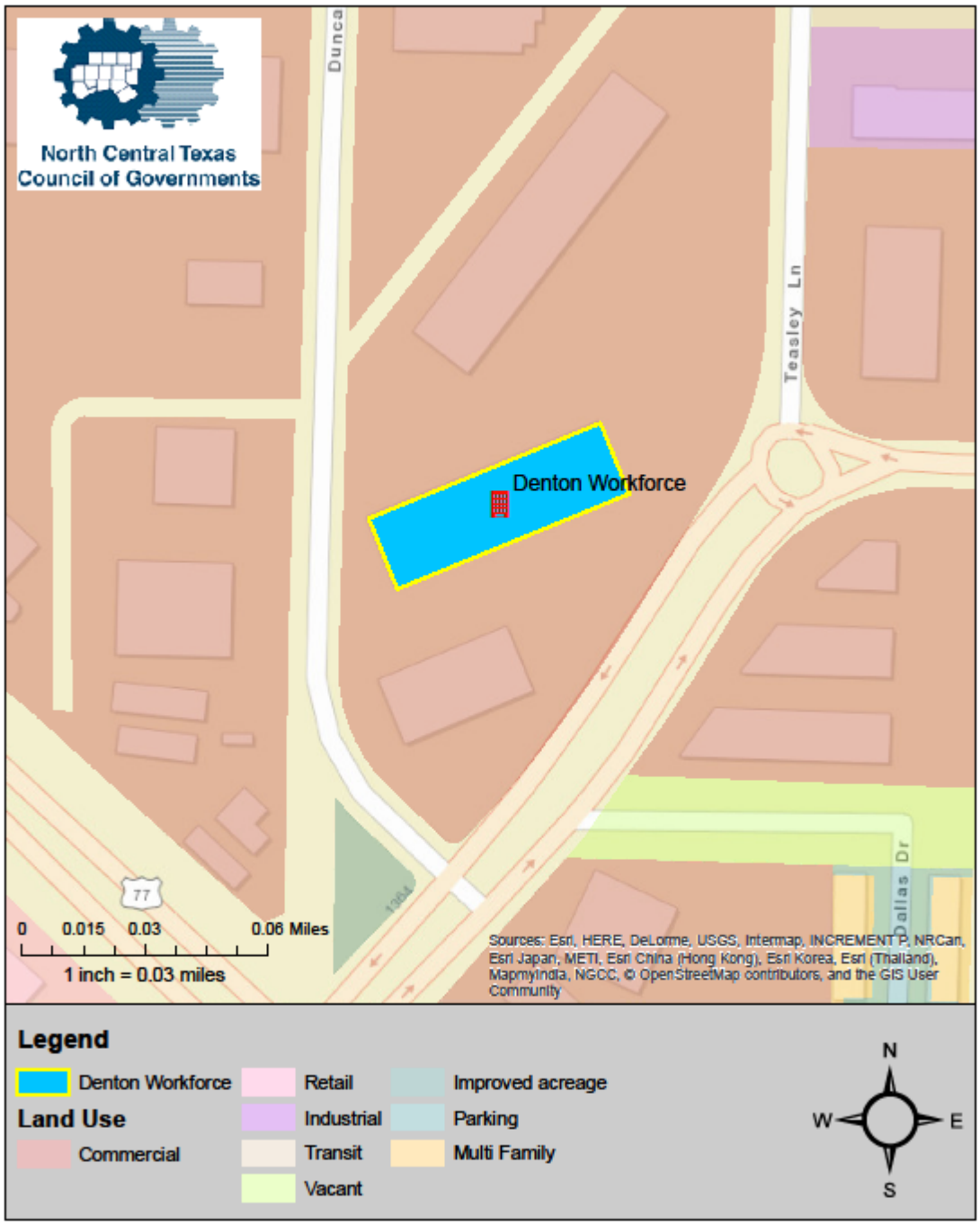
Source: NCTCOG, NCTCOG 2015 Land Use, NCTCOG Spatial Data Cooperative Program

Land Use Collin College Preston Ridge 2015 - 2017



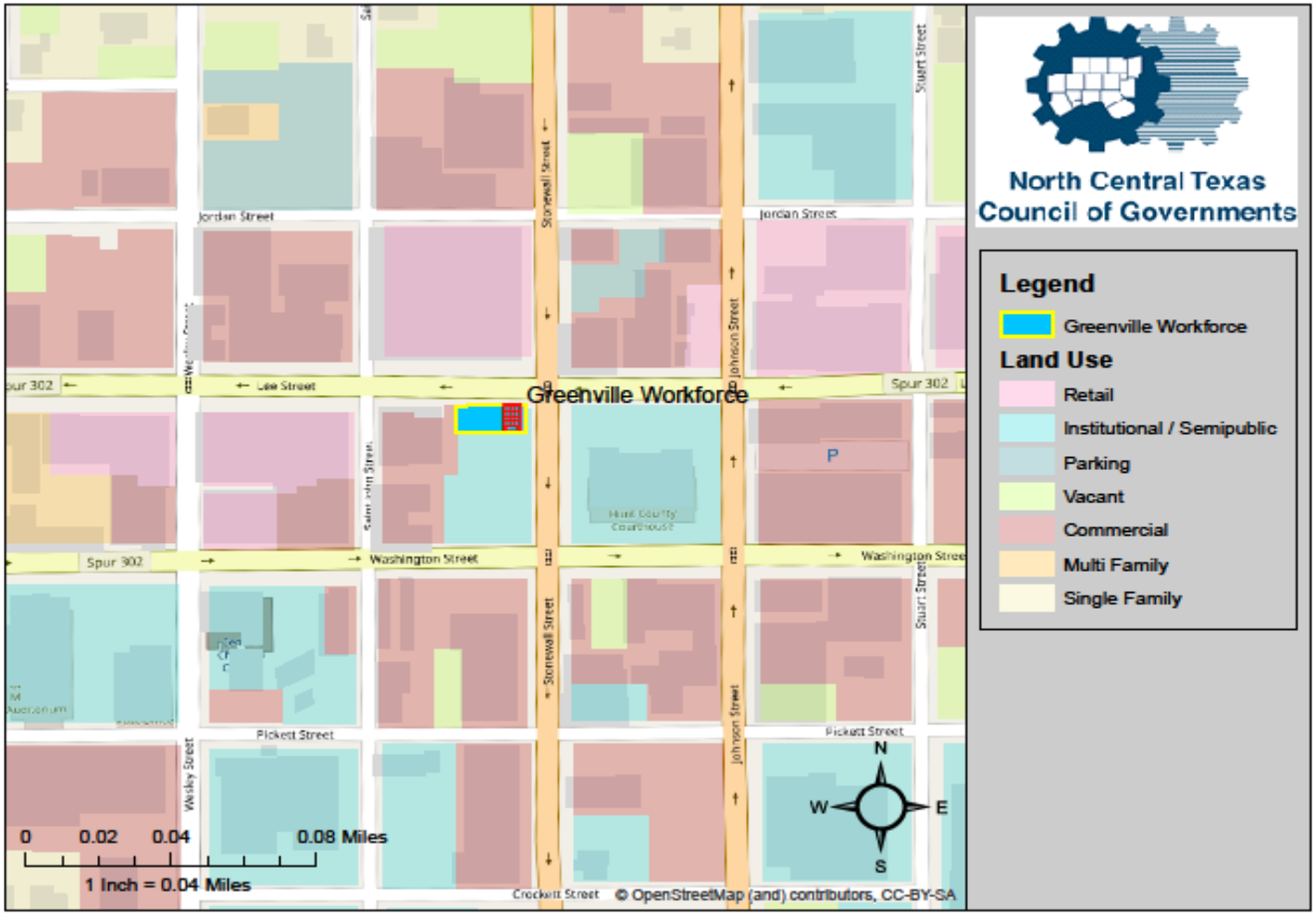
NCTCOG, NCTCOG Spatial Data Cooperative Program, NCTCOG 2015 Land Use

Denton Land Use 2015 - 2017



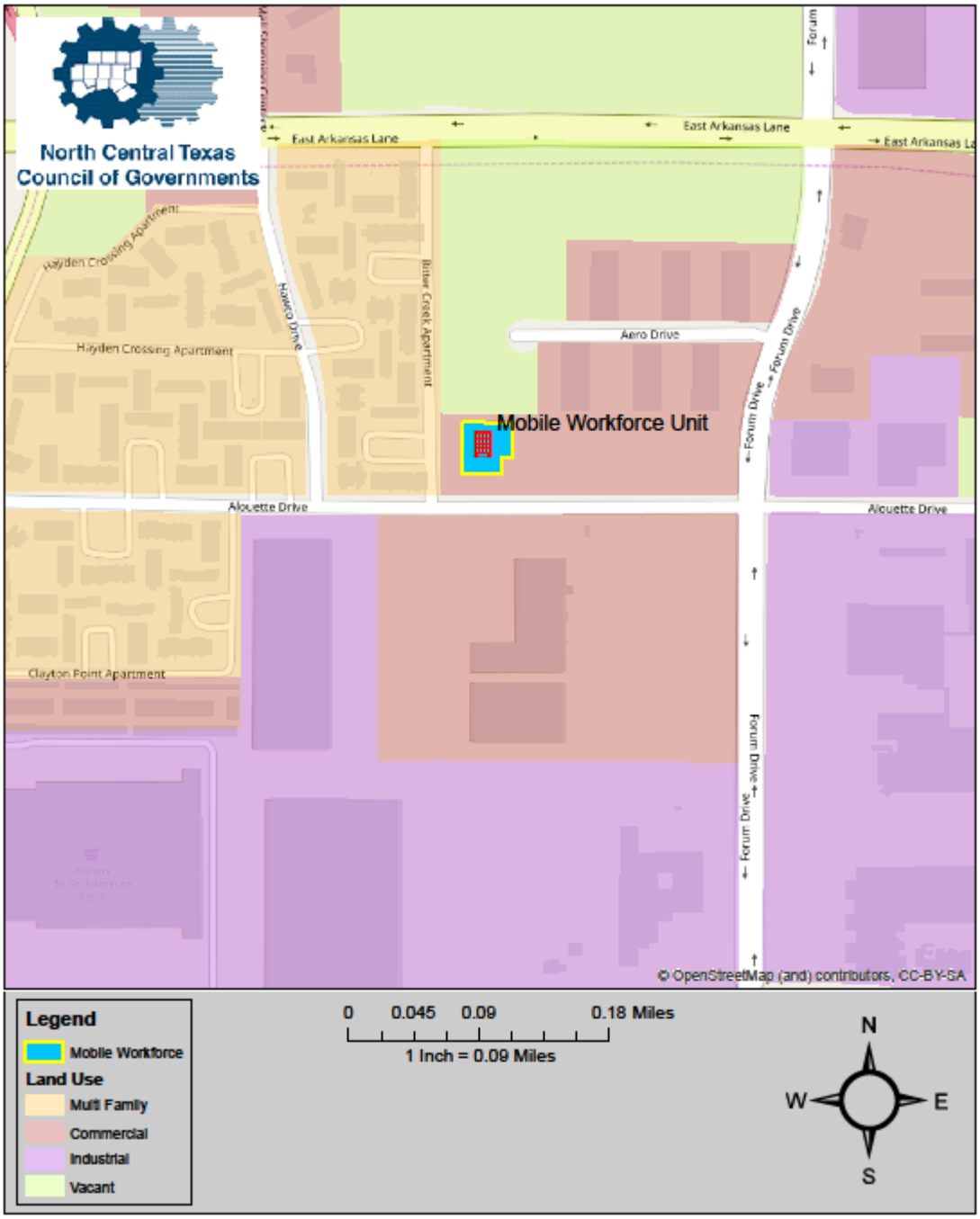
Source: NCTCOG, NCTCOG Spatial Data Cooperative Program, NCTCOG 2015 Land Use

Greenville Workforce Land Use 2015 - 2017



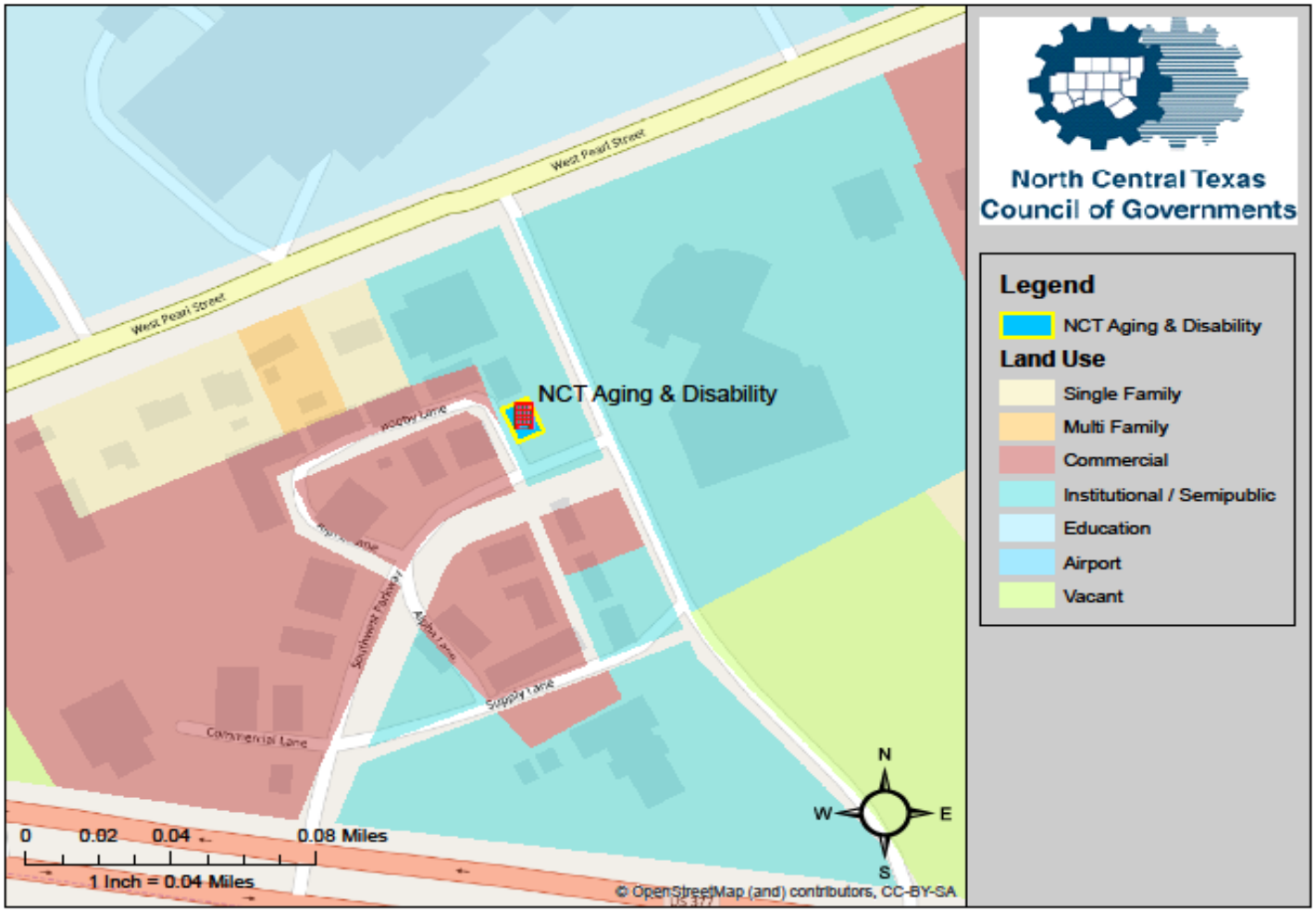
Source: NCTCOG, NCTCOG 2015 Land Use, NCTCOG Spatial Data Cooperative Program

Mobile Workforce Unit Land Use 2015 - 2017



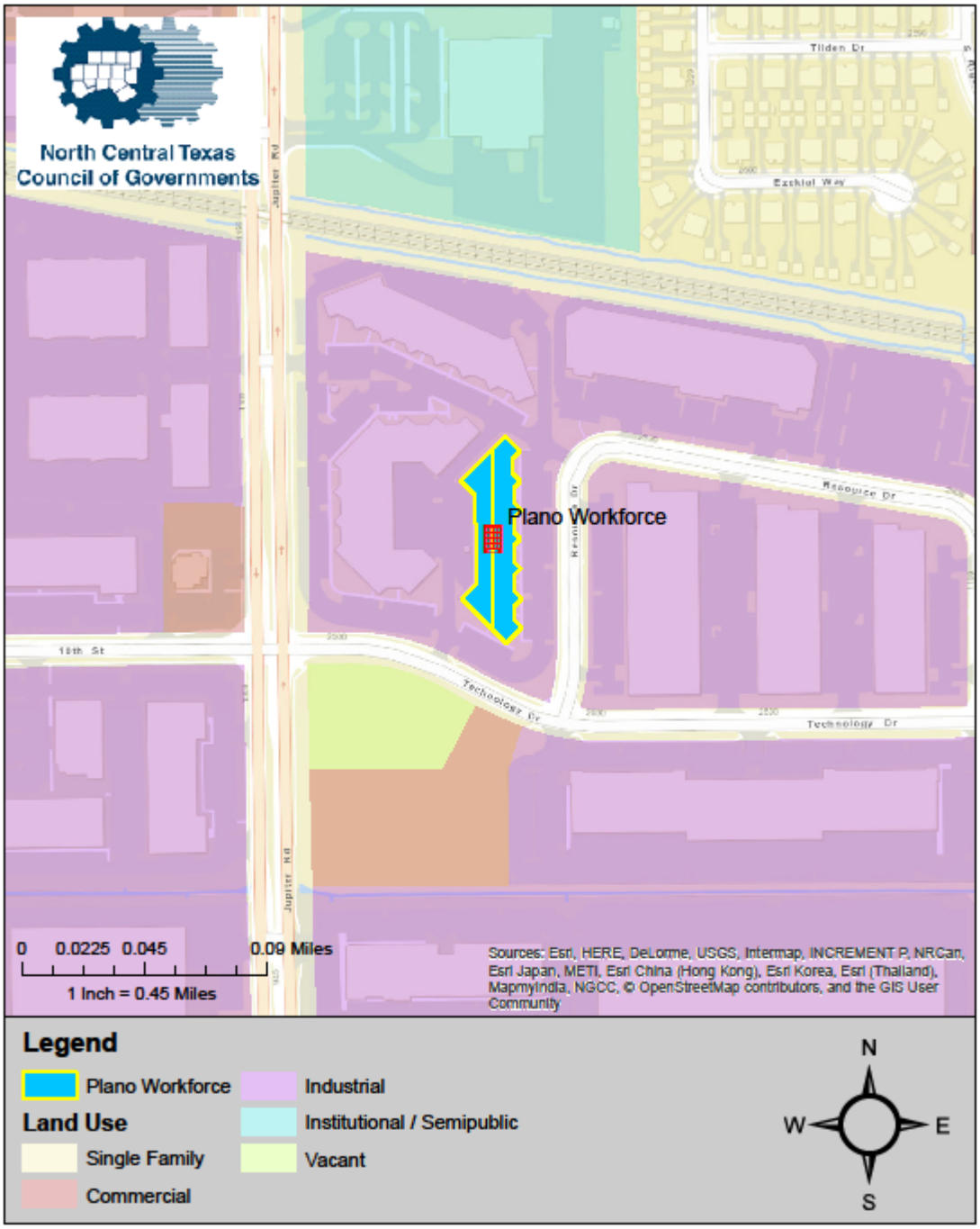
Source: NCTCOG, NCTCOG 2015 Land Use, NCTCOG Spatial Data Cooperative Program

Land Use North Central Texas Aging & Disability Resource 2015 - 2017



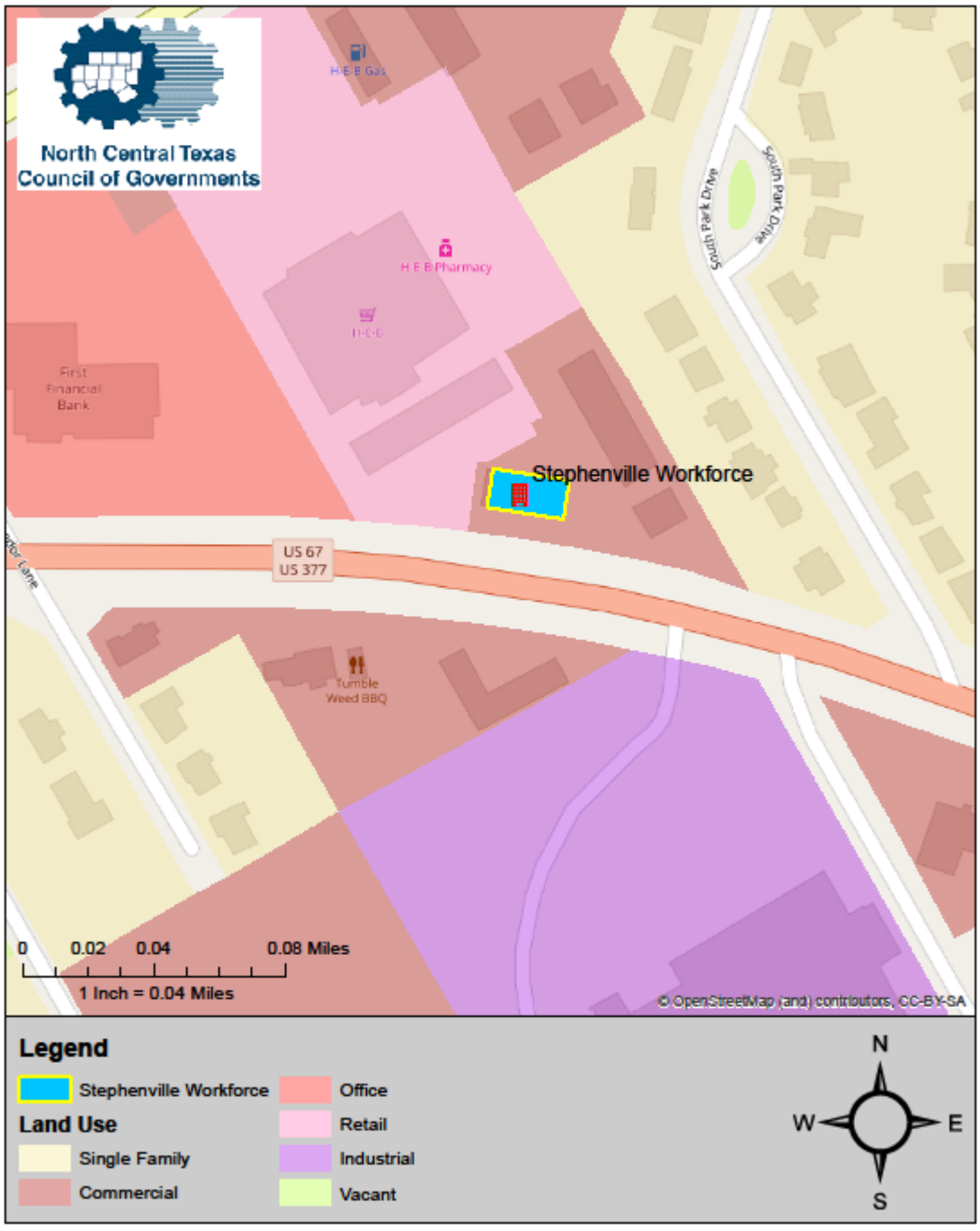
Source: NCTCOG, NCTCOG 2015 Land Use, NCTCOG Spatial Data Cooperative Program

Plano Workforce Land Use 2015 - 2017



Source: NCTCOG, NCTCOG Spatial Data Cooperative Program, NCTCOG 2015 Land Use

Stephenville Workforce Land Use 2015 - 2017

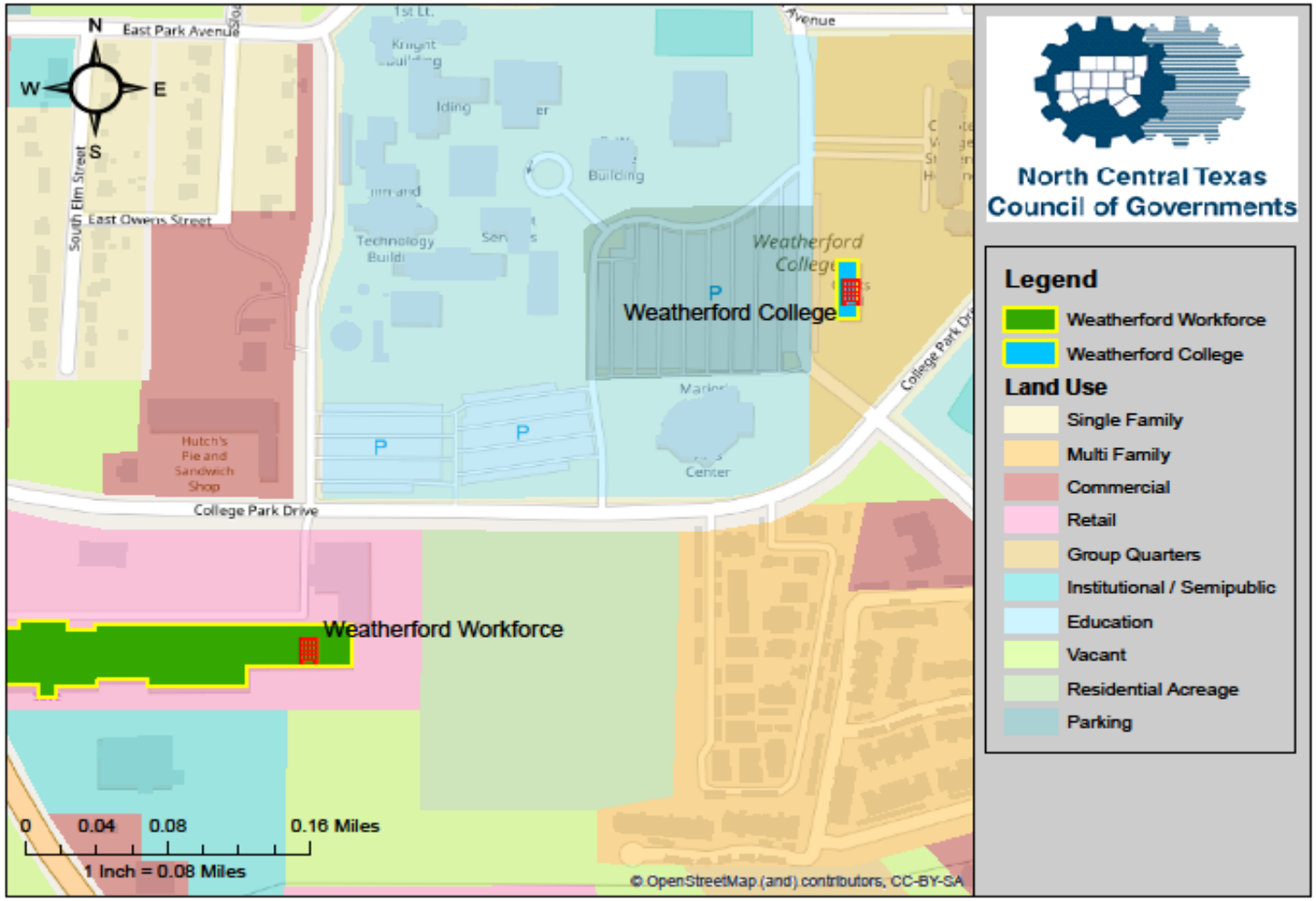


Source: NCTCOG, NCTCOG Spatial Data Cooperative Program, NCTCOG 2015 Land Use

Texas State Technical College Land Use 2015 - 2017

Source: NCTCOG, NCTCOG Spatial Data Cooperative Program, NCTCOG 2015 Land Use

Land Use Weatherford 2015 - 2017



Source: NCTCOG, NCTCOG 2015 Land Use, NCTCOG Spatial Data Cooperative Program

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the North Central Texas Council of Governments has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped agency officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The agency's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The agency developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the North Central Texas Council of Governments' Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the agency's Emergency Preparedness Specialist.

The LPT was assembled in 2017 with representatives from the North Central Texas Council of Governments. The agency acted as the plan development consultant, providing hazard mitigation planning services.

North Central Texas Council of Governments Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
NCTCOG	Emergency Preparedness Department	Director	General oversight, hazard identification, and plan development
NCTCOG	Emergency Preparedness Department	Supervisor	General oversight, hazard identification, and plan development
NCTCOG	Emergency Preparedness Department	Specialist	General oversight, hazard identification, and plan development
NCTCOG	Emergency Preparedness Department	Program Assistant	General oversight, hazard identification, and plan development
NCTCOG	Environmental & Development Department	Environmental Planner	Hazard identification and plan development
NCTCOG	Regional Police Academy (Centerpoint I Representative)	Police Training Coordinator	Hazard identification and plan development
NCTCOG	9-1-1 Department (Centerpoint III Representative)	9-1-1 Operations Supervisor	Hazard identification and plan development
NCTCOG	Administration- Building Management	Facilities Manager	Hazard identification and plan development
NCTCOG	Research & Information Services Department	Geographic Information System Technician	Hazard identification and plan development
NCTCOG	Transportation Department - Severe Weather Monitor Team	Program Manager	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the agency, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the agency in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: Building management installed drought-friendly landscaping to a limited portion of the campus to conserve water. A full list of completed mitigation action items are described in Chapter 5 of this annex.

3.2 Community Profile

The North Central Texas Council of Governments (NCTCOG) is a voluntary association of, by and for local governments, established to assist local governments in planning for common needs, cooperating for mutual benefit, and coordinating for sound regional development. There are currently 367 employees in the organization. The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the North Central Texas Council of Governments.

North Central Texas Council of Governments Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Centerpoint One (CPI) 600 Six Flags Drive, Arlington	Government Facility
Centerpoint Two (CPII) 616 Six Flags Drive, Arlington	Government Facility
Centerpoint Three (CPIII) 624 Six Flags Drive, Arlington	Government Facility
Multiple NCTCOG Workforce Department satellite locations	Government Facility

*The capacity, square footage, and structure value of these assets are unavailable.

3.3 Natural Hazard Profiles

The North Central Texas Council of Governments' Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the North Central Texas Council of Governments in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
N/A	Wildfire
1	Thunderstorm (includes hail, wind, lightning)
2	Winter Storms
3	Tornado
4	Extreme Heat
5	Flooding
6	Expansive Soils
7	Drought
8	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to all property used by the North Central Texas Council of Governments.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply
Vulnerabilities	There is no historical data for drought damage. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal overall.

Jurisdiction's ground-water supply: Because NCTCOG is an organization and does not own land or operate as a local government, it does not have a ground-water supply, water restrictions, or zoning districts.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Limited
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages was unavailable. Expansive soils are a major consideration to all existing and future structures NCTCOG may inhabit.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: There is no history of damage to the campuses or satellite/remote locations. The buildings are leased and the building management would is responsible for the cost to repair any damage.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	As an agency that works inside office buildings, there is limited interaction with the outdoors. The biggest concern would be power failure due to extreme heat and employees who work in a mobile capacity.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The older employees of NCTCOG and the police academy cadets doing exercises outside are the most vulnerable to extreme heat exposure.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? There has been no cases reported.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Structure and infrastructure damage – flooded structures and eroded roads Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Commuters to NTCOG are considered most at risk.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: N/A.

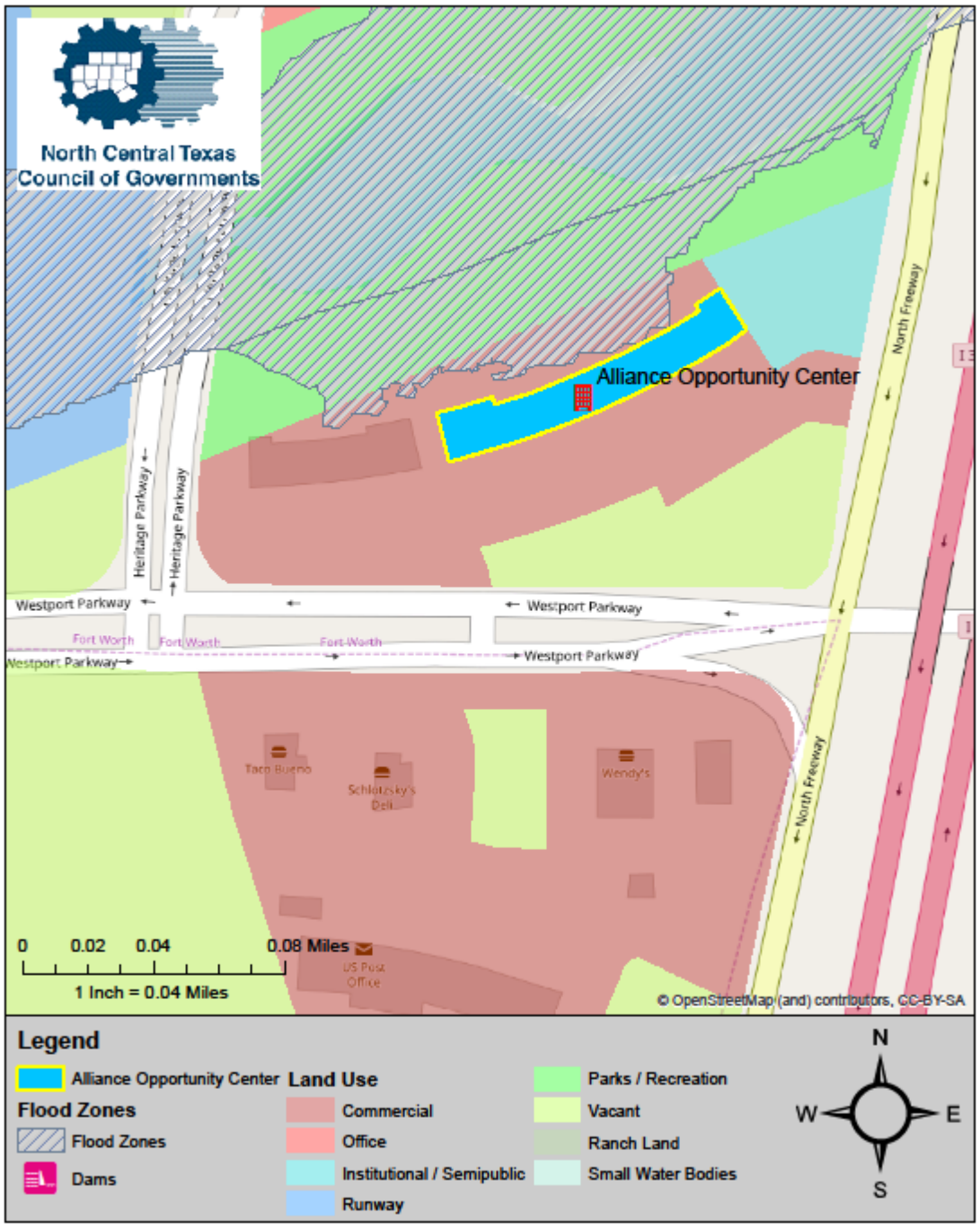
Names of any creeks or rivers that flood: N/A.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. **The North Central Texas Council of Governments (NCTCOG) is not a participant in the NFIP.**

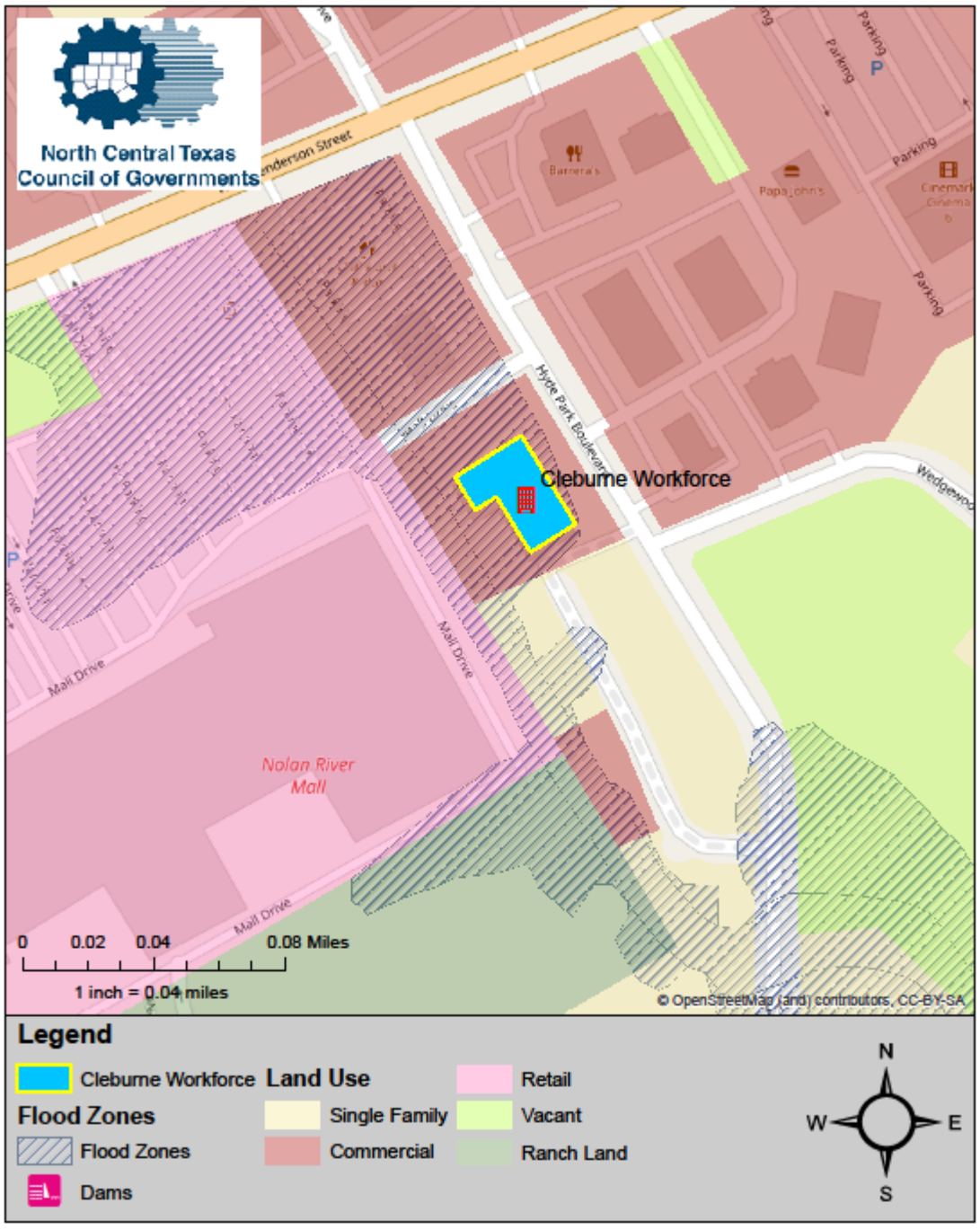
The following maps identify the flood zones near NCTCOG properties.

Alliance Opp Center Land Use with Flood Zones 2015 - 2017



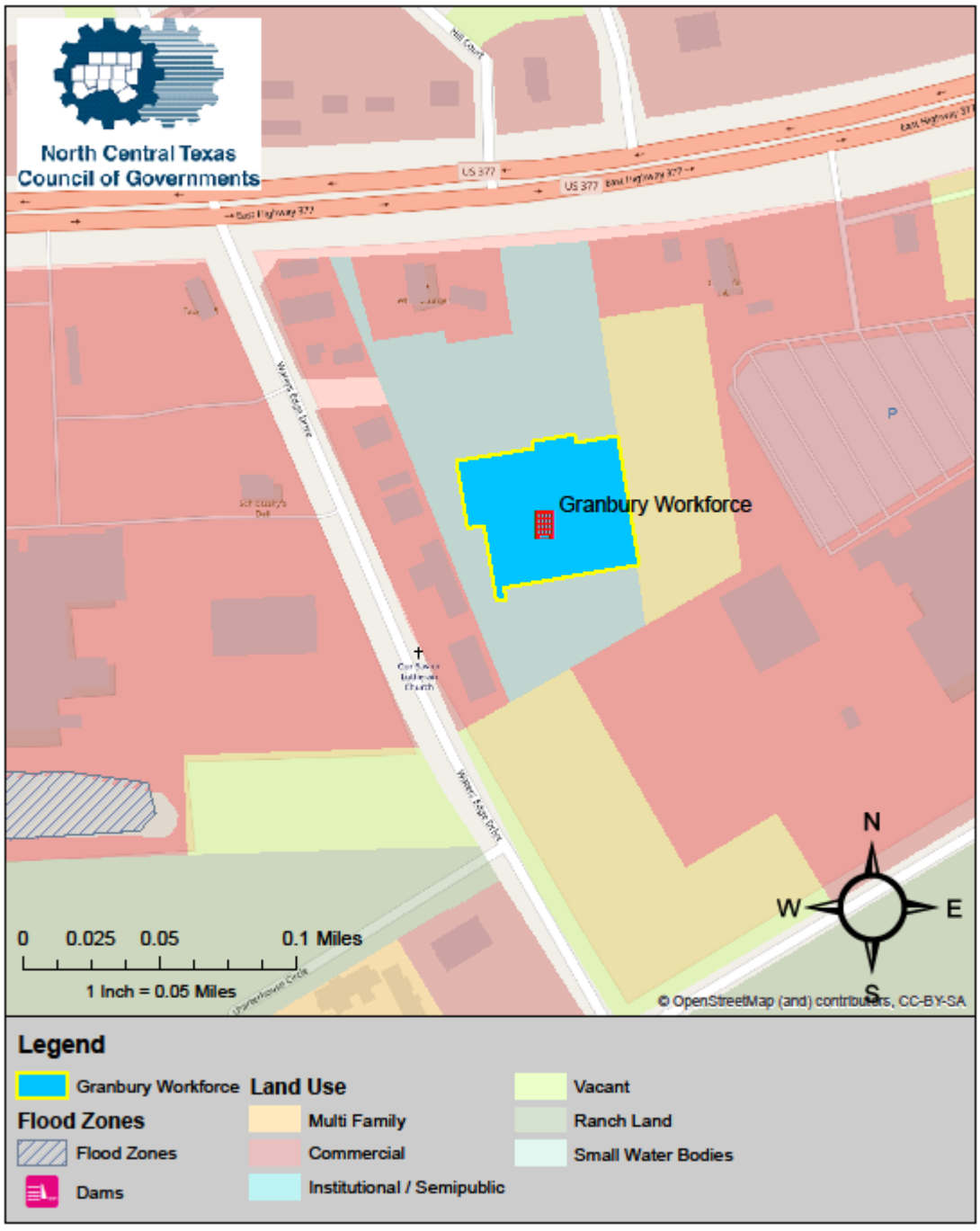
Source: NCTCOG, Federal Emergency Management Agency Flood Insurance Rate Map, NCTCOG Spatial Data Cooperative Program, NCTCOG 2015 Land Use

Cleburne Land Use and Flood Zones 2015 - 2017



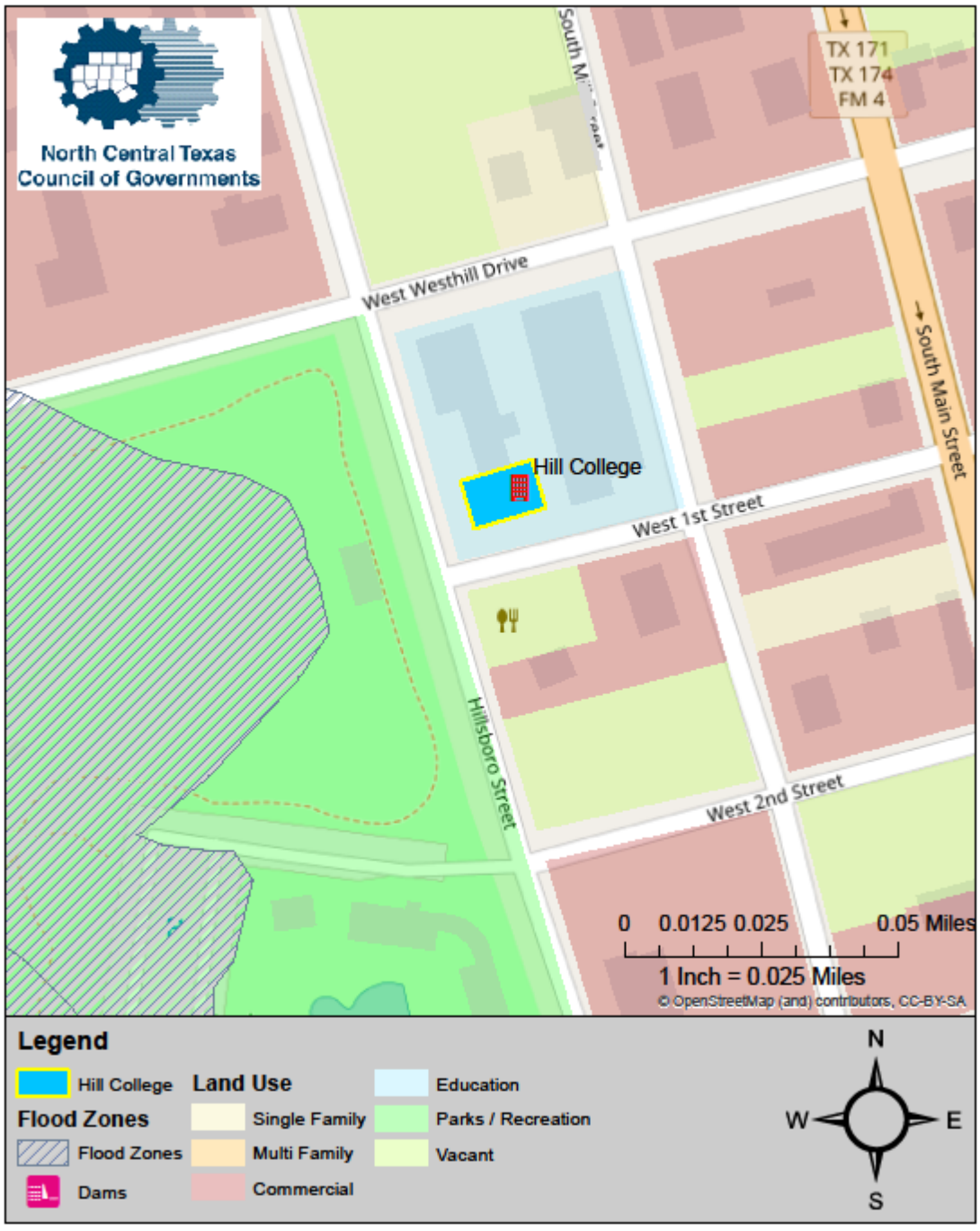
Source: NCTCOG, Federal Emergency Management Agency Flood Insurance Rate Map, NCTCOG 2015 Land Use, NCTCOG Spatial Data Cooperative Program

Land Use with Flood Zones Granbury 2015 - 2017



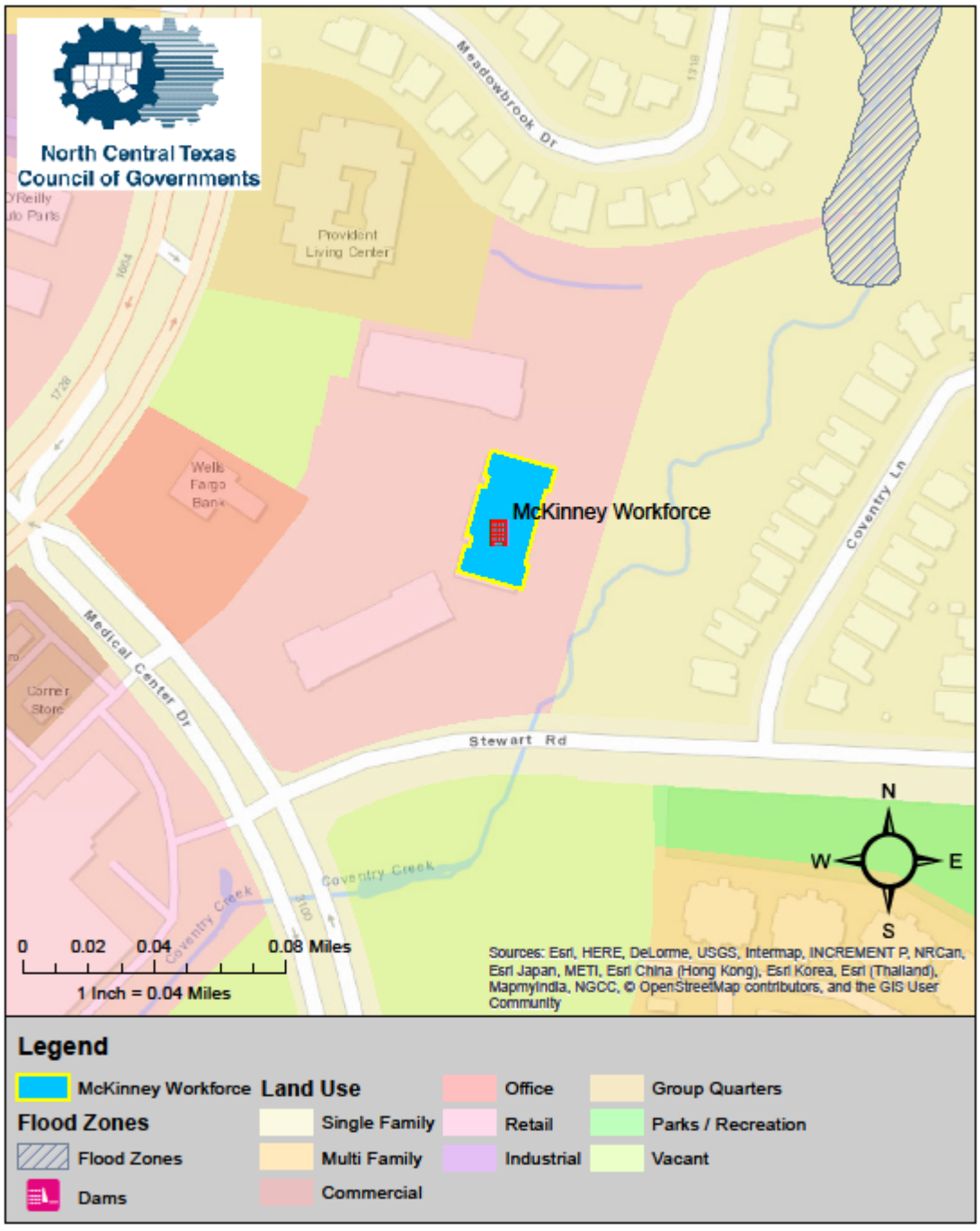
Source: NCTCOG, Federal Emergency Management Agency Flood Insurance Rate Map, NCTCOG 2015 Land Use, NCTCOG Spatial Data Cooperative Program

Hill College Land Use with Flood Zones 2015 - 2017



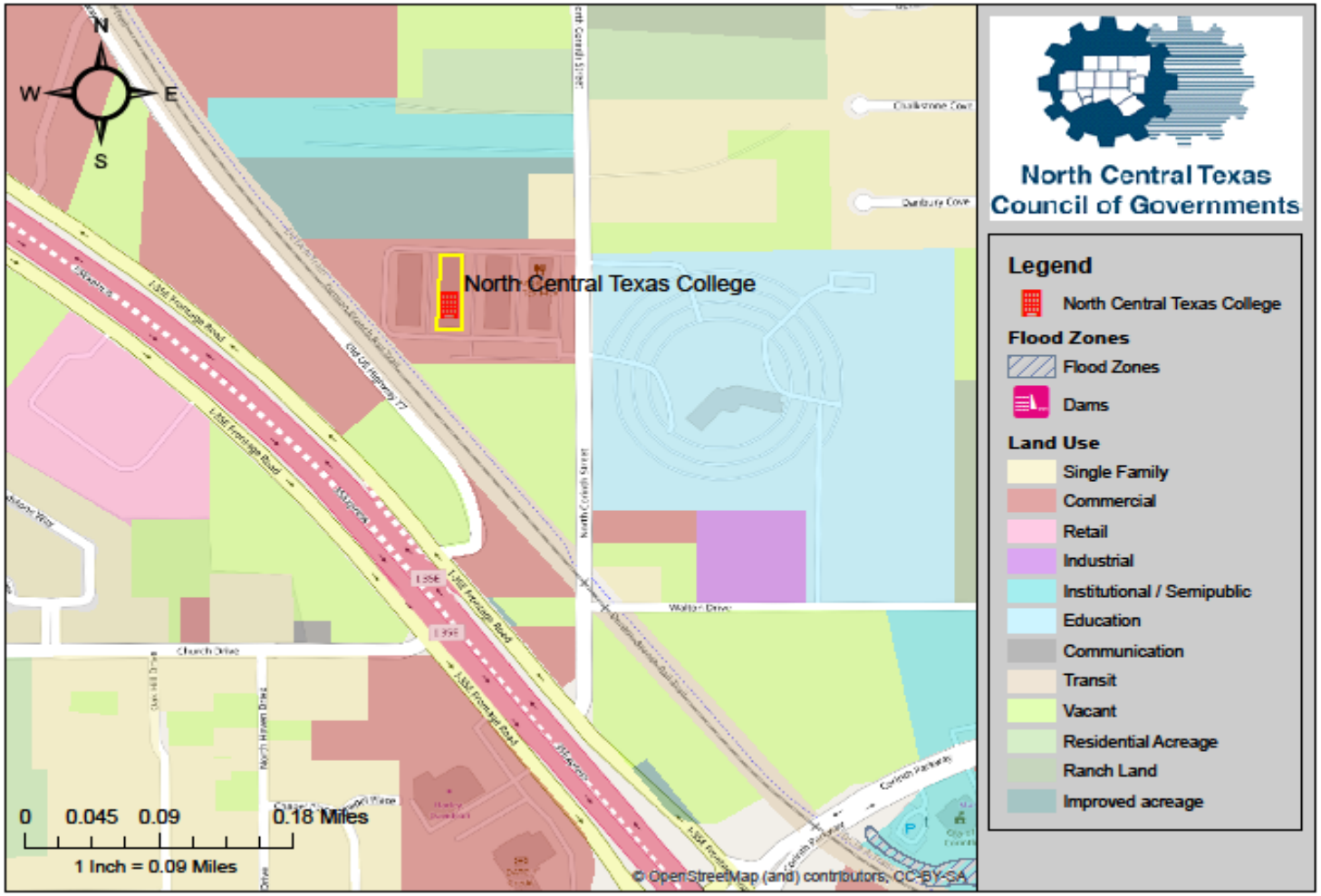
Source: NCTCOG, Federal Emergency Management Agency Flood Insurance Rate Map, NCTCOG 2015 Land Use, NCTCOG Spatial Data Cooperative Program

McKinney Land Use with Flood Zones 2015 - 2017



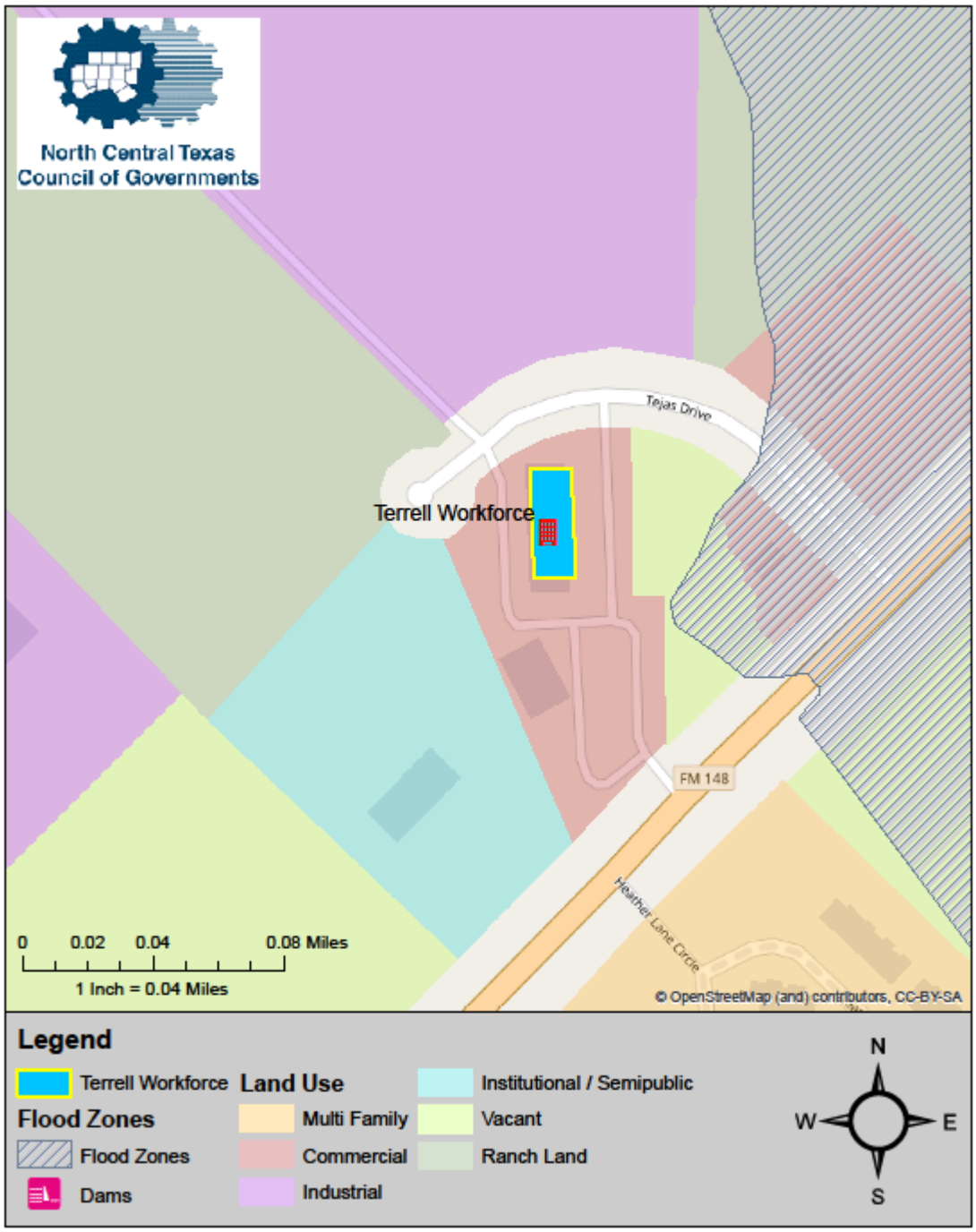
Source: NCTCOG, Federal Emergency Management Agency Flood Insurance Rate Map, NCTCOG Spatial Data Cooperative Program, NCTCOG 2015 Land Use

Land Use with Flood Zones North Central Texas College 2015 - 2017



Source: NCTCOG, Federal Emergency Management Agency Flood Insurance Rate Map, NCTCOG 2015 Land Use

Land Use with Flood Zones Terrell 2015 - 2017



Source: NCTCOG, Federal Emergency Management Agency Flood Insurance Rate Map, NCTCOG Spatial Data Cooperative Program, NCTCOG 2015 Land Use

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to vehicles, equipment, and buildings Transportation delays Injuries and deaths Debris from trees and damaged property Communication problems – phone and internet lines down
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Most of the buildings are multi-level, with multiple windows that would be vulnerable to the effects of thunderstorms.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Since 2015, there has been no reports of damage.

Number of homes lost due to lightning-induced fires: N/A.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Loss of property Structure and infrastructure damage
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Most of the buildings are multi-level, with multiple windows that would be vulnerable to the effects of tornadoes.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	N/A
Probability of Future Occurrence	N/A
Maximum Probable Extent	N/A
Potential Impact	N/A
Vulnerabilities	Wildfires are not a threat to NCTCOG due to the urbanized landscape.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the agency are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Nearby bridges, overpasses, and Highway 360 can be impacted by winter storms. Although these are not NCTCOG's property, the impacts can affect NCTCOG employees.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred near NCTCOG within the City of Arlington between 2015 and 2017. Because the main campus of NCTCOG is located in Arlington, these events had the potential to impact NCTCOG and its employees. The material is organized by location and date. NCTCOG has no record of damages from these events within the city.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Arlington	5/24/2015	Flash Flood		0	0	$0	$0	
Arlington	5/24/2015	Flash Flood		0	0	$0	$0	
Arlington	5/26/2015	Thunderstorm Wind	60	0	0	$10,000	$0	MG
Arlington	5/28/2015	Flash Flood		0	0	$0	$0	
Arlington	12/27/2015	Hail	1	0	0	$0	$0	
Arlington	3/17/2016	Hail	2.5	0	0	$400,000	$0	
Arlington	3/17/2016	Hail	0.75	0	0	$0	$0	
Arlington	1/15/2017	Flood		1	0	$0	$0	
Arlington	5/19/2017	Thunderstorm Wind	39	0	0	$5,000	$0	EG
Total				**1**	**0**	**$415,000**	**$0**	

*MG- Measured Wind Gusts

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The North Central Texas Council of Governments identified their greatest vulnerabilities and concerns:

- Thunderstorms have the potential to damage all buildings and vehicles on the property, severely impacting daily operations.
- The time employees spend outside or commuting to work are when they are most vulnerable to any of the identified hazards.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the agency to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the North Central Texas Council of Governments' Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	No; No; Yes
Capital Improvement Plan	Yes	Architect, 9-1-1, 2-year plan for Regional Police Academy: Yes; No; Yes
Economic Development Plan	Yes	Comprehensive Economic Development Strategy: No; Yes: Yes
Local Emergency Operations Plan	Yes	Emergency Procedures Handbook: Yes; Yes; Yes
Continuity of Operations Plan	Yes	Department COOPs/Agency COOP: Yes; No; Yes
Transportation Plan	No	
Stormwater Management Plan	No	
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	Yes	Strategic Plan: No; Yes; Yes
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	No	
Subdivision Ordinance	No	
Floodplain Ordinance	No	
Flood Insurance Rate Maps	No	

Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	
Acquisition of land for open space and public recreation uses	No	
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	No	
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	No	
Site Plan Review Requirements	No	
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Executive Board: makes/approves all agency decisions; Yes
Mitigation Planning Committee	Yes	Planning and Hazard Assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Facilities maintenance; Yes
Mutual Aid Agreements	Yes	For Department of Public Safety, 9-1-1; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	No	
Floodplain Administrator	No	
Emergency Manager	No	
Community Planner	No	
Civil Engineer	No	
GIS Coordinator	Yes	No; No; Yes
Other:	Yes	Safety & Security Team: No; No; Yes
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Air horns and emails about severe weather; Yes
Hazard data and information	Yes	Research & Information Services Department; No

Technical	Have capability?	Describe capability. Has capability been used to assess or mitigate risk in the past?
Grant writing	Yes	All departments write grants to fund staff and projects; Yes
HaZUS analysis	No	
Other	No	
Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Severe Weather Monitoring (SWM) group: alerts staff of severe weather; Yes Human Resources: incorporates access and functional needs; Yes eCOG: notifies staff on environmental procedures and programs; Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Environmental education, emergency preparedness; Yes Severe Weather Monitoring (SWM) team sends out weather information and evacuations on website; Yes
Natural disaster or safety related school programs	Yes	9-1-1 Department promotes school programs; Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	No	
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	No	
Authority to levy taxes for specific purposes	No	
Fees for water, sewer, gas, and/or electric services	No	

Funding Resources	Have capability?	Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?
Impact fees for new development	No	
Stormwater utility fee	No	
Incurrence of debt through general obligation bonds and/or special tax bonds	No	
Incur debt through private activities	No	
Community Development Block Grant	No	
Other federal funding programs	Yes	Texas Commission on Environmental Quality (TCEQ): solid waste; Multiple federal grants used for mitigation, transportation, and environmental plans; Yes
State funding programs	No	
Other	Yes	TCEQ: solid waste; Yes

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates, and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The North Central Texas Council of Governments' action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Flooding, Lightning, Winter Storms, Wildfire, Extreme Temperatures	Increase the number of homes and businesses with weather alert radios utilizing North Central Texas Council of Governments (NCTCOG) funding.	Purchase weather alert radios for NCTCOG.	6 months	Emergency Preparedness Department	$800 (20 radios at $40 per radio)	$3,200	Hazard Mitigation Grant Program (HMGP), local funds
		STATUS: Completed					
		Purchase an outdoor warning system for the NCTCOG facilities.	1 year	Administration Department, Emergency Preparedness Department	$5,000	$20,000	HMGP, local funds
		STATUS: Deleted- City of Arlington has warning system					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Extreme Heat, Winter Storms	Protect NCTCOG employees and visitors from natural hazards.	Install interior safe room in the building for all floors for NCTCOG facilities.	1 year	Administration Department, Executive Director, Emergency Preparedness Department	$45,000	$180,000	HMGP, Pre-Disaster Mitigation (PDM), Department of Homeland Security (DHS), National Weather Service (NWS) funds, local funds, private donations, user fees

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes	Educate NCTCOG employees on participating in the State of Texas Tornado Shelter Rebate Program.	Conduct public education campaign to educate about tornado safety.	1 year	Emergency Preparedness Department	$15,000	$60,000	NWS funds, local funds, State Homeland Security Program (SHSP), The Urban Area Security Initiative (UASI)
		STATUS: Completed					
Flooding	Reduce flood-related costs through participation in flood insurance programs at the NCTCOG.	Purchase flood insurance for the NCTCOG facilities to provide coverage to potential damage.	1 year	Administration Department, Executive Board, Emergency Preparedness Department, Environment and Development Department	$15,000	$60,000	Local funds
		STATUS: Deleted- no longer a priority					
		Update and improve NFIP Digital Flood Insurance Rate Maps	6 to 18 months	Environment and	$150,000	$600,000	Cooperative Technical Partnership

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		for the North Central Texas Region.		Development Department			Funds (CTP), HMGP, UASI, SHSP, local funds
		STATUS: In progress					
Flooding	Develop effective flood mitigation public education materials at NCTCOG.	Plan and promote flood preparedness activities for NCTCOG staff and public.	6 months	Emergency Preparedness Department, Environment and Development Department	$15,000	$60,000	HMGP, SHSP, UASI, local funds
		STATUS: Completed					
		Provide floodplain management education for the North Central Texas region.	Annually	Environment and Development Department	$25,000	$100,000	Stormwater funds, HMGP, UASI, SHSP, local funds
		STATUS: In progress					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Protect NCTCOG facilities against power failures.	Purchase and install additional generator capacity for NCTCOG offices and operations.	3 years	Administration Department	$150,000	$600,000	HMGP, SHSP, UASI, local funds
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Protect NCTCOG facilities against power failures.	Develop and implement a power failure contingency plan.	12-18 months	Administration Department	$15,000	$60,000	HMGP, SHSP, UASI, local funds
		STATUS: Deleted- no longer a priority					
Hail	Educate employees to engage in storm-resistant construction practices at their homes and at NCTCOG facilities.	Upgrade current roofing and windows with hail-resistant roofing material and windows at NCTCOG facilities.	1 year	Emergency Preparedness Department, Administration Department	Unknown	Unknown	HMGP, local funds
		STATUS: Deferred to 2020 HazMAP					
Hail	Educate employees to engage in storm-resistant construction practices at their homes and at NCTCOG facilities.	Create and promote a public education campaign to encourage hail-resistant roofing in new construction and roof replacements for employees.	1 year	Emergency Preparedness Department, Environment and Development Department Codes Council	$15,000	$60,000	HMGP, local funds
		STATUS: Completed					
Wildfire	Develop and implement	Implement a landscaping	1 year	Administration Department,	$5,000	$20,000	Local funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	landscaping practices that mitigate the risk of wildfires at NCTCOG facilities.	management policy that keeps surround facility vegetation especially trees adequately trimmed.		Building Management			
		STATUS: Completed					
Wildfire	Enhance wildfire planning efforts in North Central Texas (NCTCOG).	Develop Community Wildfire Protection Plans for each of the rural counties in the North Central Texas Region.	12-18 months	Emergency Preparedness Department	$200,000	$800,000	HMGP, PDM, Texas Forest Service grants, other federal/state grants
		STATUS: Deleted- no longer a priority					
Wildfire	Work with North Central Texas communities to enhance their Firewise ratings (NCTCOG).	Develop Firewise communities in cities across the North Central Texas Region	18-24 months	Emergency Preparedness Department	$400,000	$1,600,000	HMGP, PDM, Texas Forest Service grants, other federal/state grants
		STATUS: Deleted- no longer a priority					
Winter Storms	Provide warming centers to Tarrant County citizens, particularly those with special needs at NCTCOG.	Develop NCTCOG facilities as warming centers to the public with a focus on special populations.	1 year	Agency on Aging, Administration Department, Executive Director,	$5,000	$20,000	Local funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
				Emergency Preparedness Department			
		STATUS: Deleted- no longer a priority					
Winter Storms	Ensure that employees and NCTCOG citizens are prepared for a winter weather emergency.	Conduct public education campaign warning of risks associated with winter storms.	1 year	Emergency Preparedness Department	$15,000	$60,000	HMGP, local funds
		STATUS: Completed					
		Purchase of additional laptops and licenses to give greater number of employees the ability to work from home or other alternate work sites in severe winter weather conditions.	3 years	Emergency Preparedness Department	$135,000	$540,000	HMGP, local funds, grant streams
		STATUS: Completed					
Drought	Implement environmental conservation practices at NCTCOG facilities.	Install low water volume fixtures in all NCTCOG facilities.	1 year	Administration Department, Emergency Preparedness Department, Environment	$150,000	$600,000	Building Management

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
				and Development Department			
		STATUS: Deferred to 2020 HazMAP					
		Publish and distribute information on the Texas Smartscape program.	1 year	Environment and Development Department	$15,000	$60,000	HMGP, local funds
		STATUS: In progress					
Lightning	Mitigate lightning risk at NCTCOG facilities.	Installation of lightning down conductors to NCTCOG facilities.	1 year	Emergency Preparedness Department, Severe Weather Team	$85,000	$340,000	HMGP, local funds
		STATUS: Deleted- no longer a priority					
		Purchase and install lightning rods to prevent structural/hardware damage.	1 year	Emergency Preparedness Department	$60,000	$240,000	HMGP, local funds
		STATUS: Deleted- no longer a priority					
Extreme Temperatures	Identify and implement mitigation-feasible projects related to	Maintain interior building temperatures below 77 degrees Fahrenheit.	1 year	Administration Department	$10,000	$40,000	Local funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	extreme heat (NCTCOG).						
		STATUS: Completed					

5.3 New Action Items

The North Central Texas Council of Governments' action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[2] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Drought, Earthquake, Expansive Soils, Extreme Heat, Flooding, Thunderstorm, Tornado, Winter Storm**
Expand the hazard mitigation planning program to include Hazard Mitigation Actions Plans, Community Wildfire Protection Plans (when applicable), and educational tools for all 16 counties in the region to ensure they meet planning requirements.	
Participating Jurisdiction:	North Central Texas Council of Government
Priority:	1
Estimated Cost:	$5,000,000
Estimated Benefit:	$30,000,000
Potential Funding Source(s):	Hazard mitigation grants, local funds
Lead Agency/Department Responsible:	Emergency Preparedness Department
Implementation Schedule:	24 months

Hazard(s) Addressed	**Earthquakes, Thunderstorms, Tornadoes**
Expand the North Central Texas Safe Room Rebate Program for all 16 counties in the North Central Texas region.	
Participating Jurisdiction:	North Central Texas Council of Government
Priority:	2
Estimated Cost:	$5,000,000
Estimated Benefit:	$30,000,000
Potential Funding Source(s):	Hazard mitigation grants, local funds
Lead Agency/Department Responsible:	Emergency Preparedness Department
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Drought, Earthquake, Expansive Soils, Extreme Heat, Flooding, Thunderstorm, Tornado, Winter Storm
Enhance the public education system to include mitigation strategies for all identified hazards.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	3
Estimated Cost:	$15,000
Estimated Benefit:	$90,000
Potential Funding Source(s):	Hazard mitigation grants, local funds, local funding for staff time
Lead Agency/Department Responsible:	Emergency Preparedness Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquake, Tornado
Conduct disaster drills to mitigate injuries or death.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	4
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	Local funding for staff time
Lead Agency/Department Responsible:	Administration Department, Emergency Preparedness Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Extreme Heat, Thunderstorms, Winter Storms
Install hardened, covered walkways to mitigate injuries to pedestrians during severe weather.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	5
Estimated Cost:	$250,000
Estimated Benefit:	$1,500,000
Potential Funding Source(s):	Hazard mitigation grants, agency budget, building management funding
Lead Agency/Department Responsible:	Administration Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Extreme Heat, Thunderstorms, Winter Storms
Install hardened, covered parking – scalable to parking closest to Centerpoint I, II, and III buildings to mitigate damage to agency vehicles and pedestrians during the identified severe weather events.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	6
Estimated Cost:	$500,000
Estimated Benefit:	$3,000,000
Potential Funding Source(s):	Hazard mitigation grants, agency budget, building management funding
Lead Agency/Department Responsible:	Administration Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Create hardened interior rooms on all floors.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	7
Estimated Cost:	$20,000
Estimated Benefit:	$120,000
Potential Funding Source(s):	Hazard mitigation grants, agency budget, building management funding
Lead Agency/Department Responsible:	Administration Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Flooding, Tornadoes
Implement gaining/anchoring of freestanding furniture to prevent falling or floating objects that could harm people and property.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	8
Estimated Cost:	$15,000
Estimated Benefit:	$90,000
Potential Funding Source(s):	Hazard mitigation grants, Maintenance and Repair budget
Lead Agency/Department Responsible:	Administration Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Install automatic water faucets in new and existing agency buildings to conserve water.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	9
Estimated Cost:	$115,000
Estimated Benefit:	$690,000
Potential Funding Source(s):	Agency budget, building management funding
Lead Agency/Department Responsible:	Administration Department, building management (will do in conjunction with NCTCOG's remodel)
Implementation Schedule:	36 months

Hazard(s) Addressed	Drought
Install low-volume water fixtures to conserve water during consumption for new and existing agency buildings.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	10
Estimated Cost:	$115,000
Estimated Benefit:	$690,000
Potential Funding Source(s):	Agency budget, building management funding
Lead Agency/Department Responsible:	Administration Department, building management (will do in conjunction with NCTCOG's remodel)
Implementation Schedule:	36 months

Hazard(s) Addressed	Drought, Expansive Soils
Implement "Smartscape" design for all agency property.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	11
Estimated Cost:	$84,000
Estimated Benefit:	$504,000
Potential Funding Source(s):	Agency budget, building management funding
Lead Agency/Department Responsible:	Administration Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Expansive Soils
Upgrade parking lot surface to permeable material.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	12
Estimated Cost:	$70,000
Estimated Benefit:	$420,000
Potential Funding Source(s):	Hazard mitigation grants, Maintenance & Repair budget
Lead Agency/Department Responsible:	Administration Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Create a water runoff system for drainage for agency property.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	13
Estimated Cost:	$60,000
Estimated Benefit:	$360,000
Potential Funding Source(s):	Hazard mitigation grants, Community Development Block Grant
Lead Agency/Department Responsible:	Administration Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Extreme Heat, Winter Storms
Install weather stripping to new and existing exterior doors.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	14
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	Hazard mitigation grants, agency budget
Lead Agency/Department Responsible:	Administration Department
Implementation Schedule:	3 months

Hazard(s) Addressed	Flooding
Establish and implement water quality management and conservation practices using regional development standards.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	18
Estimated Cost:	$500,000
Estimated Benefit:	$3,000,000
Potential Funding Source(s):	Hazard mitigation grants, agency budget
Lead Agency/Department Responsible:	Environment & Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Promote the inclusion of low impact development requirements in local and regional ordinances.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	19
Estimated Cost:	$500,000
Estimated Benefit:	$3,000,000
Potential Funding Source(s):	Hazard mitigation grants, agency budget
Lead Agency/Department Responsible:	Environment & Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Encourage fully developed land use conditions to be used for infrastructure design purposes.	
Participating Jurisdiction:	North Central Texas Council of Governments
Priority:	20
Estimated Cost:	$500,000
Estimated Benefit:	$3,000,000
Potential Funding Source(s):	Hazard mitigation grants, agency budget
Lead Agency/Department Responsible:	Environment & Development Department
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the agency were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the agency, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by the Executive Director or other interested party.
2. Proposal is placed on the local agenda of the Executive Council.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the agency have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the public bulletin board.
4. Proposal is discussed at the Executive Council meeting, including any comments by members of the agency attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate department.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Comprehensive Economic Development Strategy Plan	All departments at NCTCOG	Every 4 years	Reference the HazMAP when reviewing this plan.	When updating the Comprehensive Economic Development Strategy Plan, the NCTCOG planning team will review this HazMAP to ensure mitigation goals are realized.
Strategic Plan	All departments at NCTCOG	Every 5 years	Reference the HazMAP when reviewing this plan.	When updating the Strategic Plan, the NCTCOG planning team will review this HazMAP to ensure mitigation goals are realized.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the North Central Texas Council of Governments. For additional information, see Appendices A and B.

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City of North Richland Hills

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of North Richland Hills was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of North Richland Hills alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

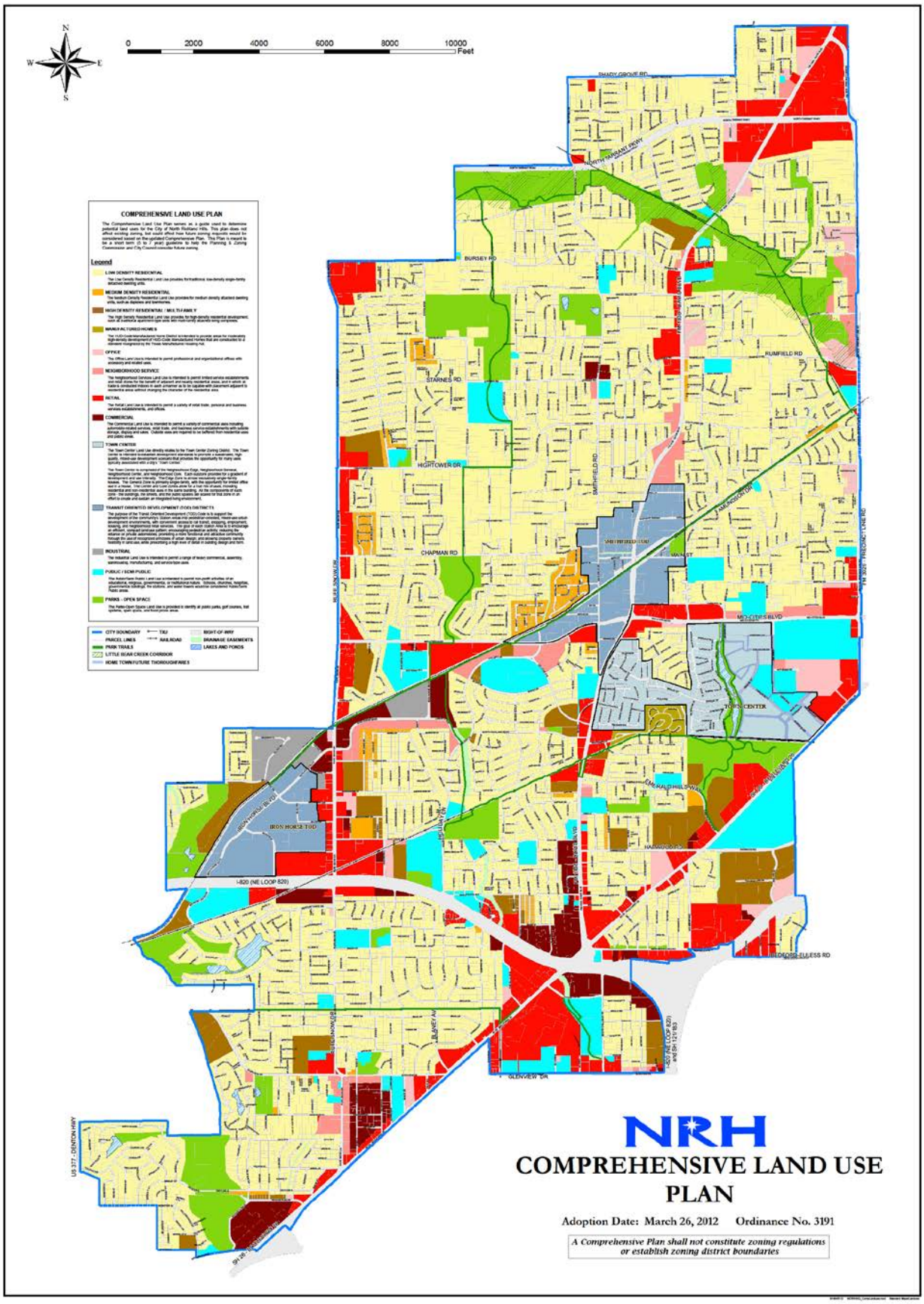
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of North Richland Hills will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

The following maps provide an overview of the City of North Richland Hills:

- Comprehensive Land Use Plan
- Thoroughfare Plan
- Zoning Map


N
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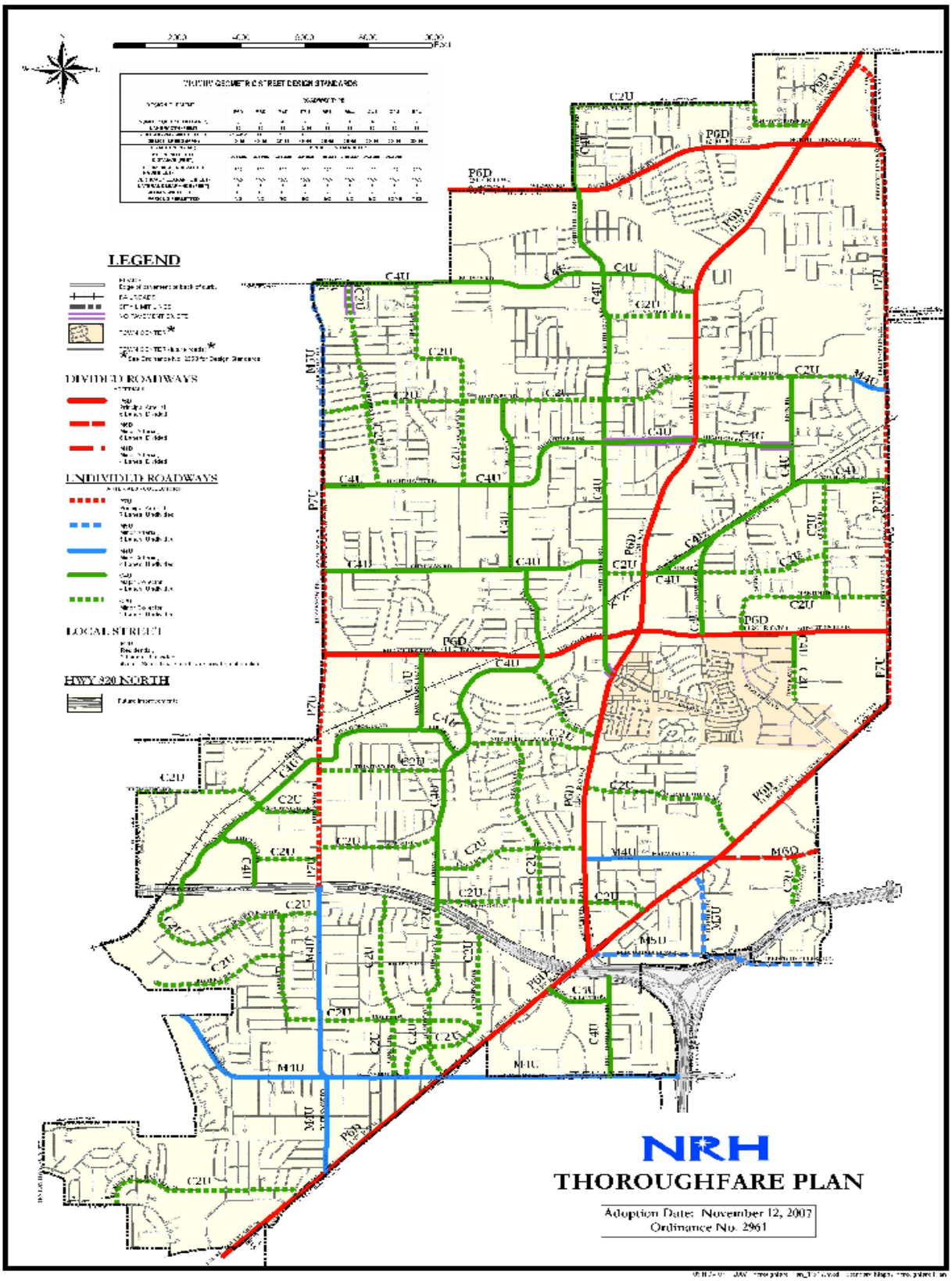
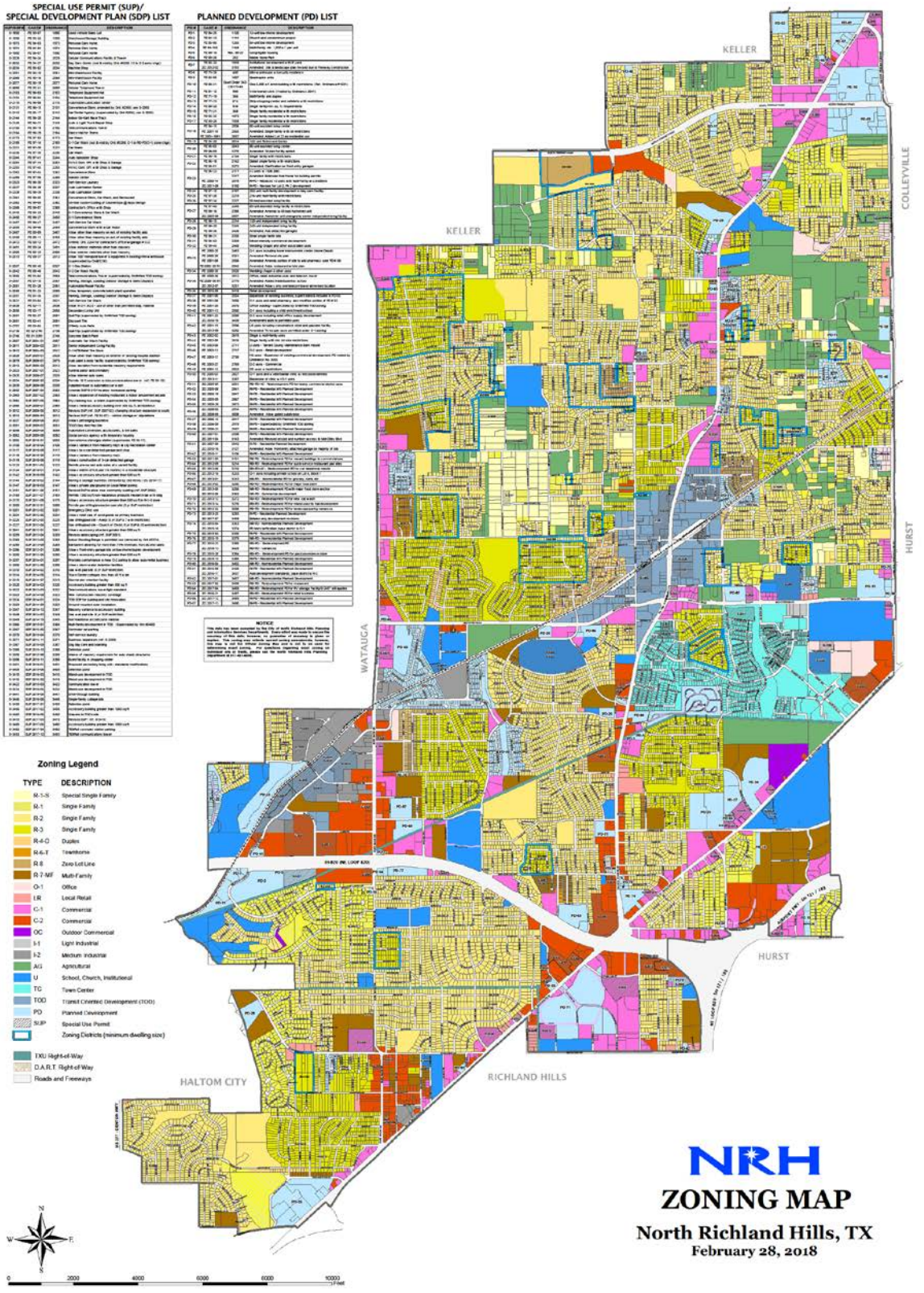
Feet
COMPREHENSIVE LAND USE PLAN
Legend
LOW DENSITY RESIDENTIAL
MEDIUM DENSITY RESIDENTIAL
HIGH DENSITY RESIDENTIAL / MULTI-FAMILY
MANUFACTURED HOMES
OFFICE
NEIGHBORHOOD SERVICE
RETAIL
COMMERCIAL
TOWN CENTER
TRANSIT ORIENTED DEVELOPMENT (TOD) DISTRICTS
INDUSTRIAL
PUBLIC / SEMI-PUBLIC
PARKS - OPEN SPACE
CITY BOUNDARY
PARCEL LINES
PARK TRAILS
LITTLE BEAR CREEK CORRIDOR
HOME TOWN/FUTURE THOROUGHFARES
TXU
RAILROAD
RIGHT-OF-WAY
DRAINAGE EASEMENTS
LAKES AND PONDS
SHADY GROVE RD
NORTH FARMART EXPWY
BURSEY RD
STARNES RD
RUMFIELD RD
HIGHTOWER DR
SMITHFIELD RD
CHAPMAN RD
MAIN ST
MID-CITIES BLVD
TOWN CENTER
EMERALD HILLS WAY
IRON HORSE TOD
I-820 (NE LOOP 820)
GLENVIEW DR
NRH
COMPREHENSIVE LAND USE PLAN
Adoption Date: March 26, 2012 Ordinance No. 3191
A Comprehensive Plan shall not constitute zoning regulations or establish zoning district boundaries


LEGEND
DIVIDED ROADWAYS
UNDIVIDED ROADWAYS
LOCAL STREET
HWY 820 NORTH
NRH
THOROUGHFARE PLAN
Adoption Date: November 12, 2007
Ordinance No. 2961


SPECIAL USE PERMIT (SUP)/
SPECIAL DEVELOPMENT PLAN (SDP) LIST
PLANNED DEVELOPMENT (PD) LIST
NOTICE
Zoning Legend
TYPE
DESCRIPTION
Special Single Family
Single Family
Single Family
Single Family
Duplex
Townhome
Zero Lot Line
Multi-Family
Office
Local Retail
Commercial
Commercial
Outdoor Commercial
Light Industrial
Medium Industrial
Agricultural
School, Church, Institutional
Town Center
Transit Oriented Development (TOD)
Planned Development
Special Use Permit
Zoning Districts (minimum dwelling size)
TXU Right-of-Way
D.A.R.T. Right-of-Way
Roads and Freeways
KELLER
KELLER
COLLEYVILLE
HURST
HURST
WATAUGA
HALTOM CITY
RICHLAND HILLS
NRH
ZONING MAP
North Richland Hills, TX
February 28, 2018

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of North Richland Hills has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of North Richland Hills's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of North Richland Hills. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of North Richland Hills Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of North Richland Hills	Office of Emergency Management	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of North Richland Hills	Fire Department	Assistant Fire Chief	Hazard identification and plan development
City of North Richland Hills	Police Department	Assistant Police Chief	Hazard identification and plan development
City of North Richland Hills	Public Works Department	Managing Director of Public Works	Hazard identification and plan development
City of North Richland Hills	Public Works Department	Public Works Operations Manager	Hazard identification and plan development
City of North Richland Hills	Planning & Zoning Department	Planning Manager	Hazard identification and plan development
City of North Richland Hills	Building Inspections & Permits Department	Chief Building Official	Hazard identification and plan development
City of North Richland Hills	Engineering Department	City Engineer	Hazard identification and plan development
City of North Richland Hills	Planning & Zoning Department	Geographic Information System (GIS) Analyst	Hazard identification and plan development
City of North Richland Hills	Parks & Recreation Department	Assistant Director of Parks and Recreation	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no development in hazard-prone areas since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: A full list of completed mitigation action items are described in Chapter 5 of this annex. The Building Inspections and Permits Department and Planning and Zoning Department are working with developers to ensure standards are being followed that align with our public safety goals. Hazard-prone area development is being limited and monitored to make sure life safety is achieved across the entire community.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of North Richland Hills.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	70,441
Persons under 5 years (%)	6.9
Persons 65 years and over (%)	13.8
Language other than English spoken at home (%)	18.8
With a disability, under age 65 (%)	7.7
Persons without health insurance, under age 65 (%)	16.3
Persons in poverty (%)	7.8
Median household income	$63,537
Households, 2012-2016	25,682
Median value of owner-occupied housing units, 2012-2016	$160,200

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of North Richland Hills.

City of North Richland Hills Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Warning Siren 7301 Onyx Drive	Communications
Warning Siren 7500 Deville Drive	Communications
Warning Siren 6400 Combs Road	Communications
Warning Siren 7500 Circle Drive	Communications
Warning Siren 8400 Emerald Hills Drive	Communications
Warning Siren 7300 Chapman Drive	Communications
Warning Siren 8700 Martin Drive	Communications
Warning Siren 8600 Royal Ridge Drive	Communications
Warning Siren 7628 Douglas Lane	Communications
Warning Siren 8400 North Tarrant Pkwy.	Communications
Fire Station #1 8001 Shadywood Lane	Fire
Fire Station #2 4001 Rufe Snow Drive	Fire
Fire Station #3 5328 David Boulevard	Fire
Fire Station #4 7245 Hightower Drive	Fire
Fire Station #5 7202 Dick Fisher Drive North	Fire
Aegon Lift Station 9151 Boulevard 26	Utility
City Hall 4301 City Point Drive	Administration
North Hills Hospital 4401 Booth Calloway Road	Medical
Overhead Water Storage 8509 A Davis Boulevard	Storage

City of North Richland Hills Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Pressure Reducing Valve 7512 Boulevard 26	Utility
Pump Station 4145 Stanley Keller Road	Utility
Pumphouse 6105 Davis Boulevard	Utility
Pumphouse and Storage 4100 Booth Calloway Road	Utility
Pumphouse and Well 8501 Harwood Road	Utility
Service Center 7200A Dick Fisher Drive	Utility
Sewage Lift Station 4024 Daley Ave.	Utility
Storage Tank 7301 Bursey Road	Utility
Utility Storage Tank Stames Road / 7400 Oak Park Drive	Utility
Watauga Road Pump Station 5101 Western Center Boulevard	Utility
Water Main Vault 6637 Watauga Road	Utility
Water Main Vault 6657 Starnes Road	Utility
Water Main Vault 7001 Rufe Snow Drive	Utility
Well 8601 Harwood Road	Utility
Well Pump 8728 Amundson Drive	Utility

*The capacity, square footage, and structure/content value are unavailable for these assets.

3.3 Natural Hazard Profiles

The City of North Richland Hills's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of North Richland Hills in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Flooding
2	Drought
3	Earthquake
4	Expansive Soils
5	Extreme Heat
7	Thunderstorm (includes hail, wind, lightning)
8	Tornado
9	Wildfire
10	Winter Storms

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of North Richland Hills.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	Medium	Major
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00

Extent Scale			
	Minor	**Medium**	**Major**
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	There is no historical data for drought damage in the city. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Rise in water costs would affect the population living below the poverty line. The NRH2O water park could experience water shortage, which would hurt their business and the tourism industry within the city.

Jurisdiction's ground-water supply: The City of North Richland Hills receives its water supply from the City of Fort Worth and the Trinity River Authority (TRA). The City of Fort Worth and TRA get their water from The Tarrant Regional Water District which collects water from Lake Bridgeport, Cedar Creek Reservoir, Eagle Mountain Lake, Richland-Chambers Reservoir, Lake North Richland Hills, Lake Worth, and Lake Benbrook.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: Watering of lawns and yards is limited to certain days and between certain times but no more than 2 times a week; cannot water lawn when any form of precipitation is falling; must keep irrigation systems properly maintained.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Limited
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the exact amount of damages in the city was unavailable, as only road data is available. Expansive soils are a major consideration to all existing and future structures. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Damage occurs daily and all over the city for roadways in North Richland Hills. The city spends approximately $200,000 a year on road repairs; however, due to the manner in which data for expansive soils is collected it is not clear how many of these repairs were due to expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme heat pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: Approximately 13.8% of the population in North Richland Hills consists of individuals who are 65 years or older. In addition, approximately 7.8% of individuals in North Richland Hills live below the poverty line.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? The annual Fourth of July celebration always has incidents of heat-related illness due to extreme hear exposure.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? Yes, various city facilities have experienced heat-related power failure.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Commuters and any buildings in a floodplain are considered most at risk.

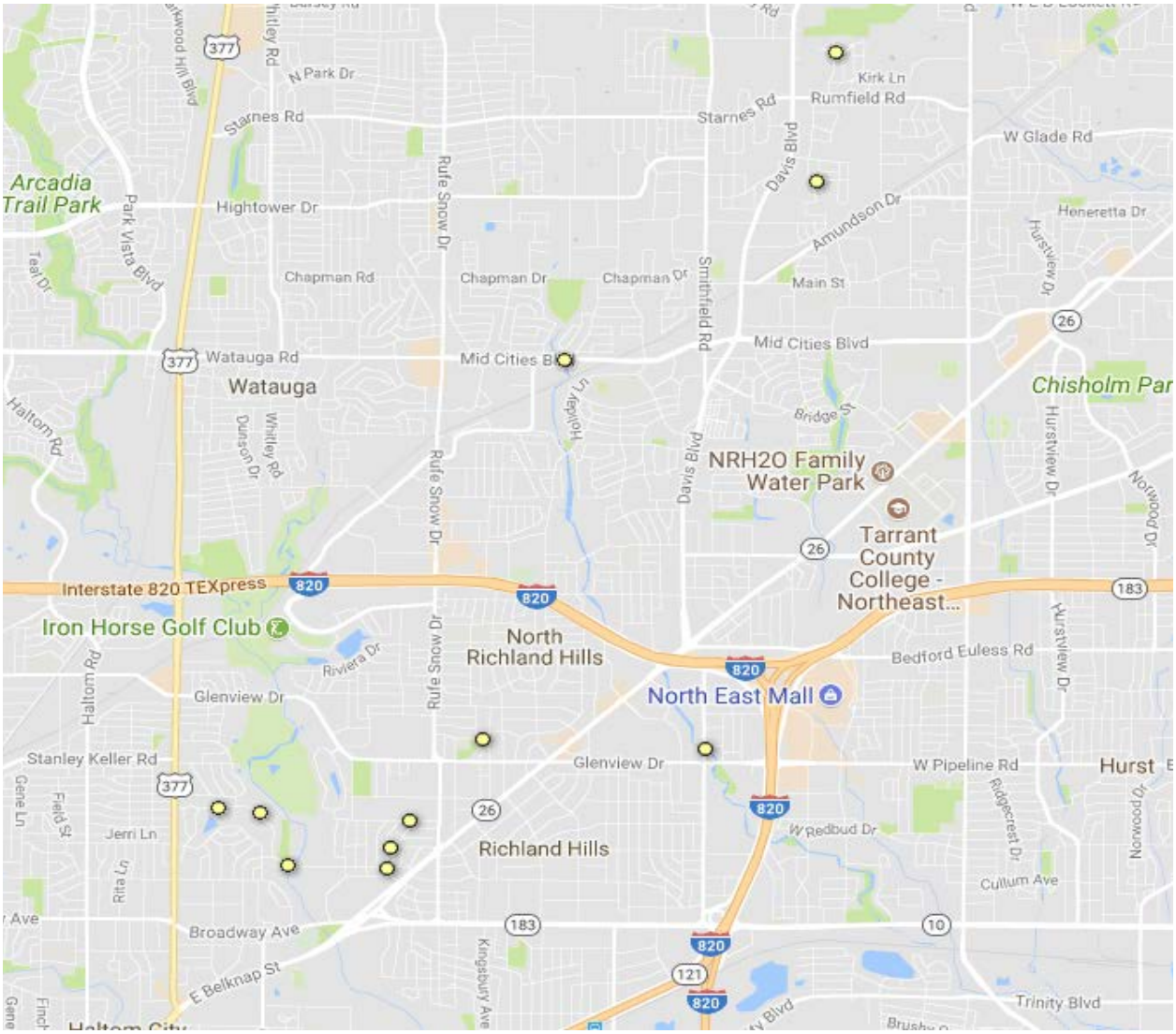
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? Yes, but there has not been permit requests related to foundation repairs since 2015.

Intersections or traffic routes impacted by flooding: In times of very high water the Big Fossil Creek crossing at Glenview Drive can crest the roadway. There is a large apartment complex located at this site with an approximate value is $5.5 million. See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Calloway Branch and its tributaries, Singing Hills Creek and its tributaries, Walker Branch and its tributaries, Big Fossil Creek and its tributaries, Mackey Creek, Little Bear Creek and its tributaries, and Mesquite Branch.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Onyx Drive South	Big Fossil Creek	Vented Ford
Wendell Drive	Big Fossil Creek, TRIB Stream BFC-6	Vented Ford
North Hills Drive	Big Fossil Creek, TRIB Stream BFC-6	Vented Ford
Booth Calloway Road	Calloway Branch	Vented Ford
Mid Cities Boulevard	Calloway Branch	Vented Ford
Northfield Drive	Little Bear Creek, TRIB Stream LB-1	Vented Ford

Road	Flooding Source	Low Water Crossing Type
Onyx Drive South	Mackey Creek	Vented Ford
Jerrell Street	Mackey Creek	Vented Ford
Onyx Drive North	Mackey Creek	Vented Ford
Manor Drive	Mackey Creek	Vented Ford
Brookview Lane	Walker Branch	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Commercial	1,560.89	134.69	9%
Agricultural	740.27	132.93	18%
Industrial	163.82	0.01	0%
Residential	6,956.62	424.21	6%
Institutional	591.37	95.63	16%
Town Center	360.86	21.61	6%
TOD	345.91	8.12	25%
Planned Development	960.56	71.66	7%
Total	**11,680.30**	**888.06**	**7.6%**

Source: City zoning and NFIP Geographic Information System (GIS) Shapefiles.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of North Richland Hills is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480607#
Community Name	City of North Richland Hills
County	Tarrant
Initial FHBM Identified	06/28/74
Initial FIRM Identified	04/01/81
Current Effective Map Date	09/25/09
Reg-Emer Date	04/01/81
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? City Engineer.

What specific flooding ordinances and plans does your jurisdiction have? Article II. Flood Damage Prevention Ordnance.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? New and substantially improved structures must be elevated at least 18 inches above base flood elevation (BFE).

What building restrictions, in regards to floodplains, does your jurisdiction enforce? New and substantially improved structures must be elevated at least 18 inches above base flood elevation (BFE), elevation certificates must be provided at form board, and construction completion prior to issuing a Certificate of Occupancy, Letters of Map Revision as necessary.

Repetitive and Severe Repetitive Loss Properties: There are currently 4 residential repetitive loss property in the southeast section of the city and 0 severe repetitive loss properties within the City of North Richland Hills. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
1,056	5.2%	81	5.9%

Source: City of North Richland Hills.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of North Richland Hills's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 266 Insurance in-force: $75,958,900 Written premium in-force: 175,183

How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: 112 claims have been filed, but 25 closed without payment. $718,857.87 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	391 structures within the SFHA
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	N/A
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes
Is floodplain management an auxiliary function?	Community FPA	Yes
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Provide review of floodplain development permits, maintain elevation certificates, current and past Flood Insurance Rate Maps, provide current data for city website, provide literature regarding floodplains to residents, offer floodplain determination letters, inspect construction within floodplain, review engineering plans for compliance with city and NFIP regulations.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	None
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes
Are there any outstanding compliance issues (i.e. current violations)?		No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		2014

Is a CAV or CAC scheduled or needed?		No
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	04/01/1981
Are the FIRMs digital or paper?	Community FPA	Digital
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes, minimum finish floor elevation 18 inches above BFE.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP	Floodplain development permit is submitted to City FPA and reviewed against the city's applicable criteria and ordinances. FEMA coordination may begin at this point if necessary if it has not already begun. Once FPA is satisfied of the projects compliance with all applicable standards, the floodplain development permit is issued. Project is followed up with during construction or when nearing completion as necessary for the project.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	Yes
What is the community's CRS Class Ranking?	Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual	7
Does your flood management plan or hazard mitigation plan include CRS planning requirements?	Community FPA, FEMA CRS Coordinator, ISO representative. CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Yes

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of thunderstorms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. While thunderstorms pose a serious threat to any population, issues with mobility could make it difficult for the elderly to evacuate ahead of such a threat or relocate after a damaging hail storm has occurred. In addition, power failures could affect necessary medical equipment for elderly or populations with functional and access needs.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Since 2015, the city has experienced approximately $438,850 in damages due to thunderstorms, according to the city fire department.

Number of homes lost due to lightning-induced fires: Data does not differentiate between lightning and other fire-inducing sources.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

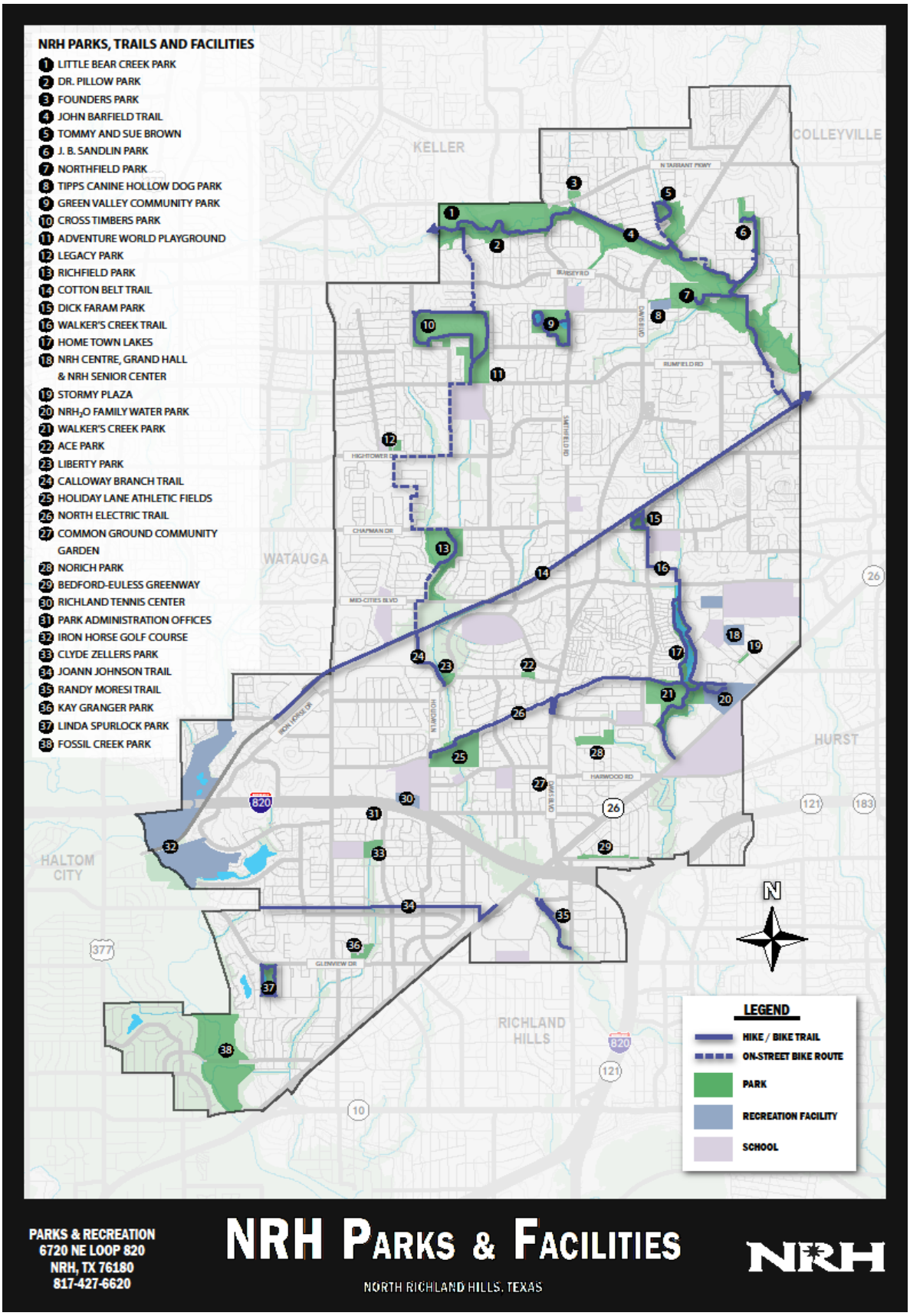
Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

Is there an area of the town that is the most vulnerable to tornadoes? The City of North Richland Hills has a mobile home park located in the center of town. This area is particularly vulnerable to tornadoes. There are also many assisted living, nursing homes, and schools within the city limits. All of these locations are vulnerable to tornadoes.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Most vulnerable location (North, East, South, West) of your jurisdiction? There are parks and/or green space throughout the city, totaling 884.44 acres of open space. Properties in the wildland-urban interface are the most vulnerable to wildfires. See the following map for park locations.


NRH PARKS, TRAILS AND FACILITIES
1 LITTLE BEAR CREEK PARK
2 DR. PILLOW PARK
3 FOUNDERS PARK
4 JOHN BARFIELD TRAIL
5 TOMMY AND SUE BROWN
6 J. B. SANDLIN PARK
7 NORTHFIELD PARK
8 TIPPS CANINE HOLLOW DOG PARK
9 GREEN VALLEY COMMUNITY PARK
10 CROSS TIMBERS PARK
11 ADVENTURE WORLD PLAYGROUND
12 LEGACY PARK
13 RICHFIELD PARK
14 COTTON BELT TRAIL
15 DICK FARAM PARK
16 WALKER'S CREEK TRAIL
17 HOME TOWN LAKES
18 NRH CENTRE, GRAND HALL & NRH SENIOR CENTER
19 STORMY PLAZA
20 NRH2O FAMILY WATER PARK
21 WALKER'S CREEK PARK
22 ACE PARK
23 LIBERTY PARK
24 CALLOWAY BRANCH TRAIL
25 HOLIDAY LANE ATHLETIC FIELDS
26 NORTH ELECTRIC TRAIL
27 COMMON GROUND COMMUNITY GARDEN
28 NORICH PARK
29 BEDFORD-EULESS GREENWAY
30 RICHLAND TENNIS CENTER
31 PARK ADMINISTRATION OFFICES
32 IRON HORSE GOLF COURSE
33 CLYDE ZELLERS PARK
34 JOANN JOHNSON TRAIL
35 RANDY MORESI TRAIL
36 KAY GRANGER PARK
37 LINDA SPURLOCK PARK
38 FOSSIL CREEK PARK
KELLER
COLLEYVILLE
WATAUGA
HURST
HALTOM CITY
RICHLAND HILLS
N
LEGEND
HIKE / BIKE TRAIL
ON-STREET BIKE ROUTE
PARK
RECREATION FACILITY
SCHOOL
PARKS & RECREATION
6720 NE LOOP 820
NRH, TX 76180
817-427-6620
NRH PARKS & FACILITIES
NORTH RICHLAND HILLS, TEXAS
NRH

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	10
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Iron Horse overpass, Rufe Snow overpass, David Boulevard overpass, and multiple overpasses locations on Loop 820.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents. There would be a delay in emergency response and an increase in life safety concerns.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of North Richland Hills between 2015 and 2017 and does not include all the damage and events that the city has collected from the fire department. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
North Richland Hills	12/27/2015	Hail	1	0	0	$0	$0	
North Richland Hills	3/8/2016	Thunderstorm Wind	52	0	0	$2,000	$0	EG
North Richland Hills	4/11/2017	Hail	1	0	0	$0	$0	
Total				**0**	**0**	**$2,000**	**$0**	

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of North Richland Hills identified their greatest vulnerabilities and concerns:

- Approximately 13.8 % of the population in North Richland Hills consists of individuals who are 65 years or older. In addition, approximately 7.8 % of individuals in North Richland Hills live in poverty; these populations would be more vulnerable to hazards than other populations.
- Expansive soils cause approximately $200,000 of damage to roads a yea.
- Expansive soils have caused over foundation repairs in over $4.5 million worth of property.
- Big Fossil Creek has crested the road at Glenview Drive near an apartment complex valued at $5.5 million in the past.
- Thunderstorms produce damage from winds, hail, and lightning multiple times each year.
- Nursing homes, assisted living centers, mobile home parks, and schools are all vulnerable to tornadoes.
- North Richland Hills has 884.44 acres of open space that is vulnerable to wildfires.
- Iron Horse overpass, Rufe Snow overpass, David Boulevard overpass, and Loop 820 overpasses at multiple locations are all vulnerable to winter weather.
- All city structures are vulnerable to water lines and power lines breaking during winter storms.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of North Richland Hills's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	No; No; No
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	Yes	No; No; No
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	No	
Transportation Plan	Yes	No; No; No
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	No; No

Acquisition of land for open space and public recreation uses	Yes	Yes; Yes
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year:** ICC/2012
Building Code Effectiveness Grading Schedule (BGEGS) Score	Yes	**Score:** 1 and 2 family residential = 4, Commercial = 4
Fire Department ISO Rating	Yes	**Rating:** 2
Site Plan Review Requirements	Yes	**Type(s) of requirement:** Form board survey required for each new building application.
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and zoning; Yes
Mitigation Planning Committee	Yes	Planning and hazard analysis; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Tree trimming, maintenance and clearing drainage systems; Yes
Mutual Aid Agreements	Yes	Response and assistance; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor warning system and Everbridge mass notification system; Yes
Hazard data and information	Yes	Geographic Information System (GIS) layers, mapping; Yes
Grant writing	Yes	Urban Areas Security Initiative (UASI) and other programs as needed; Yes
HaZUS analysis	Yes	No.
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Community Emergency Response Team (CERT), Citizens Fire Academy (CFA), Citizens Police Academy (CPA), and Citizens Civic Academy (CCA) have trained citizens who can help during a disaster and evacuations; Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Fire education programs, police education programs, emergency preparedness programs; Yes
Natural disaster or safety related school programs	Yes	Coordinate with staff and students on education programs; Yes
StormReady certification	Yes	StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education and awareness. To be officially StormReady, a community must: Establish a 24-hour warning point and emergency operations center. Have more than one way to receive severe weather warnings and forecasts and to alert the public. Create a system that monitors weather conditions locally. Promote the importance of public readiness through community seminars. Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises. Yes
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	Works with local hospital and healthcare systems to coordinate issues; Yes
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	No; Yes
Authority to levy taxes for specific purposes	Yes	No; Yes
Fees for water, sewer, gas, and/or electric services	Yes	No; Yes
Impact fees for new development	Yes	No; Yes
Stormwater utility fee	Yes	No; Yes
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	No; Yes
Incur debt through private activities	No	
Community Development Block Grant	Yes	No; Yes
Other federal funding programs	Yes	Yes, hazard mitigation grants for cleaning up infrastructure after a large flood; Yes
State funding programs	Yes	No; Yes
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates, and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of North Richland Hills's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Improve the City of North Richland Hills's first responder capabilities to prepare for and respond to all-hazard events.	Conduct annual disaster exercises involving all response agencies and city departments.	12 months	Office of Emergency Management, first responder agencies, city departments	$50,000	$1,000,000	City budget, Federal Emergency Management Agency (FEMA) Homeland Security Grant Program
		STATUS: Deferred to 2020 HazMAP					
		Train first responders and city department representatives annually on Emergency Operation Center (EOC) procedures.	12 months	Office of Emergency Management, first responder agencies, city departments	$10,000	$100,000	City budget, grants, FEMA Homeland Security Grant Program
		STATUS: Deferred to 2020 HazMAP					
		Conduct annual continuity of operations exercise for all city departments.	12 months	Office of Emergency Management, city departments	$40,000	$160,000	City budget, FEMA Homeland Security Grant Program
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High	Increase citizen severe thunderstorm/windstorm	Distribute severe weather mitigation literature at	36 months	Office of Emergency Management	$2,000	$20,000	City budget, FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Winds, Tornadoes	mitigation in the City of North Richland Hills.	appropriate/identified events.					
		STATUS: Deferred to 2020 HazMAP					
		Provide weather radios to identified special needs citizens (for example, elderly, rural, low-income).	12 months	Office of Emergency Management	$15,000	$200,000	Grants, city budget, FEMA
		STATUS: Deferred to 2020 HazMAP					
		Create covered areas for city equipment/vehicles at the City Service Center.	12 months	Office of Emergency Management, Public Works Department	$80,000	$320,000	Grants, city budget, FEMA
		STATUS: Deferred to 2020 HazMAP					
Flooding	Improve the City of North Richland Hills's flooding information distribution and warning to citizens.	Continue efforts to lower the city's Community Rating System (CRS) rating.	12 months	Office of Emergency Management, City Floodplain Administrator, Engineering Department	Unknown	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Flooding	Eliminate repetitive loss properties in the City of North Richland Hills.	Continue to identify repetitive loss areas and structures.	24 months	Office of Emergency Management, City Floodplain Administrator, Engineering Department	Unknown	Unknown	City budget, FEMA Severe Repetitive Loss Program, United States Department of Housing and Urban Development (HUD) Sustainable Housing and Communities Program
		STATUS: Deferred to 2020 HazMAP					
		Continue to relocate/acquire structures that could be affected by flooding.	36 months	Office of Emergency Management, City Floodplain Administrator, Engineering Department	$15,000	$250,000	City budget, grants, Hazard Mitigation Grant Program (HMGP), HUD Community Development Block Grant (CDBG)
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Flooding	Improve the City of North Richland Hills's drainage system.	Design, construct, and maintain drainage improvement projects, including areas of the city to minimize the risk of loss of life and future flood damages.	12 months	Office of Emergency Management, City Floodplain Administrator, Engineering Department	Unknown	Unknown	City budget, federal funding, HMGP
		STATUS: Deferred to 2020 HazMAP					
Dam Failure	Improve the City of North Richland Hills's dam failure information distribution and warning to citizens.	Distribute dam failure preparedness/mitigation literature at community events.	12 months	Office of Emergency Management, city officials	$2,500	$10,000	Unknown
		STATUS: Deferred to 2020 HazMAP					
Dam Failure	Improve the City of North Richland Hills's first responder capabilities to prepare for and respond to dam failure events.	Train all first responders on dam failure awareness and response.	12 months	Office of Emergency Management, Fire Department	$10,500	$40,000	Unidentified
		STATUS: Deferred to 2020 HazMAP					
		Conduct a dam breech analysis study and take appropriate remedial actions.	24 months	Office of Emergency Management, Public Works Department	$12,000	$50,000	Unidentified

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Improve the City of North Richland Hills's information distribution and warning capabilities to citizens.	Acquire 10 generators for running signal lights at major thoroughfares.	6 months	Public Works Department	Unknown	Unknown	City budget, FEMA Homeland Security Grant Program, HUD CDBG
		STATUS: Deferred to 2020 HazMAP					
Hail	Improve the City of North Richland Hills's mitigation to hailstorms.	Replace metal roofing with hail-resistant roofing for all city buildings.	24 months	Facilities Department	Unknown	Unknown	City budget, FEMA, HMGP
		STATUS: Deleted- action is irrelevant					
		Create covered areas for city equipment/vehicles various locations that city vehicles are parked.	12 months	Facilities Department	$80,000	$320,000	City budget, FEMA, HMGP
		STATUS: Deferred to 2020 HazMAP					
Hail	Improve the City of North Richland Hills's hailstorm information distribution and warning to citizens.	Distribute hailstorm preparedness literature at community events.	36 months	Office of Emergency Management, city officials	$2,500	$100,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Protect critical facilities and vulnerable	Identify critical facilities in wildfire hazard areas	6 months	Office of Emergency	Unknown	Unknown	City budget, FEMA

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	populations from the effects of urban grass/wildfires in the City of North Richland Hills.	and develop an awareness program and take appropriate remedial action.		Management, Fire Department			Firefighter Assistance Grant Program
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Encourage the protection of residential and commercial structures in the City of North Richland Hills.	Educate homeowners during Fire Prevention month on mitigation (October).	6 months	Office of Emergency Management, Fire Department	$2,000	$8,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Winter Storms	Improve first responder capabilities to prepare for, respond to, and recover from severe winter storms in the City of North Richland Hills.	Provide more ice control capability for public works equipment.	12 months	Public Works Department	Unknown	Unknown	City budget, HMGP
		STATUS: Deferred to 2020 HazMAP					
Winter Storms	Improve the City of North Richland Hills's capability to prepare for, respond to, and recover from severe winter storms.	Establish programs to protect the poor, ill, and elderly during extreme winter temperatures.	24 months	Office of Emergency Management	Unknown	Unknown	City budget, HUD CDBG, FEMA
		STATUS: Deferred to 2020 HazMAP					
Winter Storms	Increase citizen severe winter storm awareness,	Distribute severe winter weather	12 months	Office of Emergency	$2,000	$20,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	preparedness, and response in the City of North Richland Hills.	preparedness/mitigation literature at appropriate/identified community events.		Management, city officials			
		STATUS: Deferred to 2020 HazMAP					
		Acquire larger generator for EOC operations.	12 months	Office of Emergency Management, National Weather Service	$200,000	$800,000	City budget, grants
		STATUS: Deferred to 2020 HazMAP					
Infectious Disease Outbreak	Improve the City of North Richland Hills's first responder capabilities to prepare for and respond to pandemic/epidemic events.	Train all first responders on pandemic flu response.	12 months	Environmental Services Department, Tarrant County Health and Human Services Department	$5,000	$50,000	City budget, FEMA Homeland Security Grant Program
		STATUS: Deleted- technological hazards not included in the new plan					
		Participate in Strategic National Stockpile drills and exercises.	12 months	Office of Emergency Management, Environmental Services Department,	$5,000	$50,000	City budget, FEMA Homeland Security Grant Program

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
				Tarrant County Health and Human Services Department			
		STATUS: Deleted- technological hazards not included in the new plan					
		Acquire infectious disease personal protective equipment for all first responders.	12 months	Office of Emergency Management, Environmental Services Department, Fire Department	$5,000	$50,000	City budget, FEMA Homeland Security Grant Program
		STATUS: Deleted- technological hazards not included in the new plan					
		Augment equipment for establishing point of distribution sites for first responders.	12 months	Environmental Services Department	$20,000	$80,000	City budget, FEMA Public Assistance Grant Program
		STATUS: Deleted- technological hazards not included in the new plan					
Infectious Disease Outbreak	Improve the City of North Richland Hills's pandemic/epidemic information distribution and warning to citizens.	Educate the public on pandemics, including isolation, quarantine, triage, and medical care.	36 months	Office of Emergency Management, Environmental Services Department, Tarrant	$2,000	$20,000	City budget, public health grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
				County Health and Human Services Department			
		STATUS: Deleted- technological hazards not included in the new plan					
Drought	Protect critical facilities and vulnerable agriculture in the City of North Richland Hills from the effects of drought conditions.	Continue to identify and implement water conservations efforts before, during, and after times of drought.	6 months	Office of Emergency Management	$2,500	$50,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Drought	Review North Richland Hills water enforcement legislation and update as necessary to mitigate the effects of drought.	Review current legislation for water conservation enforcement in North Richland Hills.	October 2016	Office of Emergency Management, Public Works Department	$0	$150,000	Local and federal funds
		STATUS: Deferred to 2020 HazMAP					
		Develop or update water conservation enforcement legislation to ensure effective practices during periods of drought.	October 2016	Office of Emergency Management, Public Works Department	$0	$500,000	Local and federal funds
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Drought	Develop contingency plans for North Richland Hills to ensure adequate power and water supply during prolonged periods of drought.	Review current contingency plans.	Unknown	Office of Emergency Management, Public Works Department	$0	$100,000	Local and federal funds
		STATUS: Deferred to 2020 HazMAP					
		Develop or update potable water contingency plans.	Unknown	Office of Emergency Management, Public Works Department	$0	$100,000	Local and federal funds
		STATUS: Deferred to 2020 HazMAP					
		Develop or update power supply contingency plans.	Unknown	Office of Emergency Management, Public Works Department	$0	$100,000	Local and federal funds
		STATUS: Deferred to 2020 HazMAP					
Drought	Upgrade water and irrigation systems to conserve water in North Richland Hills.	Installing efficient irrigation systems in new city facilities.	October 2020	Office of Emergency Management, Public Works Department	$50,000	$100,000	Local and federal funds
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Drought	Protect critical facilities and vulnerable agriculture in the City of North Richland Hills from the effects of drought conditions.	Educate citizens in the City about the potential negative effects that arise from extended drought conditions.	12 months	Office of Emergency Management	$1,000	$50,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Drought	Develop a drought awareness education program for North Richland Hills citizens.	Evaluate the hazards posed by drought in North Richland Hills.	October 2014	Office of Emergency Management	$0	$100,000	Local and federal funds
		STATUS: Deferred to 2020 HazMAP					
		Develop a drought awareness education program that provides tips and pertinent information for ensuring the protection of property and the environment against drought.	October 2014	Office of Emergency Management	$0	$100,000	Local and federal funds
		STATUS: Deferred to 2020 HazMAP					
Drought	Distribute drought awareness information to North Richland Hills citizens.	Provide drought awareness information to North Richland Hills citizens through a social media campaign.	October 2014	Office of Emergency Management	$0	$100,000	Local and federal funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
		Provide drought awareness information through the North Richland Hills website.	October 2014	Office of Emergency Management	$0	$100,000	Local and federal funds
		STATUS: Deferred to 2020 HazMAP					
Terrorism	Increase citizen domestic and international terrorism mitigation activities in the City of North Richland Hills.	Provide satellite and microwave capability for mobile command post.	24 months	Office of Emergency Management	$100,000	$400,000	City budget, FEMA Homeland Security Grant Program
		STATUS: Deleted- technological hazards not included in the new plan					
		Provide more close captioned TV (CCTV) at identified public sites.	12 months	Public Works Department	$1,200,000	$4,800,000	City budget, FEMA Homeland Security Grant Program
		STATUS: Deleted- technological hazards not included in the new plan					
		Install security-related equipment (CCTV) at City Hall.	12 months	Public Works Department	$250,000	$100,000	City budget, FEMA Homeland Security Grant Program
		STATUS: Deleted- technological hazards not included in the new plan					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Terrorism	Increase citizen domestic and international terrorism mitigation activities in the City of North Richland Hills.	Train all first responders on CBRNE response.	12 months	Environmental Services Department	$5,000	$100,000	City budget, FEMA Competitive Training Grant Program
		STATUS: Deleted- technological hazards not included in the new plan					
Terrorism	Increase citizen domestic and international terrorism mitigation activities in the City of North Richland Hills.	Increase public terrorism awareness through public speaking engagements.	36 months	Police Department	$1,000	$5,000	City budget
		STATUS: Deleted- technological hazards not included in the new plan					
		Increase awareness of potential incidents in public schools.	36 months	Police Department, school officials	$2,000	$6,000	City budget, school budget, Department of Education Readiness and Emergency Management for Schools Program
		STATUS: Deleted- technological hazards not included in the new plan					
Lightning	Increase citizen lightning awareness in the City of North Richland Hills.	Institute a public education campaign and associated signage for walking trails and city parks.	24 months	Parks and Recreation Department	Unknown	Unknown	City budget, FEMA Hazard Mitigation Grant Program

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
		Install lightning and electric arrestors at city sites; lift stations and pump stations.	12 months	Public Works Department, Facilities Department	Unknown	Unknown	City budget, FEMA Hazard Mitigation Grant Program
		STATUS: Deferred to 2020 HazMAP					
		Provide lightning protection systems for outdoor facilities.	12 months	Office of Emergency Management, Parks and Recreation Department, Facilities Department	Unknown	Unknown	Unknown
		STATUS: Deferred to 2020 HazMAP					
Lightning	Increase citizen lightning awareness in the City of North Richland Hills.	Distribute lightning awareness literature at appropriate/ identified community events.	36 months	Office of Emergency Management	$2,000	$20,000	City Budget
		STATUS: Deferred to 2020 HazMAP					
Hazardous Materials Release	Improve the City of North Richland Hills's capability to prepare for, respond to, and recover from hazardous material events.	Provide hazardous material response equipment.	12 months	Environmental Services Department, Fire Department	Unknown	Unknown	City budget, FEMA Commercial Equipment Direct Assistance

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
							Program, Superfund Amendments and Reauthorization Act (SARA), Title III
		STATUS: Deleted- technological hazards no longer included in the new plan					
		Provide first responders air monitoring equipment and calibration.	6 months	Environmental Services Department	Unknown	Unknown	City budget, FEMA Commercial Equipment Direct Assistance Program, SARA, Title III
		STATUS: Deleted- technological hazards no longer included in the new plan					
		Provide training for first responders on air monitoring equipment and calibration.	6 months	Environmental Services Department	Unknown	Unknown	FEMA Commercial Equipment Direct Assistance Program, SARA, Title III
		STATUS: Deleted- technological hazards no longer included in the new plan					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Extreme Temperatures	Improve the City of North Richland Hills's first responder capabilities to mitigate extreme heat events.	Open cooling centers and take appropriate action to make available.	12 months	Office of Emergency Management	Unknown	Unknown	City budget
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Improve the City of North Richland Hills's extreme heat mitigation information distribution and warning to citizens.	Distribute extreme temperature mitigation literature at community events.	12 months	Office of Emergency Management, city officials	$2,500	$100,000	City budget
		STATUS: Deferred to 2020 HazMAP					
Expansive Soils	Mitigate expansive soils in North Richland Hills.	Improve construction techniques through building code enhancements.	October 2020	Office of Emergency Management, Public Works Department	$0	$50,000	Local and federal funds
		STATUS: Deferred to 2020 HazMAP					
		Educate construction contractors, homeowners, and business owners about mitigation techniques.	October 2020	Office of Emergency Management, Public Works Department	$0	$50,000	Local and federal funds
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Hail	Provide hail resistant parking for city owned vehicles.	Evaluate the need and locations to build protection from hail for city vehicles. Install covered parking at the locations where needed.	2020	Facility Maintenance Department	$100,000	Unknown	General fund
		STATUS: Deferred to 2020 HazMAP					
Hail	Increase awareness to the citizens on how the can protect themselves and their property from the effects of hail.	Provide educational materials on what type of roofs and windows stand up to hail the best. Use other forms of media to teach people how to protect themselves from hail.	2019	Office of Emergency Management	$1,500	Unknown	General fund
		STATUS: Deferred to 2020 HazMAP					
Lightning	Develop a lightning mitigation education program for the City of North Richland Hills.	Reach out to community groups and provide them a one hour education program on the dangers of lightning and how to protect themselves from lightning through mitigation activities.	2015	Office of Emergency Management	Staff Time	Unknown	General fund
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Wildfire	Reduce the amount of fuel available for the spread of a wildfire.	Aggressively enforce our high weed and grass ordinance to reduce the height of grasses and other natural habitat that does offer fuel for advancing wildfires. This enforcement does offer a great deal of mitigation against the rapid growth of wildfires.	As funding is available	Code Enforcement Division	Cost associated with personnel.	Unknown	General fund
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	During these times of extreme heat we will initiate public service announcements (PSAs) to target the population that may be at the highest risk from the effects of extreme heat.	The City of North Richland Hills will actively determine parameters for the opening of cooling centers to allow citizens, especially vulnerable populations, to seek refuge from extreme temperatures.	As funding is available	Parks Department	The city currently has several facilities that could be utilized for cooling centers, the costs are minimal. Mainly additional utility and personnel	Unknown	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
					related costs.		
		STATUS: Deferred to 2020 HazMAP					

5.3 New Action Items

The City of North Richland Hills's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[2] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Flooding**
Continue to identify repetitive loss areas and structures.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	1
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	**Flooding**
Continue to relocate/acquire structures that could be affected by flooding.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	2
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Flooding
Design, construct, and maintain drainage improvement projects, including areas of the city to minimize the risk of loss of life and future flood damages.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	3
Estimated Cost:	$15,000
Estimated Benefit:	$90,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, City Floodplain Administrator, Engineering Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Distribute flood mitigation literature at community events, to include the dangers of dam failure.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	4
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Train all first responders on dam failure awareness, mitigation, and response.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	5
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, hazard mitigation grants, Homeland Security Grant Program
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Work with the state to conduct a study to determine inundation zones, vulnerability to, and potential impacts of a dam failure and take appropriate remedial actions.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	6
Estimated Cost:	$12,000
Estimated Benefit:	$72,000
Potential Funding Source(s):	City budget, hazard mitigation grants, Homeland Security Grant Program
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Continue efforts to improve the City's CRS rating.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	7
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Review and enhance water conservation enforcement legislation to ensure effective practices during periods of drought.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	8
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Review and enhance current contingency plans, to include potable water and power supply plans.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	9
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Expansive Soils
Install efficient irrigation systems in new and existing city facilities	
Participating Jurisdiction:	City of North Richland Hills
Priority:	10
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works and Transportation Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Using multiple outlets, provide public education to mitigate drought damage.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	11
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Adopt and implement ICC/2018 Building Codes, requiring new construction of public buildings and schools to have safe rooms.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	12
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Building Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes
Using multiple outlets, provide public education to mitigate earthquake damage.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	13
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City budget, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Expansive Soils
Educate construction contractors, homeowners, and business owners about mitigation techniques for expansive soils.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	14
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Extreme Heat, Winter Storms
Using multiple outlets, provide public education to mitigate the negative effects of extreme temperatures.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	15
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City budget, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Extreme Heat, Winter Storms
The City of North Richland Hills will actively determine parameters for the opening of cooling and warming centers, and acquire the need resources, to allow citizens, especially vulnerable populations, to seek refuge from extreme temperatures.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	16
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Parks Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Extreme Heat, Thunderstorms, Winter Storms
Install fortified covered parking for critical vehicles, equipment and nearby pedestrians at locations where needed, to include the City Service Center.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	17
Estimated Cost:	$80,000
Estimated Benefit:	$480,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Facilities Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Using multiple outlets, provide public education to mitigate thunderstorm and tornado damage, to include what type of roofs and windows stand up to sever weather the best.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	18
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Conduct annual disaster exercises involving all response agencies and City departments.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	19
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City budget, Homeland Security Grant Program
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Train first responders and city department representatives annually on Emergency Operation Center (EOC) procedures for severe weather.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	20
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City budget, Homeland Security Grant Program, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Conduct annual continuity of operations involving all response agencies and city departments.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	21
Estimated Cost:	$40,000
Estimated Benefit:	$240,000
Potential Funding Source(s):	City budget, Homeland Security Grant Program, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Extreme Heat, Flooding, Thunderstorms, Tornadoes
Provide weather radios to identified special needs citizens (for example, elderly, rural, low-income).	
Participating Jurisdiction:	City of North Richland Hills
Priority:	22
Estimated Cost:	$15,000
Estimated Benefit:	$90,000
Potential Funding Source(s):	City budget, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Acquire 10 generators for running signal lights at major thoroughfares.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	23
Estimated Cost:	$250,000
Estimated Benefit:	$1,500,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Institute a public education campaign and associated signage for walking trails and city parks.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	24
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City budget, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Parks Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms
Install lightning and electric arrestors at critical facilities, lift stations, and pump stations.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	25
Estimated Cost:	$80,000
Estimated Benefit:	$480,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department, Facilities Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Assist multi-families in residential structures and facilities that house at-risk special needs populations (nursing homes) with funding for tornado safe rooms.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	26
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Building Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Wildfire
Identify critical facilities in wildfire hazard areas and develop an awareness program for mitigation actions.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	27
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Fire Department, staff time
Implementation Schedule:	12 months

Hazard(s) Addressed	Wildfire
Educate homeowners during Fire Prevention Month (October) on mitigation activities.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	28
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Fire Department, staff time
Implementation Schedule:	12 months

Hazard(s) Addressed	Wildfire
Aggressively enforce the high weed and grass ordinance to reduce the height of grasses and other natural habitat that does offer fuel for advancing wildfires. This enforcement does offer a great deal of mitigation against the rapid growth of wildfires.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	29
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Code Enforcement
Implementation Schedule:	12 months

Hazard(s) Addressed	Winter Storms
Provide additional ice control capabilities for public works equipment.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	30
Estimated Cost:	$250,000
Estimated Benefit:	$1,500,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Extreme Heat, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Acquire a larger generator for EOC operations.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	31
Estimated Cost:	$250,000
Estimated Benefit:	$1,500,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Facilities Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes
Conduct a seismic vulnerability study to assess seismic sources, soil conditions and related potential hazards as well as the impacts to our community.	
Participating Jurisdiction:	City of North Richland Hills
Priority:	31
Estimated Cost:	$20,000
Estimated Benefit:	$120,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plan	Public Works Department, Office of Emergency Management, City Administration	Annually	Flooding, retention, and drainage projects	The Office of Emergency Management will participate in the review process and suggest changes based on mitigation goals.
Land Use Plan	Public Works Department, Office of Emergency Management, City Administration	As needed	Land use	City leadership will review the HazMAP for its impact on plan revisions and implementation.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of North Richland Hills. For additional information, see Appendices A and B.

Town of Pantego*

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

The Town of Pantego is a new participant in the Tarrant County Hazard Mitigation Action Plan (HazMAP) and does not have a previous mitigation plan.

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County HazMAP planning process for the Town of Pantego, a new participant in the HazMAP, was the Chief of Public Service/Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the Town of Pantego alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

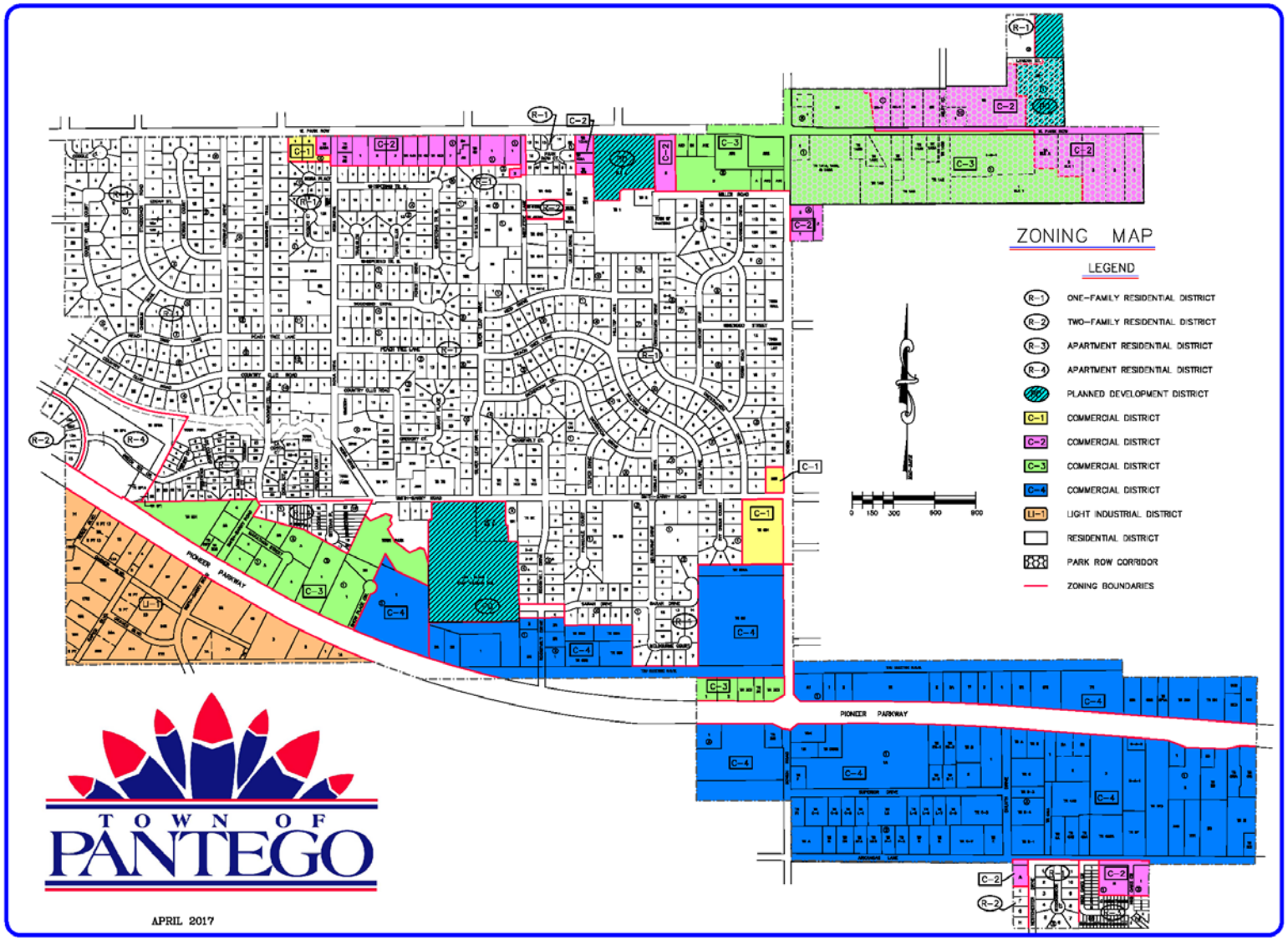
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the Town of Pantego will take the HazMAP to Town Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

The following map provides an overview of the Town of Pantego:

- Zoning Map


ZONING MAP
LEGEND
R-1 ONE-FAMILY RESIDENTIAL DISTRICT
R-2 TWO-FAMILY RESIDENTIAL DISTRICT
R-3 APARTMENT RESIDENTIAL DISTRICT
R-4 APARTMENT RESIDENTIAL DISTRICT
PD PLANNED DEVELOPMENT DISTRICT
C-1 COMMERCIAL DISTRICT
C-2 COMMERCIAL DISTRICT
C-3 COMMERCIAL DISTRICT
C-4 COMMERCIAL DISTRICT
LI-1 LIGHT INDUSTRIAL DISTRICT
RESIDENTIAL DISTRICT
PARK ROW CORRIDOR
ZONING BOUNDARIES
0 150 300 600 900
PIONEER PARKWAY
TOWN OF
PANTEGO
APRIL 2017

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the Town of Pantego has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped town officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The town's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The town developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the Town of Pantego's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the town's Fire Chief / Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the Town of Pantego. The town acted as the plan development consultant, providing hazard mitigation planning services.

Town of Pantego Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
Town of Pantego	Fire Department	Fire Chief	General oversight, hazard identification, and plan development
Town of Pantego	Town Administration	Town Manager	Hazard identification and plan development
Town of Pantego	Police Department	Police Chief	Hazard identification and plan development
Town of Pantego	Public Works Department	Director	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the town, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the town in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

As the Town of Pantego is a new participant in the Tarrant County HazMAP, there are no changes in development since the previous plan.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the Town of Pantego.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	2,543
Persons under 5 years (%)	Data unavailable
Persons 65 years and over (%)	25%
Language other than English spoken at home (%)	Data unavailable
With a disability, under age 65 (%)	Data unavailable
Persons without health insurance, under age 65 (%)	11
Persons in poverty (%)	10.5
Median household income	$60,972
Households, 2012-2016	1,107
Median value of owner-occupied housing units, 2012-2016	$180,700

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the Town of Pantego.

Town of Pantego Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Police Department and Municipal Court 2600 Miller Lane	Government facility
Town Hall 1614 South Bowen Road (Includes town's administrative offices, Utility Department, Finance Department, and Building Inspections/Code Enforcement offices.)	Government facility

Town of Pantego Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Lift Station 3613 Shady Valley Drive	Water infrastructure
Well Sites 2007 West Pioneer Parkway, 3624 Garner Boulevard, 1604 Nora Drive, and 1704 ½ Dickerson Drive	Water infrastructure

*The capacity, square footage, and structure/content value are unavailable for these assets.

3.3 Natural Hazard Profiles

The Town of Pantego's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the Town of Pantego in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
N/A	Wildfire
1	Thunderstorm (includes hail, wind, lightning)
2	Tornado
3	Extreme Heat
4	Drought
5	Expansive Soils
6	Winter Storms
7	Flooding
8	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire Town of Pantego.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Significant
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	There is no historical data for drought damage in the town. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Rise in water costs would affect the population living below the poverty line. Businesses affected would be primarily restaurants, which rely upon water for their operations. The local government would suffer from a loss of potential revenue from water usage. Potential losses on water revenue could amount to $38-56,000 monthly if a complete loss of water occurred.

Jurisdiction's ground-water supply: All water in the Town of Pantego comes from well sources.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: There is water restrictions only when well maintenance or inoperability is in effect. Water restrictions involve limiting lawn watering and hard-surface washing.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data. The loss to the economy would be the inability to buy and sell in the retail districts and the inability to produce in the light manufacturing districts. Potential revenue losses from a total destruction scenario would amount to 62% of general fund revenue from sales taxes. The amount of revenue lost from manufacturing is not calculated as it has a minimal impact on revenue. Structures affected include the fire station, Town Hall, police station, public works facilities, court clerk's facility, well site facilities, and park structures. Estimated dollar losses would exceed $20 million.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the exact amount of damages in the town was unavailable. Expansive soils are a major consideration to all existing and future structures. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Damage from expansive soils is not collected in the Town of Pantego.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: Approximately 25% of the population in the Town of Pantego consists of individuals who are 65 years or older and would be most vulnerable to extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? There are no special events held in the Town of Pantego.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? There is no historical data of this type.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Commuters and any buildings in a floodplain are considered most at risk.

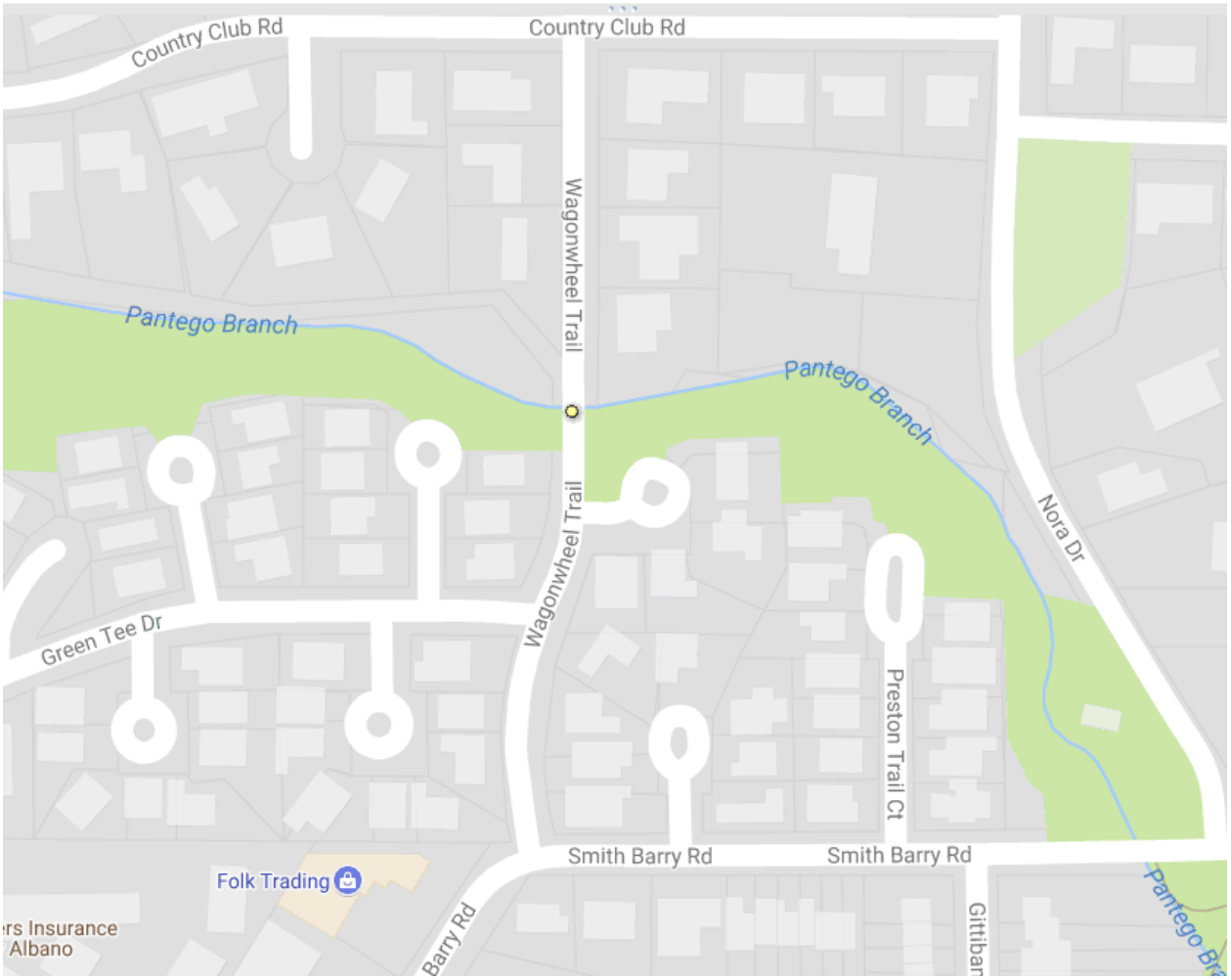
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? Yes, but repair costs are not available.

Intersections or traffic routes impacted by flooding: See the low water crossing below. This road has the potential to flood.

Names of any creeks or rivers that flood: Pantego Branch has the potential of flooding.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. This crossing can be dangerous when flooded. The one crossing in Pantego is identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Wagon Wheel Trail	Pantego Branch	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The Town of Pantego is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	481116#
Community Name	Town of Pantego
County	Tarrant
Initial FHBM Identified	08/13/76
Initial FIRM Identified	07/16/80
Current Effective Map Date	09/25/09
Reg-Emer Date	07/16/80
Tribal	NO

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? A third-party engineer with the firm of Discuilo-Stanton and Joyce.

What specific flooding ordinances and plans does your jurisdiction have? Article 3.10, Flood Damage Prevention, "The areas of special flood hazard identified by the Federal Emergency Management Agency in the current scientific and engineering report entitled, "The Flood Insurance Study (FIS) for Tarrant County, Texas and Incorporated Areas," dated September 25, 2009, with accompanying flood insurance rate maps dated September 25, 2009, and any revisions have been adopted by ordinance.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? New and substantially improved structures must be elevated at least two feet above base flood elevation (BFE).

What building restrictions, in regards to floodplains, does your jurisdiction enforce? New and substantially improved structures must be elevated at least two feet above base flood elevation (BFE).

Repetitive and Severe Repetitive Loss Properties: There is currently 1 residential repetitive loss property and 0 severe repetitive loss properties within the Town of Pantego. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the Town of Pantego's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 17 Insurance in-force: $4,243,000 Written premium in-force: $7,975
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: 17 claims have been filed, but 4 closed without payment. $39,574.45 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	At least 17 structures are at risk of flooding.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	Data unavailable.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	The NFIP coordinator is a licensed public engineer contracted by the Town of Pantego. Permits are required and all plans are required to have an engineer's stamp and are then reviewed by Town staff and contracted public engineer.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Only barrier is staffing that prevents better tracking of the above.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.

When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Data unavailable.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	08/13/76
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Permit is required. Plans required with a site plan and survey that illustrates location of structure, easements, etc. Engineer certification and review by Town engineer required.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The Town of Pantego will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of thunderstorms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Existing historical data includes damage from lightning to police/fire communications systems and Public Works communication systems. Additional historical data related to wind damage include three commercial structures that sustained roof and façade damage. Past damages have totaled $63,000.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Economic factors are primarily related to loss of revenue from sales tax due to destruction of businesses and infrastructure and loss of production ability due to loss of facilities. Potential lost sales tax revenue to the Town of Pantego is estimated at $3 million annually. Estimates of lost revenue to businesses is not available. Potential property damages could total $370,198,914, with a net taxable value of $282,484,226.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado.

Is there an area of the town that is the most vulnerable to tornadoes? All critical facilities within Pantego are vulnerable to tornadoes.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	N/A
Probability of Future Occurrence	N/A
Maximum Probable Extent	N/A
Potential Impact	N/A
Vulnerabilities	As there is no wildland-urban interface, the Town of Pantego is not susceptible to wildfires.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the town are exposed to this hazard. Although any structure is vulnerable to a severe winter event, no historical data exists that supports a past occurrence of damages of this type.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Smith Barry Road and Wagonwheel Trail.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the Town of Pantego's history, up to 2017. The material is organized by location and date.

Historical Events from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Pantego	04/30/2004	Hail	2	0	0	$0	$0	
Pantego	06/02/2004	Flash Flood		0	0	$0	$0	
Pantego	06/06/2012	Lightning		0	0	$30,000	$0	
Pantego	10/02/2014	Thunderstorm Wind	65	0	1	$10,000	$0	EG
Pantego	04/24/2015	Thunderstorm Wind	61	0	0	$15,000	$0	EG
Pantego	03/17/2016	Hail	1.5	0	0	$8,000	$0	
Total				**0**	**1**	**$63,000**	**$0**	

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The Town of Pantego identified their greatest vulnerabilities and concerns:

- The overriding concern for Pantego has been and will continue to be thunderstorm activity.
- The Town of Pantego has experienced thunderstorm activity with high wind as the predominantly contributing factor to damage within the community.
- The Town of Pantego has experienced damage from lightning activity primarily to Town owned property.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the town to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the Town of Pantego's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	No; land use; Yes
Capital Improvement Plan	Yes	Flood mitigation (not formally adopted); Yes; Yes
Economic Development Plan	Yes	Scheduled capital for equipment; Yes; Yes
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	Yes	Yes; Yes; Yes
Transportation Plan	No	
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)		
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	No; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	No	
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	
Acquisition of land for open space and public recreation uses	No	

Building Code, Permitting, and Inspections	Have capability?	
Building Code	Yes	**Version/Year: IBC/2015**
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating:** 2
Site Plan Review Requirements	Yes	**Type(s) of requirement:** staff review, approval by Planning and Zoning Commission
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Land use, Planning and Zoning Commission , plan approval; Yes
Mitigation Planning Committee	Yes	Planning and hazard assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Public Works routinely clears public drainage flumes to prevent flooding; Yes
Mutual Aid Agreements	Yes	Arlington (automatic aid), Mansfield, Dalworthington Gardens, Kennedale; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	PT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	No	Yes; Yes; Yes
Civil Engineer	PT	Yes; Yes; Yes
GIS Coordinator	No	
Other: Police and Fire Chiefs	FT	Yes; Yes; Yes
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Blackboard Connect communication system; Yes
Hazard data and information	Yes	Floodplain data, weather data from events; Yes
Grant writing	Yes	Grants are written by appropriate department head; No
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	No	
Natural disaster or safety related school programs	No	
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	No	
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes; Yes
Authority to levy taxes for specific purposes	Yes	Yes, street maintenance; Yes
Fees for water, sewer, gas, and/or electric services	Yes	Yes, water/sewer; Yes
Impact fees for new development	No	
Stormwater utility fee	No	
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes; Yes
Incur debt through private activities	No	
Community Development Block	Yes	Yes, sidewalks; No

Grant		
Other federal funding programs	No	
State funding programs	No	
Other	Yes	Mobility funds from Tarrant County transportation funding to rebuild roads; Yes

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

As a new participant, the Town of Pantego does not have previous mitigation actions to review.

5.3 New Action Items

The Town of Pantego's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[2] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.
[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Adopt and implement most current International Code Council building codes.	
Participating Jurisdiction:	Town of Pantego
Priority:	1
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Community Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Purchase and install generators for new and existing critical facilities.	
Participating Jurisdiction:	Town of Pantego
Priority:	2
Estimated Cost:	$150,000
Estimated Benefit:	$900,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Community Development Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Install safe rooms in new and existing town buildings.	
Participating Jurisdiction:	Town of Pantego
Priority:	3
Estimated Cost:	$3,000,000
Estimated Benefit:	$18,000,000
Potential Funding Source(s):	Town budget, hazard mitigation grants
Lead Agency/Department Responsible:	Community Development Department
Implementation Schedule:	48 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Develop and implement a comprehensive public education program that includes recommended actions to mitigate the impacts of these hazards.	
Participating Jurisdiction:	Town of Pantego
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Town budget, hazard mitigation grants, town funding for staff time
Lead Agency/Department Responsible:	Public Safety Department, Community Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Create and implement a drought contingency plan for the town facilities and property that addresses the use of low flow fixtures, xeriscaping, or drought-tolerant plants.	
Participating Jurisdiction:	Town of Pantego
Priority:	5
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Town budget, HMGP, staff time
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Participate in FEMA's Community Rating System to lower flood insurance premiums for residents with flood insurance.	
Participating Jurisdiction:	Town of Pantego
Priority:	6
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	Town budget, hazard mitigation grants, town funding for staff time
Lead Agency/Department Responsible:	Community Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	Town of Pantego
Priority:	7
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the floodplain administrator to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	Town of Pantego
Priority:	8
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	Town of Pantego
Priority:	9
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	Town of Pantego
Priority:	10
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	Town of Pantego
Priority:	11
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	Town of Pantego
Priority:	12
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	Town of Pantego
Priority:	13
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the state to conduct a study to determine inundation zones, vulnerability to, and potential impacts of a dam failure.	
Participating Jurisdiction:	Town of Pantego
Priority:	14
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the town were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the town, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.

5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Parks Master Plan	Zoning and Development	Every 5 years or as needed	Reference the HazMAP and incorporate relevant mitigation techniques.	At the update of this plan, planning members will reference the HazMAP. Town Council will vote to adopt the update.
Comprehensive Plan	Town Council	As needed	Reference the HazMAP and incorporate relevant mitigation techniques.	At the update of this plan, planning members will reference the HazMAP. Town Council will vote to adopt the update.
Capital Improvement Project	Public Works	As needed	Reference the HazMAP and incorporate drainage improvements and other relevant mitigation techniques that pertain to critical infrastructure.	At the update of this plan, planning members will reference the HazMAP. Town Council will vote to adopt the update.
Water Resource Management Plan	Town Manager, Public Works	As needed	Reference the HazMAP and incorporate relevant mitigation techniques.	At the update of this plan, planning members will reference the HazMAP. Town Council will vote to adopt the update.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the Town of Pantego. For additional information, see Appendices A and B.

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City of Richland Hills

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Richland Hills was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Richland Hills alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Richland Hills will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Richland Hills has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Richland Hills's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Richland Hills. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Richland Hills Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Richland Hills	Fire Department	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Richland Hills	Fire Department	Fire Chief	Hazard identification and plan development
City of Richland Hills	Neighborhood Services Department	Director	Hazard identification and plan development
City of Richland Hills	City Manager's Office	City Manager	Hazard identification and plan development
City of Richland Hills	City Manager's Office	Assistant City Manager	Hazard identification and plan development
City of Richland Hills	Environmental Services Department	Director	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no recorded change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: A full list of completed mitigation action items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Richland Hills.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	8,052
Persons under 5 years (%)	5.5
Persons 65 years and over (%)	17.6
Language other than English spoken at home (%)	21.3
With a disability, under age 65 (%)	10.2
Persons without health insurance, under age 65 (%)	25
Persons in poverty (%)	10.3
Median household income	$50,481
Households, 2012-2016	3,108
Median value of owner-occupied housing units, 2012-2016	$111,000

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Richland Hills. The 2017 Tarrant Appraisal District value for the entire community is $528, 320,000.

City of Richland Hills Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Richland Hill City Hall 3200 Diana Drive	Government Facility
Police Department 6700 Baker Boulevard	Government Facility
Public Works Department 6700 Rena Drive	Government Facility
Fire Station 3201 Diana Drive	Government Facility
The Link Event & Recreation Center 6750 Baker Boulevard	Recreation Center

*The capacity, square footage, and structure/content value of these assets were unavailable.

3.3 Natural Hazard Profiles

The City of Richland Hills's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Richland Hills in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Thunderstorm (includes hail, wind, lightning)
2	Expansive Soils
3	Extreme Heat
4	Drought
5	Flooding
6	Tornado
7	Winter Storms
8	Earthquake
9	Wildfire

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Richland Hills.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	There is no historical data for drought damage in the city. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. The city has two large landscaping companies that stand to be at a significant risk of economic impact in the event of a sustained drought. Their annual sales tax impact to the community combined is $150,000.

Jurisdiction's ground-water supply: Supply comes from the City of Fort Worth and two city-owned groundwater wells.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: The City of Richland Hills follows the City of Fort Worth's water restriction guidelines.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data. The estimated value of the community is $528,320,000.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the total amount of damages in the city is unclear. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: The city experiences infrastructure damage on an annual basis from expansive soils. Estimated annual repair costs for roads, water lines, and sanitary sewer repairs is estimated over the last five years are approximately $1.5 million, but the damage to buildings and facilities is unknown.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: Richland Hills has a large community of retirement aged persons or older, with a total of four skilled nursing facilities with a patient count over 300. There are three schools and three childcare facilities in the city and the total population serviced by these facilities is estimated at 1,700 students and children.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? No cases have been reported.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Significant
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Commuters and any buildings in a floodplain are considered most at risk. There are 36 commercial buildings and 390 residential structures within the 100-year floodplain. Based on geographical information, $88,000,000 in improved property is exposed to potential flood damages. Of the total assessed value improvement in the city, 18% is at risk from a 100-year storm event. There have been a total of 74 FEMA flood insurance claims within the city for a total of $1,113,570. 11% of the city's residential parcels and 3% of the residential parcels are located within the 100-year floodplain.

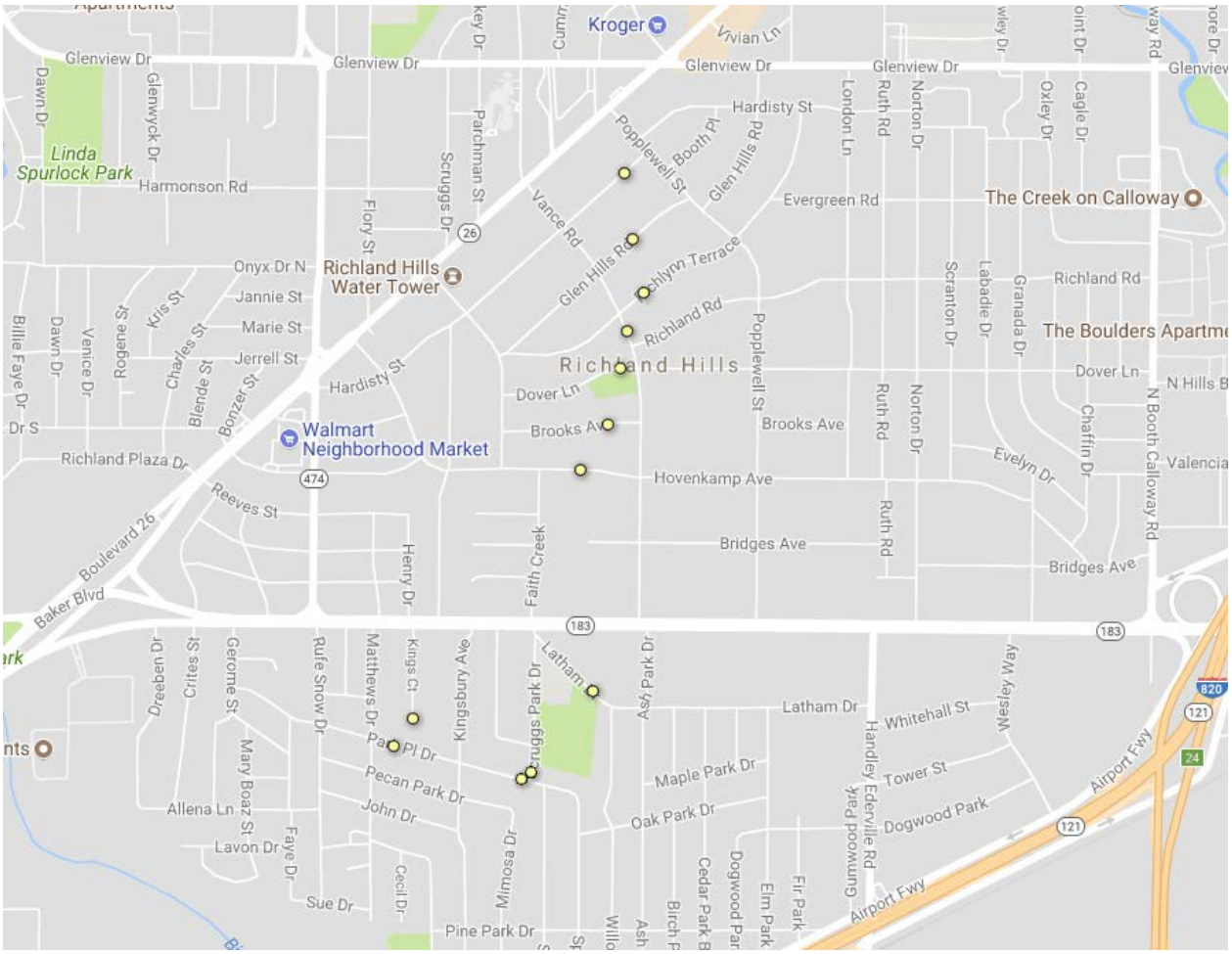
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: Past damage to roads, water lines, and sewer systems from flooding is primarily focused on the south side of the city and includes the streets of Kingsbury, John, Matthews, Hardisty, Cecil, and Rosebud. All but the last two of these streets have received extensive repairs and updating over the last five years. Total spent on these projects was approximately $8 million. Since repairs and improvements have been made, there have been no further incidences of flooding. The remaining two streets have limited damage problems that cost approximately $10,000 per year to repair.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? Yes, but permit information is unavailable.

Intersections or traffic routes impacted by flooding: Cecil and Rosebud residential streets flood only during torrential rains of more than 1-2 inches. See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Big Fossil Creek.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Park Place Drive	Big Fossil Creek, TRIB Stream BFC-5	Vented Ford
Scruggs Park Drive	Big Fossil Creek, TRIB Stream BFC-5	Vented Ford
Latham Drive	Big Fossil Creek, TRIB Stream BFC-5	Vented Ford
Hovenkamp Avenue	Big Fossil Creek, TRIB Stream BFC-5	Vented Ford
Brooks Avenue	Big Fossil Creek, TRIB Stream BFC-5	Vented Ford
Dover Lane	Big Fossil Creek, TRIB Stream BFC-5	Vented Ford
Vance Road	Big Fossil Creek, TRIB Stream BFC-5	Vented Ford
Richlynn Terrace	Big Fossil Creek, TRIB Stream BFC-5	Vented Ford
Glen Hills Road	Big Fossil Creek, TRIB Stream BFC-5	Vented Ford
Hardisty Street	Big Fossil Creek, TRIB Stream BFC-5	Vented Ford
Park Place Drive	Big Fossil Creek, TRIB Stream BFC-5A	Vented Ford
Kings Court	Big Fossil Creek, TRIB Stream BFC-5A	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Hotel/Motel	2.62	0.62	0.25%
Railroad	11.23	0.89	0.36%
Utilities	50.62	3.09	1.24%
Institutional	22.00	3.10	1.35%
Multi-family	48.24	7.33	2.94%
Commercial	186.40	9.39	3.77%
Parks/Recreation	48.91	44.12	17.71%
Vacant	1340.40	44.56	17.88%
Flood Control	60.62	54.92	22.05%
Single Family	886.93	81.08	32.55%
Total	**2657.97**	**249.06**	**100%**

Source: Richland Hills Geographic Information Systems (GIS) Department.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Richland Hills is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480608#
Community Name	City of Richland Hills
County	Tarrant County
Initial FHBM Identified	3/15/74
Initial FIRM Identified	2/16/77
Current Effective Map Date	9/25/09
Reg-Emer Date	2/16/77
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Halff Associates is the contracted city engineering firm that have assigned a floodplain manager.

Repetitive and Severe Repetitive Loss Properties: There are 7 residential repetitive loss properties and 1 residential severe repetitive loss property within primarily the southern portion of the City of Richland Hills. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
390	11 %	102	3%

Source: Richland Hills Geographic Information Systems (GIS) Department.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Richland Hills's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 91 Insurance in-force: $19,094,000 Written premium in-force: $90,878

How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: 100 claims have been filed, but 21 closed without payment. $1,140,570.00 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	350.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	Approximately 66% of the residential properties within the 100-year floodplain do not have flood insurance.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Data unavailable.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Richland Hills participates as a Class 8 CRS community and provided permit review, GIS access on the city website, yearly education and outreach, public assistance for flood questions, and on-site inspections.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	None.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		September 18, 2013.
Is a CAV or CAC scheduled or needed?		Yes, August 1, 2018 for a CRS Recertification.

Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	3/15/1974
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	The permitting process includes a floodplain development permit including the description of the new building, list of special flood hazard areas, CLOMR/LOMR (Letter of Map Revision) requirements, Base Flood Elevations, Substantial Improvement Provisions, and non-residential floodproofing.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	Yes.
What is the community's CRS Class Ranking?	Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual	Class 8.

Does your flood management plan or hazard mitigation plan include CRS planning requirements?	Community FPA, FEMA CRS Coordinator, ISO representative. CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	Yes.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Since 2015, damage reports have been sporadic and centered on downed fences from high winds and roof damage from winds and hail. This data is not captured within current permitting or inspection processes.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard. Luckily, there is no wildland-urban interface within the city.

Most vulnerable location (North, East, South, West) of your jurisdiction? A wildland fire spreading from the bordering communities on the western side of the city could be a threat to properties along the western border. Buffer areas of limited vegetation make this hazard extremely unlikely in the future.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard. Storms lasting more than 2-3 days could begin causing economic hardship for residents and business owners.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: There is a bridge at Highway 121 at the Handley-Ederville Road exit.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Richland Hills between 2015 and 2017. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Richland Hills	5/23/2015	Heavy Rain		0	0	$0	$0	
Richland Hills	6/26/2015	Thunderstorm Wind	55	0	0	$500	$0	EG
Richland Hills	5/10/2016	Thunderstorm Wind	52	0	0	$2,000	$0	EG
Richland Hills	5/10/2016	Thunderstorm Wind	52	0	0	$3,000	$0	EG
Richland Hills	5/10/2016	Thunderstorm Wind	56	0	0	$3,000	$0	EG
Richland Hills	3/29/2017	Thunderstorm Wind	61	0	0	$0	$0	EG
Total				**0**	**0**	**$13,000**	**$0**	

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Richland Hills identified their greatest vulnerabilities and concerns:

- Expansive soils are an ongoing problem in the community that requires mitigation efforts annually.
- Drought has the potential to impact the infrastructure, as it will often impact expansive soils severity.
- Thunderstorms, wind, and hail are always a threat to the community, depending on severity, duration, and direction of movement through the area.
- Exposure to winter storm activity is an occasional hazard; however, the location and overall mild weather of the city make this hazard a rare occurrence at best.
- Tornadoes are always a threat when thunderstorms are in the area. Their potential to impact the whole community or a substantial portion of it are significant and continually monitored.
- Though flooding was a significant hazard in the past, efforts on the city's behalf to make improvements have proven fruitful and they have reduced the overall risk to only a small area of the town.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Richland Hills's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	No; No; Yes
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	Yes	No; No; Yes
Local Emergency Operations Plan	Yes	No; No; Yes
Continuity of Operations Plan	No	
Transportation Plan	Yes	Part of Comprehensive Plan; No; No; Yes
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	No	No wildfire threat for the community
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	

Acquisition of land for open space and public recreation uses	No	
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year: ICC 2012**
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 4**
Site Plan Review Requirements	Yes	**Type(s) of requirement:** Development Review Committee must review and approve all site plans.
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Review proposals for new businesses or upgrades to existing businesses. Yes
Mitigation Planning Committee	Yes	Hazard identification and risk assessment. No
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Public Works Department regularly maintains drainage easements, creeks, and public easements. Yes
Mutual Aid Agreements	Yes	We have mutual aid with all neighboring communities and it is effective in mitigating incidents. Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Contracted Out	No; No; Yes
Floodplain Administrator	Contracted Out	No; No; Yes
Emergency Manager	No	No; No; Yes
Community Planner	Contracted Out	No; No; Yes
Civil Engineer	Contracted Out	No; No; Yes
GIS Coordinator	Contracted Out	No; No; Yes
Other:	FT	Fire Chief: Yes; Yes; Yes
***Full-time (FT) or part-time (PT) position**		

Technical	Have capability?	Describe capability. Has capability been used to assess or mitigate risk in the past?
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor Warning Sirens (2); Yes
Hazard data and information	Yes	Tier II reports from all businesses housing and/or using hazardous chemicals; Yes
Grant writing	Yes	No
HaZUS analysis	No	
Other		
Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Fire prevention programs in schools, Citizen's Fire Academy, Environmental Waste Collection day
Natural disaster or safety related school programs	No	
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	No	
Other		

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Drainage improvements; Yes
Authority to levy taxes for specific purposes	Yes	General obligation bonds for capital projects; Yes
Fees for water, sewer, gas, and/or electric services	Yes	Drainage fees; No
Impact fees for new development	Yes	No; No
Stormwater utility fee	Yes	Drainage fees for drainage projects only; No
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Drainage fees for drainage projects only; No
Incur debt through private activities	No	
Community Development Block Grant	Yes	No; Yes
Other federal funding programs	No	
State funding programs	Yes	Texas Water Development Board grants and loans; Yes
Other		

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Richland Hills's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	Obtain funding from City of Richland Hills revenues during budget process to replace Outdoor Warning Sirens.	Replace Outdoor Warning Sirens.	1 year	City of Richland Hills	$50,000	$200,000	City operating budget
		STATUS: Deleted by city management, declared to be antiquated technology					
Severe Thunderstorms and High Winds, Tornadoes	Initiate use of Emergency Communications Network – CodeRed.	Active promotion and assistance for signup of residents and business community on CodeRed.	Annual	Police Department	$3,000	$100,000	City operating budget
		STATUS: Deleted by city management due to lack of use for cost					
Severe Thunderstorms and High Winds, Tornadoes	Active promotion of safe room construction in new and remodeled structures.	Promote and encourage the addition of safe rooms in all new construction and major renovations.	Annual Program	Office of Emergency Management, Community Development Department	$2,500	$100,000	City operating budget
		STATUS: Deferred to 2020 HazMAP					
		Assist residents in application of safe room grants when available.	Annual Program	Office of Emergency Management	$1,000	$100,000	City operating budget
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	Public education activities directed towards residents and businesses regarding mitigation measures and precautions for severe weather events.	Use city website as a source for residents to obtain information on mitigation for severe storms.	Annually	Office of Emergency Management, Fire Department	$1,000	$100,000	City operating budget
		STATUS: Completed					
		Prepare written articles for city newsletter.	Annually	Office of Emergency Management, Fire Department	$1,000	$100,000	City operating budget
		STATUS: Completed					
		Inform residents and business community of severe storm mitigation activities during civic and social events in the city through talks and distribution of written material.	Annually	Office of Emergency Management, Fire Department	$500	$100,000	City operating budget
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes	Ensure City of Richland Hills city owned facilities have a safe room or place of shelter.	Evaluate current facilities for safe room.	2 weeks	Office of Emergency Management, Public Works Department	$500	Unknown	City operating budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed.					
		Evaluate the current facilities as places of refuge during severe weather incidents.	2 weeks	Office of Emergency Management, Public Works Department	$500	Unknown	City operating budget
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes	Addition of safe rooms in city-owned facilities if one does not exist at this time.	Ensure city facilities in Richland Hills have adequate safe room protection against severe weather events.	4 years	Office of Emergency Management, Public Works Department	$400,000	$1,000,000	City operating budget
		STATUS: Completed					
Flooding	Reduce flood insurance premiums to citizens by ensuring Richland Hills's participation in the Community Rating System (CRS) program.	Join the Federal Emergency management Agency's (FEMA's) CRS program.	3 months	City of Richland Hills	$8,000	$100,000/ year	Drain bonds
		STATUS: Completed					
Flooding	Construct drainage improvements along stream BFC-5 and 5A	Baker Boulevard detention pond.	Completed	City of Richland Hills	$480,000	$1,920,000	Drain bonds
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	in the City of Richland Hills.	Birdville Independent School District (BISD) detention pond.	Completed	City of Richland Hills	$1,145,000	$4,580,000	Drain bonds
		STATUS: Completed					
		Upper Hardest drain improvements.	Completed	City of Richland Hills	$363,000	$1,452,000	Drain bonds
		STATUS: Deferred to 2020 HazMAP					
Flooding	Construct larger drainage system in the City of Richland Hills.	Matthew interceptor.	6 months	City of Richland Hills	$1,500,000	$6,000,000	Drain bonds
		STATUS: Completed					
		Kingsbury interceptor.	2 years	City of Richland Hills	$1,200,000	$4,800,000	Drain bonds
		STATUS: Completed					
		Lower Hardisty drain improvements.	3 years	City of Richland Hills	$2,500,000	$100,000	Drain bonds
		STATUS: Deferred to 2020 HazMAP					
Flooding	Maintain existing levees along the Big Fossil Creek on the east side of Richland Hills.	Perform semi-annual inspection of the levee to look for any maintenance problems or levee failure issues.	Twice per year	Public Works Department	Unknown	Unknown	Public Works operating budget
		STATUS: Completed and ongoing					
		Report inspection of levees to Army Corps of Engineers	Twice per year	Public Works Department	Unknown	Unknown	Public Works operating budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed and ongoing					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Ensure city buildings in Richland Hills used for safety and sheltering are equipped with power generators.	Develop an inventory of generators available in public safety buildings, designated, shelters, and city facilities.	3rd Quarter 2014	Office of Emergency Management	Unknown	Unknown	Unknown
		STATUS: Completed					
		Seek out funding for purchase of needed power generators for needed buildings.	1st Quarter 2015	Office of Emergency Management	Unknown	Unknown	Unknown
		STATUS: Completed					
		Install power generators in identified city properties and buildings identified as shelters.	1st Quarter 2016	Office of Emergency Management	$40,000	$160,000	City issued bonds
		STATUS: Completed at fire department; others deferred to 2020 HazMAP					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Ensure City of Richland Hills critical facilities have adequate power generators and capabilities exist to provide power to	Evaluate the current facilities (levee pumps, sewage lift station pumps) power sources and need for generators.	1st Quarter 2015	Public Works Department	$500	$2,000	Public Works operating or enterprise fund
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	those critical facilities (pumping station, sewer lifting stations, etc.).	If needed, install permanent pumps or capability to bring in temporary generators in the event of long term power outage.	2nd Quarter 2016	Public Works Department	$75,000	$1,600,000	City issued bonds
		STATUS: Completed					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes Failure	Provide education materials to residents of Richland Hills in securing property and relocating to family or friends' residences in the event of long term power outage.	Identify appropriate size and type of generator for critical facilities.	3rd Quarter 2015	Office of Emergency Management	$2,000	$8,000	Office of Emergency Management budget
		STATUS: Completed					
		Purchase/order generator for critical facilities.	3rd Quarter 2015	Office of Emergency Management	$2,000	$8,000	Office of Emergency Management budget
		STATUS: Completed at fire department; others deferred to 2020 HazMAP					
Power Failure, Winter Storms, Severe Thunderstorms and High Winds, Tornadoes	Distribution of materials and training of citizens and businesses of Richland Hills in the preparedness of long-term power outages.	Through social media, website, city newsletter; inform residents on preparedness.	4th Quarter 2015	Office of Emergency Management, Fire Department	$2,000	$8,000	Fire's public education budget
		STATUS: Completed					
		Through presentations at schools, civic organizations, etc.,	4th Quarter 2015	Office of Emergency Management,	$2,000	$8,000	Fire Public Education budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		distribute material and provide residents and business community preparedness material.	through 2016	Fire Department			
		STATUS: Completed and ongoing					
Hail	During new construction meetings in Richland Hills promote hail resistant construction practices.	During pre-construction meetings with developers provide hail-resistant construction benefits.	1st Quarter 2015	City of Richland Hills Commercial Developers	Unknown	Unknown	Unknown
		STATUS: In progress					
		During pre-construction meetings provide hail-resistant construction benefits.	1st Quarter 2015	City of Richland Hills Commercial Developers	Unknown	Unknown	Unknown
		STATUS: In progress					
Hail	Seek established public education programs describing dangers of hail in Richland Hills.	Search for existing public education programs regarding hail danger and develop program for Richland Hills to present to the public.	3rd Quarter 2014	Office of Emergency Management	Unknown	Unknown	Unknown
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Provide public with hail damage mitigation information through website and newsletter.	3rd Quarter 2014	Office of Emergency Management	Unknown	Unknown	Unknown
		STATUS: In progress					
Hail	Provide business owners and commercial/ institutional business owners in Richland Hills with hail mitigation actions they can take to prevent hail damage impact.	Search for existing public education programs available to business and building owners and develop information to disseminate.	3rd Quarter 2014	Office of Emergency Management	Unknown	Unknown	Unknown
		STATUS: In progress					
		Distribute hail mitigation information to building owners and business owners by fire inspectors during annual inspections.	1st Quarter 2015	Fire Department	Unknown	Unknown	Unknown
		STATUS: In progress					
Wildfire	Provide residents through the Richland Hill website, social media, newsletter and	Alert residents to county burn bans through multiple media messages.	In progress	Fire Department, Police Department	Unknown	Unknown	Unknown
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	signs of County burn bans when in effect.	Develop handouts to distribute to residents informing of the city ordinance on open fires and the county burn ban.	3nd Quarter 2014	Fire Department	$300	$1,200	Fire Department budget, printing
		STATUS: Completed					
Wildfire	Public education program developed to provide residents with knowledge of wildfire mitigation actions both in Richland Hill city boundaries and while in rural areas.	Seek out established public education material on wildfire prevention in both urban and rural areas.	2nd Quarter 2014	Fire Department	Unknown	Unknown	Unknown
		STATUS: Completed					
		Develop public education program designed to inform citizens of wildfire prevention in both urban and rural areas.	3rd Quarter 2014	Fire Department	Unknown	Unknown	Unknown
		STATUS: Completed					
		Train fire personnel in wildfire safety, urban and rural, so public education can be spread to the public.	3rd Quarter 2014	Fire Department	Unknown	Unknown	Unknown
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Infectious Disease Outbreak	Review current Tarrant County/Richland Hills mass prophylaxis distribution policies/procedures.	Review current policies for both the county and city.	2nd Quarter 2014	Office of Emergency Management	Unknown	Unknown	Unknown
		STATUS: Completed					
		Revise/update current city policy/practices to meet current county recommendations.	4th Quarter 2014	Office of Emergency Management	Unknown	Unknown	Unknown
		STATUS: Completed					
Infectious Disease Outbreak	Prepare City of Richland Hills's first responders and volunteers to work with Tarrant County in the event of a mass prophylaxis distribution.	Train first responders in point of dispensing (POD) procedures.	3rd Quarter 2014	Office of Emergency Management, Fire Department	Unknown	Unknown	Unknown
		STATUS: Deleted-no longer identifying technological hazards					
		Training non-first responder city employees in POD procedures.	4th Quarter 2014	Office of Emergency Management, Fire Department	Unknown	Unknown	Unknown
		STATUS: Deleted-no longer identifying technological hazards					
		Develop volunteer pool to assist city/county in POD activities.	2nd Quarter 2015	Office of Emergency Management	Unknown	Unknown	Unknown
		STATUS: Deleted-no longer identifying technological hazards					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Infectious Disease Outbreak	Using existing materials collect and put together information packets on dangers of infectious disease outbreaks and effective measures the Richland Hills public can take in protecting themselves.	Search and collect information/brochures that can be distributed to the public.	3rd Quarter 2014	Office of Emergency Management	$1,000	$5,000	Operations budget, grant
		STATUS: Completed					
		Distribute messages via social media, city newsletter, and website.	4th Quarter 2014	Office of Emergency Management	$1,000	$4,000	Operations budget, grant
		STATUS: Completed					
Drought	Review and update if needed current City of Richland Hills ordinances regarding water conservation during periods of drought.	Review current ordinances to determine if they meet recommended practices from state and/or City of Fort Worth (water supplier).	3rd Quarter 2014	Public Works Department, city management	Unknown	Unknown	Unknown
		STATUS: Completed					
		If necessary present new or revised ordinances to City Council for water conservation.	4th Quarter 2014	Public Works Department, city management	Unknown	Unknown	Unknown
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Review state, county and Fort Worth Water District (city's source of potable water) restrictions and recommendations from water conservation.	3rd Quarter 2014	Public Works Department	Unknown	Unknown	Unknown
		STATUS: Completed					
Drought	Public education increasing awareness of water restrictions.	Through social media blitz city often with water restrictions and conservation methods.	1st Quarter 2015	Public Works Department	Unknown	Unknown	Unknown
		STATUS: Completed					
		Repeat messages in city newsletter regarding drought, water conservation, and restrictions.	1st Quarter 2015	Public Works Department	Unknown	Unknown	Unknown
		STATUS: Completed					
		Increase signs and visibility of outdoor signs providing message(s) on water restrictions, conservation, and restrictions.	1st Quarter 2015	Public Works Department	$5,000	$20,000	Water Enterprise fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
Terrorism	Conduct multiagency jurisdictional mock training exercises to active shooter scenarios, coordinated by Richland Hills.	Participate in BISD mock lockdown training exercises.	Completed	Police Department, BISD	Unknown	$7,900	City revenue
		STATUS: Completed					
		Conduct multiagency response to active shooter training in multiple schools.	Completed	Richland Hills, North Richland Hills, Watauga, and Haltom City police departments	Unknown	$7,900	City revenue
		STATUS: Completed					
		Develop after action report to evaluate training.	Completed	Police Department	Unknown	$7,900	City revenue
		STATUS: Completed					
Terrorism	Provide active shooter response training to all Richland Hills uniformed officers in the department.	Develop a lesson plan on response to active shooter.	Completed	Police Department	Unknown	$7,900	City revenue
		STATUS: Completed					
		Conduct basic on-site training in rapid response to active shooter incidents.	Completed	Police Department	Unknown	$7,900	City revenue

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
		Assemble go-kits for responding to active shooter incidents.	Completed	Police Department	$7,608	$7,900	City revenue
		STATUS: Completed					
Terrorism	Have a standard operating procedure (SOP) in effect in the event of an active shooter call-out in Richland Hills.	Conduct research into incidents that have occurred in the past.	Completed	Police Department	Unknown	Unknown	City revenue
		STATUS: Completed					
		Hold Safety and Security Forum with BISD representatives.	Completed	Police Department, BISD	Unknown	Unknown	City revenue
		STATUS: Completed					
		Develop SOP for officers responding to active shooter incidents.	Completed	Police Department	Unknown	Unknown	City revenue
		STATUS: Completed					
Lightning	Develop and institute lightning preparedness information for residents and business owners in Richland Hills.	Promote lightning awareness on website.	Apr-2014	Fire Department	Unknown	Unknown	Unknown
		STATUS: Completed					
		Obtain established public education material on lighting awareness and safety.	May-2014	Fire Department	$500	$2,000	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
		Develop public education presentation for lightning awareness and safety for audience presentations.	May-2014	Fire Department	$500	$2,000	City budget
		STATUS: Completed					
Lightning	Reduce lightning risks to residential, commercial and institutional structures in the City of Richland Hills through promoting the use of lightning arrestors, surge protectors and whole house surge protectors.	Obtain and distribute information on protecting property against lightning damage.	4th Quarter 2014	Fire Department	$500	$2,000	Public education budget
		STATUS: Completed					
		Promote lightning protection on new or remodeled structures in the city during permit application period.	3rd Quarter 2014	Community Development Department	$300	$1,200	Community Development budget - printing
		STATUS: Completed					
Hazardous Materials Release	Perpetuate the knowledge, safe practices, and preparedness in the business community on handling and storing hazardous	Train fire inspectors in hazardous materials operations level.	1st Quarter 2014	Fire Department	$1,500	$6,000	Fire Department training budget and Texas A&M Forest Service grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	materials, in Richland Hills.	**STATUS: Completed**					
		Fire inspectors to be accompanied by HAZMAT techs during inspections of sites with hazmat materials.	1st Quarter 2015	Fire Department	Unknown	Unknown	Unknown
		STATUS: Completed					
Hazardous Materials Release	Fire Department's hazardous materials team members to work with business owners employees in review company's operations and actions during spill events, in Richland Hills.	Identify business properties with hazardous materials on site.	3rd Quarter 2014	Fire Department	Unknown	Unknown	Unknown
		STATUS: Completed					
		Promote joint training exercise between department's HAZMAT team and companies, in the city, that have hazardous materials.	4th Quarter 2014	Fire Department	Unknown	Unknown	Unknown
		STATUS: Completed					
		Department and regional hazmat team to train on specific products in business community.	4th Quarter 2014 and beyond	Fire Department	Unknown	Unknown	Unknown
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Obtain equipment and supplies needed to respond to specific potential incidents inside business community.	4th Quarter 2014 and beyond	Fire Department	Unknown	Unknown	Unknown
		STATUS: Completed					
Extreme Temperatures	Promote incorporation of power generators for the use of a new Richland Hills city facility in the planning stages now. Generator(s) to provide the power necessary to operate heating, ventilation, and air-conditioning (HVAC) in the event of wide spread power loss during extreme temperatures.	Electrical generator(s) to power new public facility for shelter or warming/cooling center.	1st Quarter 2016	Office of Emergency Management	$50,000	$200,000	Bonds
		STATUS: Completed					
		Build warming/cooling shelter facility into new public building.	1st Quarter 2016	Office of Emergency Management	$10,000	$40,000	Bonds
		STATUS: Completed					
Extreme Temperatures	Develop extreme temperature plans to operate Richland Hills	Develop plans to operate, staff, and run a warming/ cooling shelter.	3rd Quarter 2014	Office of Emergency Management	Unknown	Unknown	Unknown

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	warming/cooling shelter.	**STATUS: Completed**					
		Hold drills to test plan with existing city structures.	4th Quarter 2014	Office of Emergency Management	Unknown	Unknown	Unknown
		STATUS: Completed					
Extreme Temperatures	Promote preparedness for residents and business community during extreme weather events in Richland Hills.	Develop public education program for residents on preparedness for extreme weather.	4th Quarter 2014	Office of Emergency Management	Unknown	Unknown	Unknown
		STATUS: Completed					
		Develop public education campaign program for business and building owners for extreme temperature.	4th Quarter 2014	Office of Emergency Management	Unknown	Unknown	Unknown
		STATUS: Completed					
Expansive Soils	Develop public education programs directed towards informing the Richland Hills public about the possibility of expansive soils and	Collect existing public education material on building structures resistant to expansive soils.	1st Quarter 2016	Office of Emergency Management, Community Development Department	$2,000	$8,000	Operating budget
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	the mitigation actions that can be taken to protect themselves.	Distribute materials promoting building methods that reduce the damage from expansive soils to builders/ remodelers, citizens.	2nd Quarter 2016	Community Development Department	Unknown	Unknown	Unknown
		STATUS: Completed					
		Present materials and steps to mitigate expansive soils during presentations to residents and business owners.	2nd Quarter 2016 and forward	Office of Emergency Management, Community Development Department	Unknown	Unknown	Unknown
		STATUS: Completed					
Expansive Soils	Review current City of Richland Hills' building codes to determine if they are adequate in promoting the materials and building practices that would diminish the damage to the new structures from expansive soils.	Review current, adopted, building code to determine whether the code addresses construction methods needed in areas where expansive soils are a possibility.	1st Quarter 2015	Community Development Department	Unknown	Unknown	Unknown
		STATUS: Completed					
		Propose and adopt, by ordinance, safe building methods used to	2nd Quarter 2015	Community Development Department	Unknown	Unknown	Unknown

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		mitigate the possible damage to a structure from expansive soil.					
		STATUS: Completed					

5.3 New Action Items

The City of Richland Hills's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[2] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms**
Install power generators in new and existing city properties and buildings identified as shelters.	
Participating Jurisdiction:	City of Richland Hills
Priority:	1
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City operating budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	**Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms**
Enhance the public education program with the use of social media, city website, and city newsletter to educate residents on mitigation strategies for the identified hazards.	
Participating Jurisdiction:	City of Richland Hills
Priority:	2
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City operating budget, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	12 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Flooding
Perform semi-annual inspection of the levee to look for any maintenance problems or levee failure issues and report results to the United States Army Corps of Engineers.	
Participating Jurisdiction:	City of Richland Hills
Priority:	3
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City operating budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	Every 6 months

Hazard(s) Addressed	Extreme Heat, Winter Storms
Organize outreach to vulnerable populations and establish an accessible heating or cooling center at The Link Recreation Center.	
Participating Jurisdiction:	City of Richland Hills
Priority:	4
Estimated Cost:	$500
Estimated Benefit:	$30,000
Potential Funding Source(s):	City operating budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, The Link staff
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Promote and encourage the addition of safe rooms in all new and existing facilities and major renovations.	
Participating Jurisdiction:	City of Richland Hills
Priority:	5
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City operating budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Community Development Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Tornadoes
Assist residents that are participants in the North Central Texas Safe Room Rebate Program with their application, as needed.	
Participating Jurisdiction:	City of Richland Hills
Priority:	6
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City operating budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Inform residents and the business community of natural hazard mitigation activities during civic and social events in the city through talks and distribution of written material.	
Participating Jurisdiction:	City of Richland Hills
Priority:	7
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City operating budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Fire Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Conduct Lower Hardisty drain improvements.	
Participating Jurisdiction:	City of Richland Hills
Priority:	8
Estimated Cost:	$2,500,000
Estimated Benefit:	$15,000,000
Potential Funding Source(s):	Drainage bonds, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works contractor
Implementation Schedule:	36 months

Hazard(s) Addressed	Thunderstorms
During pre-construction meetings with developers, provide hail-resistant construction mitigation techniques and their benefits.	
Participating Jurisdiction:	City of Richland Hills
Priority:	9
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City operating budget, city funding for staff time
Lead Agency/Department Responsible:	Community Development Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Thunderstorms
Use fire inspectors to distribute thunderstorm mitigation information to business owners during annual inspections.	
Participating Jurisdiction:	City of Richland Hills
Priority:	10
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City operating budget, city funding for staff time
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Evaluate how the community and its water sources have been impacted by droughts in the past.	
Participating Jurisdiction:	City of Richland Hills
Priority:	11
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City operating budget, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Develop a drought communication plan and early warning system to communicate relevant information to officials and the public.	
Participating Jurisdiction:	City of Richland Hills
Priority:	12
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City operating budget, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Alert residents to county burn bans through multiple media messages.	
Participating Jurisdiction:	City of Richland Hills
Priority:	13
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City operating budget, city funding for staff time
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Wildfire
Develop handouts to distribute informing of the city ordinance on open fires and county burn bans.	
Participating Jurisdiction:	City of Richland Hills
Priority:	14
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City operating budget, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Extreme Heat
Encourage use of cool roofing products that reflect sunlight and heat away from new and existing buildings.	
Participating Jurisdiction:	City of Richland Hills
Priority:	15
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City operating budget, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management, Planning and Development Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Expansive Soils
Develop and maintain a database to track community vulnerability to expansive soils.	
Participating Jurisdiction:	City of Richland Hills
Priority:	16
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	City operating budget, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management, Planning and Development Department, Public Works Department
Implementation Schedule:	48 months

Hazard(s) Addressed	Expansive Soils
Amend development codes to require substantial foundation piers in areas known for expansive soils	
Participating Jurisdiction:	City of Richland Hills
Priority:	17
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City operating budget, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Planning and Development Department, Public Works Department
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plans (CIPs)	Public Works Department, Office of Emergency Management	5 year cycle with annual review	Flooding, retention, and drainage projects.	When reviewing the CIPs, the planning team will review the HazMAP to identify which action items can be addressed with the fiscal and administrative capabilities of the city.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Richland Hills. For additional information, see Appendices A and B.

City of River Oaks*

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

The City of River Oaks is a new participant in the Tarrant County Hazard Mitigation Action Plan (HazMAP) and does not have a previous mitigation plan.

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County HazMAP planning process for the City of River Oaks, a new participant in the HazMAP, was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided is for the City of River Oaks alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of River Oaks will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of River Oaks has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of River Oaks' Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of River Oaks. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of River Oaks Local Planning Team Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of River Oaks	City Administration	Emergency Management Coordinator	General oversight Hazard identification and plan development
City of River Oaks	City Council	Mayor	Hazard identification and plan development
City of River Oaks	Public Works Department	Director	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

As the City of River Oaks is a new participant in the Tarrant County HazMAP, there are no changes in development.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of River Oaks.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	7,703
Persons under 5 years (%)	Data unavailable
Persons 65 years and over (%)	Data unavailable
Language other than English spoken at home (%)	Data unavailable
With a disability, under age 65 (%)	10.7
Persons without health insurance, under age 65 (%)	24
Persons in poverty (%)	10.4
Median household income	$42,054
Households, 2012-2016	2,740
Median value of owner-occupied housing units, 2012-2016	$85,500

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of River Oaks.

City of River Oaks Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
City Hall/Fire Department/Police Department 4900 River Oaks Boulevard	Government Facility
Community Center 5300 Blackstone Drive	Recreation Center

*The capacity, square footage, and structure value of these assets are unavailable.

3.3 Natural Hazard Profiles

The City of River Oaks' Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of River Oaks in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Thunderstorm (includes hail, wind, lightning)
2	Tornado
3	Extreme Heat
4	Winter Storms
5	Wildfire
6	Flooding
7	Expansive Soils
8	Drought
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of River Oaks.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Jurisdiction's ground-water supply: The city only uses surface water, which is from Lake Worth.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: None.

Describe any water restrictions used in your jurisdiction: The city follows the City of Fort Worth's guidelines and restricts watering to certain days during certain hours in the summer months.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data. The total appraised value within the city is $216,666,441.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Damage is not collected for expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	The elderly, homeless, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. The populations includes approximately 20% elderly persons and 4,000 children, though these numbers are unconfirmed by the United States Census.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? No cases of extreme heat exposure have been reported.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

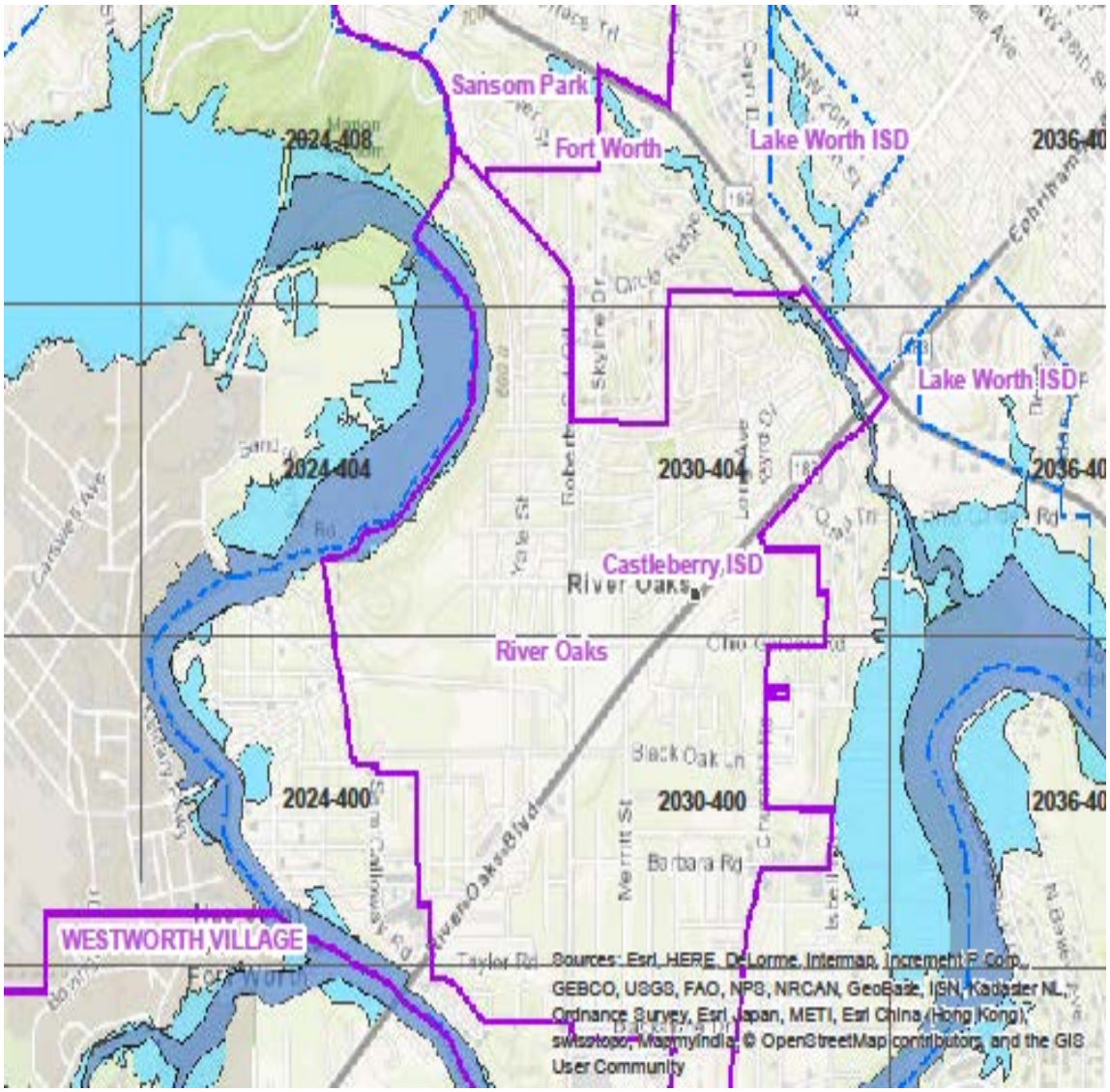
Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. In the past, flash flooding has caused $15,000 in property damage and can be expected in the future.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage to roads has been reported.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: None.

Names of any creeks or rivers that flood: The city is surround by the West Fork of these Trinity River, as seen in the following map, but the city is designed to not be impacted by river flooding with its extensive levee system.



National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of River Oaks is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480609#
Community Name	City of River Oaks
County	Tarrant County
Initial FHBM Identified	12/28/73
Initial FIRM Identified	06/19/85

Current Effective Map Date	09/25/2009
Reg-Emer Date	06/19/85
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Public Works Director.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? Permits are required for any development in a floodplain.

Repetitive and Severe Repetitive Loss Properties: There are currently 0 repetitive loss properties and 0 severe repetitive loss properties within the City of River Oaks. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of River Oaks' ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 8 Insurance in-force: $1,545,200 Written premium in-force: $3,462
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 4 claims have been filed. $67,027.56 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	At least 8 structures are at risk to flooding.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	Data unavailable.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	No.

Is floodplain management an auxiliary function?	Community FPA	Data unavailable.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	City Floodplain Administrator is the City's Public Works Director. He is responsible for initial review and the City Engineer does reviews.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	None.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Data unavailable.
Is a CAV or CAC scheduled or needed?		Data unavailable.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	06/19/85
Are the FIRMs digital or paper?	Community FPA	Paper.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Data unavailable.

Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP	Data unavailable.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of River Oaks will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of thunderstorms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Hail has caused $10 million in property damage across the city.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. The total appraised value within the city is $216,666,441.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: No prior tornadoes have been reported.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard. There are approximately 20 homes along the edge of Camp Carter and a barn that is valued at around $200,000.

Most vulnerable location (North, East, South, West) of your jurisdiction? Camp Carter, on the north side of the city, has over 350 acres of open space. There are approximately 20 homes and a barn near the camp that would be most vulnerable to a fire, though there has been no cases of a wildfire in the past.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Though not in River Oaks, the State Highway 183 overpass in Westworth Village at the West Fork of the Trinity River would restrict residents from crossing the river if it was impacted by a winter storm.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Traffic flow would be blocked to and from the city.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are past natural hazard events that occurred within the City of River Oaks' history. The material is organized by location and date.

Historical Events From The National Centers For Environmental Information (www.ncdc.noaa.gov)							
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
River Oaks	04/20/1997	Hail	1.5	0	0	$0	$0
River Oaks	04/17/2008	Hail	1.75	0	0	$10,000,000	$0
River Oaks	11/10/2008	Flash Flood		0	0	$15,000	$0
River Oaks	05/23/2011	Hail	1	0	0	$0	$0
River Oaks	05/02/2011	Hail	1.5	0	0	$0	$0
River Oaks	04/11/2017	Hail	1	0	0	$0	$0
River Oaks	04/11/2017	Hail	1	0	0	$0	$0
Total:				**0**	**0**	**$10,015,000**	**$0**

3.5 Overall Vulnerability

The City of River Oaks identified their greatest vulnerabilities and concerns:

- City Hall is vulnerable to thunderstorm and tornado events.
- All the generators in the city are around 20 years old and will likely not be effective if used for an extended period of time.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of River Oaks' Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	No; No; Yes
Capital Improvement Plan	Yes	No; No; Yes
Economic Development Plan	No	Economic Development Corporation
Local Emergency Operations Plan	Yes	Tarrant County: Yes; Yes; Yes
Continuity of Operations Plan	No	
Transportation Plan	Yes	In Master Plan: No; No; No
Stormwater Management Plan	Yes	Yes; No; Yes
Community Wildfire Protection Plan	No	Mutual aid with surrounding cities with equipment
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	No; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Stormwater Ordinance; Yes; Yes
Acquisition of land for open space and public recreation uses	No	

Building Code, Permitting, and Inspections	Have capability?	
Building Code	Yes	**Version/year:** IBC 2012
Building Code Effectiveness Grading Schedule (BGEGS) Score	Yes	**Score:** 5 for 1-2 family; 4 for commercial
Fire Department ISO Rating	Yes	**Rating:** 4
Site Plan Review Requirements	Yes	**Type(s) of requirement:** expansions requires approval from city council
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	A recommending board- review of plats, zoning; Yes
Mitigation Planning Committee	Yes	Planning and hazard assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Tree trimming, clearing drainage systems, generator maintenance schedule; Yes
Mutual Aid Agreements	Yes	Surrounding cities and county, Police/Fire; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	PT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Role of city administrator: Yes; Yes; Yes
Civil Engineer	PT	Drainage and water/sewage, 3rd party: Yes; Yes; Yes
GIS Coordinator	No	
Other:	PT	Zoning Administrator: Yes; Yes; Yes
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor warning system, citizens can sign up for email notification on city website; Yes
Hazard data and information	Yes	Tier 2 Reporting; Yes
Grant writing	No	
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Monthly City Hall meetings and water bills that discuss water, sewer, weather, fire, water use; Yes
Natural disaster or safety related school programs	Yes	Presentation on stormwater and fire safety, health fair, career day, KnoWhat2Do; Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	American Red Cross, Salvation Army, and the Young Men's Christian Association (YMCA) provide general help; Yes
Other		
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes, water, sewage, drainage, emergency vehicles; Yes
Authority to levy taxes for specific purposes	Yes	Ad-valorem; Yes
Fees for water, sewer, gas, and/or electric services	Yes	Water, sewer; No
Impact fees for new development	No	
Stormwater utility fee	Yes	Stormwater improvements; stormwater related
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Obligation bonds, Texas Water Development Board (TWDB) funding; No
Incur debt through private activities	No	
Community Development Block Grant	Yes	Public Works infrastructure; Yes

Other federal funding programs	No	
State funding programs	No	TWDB
Other		

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, policies, and resources for mitigation include budgeting and passing policies and procedures for mitigation actions, adopting and implementing stricter mitigation regulations, approving the hiring and training of staff for mitigation activities, approving mitigation updates, and additions to existing plans as new needs are recognized. Look into both the StormReady and Firewise programs and obtain those certifications. Adopt more recent editions of all codes for the city and have trained and motivated personnel to interpret and enforce these codes.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

As a new participant, the City of River Oaks does not have mitigation actions to review.

5.3 New Action Items

The City of River Oaks' action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.
[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Flooding
Conduct a hydrologic study to determine threat, risk, and potential impacts of flooding from levee failure along the West Fork of the Trinity River.	
Participating Jurisdiction:	City of River Oaks
Priority:	1
Estimated Cost:	$1,400,000
Estimated Benefit:	$8,400,000
Potential Funding Source(s):	City budget, Hazard Mitigation Grant Program (HMGP)
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Eliminate potential loss of power to municipal buildings from these identified hazards with the installation of backup generators for electrical power in municipal buildings.	
Participating Jurisdiction:	City of River Oaks
Priority:	2
Estimated Cost:	$225,000
Estimated Benefit:	$1,350,000
Potential Funding Source(s):	City budget, HMGP
Lead Agency/Department Responsible:	Office of Emergency Management, Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Retrofit city buildings with impact-resistant roofing and building material.	
Participating Jurisdiction:	City of River Oaks
Priority:	3
Estimated Cost:	$30,000
Estimated Benefit:	$180,000
Potential Funding Source(s):	City budget, HMGP
Lead Agency/Department Responsible:	Building Official
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Enhance the citywide notification system for phone, text, and email by implementing a system such as Code Red or Everbridge.	
Participating Jurisdiction:	City of River Oaks
Priority:	4
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, HMGP
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Develop and implement a comprehensive public education program that includes recommended activities to mitigate the impact of each identified hazard.	
Participating Jurisdiction/s	City of River Oaks
Priority:	5
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, HMGP, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management,
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms
Provide flood risk mapping materials for property owners in floodplains and include mitigation techniques.	
Participating Jurisdiction:	City of River Oaks
Priority:	6
Estimated Cost:	$6,500
Estimated Benefit:	$39,000
Potential Funding Source(s):	City budget, HMGP, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Create and implement a water conservation program for public and residential property.	
Participating Jurisdiction:	City of River Oaks
Priority:	7
Estimated Cost:	$2,500
Estimated Benefit:	$15,000
Potential Funding Source(s):	City budget, HMGP, private companies
Lead Agency/Department Responsible:	Water Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Educate city employees on the most "at-risk" populations in the city and how to mitigate the risks to these populations.	
Participating Jurisdiction:	City of River Oaks
Priority:	8
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City budget, HMGP
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought
Create and implement a drought contingency plan for city facilities and property.	
Participating Jurisdiction:	City of River Oaks
Priority:	9
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, HMGP, water suppliers
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Adopt and implement most current ICC building codes for new and existing buildings to mitigate the damage from these identified hazards.	
Participating Jurisdiction:	City of River Oaks
Priority:	10
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	City budget, HMGP, permit fees
Lead Agency/Department Responsible:	Building Inspector
Implementation Schedule:	18 months

Hazard(s) Addressed	Flooding
Require that the floodplain administrator be certified.	
Participating Jurisdiction:	City of River Oaks
Priority:	11
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Adopt enhanced floodplain ordinances.	
Participating Jurisdiction:	City of River Oaks
Priority:	12
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of River Oaks
Priority:	13
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of River Oaks
Priority:	14
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of River Oaks
Priority:	15
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of River Oaks
Priority:	16
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfires
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of River Oaks
Priority:	17
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of River Oaks
Priority:	18
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Comprehensive Plan updates	Planning and Zoning Department, Public Works Departments	Every 5 years	Reference this HazMAP when developing the plan for critical infrastructure and resources.	The plan development team will reference the HazMAP when updating this plan, in such areas as strengthening critical infrastructure and key resources based on HazMAP hazard analysis; incorporating vulnerability data and action items.
Drainage Master Plan	Public Works Department	As needed	Notations of potential drainage concerns.	The plan development team will review identified mitigation action items and consider plan revision, as necessary, to address them.
Future Land Use Plan	City Administration, Planning and Zoning board	As needed	Reference this HazMAP for actions pertaining to land use when updating the plan.	The plan development team will review identified mitigation action items and consider plan revision, as necessary, to address them.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of River Oaks. For additional information, see Appendices A and B.

City of Saginaw

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Saginaw was the Fire Chief/Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Saginaw alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

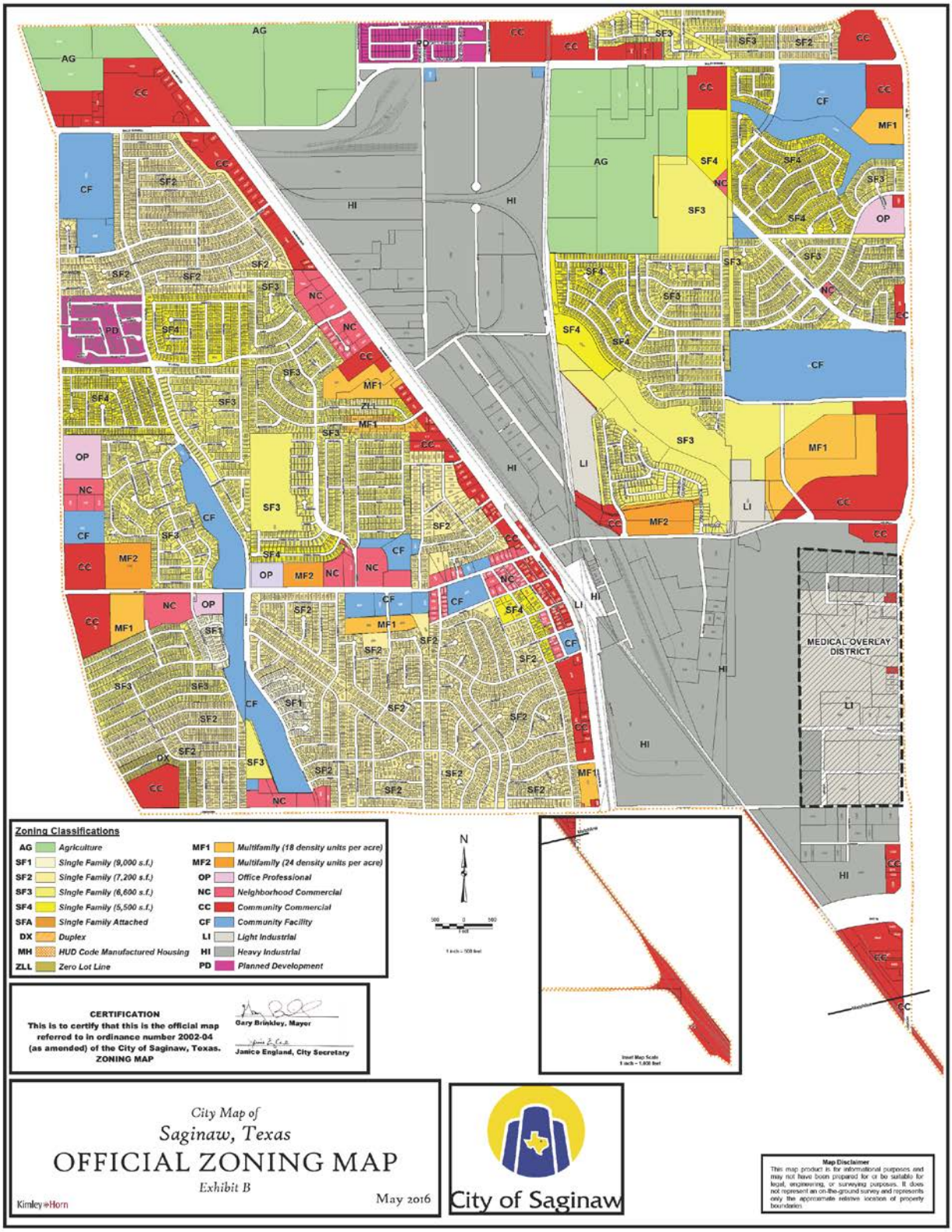
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Saginaw will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of governments (NCTCOG).

1.4 Supporting Maps

The following map provides an overview of the City of Saginaw:

- 2016 Official Zoning Map


Zoning Classifications
AG Agriculture
SF1 Single Family (9,000 s.f.)
SF2 Single Family (7,200 s.f.)
SF3 Single Family (6,600 s.f.)
SF4 Single Family (5,500 s.f.)
SFA Single Family Attached
DX Duplex
MH HUD Code Manufactured Housing
ZLL Zero Lot Line
MF1 Multifamily (18 density units per acre)
MF2 Multifamily (24 density units per acre)
OP Office Professional
NC Neighborhood Commercial
CC Community Commercial
CF Community Facility
LI Light Industrial
HI Heavy Industrial
PD Planned Development
CERTIFICATION
This is to certify that this is the official map referred to in ordinance number 2002-04 (as amended) of the City of Saginaw, Texas. ZONING MAP
Gary Brinkley, Mayor
Janice England, City Secretary
City Map of
Saginaw, Texas
OFFICIAL ZONING MAP
Exhibit B
May 2016
Kimley»Horn
City of Saginaw
MEDICAL OVERLAY DISTRICT
Map Disclaimer

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Saginaw has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Saginaw's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Fire Chief/Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Saginaw. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Saginaw Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Saginaw	Department of the City Manager	Assistant City Manager	General oversite, hazard identification, and plan development
City of Saginaw	Fire Department	Fire Chief/Emergency Management Coordinator	General oversite, hazard identification, and plan development
City of Saginaw	Police Department	Police Administration	Hazard Identification and plan development
City of Saginaw	Public Services Department	Public Services Superintendent	Hazard Identification and plan development
City of Saginaw	Public Services Department	Director of Public Services	Hazard Identification and plan development
City of Saginaw	Public Services Department	Head City Mechanic/Fleet Services	Hazard Identification and plan development
City of Saginaw	City Development Department	City Engineer	Hazard Identification and plan development
City of Saginaw	Fire Department	Division Chief/Fire Services	Hazard Identification and plan development
City of Saginaw	Fire Department	Division Chief/Fire Operations	Hazard Identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no recorded change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: A full list of completed mitigation action items are described in Chapter 5 of this annex.

Declared Disaster Code	Incident Period	Date Declared	Description	Impact
DR-4266	March 7-March 29, 2016	March 19, 2016	Severe storms, tornadoes, and flooding.	There was property damage to both commercial and residential structures in the city.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Saginaw.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	23,014
Persons under 5 years (%)	6.8
Persons 65 years and over (%)	9.2
Language other than English spoken at home (%)	19
With a disability, under age 65 (%)	7.6
Persons without health insurance, under age 65 (%)	12.5
Persons in poverty (%)	8.1
Median household income	$81,070
Households, 2012-2016	6,836
Median value of owner-occupied housing units, 2012-2016	$130,000

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Saginaw.

City of Saginaw Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Fire Administration, City Emergency Operations Center, Fire Station 1 400 South Saginaw Boulevard	Government Facility	50 people	16,000	$454,095	$5,000,000
Tarrant County Fire Alarm Center 400 South Saginaw Boulevard	Emergency Communications Facility, Dispatch	5 people	3,000	Unknown	$1,000,000
Gavilon Grain 425 South Fairmount	Food Products	100 people	400,000	$2,214,160	Unknown
Con Agra Foods 221 South Fairmount	Food Processing	50 people	56,400	$4,033,983	Unknown
CTI Chefco Foods 504 Sansom Boulevard	Food Processing	150 people	157,987	$13,593,396	Unknown
CTI Bean Maker 500 Sansom Boulevard	Food Processing	50 people	72,512	$3,045,504	Unknown
Standard Meat 455 Sansom Boulevard	Food Processing	100 people	77,702	$3,270,180	Unknown
Ventura Foods 1100 Defiel Road	Food Processing	150 people	200,790	$7,574,900	Unknown
Attebury Grain 624 Burlington Road	Food Products	50 people	50,000	$860,318	Unknown
Cargill/Horizon Milling 401 East Industrial Avenue	Food Processing	100 people	64,607	$3,544,266	Unknown

3.3 Natural Hazard Profiles

The City of Saginaw's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Saginaw in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
N/A	Wildfire
1	Tornado
2	Thunderstorm (includes hail, wind, lightning)
3	Expansive Soils
4	Winter Storms
5	Earthquake
6	Flooding
7	Extreme Heat
8	Drought

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Saginaw.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Significant
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are considered minimal due to the minor extent expected.

Jurisdiction's ground-water supply: There is overhead water storage in three locations throughout the city**.**

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: In a period of drought, the City of Saginaw initiates water restrictions by setting days the public may water their lawns and other outside watering including washing cars, driveways, and all other non-essential water usage.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data. With high-rise buildings being more susceptible to earthquakes, three major grain storage and production facilities could all sustain major damage and failure of the structures. The three major facilities are Horizon Milling, Attabury Grain, and Miller Milling. There is an extensive water and sewer system that, if damaged, could render the entire system non-working. The water system includes three overhead water storage facilities located throughout the city.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Expansive soils are a major consideration to all existing and future structures and infrastructure. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: The City of Saginaw budgets and spends $370,000 rebuilding and repairing roads and sidewalks due to heaving, separation, cracking, and sinking due to expansive soils. The damage is consistently spread across all portions of the city including, but not limited to, commercial and residential areas. The City of Saginaw does require a permitting and review process for all slab repairs and corrections. This is tracked through the building department. In pulling the recent statistics, the Building Department has had 45 permits pulled in the last 18 months with a total cost of repair of $270,000. City buildings have not had a documented repair request over the last 10 years.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme heat pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? The City of Saginaw has no history of extreme heat problems. The city utilizes building codes, energy codes, and a strict outdoor event permitting process to help mitigate the effects of extreme heat situations.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Fire Station 1 experiences minor water entry during high water events but the problem is mitigated by city staff.

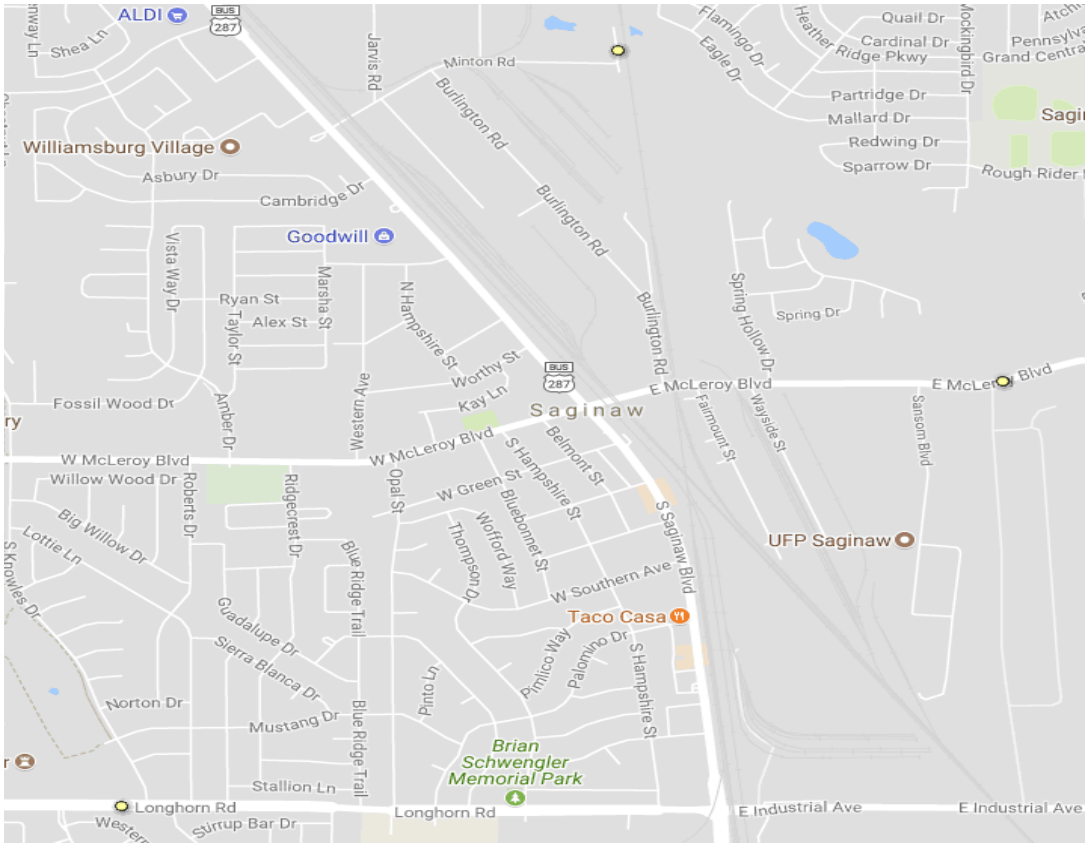
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015. The only city building that experiences problems with flooding is Fire Station 1, located at 400 South Saginaw Boulevard.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: The problem areas in Saginaw due to flooding are the following intersections and roadways, West McLeroy and Knowles, State Highway 156 and Bailey Boswell, Lawson Road, and Industrial Boulevard, Business Highway 287 and Worthy Street, Jarvis Road and Brenda Road, Business Highway 287 and Palamino Drive, and East McLeroy Boulevard and Sansom Boulevard. See low water crossing below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Big Fossil Creek and Little Fossil Creek.

Low Water Crossing: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular traffic. This crossing can be dangerous when flooded. Crossing is identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Longhorn Road	Cement Creek West Fork	Vented Ford
McLeroy Boulevard	Little Fossil Creek	Vented Ford
Zephyr Road	Little Fossil Creek	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Saginaw is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480610#
Community Name	City of Saginaw
County	Tarrant County
Initial FHBM Identified	03/08/74
Initial FIRM Identified	09/17/80
Current Effective Map Date	09/25/09
Reg-Emer Date	09/17/80
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Director of Public Services.

What specific flooding ordinances and plans does your jurisdiction have? The City of Saginaw has an adopted subdivision plan that is followed to account for the construction of all structures in or adjacent to any floodplain.

Repetitive and Severe Repetitive Loss Properties: There is currently 1 residential repetitive loss property and 0 severe repetitive loss properties within the City of Saginaw. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
54	.74%	77	17%

Source: City of Saginaw and Kimly-Horn GIS (Geographic Information System).

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Commercial/Industrial	1636.6	433.6	26.5%
Residential	1302.7	10.7	<1%
Agriculture	1099.7	225.1	20.5%
Total	**4039**	**669.4**	**16.57%**

Source: City of Saginaw and Kimly-Horn GIS (Geographic Information System).

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Saginaw's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 29 Insurance in-force: $7,266,00 Written premium in-force: $50,330
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: 7 claims have been filed. $111,199.79 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	At least 29 structures are at risk of flooding.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	No data available.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	No.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, geographic information system, and inspections.

What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	No data available.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		No data available.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	09/17/80
Are the FIRMs digital or paper?	Community FPA	Digital and paper.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes. By building ordinance.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP	No data available.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Saginaw will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. The City of Saginaw economy could be greatly affected with the event of a major thunderstorm event. The city depends on revenue from the commercial and retail industry and the loss of those revenue streams would damage the economy of the city in a major way.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Since 2015, there has been $33,000 in damage due to high winds.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015, according to the National Centers for Environmental Information, though the City of Saginaw has record of an EF0 tornado on March of 2016 that caused over $500,000 in property damage.

Is there an area of the city that is the most vulnerable to tornadoes? The city as a whole is flat and the entire city is vulnerable to a tornado event. The city has had many individual tornado shelters permitted over the past five years and the city is covered by an outdoor warning siren system.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	N/A
Probability of Future Occurrence	N/A
Maximum Probable Extent	N/A
Potential Impact	N/A
Vulnerabilities	Wildfires are not a threat to the City of Saginaw, for there is little open space in the city and the fire department does not anticipate a fire out of their control.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: The City of Saginaw only has three bridges that are part of a major traffic and safety issue when they are exposed to a winter storm. Two of the bridges are part of the Highway/Loop 820 corridor and one bridge is on Meacham Boulevard, over the railroad switching yard.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents. When the bridges become impassable it causes major traffic congestion and the closure of a major highway.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Saginaw between 2015 and 2017. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Saginaw	11/17/2015	Thunderstorm Wind	35	0	0	$1,000	$0	EG
Saginaw	3/8/2016	Thunderstorm Wind	61	0	0	$20,000	$0	EG
Saginaw	3/8/2016	Hail	1	0	0	$0	$0	
Saginaw	3/8/2016	Thunderstorm Wind	60	0	0	$5,000	$0	EG
Saginaw	7/9/2016	Thunderstorm Wind	52	0	0	$5,000	$0	EG
Saginaw	7/28/2016	Thunderstorm Wind	56	0	0	$0	$0	EG
Saginaw	7/28/2016	Thunderstorm Wind	56	0	0	$1,000	$0	EG
Saginaw	7/28/2016	Thunderstorm Wind	52	0	0	$1,000	$0	EG
Total				**0**	**0**	**$33,000**	**$0**	

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Saginaw identified their greatest vulnerabilities and concerns:

- Buildings in Saginaw are most susceptible to the damages from tornadoes and thunderstorms.
- The grain storage and productions facilities are of utmost importance to protect from all hazards. The City of Saginaw has a very large portion of the city that is industrial. These areas are filled with major food producers and grain production. A hazard, such as an earthquake, could potentially force the closing of all of these structures due to the precise production techniques of these businesses.
- Foundation and road damage is a continual problem due to expansive soils.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Saginaw's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; Yes; Yes
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	Yes	Yes; Yes; Yes
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	Yes	Yes; Yes; Yes
Transportation Plan	No	
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Stormwater: Yes; Yes
Acquisition of land for open space and public recreation uses	Yes	Public parks: Yes; Yes

Building Code, Permitting, and Inspections	Have capability?	
Building Code	Yes	**Version/Year:** IBC 2012
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 2**
Site Plan Review Requirements	Yes	**Type(s) of requirement:** staff, third party, board

Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning & Zoning Board; Yes
Mitigation Planning Committee	Yes	Planning and hazard assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Full time Public Works Department; Yes
Mutual Aid Agreements	Yes	Surrounding city and county departments; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	PT	Public Works Director: Yes; Yes; Yes
Emergency Manager	PT	Fire Chief: Yes; Yes; Yes
Community Planner	PT	Public Works Director: Yes; Yes; Yes
Civil Engineer	PT	City contract: Yes; Yes; Yes
GIS Coordinator	PT	City contract: Yes; Yes; Yes
Other:	FT	Public Works Operations Manager: Yes; Yes; Yes
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor warning sirens, CodeRed; Yes
Hazard data and information	Yes	Maintain pre-incident plans, Tier 2, yearly inspection logs; Yes
Grant writing	Yes	Fire Department staff; Yes
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Saginaw Community Emergency Response Team (C.E.R.T.), Saginaw Citizen Police Academy (CPA), and Community Link can all be utilized to assist in disaster situations and hazard prevention. Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Fire Department public events, preparedness fair, school visits, Fire Department Clown Program
Natural disaster or safety related school programs	Yes	In-school programs, multiple handouts, KnowWhat2Do; Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	Community Link outreach programs; Yes
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Large capital improvements and emergencies; Yes
Authority to levy taxes for specific purposes	Yes	City Council has authority to increase property tax rate to state maximum; No
Fees for water, sewer, gas, and/or electric services	Yes	Water and sewer; Yes
Impact fees for new development	Yes	Water and wastewater projects; Yes
Stormwater utility fee	Yes	Monthly fees charged to residents and businesses; Yes
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	City Council has authority to issue all debt needs; Yes
Incur debt through private activities	Yes	City Council can incur debt from private banks; No
Community Development Block Grant (CDBG)	Yes	Some areas meet CDBG requirements; Yes

Other federal funding programs	No	
State funding programs	No	
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, policies, and resources for mitigation include budgeting and passing policies and procedures for mitigation actions, adopting and implementing stricter mitigation regulations, approving the hiring and training of staff for mitigation activities, approving mitigation updates, and additions to existing plans as new needs are recognized. This includes creating multiple Safe Place locations at the city park to provide shelter during inclement weather.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Saginaw's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms, High Winds, Tornadoes	Assist as many Saginaw citizens as possible in receiving a storm shelter.	Aggressively participate in the State of Texas Tornado Shelter Rebate Program.	Annually	Fire Department, Office of Emergency Management	$0	$100,000	Hazard Mitigation Grant Program (HMGP)
		STATUS: In progress					
Severe Thunderstorms, High Winds, Tornadoes	Ensure critical facilities in Saginaw have adequate safe rooms to protect against high-wind events and tornadoes.	Evaluate the current conditions of critical facilities to determine which ones, if any, need safe rooms installed.	Annually	Fire Department, Office of Emergency Management	$0	$100,000	City budget, grant opportunities
		STATUS: In progress					
		Establish the size and space needed to shelter the population of the critical facility.	Annually	Fire Department, Office of Emergency Management	$0	$100,000	City budget, grant opportunities
		STATUS: In progress					
		Install safe rooms as needed in critical facilities.	Annually	Fire Department, Office of Emergency Management	$100,000	$100,000	City budget, grant opportunities
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms, High Winds, Lightning, Tornadoes, Extreme Temperatures	Distribute extreme weather mitigation information to Saginaw citizens.	Provide extreme weather mitigation information to citizens through all available social media outlets and city notification methods, including info regarding extreme heat, severe thunderstorms and tornadoes. Ensure the city website is kept up to date regarding extreme weather education and extreme weather mitigation activities.	Annually	Fire Department, Office of Emergency Management	$1,000	$1,000,000	City budget
		STATUS: In progress					
Flooding	Decrease flood insurance premiums in Saginaw by participating in the Federal Emergency Management Agency's (FEMA) Community Rating System (CRS) program.	Work with city leadership and become a member of the CRS program.	1 year	Fire Department, Public Works Department, Building Department	$5,000	$25,000	Federal Emergency Management Agency (FEMA)

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
Flooding	Review and remove repetitive loss properties in Saginaw.	Review repetitive loss properties and work with property owners to remove them using FEMA funding.	Annually	Fire Department, Public Works Department, Building Department	Unknown	Unknown	FEMA
		STATUS: In progress					
Hail	Develop a hail outreach program for the Saginaw citizens.	Develop hail outreach program that provides tips and pertinent information for ensuring the protection of property against hail.	Annually	Fire Department, Office of Emergency Management	$500	$1,000,000	City budget
		STATUS: In progress					
		Provide hail mitigation information to citizens through a social media campaign.	Annually	Fire Department, Office of Emergency Management	$500	$1,000,000	City budget
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Provide hail mitigation information through the city website.	Annually	Fire Department, Office of Emergency Management	$0	$1,000,000	City budget
		STATUS: In progress					
Hail	Provide hail-resistant parking areas for Saginaw's city vehicles.	Evaluate the need for covered parking for city vehicles to protect them against hail.	Annually	Public Works Department	$500	$500	City budget, grant opportunities
		STATUS: Completed					
		Install awnings over parking areas as needed to protect city vehicles against hail.	Annually	Public Works Department	$50,000	$200,000	City budget, grant opportunities
		STATUS: Completed					
Lightning	Protect communication infrastructure in Saginaw from lightning damage.	Install lightning rods on existing and future communication infrastructure.	Annually	Fire Department, Police Department	$10,000	$250,000	City budget, grant opportunities
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Lightning	Ensure Saginaw critical facilities are protected against lightning damage.	Evaluate the hazards and risks posed by lightning in Saginaw.	Annually	Fire Department	$500	$500	City budget, grant opportunities
		STATUS: In progress					
		Install lightning rods and other protective equipment on critical facilities.	Annually	Office of Emergency Management	$50,000	$500,000	Unknown
		STATUS: In progress					
Winter Storms	Improve Saginaw first responder capabilities to mitigate effects of severe winter storms.	Provide/purchase more ice control capability for public works equipment.	Annually	Public Works Department	Unknown	Unknown	City budget, grant opportunities
		STATUS: Completed					
Winter Storms	Improve the City of Saginaw's capability to mitigate against severe winter storms.	Establish programs/shelters to protect the poor, ill, and elderly during extreme winter temperatures.	Annually	Fire Department, Office of Emergency Management	Unknown	Unknown	City budget, grant opportunities
		STATUS: In progress					
		Distribute severe winter weather mitigation literature at identified community events	Annually	Fire Department, Office of Emergency Management	Unknown	Unknown	City budget, grant opportunities

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		and through the city website.					
		STATUS: In progress					
Drought	Review and aggressively enforce Saginaw's water use codes and ordinances and update as necessary to mitigate the effects of drought.	Review current code and ordinances for water conservation in Saginaw.	Annually	Public Works Department, Code Enforcement, Office of Emergency Management	Unknown	Unknown	City budget, grant opportunities
		STATUS: In progress					
		Develop and/or update water conservation enforcement ordinances to ensure effective practices during periods of drought.	Annually	Public Works Department, Code Enforcement, Office of Emergency Management	Unknown	Unknown	City budget, grant opportunities
		STATUS: Completed					
Drought	Upgrade water and irrigation systems to conserve water in Saginaw City facilities.	Install efficient irrigation systems in new and existing city facilities.	Annually	Public Works Department	$50,000	$250,000	City budget, grant opportunities
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Update water appliances to newer water conservation design models.	Annually	Public Works Department	$50,000	$250,000	City budget, grant opportunities
		STATUS: In progress					
Wildfire	Mitigate wildfires by encouraging wildfire resistant construction and practices in the Saginaw.	Enact building permit process that encourages wildfire resistant construction.	Annually	Building Department	Unknown	Unknown	City budget, grant opportunities
		STATUS: Completed					
		Increase public education on how to reduce the risks from wildfires (construction, landscaping, etc.) with notifications, city website, and social media.	Annually	Building Department, Fire Department	Unknown	Unknown	City budget, grant opportunities
		STATUS: Completed					
Wildfire	Ensure adequate Saginaw wildfire response plans and procedures are in place.	Review current wildfire response plans and procedures. Coordinate with surrounding partner agencies for	Annually	Fire Department	Unknown	Unknown	City budget, grant opportunities

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		automatic aid ensuring appropriate type and number of resources respond quickly.					
		STATUS: Completed					
Extreme Temperatures	Establish a plan for mitigating the negative effects of extreme temperatures within Saginaw.	Open cooling shelters and provide public information.	Annually	Fire Department, Office of Emergency Management	$1,000	$10,000	City budget, grant opportunities
		STATUS: In progress					
Extreme Temperatures	Establish extreme temperature mitigation plans for critical infrastructure in Saginaw.	Develop mitigation procedures for critical infrastructure when temperature extremes are experienced and shut down of non-critical infrastructure for ease on utilities.	Unknown	Unknown	Unknown	Unknown	City budget, grant opportunities
		STATUS: In progress					
Expansive Soils	Mitigate expansive soils in Saginaw.	Improve construction techniques through building code enhancements.	Annually	Building Department	Unknown	Unknown	City budget, grant opportunities

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: In progress					
		Educate construction contractors, homeowners, and business owners about mitigation techniques. Seminars, notifications, training classes, city website, published ordinances.	Annually	Building Department	Unknown	Unknown	City budget, grant opportunities
		STATUS: In progress					

5.3 New Action Items

The City of Saginaw's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Flooding, Thunderstorms, Tornadoes**
Enhance the coverage area of outdoor warnings with the addition of an outdoor warning siren and the replacement of any outdated outdoor warning sirens.	
Participating Jurisdiction:	City of Saginaw
Priority:	1
Estimated Cost:	$55,000
Estimated Benefit:	$330,000
Potential Funding Source(s):	Hazard Mitigation Grant Program (HMGP), city funds
Lead Agency/Department Responsible:	Office of Emergency Management, Fire Department
Implementation Schedule:	24 months

Hazard(s) Addressed	**Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes , Winter Storms**
Eliminate the loss of power from critical city buildings with the installation of backup generators to existing and future buildings for consistent reliable power.	
Participating Jurisdiction:	City of Saginaw
Priority:	2
Estimated Cost:	$115,000
Estimated Benefit:	$690,000
Potential Funding Source(s):	HMGP, city funds
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes , Winter Storms
Identify and implement the newest International Code Council (ICC) building codes and fire codes to mitigate the damage from all identified hazards.	
Participating Jurisdiction:	City of Saginaw
Priority:	3
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	City funds, city funding for staff time
Lead Agency/Department Responsible:	Building Department, Fire Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes , Winter Storms
Enhance the city CodeRed system to better serve the community with greater information and notification times.	
Participating Jurisdiction:	City of Saginaw
Priority:	4
Estimated Cost:	$2,400
Estimated Benefit:	$14,400
Potential Funding Source(s):	HMGP, city funds
Lead Agency/Department Responsible:	Office of Emergency Management, Fire Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes , Winter Storms
Enhance the comprehensive public education program both in schools and on a community level to include the recommended activities to mitigate the impact of each identified hazard.	
Participating Jurisdiction:	City of Saginaw
Priority:	5
Estimated Cost:	$3,500
Estimated Benefit:	$21,000
Potential Funding Source(s):	City funds, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought
Enhance code enforcement materials to insure proper enforcement of water conservation procedures.	
Participating Jurisdiction:	City of Saginaw
Priority:	6
Estimated Cost:	$1,800
Estimated Benefit:	$10,800
Potential Funding Source(s):	City funds
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Drought
Review City of Saginaw ordinance for water conservation and enhance ordinance, as needed.	
Participating Jurisdiction:	City of Saginaw
Priority:	7
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City funds, city funding for staff time
Lead Agency/Department Responsible:	Environmental Services Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Saginaw
Priority:	8
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Require that the floodplain administrator be certified.	
Participating Jurisdiction:	City of Saginaw
Priority:	9
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Saginaw
Priority:	10
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Saginaw
Priority:	11
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding along streams, creeks, rivers, and lakes.	
Participating Jurisdiction:	City of Saginaw
Priority:	12
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Saginaw
Priority:	13
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Saginaw
Priority:	14
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Comprehensive Master Plan and Capital Improvements Plan (CIP)	City Administration, Department Leaders	Every 5 years	Reference this HazMAP when developing the plan.	The leadership team will review this HazMAP to see which action items can be addressed with the fiscal and administrative capabilities of the city.
Parks, Recreation, and Open Space (PROS) Master Plan	City Administration, Department Heads	As Needed	Reference this HazMAP when developing the plan, with a focus on open space and outdoor mitigation activities.	The leadership team will review this HazMAP to see which action items can be addressed and an amendment may be necessary to include the action in the plan.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Saginaw. For additional information, see Appendices A and B.

2020

City of Southlake

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Southlake was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Southlake alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Southlake will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Southlake has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Southlake's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Southlake. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Southlake Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Southlake	Office of Emergency Management	Emergency Management Coordinator	Planning lead: general oversight, hazard identification, and plan development
City of Southlake	Department of Planning	City Planner	General oversight, hazard identification, and plan development
City of Southlake	Public Services Department	Deputy Director of Public Works	Hazard identification and plan development
City of Southlake	Facilities Management	Director	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no new development since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: A full list of completed mitigation action items are described in Chapter 5 of this annex.

Declared Disaster Code	Incident Period	Date Declared	Description	Impact
DR-4223	May 4-June 23, 2015	May 29, 2015	Severe storms, tornadoes, straight-line winds, and flooding.	Road was underwater for approximately 48 days from Lake Grapevine lake level (had to rent barricades, message boards, etc.). Total damage cost $5,000 + labor/personnel.
DR-4245	October 22-31, 2015	November 25, 2015	Severe storms, tornadoes, straight-line winds, and flooding.	Dove Road and Lonesome Dove Road, despite having an improved culvert, flooded approximately 6 inches for an hour during Thanksgiving 2015.
DR-4266	March 7-29, 2016	March 19, 2016	Severe storms, tornadoes, and flooding.	Straight-line winds blew over a few trees and a fence. National Weather Service investigated and determined the damage was caused by straight-line winds.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Southlake.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	31,824
Persons under 5 years (%)	4.7
Persons 65 years and over (%)	8.9
Language other than English spoken at home (%)	11.4
With a disability, under age 65 (%)	3.2
Persons without health insurance, under age 65 (%)	2.4
Persons in poverty (%)	2.5
Median household income	$189,432
Households, 2012-2016	9,192
Median value of owner-occupied housing units, 2012-2016	$586,400

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Southlake. This includes a city buildings valued at $15.2 million, a hospital valued at $10.3 million, and school facilities valued at $284 million. In addition, there are two nursing facilities valued at $16.3 million, as well as several major employers.

City of Southlake Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Southlake Town Hall	Administration	500 people	71,568	$4,953,681	$3,000,000
Southlake Department of Public Safety (DPS) HQ	Fire/Rescue/Law Enforcement	200 people	86,000	$1,162,273	$5,000,000
Southlake DPS West	Fire/Rescue/Law Enforcement	100 people	19,500	$1,331,630	$2,000,000
Southlake DPS North	Fire/Rescue/Law Enforcement	300 people	38,924	$6,690,350	$2,676,240
Southlake Public Works Operations	Utilities	50 people	14,430	$1,136,302	$5,000,000

Harris Methodist Southlake	Hospital	150 people	225,939	$10,300,000	$5,150,000
Sabre Holdings	Major Employer	5,000 people	1,047,083	$45,500,000	$22,750,000
Verizon	Major Employer/Utilities	500 people	163,909	$25,405,000	$12,702,500
Watermere	Nursing Home	1,000 people	89,631	$8,748,158	$4,374,079
Carlisle	Nursing Home	200 people	62,678	$7,643,096	$3,821,548
Carroll Senior High School	School	3,000 people	200,000	$55,381,050	$22,152,000
Carroll High School	School	3,000 people	175,000	$50,000,000	$20,000,000
Dawson Middle	School	1,500 people	135,000	$35,000,000	$14,000,000
Carroll Middle School	School	1,500 people	155,000	$40,000,000	16,000,000
Eubanks Intermediate School	School	1,500 people	120,000	$30,000,000	12,000,000
Durham Intermediate School	School	1,500 people	122,000	$32,000,000	13,000,000
Walnut Grove Elementary School	School	500 people	75,000	$2,680,599	1,072,000
Rockenbaugh Elementary School	School	500 people	80,000	$19,544,755	7,817,902
Carroll Elementary School	School	500 people	75,000	$1,444,500	577,800
Johnson Elementary School	School	500 people	74,372	$7,094,916	2,837,946
Old Union Elementary School	School	500 people	83,600	$4,175,151	1,670,000

Florence Elementary School	School	500 people	75,000	$4,486,045	$1,794,400
Clariden School	School	250 people	32,600	$2,213,499	$1,110,700
Highland Meadow Montessori School	School	250 people	3,320	$437,100	$218,550

3.3 Natural Hazard Profiles

The City of Southlake's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Southlake in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Tornado
2	Flooding
3	Thunderstorm (includes hail, wind, lightning)
4	Extreme Heat
5	Drought
6	Winter Storms
7	Wildfire
8	Expansive Soils
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Southlake.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. There could be $50,000 of potential damage to vulnerable structures, according to the National Climatic Data Center for Tarrant County and central appraisal district values.

Jurisdiction's ground-water supply: Tarrant Regional Water District.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: The City of Southlake has a water reduction and restriction campaign to save water at city facilities and enforce landscape irrigation restrictions. Social media and water billing inserts are used to remind residents to conserve water.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data. A catastrophic loss estimate for city facilities is valued at $22.2 million, which is estimated from building inspections.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: There is no history of earthquakes for the City of Southlake; however, increased geological activity in the Dallas Fort Worth area has been recorded.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the city was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: There is no documented damage by expansive soils since 2015.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	Extreme heat poses a serious threat to any population. The elderly, homeless, and outdoor laborers need to take proper precautions. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: All populations are vulnerable to extreme heat, with increased vulnerability for the elderly, children, and populations who work outside. Rolling blackouts may affect residents who need to keep medication cooled or medical equipment powered.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? Despite having multiple outdoor events, there are no reports of heat related cases.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No, though critical facilities are vulnerable to prolonged rolling blackouts, which may be initiated by the Electric Reliability Council of Texas (ERCOT).

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Commuters and any buildings in a floodplain are considered most at risk.

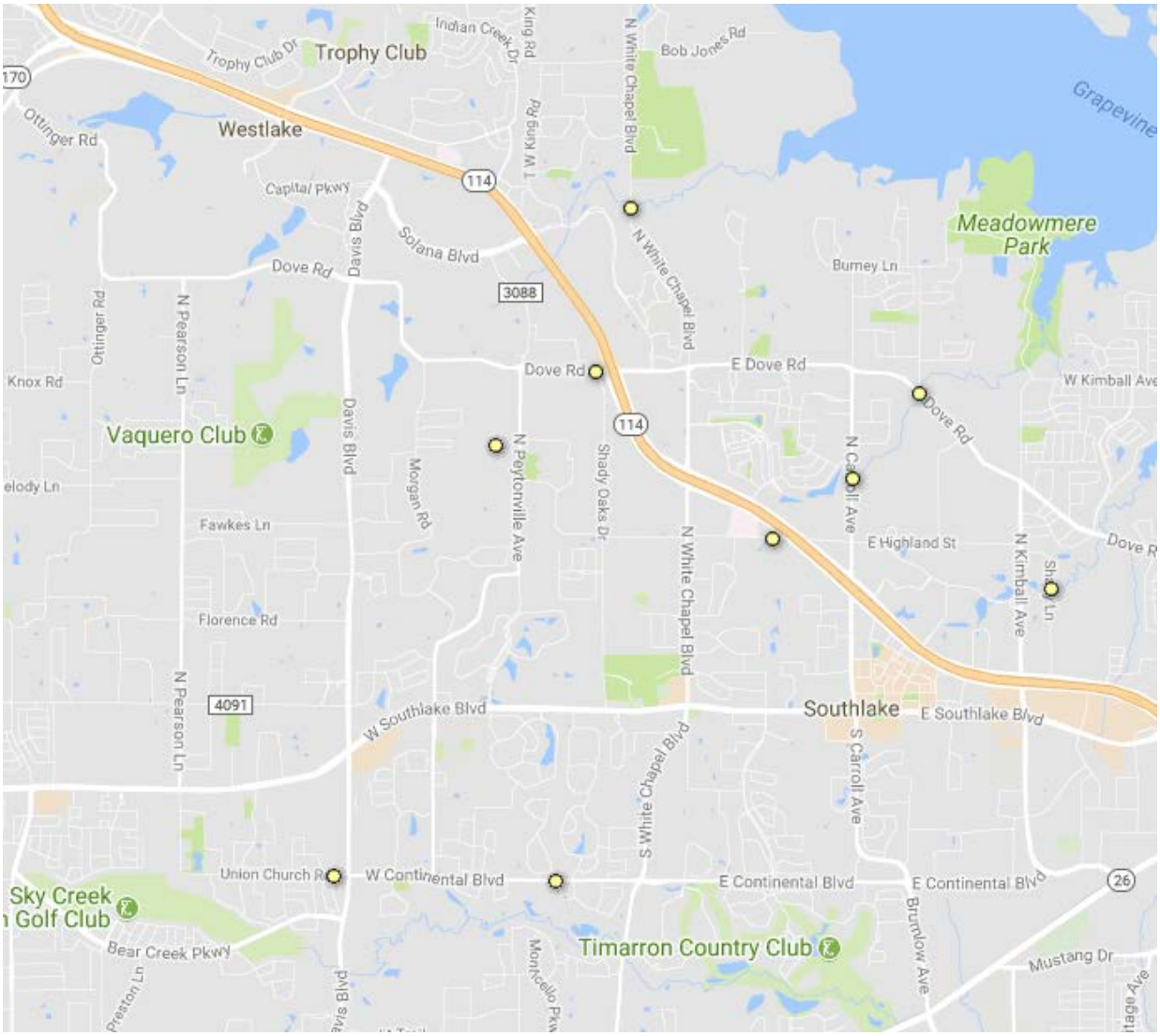
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: The bridge at White Chapel Boulevard was covered with flood water between May and June in 2015, causing $7,000 in damage and requiring new pavement.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Kirkwood Branch and Lonesome Dove Creek.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Continental Boulevard	Big Bear Creek, TRIB BB-8	Vented Ford
Union Church Road	Big Bear Creek, TRIB BB-9	Vented Ford
East Dove Road	Dove Creek	Vented Ford
North Carroll Avenue	Dove Creek	Vented Ford
Highland Street	Dove Creek	Vented Ford
Plantation Drive	Higgins Branch	Vented Ford
North White Chapel Boulevard	Kirkwood Branch	Vented Ford
Dove Road	Kirkwood Branch South Fork	Vented Ford
Shady Lane	West Jones Branch	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Southlake is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480612#
Community Name	City of Southlake
Counties	Tarrant County, Denton County
Initial FHBM Identified	02/15/74
Initial FIRM Identified	07/05/82
Current Effective Map Date	04/18/11
Reg-Emer Date	07/05/82
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Director of Public Works.

What specific flooding ordinances and plans does your jurisdiction have? International Building Code; two feet above 100-year floodplain.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? N/A.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? International Building Code; two feet above 100-year floodplain.

Repetitive and Severe Repetitive Loss Properties: There are currently 2 residential repetitive loss properties and 0 severe repetitive loss properties within the City of Southlake. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
163	6%	2%	3 %

Source: Federal Emergency Management Agency (FEMA) Floodplain Map.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Southlake's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 180 Insurance in-force: $61,612,500 Written premium in-force: $80,052
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 24 claims have been filed, but 4 of the claims closed without payment. $434,383.78 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	At least 180 structures are at risk of flooding.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	N/A.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	City's geographic information system (GIS) coordinator generates flood maps for city use.
What are the barriers to running an effective NFIP	Community FPA	None.

program in the community, if any?		
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		N/A.
Is a CAV or CAC scheduled or needed?		Yes.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	02/15/74
Are the FIRMs digital or paper?	Community FPA	Paper.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative	N/A.

	CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Southlake will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Major
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of thunderstorms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Since 2015, private properties within the city experienced roof, vehicle, and tree damage due to thunderstorms.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments near woods or grassy fields in the city are exposed to this hazard.

Most vulnerable location (North, East, South, West) of your jurisdiction? The north side of the city has the most vegetative landscape, making this area more vulnerable to wildfires than the rest of the city.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard. Approximately 8.9% of the population consists of individuals who are 65 years or older. In addition, approximately 2.5 % of the population live below the poverty line. While winter storms poses a serious threat to any population, issues with mobility and financial resources could make it difficult for these individuals to seek shelter ahead of such a threat or to relocate to adequate shelter once a winter storm occurs.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Dove Road and Highway 114; White Chapel Boulevard and Highway 114; Carroll Avenue and Highway 114; and Kimbell Avenue and Highway 114.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Southlake between 2015 and 2017. The material is organized by location and date. Some events have occurred within the city but was not tracked at this level.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Southlake	5/10/2015	Thunderstorm Wind	50	0	0	$2,000	$0	EG
Southlake	5/10/2015	Thunderstorm Wind	61	0	0	$0	$0	EG
Southlake	5/10/2015	Thunderstorm Wind	50	0	0	$10,000	$0	EG
Southlake	5/30/2015	Flash Flood		0	0	$13,000,000	$0	
Southlake	4/10/2017	Hail	1	0	0	$0	$0	
Total				**0**	**0**	**$13,012,000**	**$0**	

*EG-Wind Estimated Gusts

3.5 Technological Hazards Profiles

The City of Southlake has identified the following technological hazards that have affected or could affect the local planning area.

- Hazardous Materials (HAZMAT) Event
- Infectious Disease Outbreak
- National Security Hazard
- Power Failure
- Telecommunications Failure

3.5.1 Hazardous Materials (HAZMAT) Event

Hazard Profile: Hazardous Materials Event	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from spills Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Misplaced residents
Vulnerabilities	The entire city can be considered to be vulnerable to a hazardous materials release or spill. Risks to the environment are high should a HAZMAT release occur. Environmental concerns include interruption of water supply and secondary events such as fires and HAZMAT accidents (such as gas pipelines rupturing, rupture of HAZMAT containers at facilities, etc.).

What type of hazardous materials affect your jurisdiction, and how much of that type?

- Diesel, 39,621,600 pounds
- Gasoline, 35,154,000 pounds
- Limestone, 10,000 pounds
- Silicon Dioxide, 28,800 pounds
- Lead Acid Batteries, 26,665 pounds
- Ultrazol 9888, 42,250 pounds
- Phosphoric Acid, 20,000 pounds
- Onyx Acetone, 39,660 pounds
- Sulfuric Acid, 2,224 pounds

What types of HAZMAT releases could happen? Pipeline, plant, or transportation.

What are the health effects from the exposure to each material? Injury or death. See Safety Data Sheets at: https://chemicalsafety.com/sds-search/.

How current is your jurisdiction's Tier 2 reports? 2016.

Where are Tier 2 reports stored? Computer-Aided Management of Emergency Operations (CAMEO) software.

How is HAZMAT routed throughout your jurisdiction? Hazardous materials are continuously moving through the various thoroughfares, including Highway 114 and Highway 26.

Historical Events: No hazardous materials event has been recorded since 2015.

3.5.2 Infectious Disease Outbreak

Hazard Profile: Infectious Disease Outbreak	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Hospitals are overwhelmed Short supply of medical resources
Vulnerabilities	The entire human and animal population is at risk to an infectious disease outbreak, but children, the elderly, and those with immune system disorders are at a greater risk.

What types of infectious disease are a concern in your jurisdiction and why? Influenza remains the most significant concern to the City of Southlake because of the level of extreme contagiousness.

What are the health effects from each infectious disease exposure? The two most realistic infectious disease sources are influenza and West Nile Virus. Both initially present as "flu like" symptoms: fever, chills, headache, nausea, vomiting, and diarrhea.

What are potential sources of an infectious disease outbreak in your jurisdiction? As with most infectious diseases, contact with other humans is a significant factor in the spread of the disease, including places of congregation and busy human activity.

Historical Events: No infectious disease outbreak event has been recorded since 2015.

3.5.3 National Security Hazard

Hazard Profile: National Security Hazard	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	Limited
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Power outage Transportation disruption Loss of property Structure and infrastructure damage
Vulnerabilities	People are vulnerable to terrorist events through physical injury or disease, power outages, affects on transportation routes, establishment of shelters, affects of incident on mental state of the public, confidence of public in law enforcement support, and contamination of the food supply.

What types of national security hazards does your jurisdiction face? Ballistic missile attack, chemical and biological attack, civil disorder, nuclear attack, and terrorism.

Past damage done to your jurisdiction's critical infrastructure and facilities due to a national security hazard, including where the damage occurred: None.

Historical Events: No national security event has been recorded since 2015.

3.5.4 Power Failure

Hazard Profile: Power Failure	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Transportation disruption Loss of critical services Loss of communications
Vulnerabilities	Due to the extensive need for electricity by all sectors of society, it is reasonable to estimate that the entire city is vulnerable to this hazard.

What are the potential sources of power failure? All hazards can be a potential source of power failure.

How many people have been impacted by power failure, including any populations that are specifically vulnerable? 1,200 people in rural areas of Southlake, located in the northern portion of the city, are the most vulnerable. Failures of this nature place people of advanced age, compromised health, and social vulnerability at increased risk due to their inability to react appropriately to power failures.

How many people could be impacted by power failure? The entire city population is vulnerable to power failure.

Historical Events:

Date	Location within Jurisdiction	Time	Magnitude	Deaths	Injuries	Property Damage Estimated Value
5/10/2015	Southlake	0535	7	0	0	$10,000

3.5.5 Telecommunications Failure

Hazard Profile: Telecommunications Failure	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	Extensive
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Medium
Potential Impact	Disruption in emergency services Loss of communication for all critical entities
Vulnerabilities	The entire city is vulnerable to this hazard, but critical services and telecommunications would be impacted the most.

What are the potential sources of telecommunication failure? Damage to cell towers. Extremely high call volumes in the aftermath of a disaster that would overwhelm the network and render it unusable.

Who has been impacted by telecommunication failure? The City of Southlake has not experienced a significant telecommunications failure.

What has been impacted by telecommunication failure? The City of Southlake has not experienced a significant telecommunications failure.

Historical Events: No telecommunication failure event has been recorded since 2015.

3.6 Overall Vulnerability

The City of Southlake identified their greatest vulnerability and concerns:

- The City of Southlake's greatest vulnerability continues to be severe weather. Public education and warning tools continue to be the primary strategy to mitigate and prepare for the effects of severe weather.

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Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Southlake's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	No; No; Yes
Capital Improvement Plan	Yes	No; No; Yes
Economic Development Plan	No	
Local Emergency Operations Plan	Yes	Yes; No; Yes
Continuity of Operations Plan	No	
Transportation Plan	No	
Stormwater Management Plan	No	
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	No; Yes
Subdivision Ordinance	Yes	No; Yes
Floodplain Ordinance	Yes	No; Yes
Flood Insurance Rate Maps	Yes	No; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	

Acquisition of land for open space and public recreation uses	Yes	No; Yes
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	Yes	**Version/Year: IBC 2015**
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 1**
Site Plan Review Requirements	Yes	**Type(s) of requirement:** staff review
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Focused on traffic congestion reduction and walkability; Yes
Mitigation Planning Committee	Yes	Planning and hazard assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Only on an as needed basis; Yes
Mutual Aid Agreements	Yes	For Fire and Special Weapons and Tactics (SWAT) only. Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Yes	Yes; No; Yes
Floodplain Administrator	Yes	Yes; Yes; Yes
Emergency Manager	Yes	No; Yes; Yes
Community Planner	No	
Civil Engineer	Yes	Contractor. Yes; Yes; Yes
GIS Coordinator	Yes	Yes; Yes; Yes
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor warning sirens; Yes
Hazard data and information	Yes	In draft form currently; Yes
Grant writing	Yes	Use outside contractor; No
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or Non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Citizens Academy, Citizens on Patrol, Fire Rehab: used for crowd monitoring, traffic control, safety inspections, and Department of Public Safety assistance; Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Focused on fire safety; Yes.
Natural disaster or safety related school programs	No	
StormReady certification	Yes	StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education and awareness. To be officially StormReady, a community must: Establish a 24-hour warning point and emergency operations center. Have more than one way to receive severe weather warnings and forecasts and to alert the public. Create a system that monitors weather conditions locally. Promote the importance of public readiness through community seminars. Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises. Yes
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	No	
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If Yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes; stormwater control. Yes
Authority to levy taxes for specific purposes	Yes	No; Yes
Fees for water, sewer, gas, and/or electric services	Yes	No; No
Impact fees for new development	No	
Stormwater utility fee	No	
Incurrence of debt through general obligation bonds and/or special tax bonds	No	
Incur debt through private activities	No	
Community Development Block Grant	No	
Other federal funding programs	Yes	Emergency Management Performance Grant Program. Yes
State funding programs	No	
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Southlake's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Flooding, Hail, Lightning, Winter Storms, Hazardous Materials Incident	Maintain Southlake public alert systems.	Ensure annual Outdoor Warning Siren (OWS) maintenance and monthly test are performed.	Continual	Fire Department	$5,000	$100,000	General fund
		STATUS: Ongoing					
		Maintain and test mass notification system.	Continual	Fire Department	$23,500	$500,000	General fund
		STATUS: Ongoing					
		Maintain 790AM radio station for emergency usage.	Continual	Fire Department	$500	$100,000	General fund
		STATUS: Deleted due to lack of public reach and funding					
		Utilize city's cable channel to promote mitigation and provide alerts.	Continual	Information Technology Department	$1,500	$50,000	General fund
		STATUS: Deleted due to lack of public reach and funding					
Severe Thunderstorms	Implement a multijurisdictional	Survey the eight departments	7 months	North East Tarrant County	Unknown	Unknown	Unknown

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
and High Winds, Tornadoes, Flooding, Hail, Lightning, Winter Storms, Hazardous Materials Incident, Wildfire	Automatic Vehicle Location (AVL) system for both police and fire from Colleyville, Keller, Southlake, and Westlake (NETCOM).	and ascertain need and want as well as determine the number of users needed.		Communications (NETCOM)			
		STATUS: Ongoing					
		Determine vendor for purchase.	1 year	NETCOM with a representative from all cities	Unknown	Unknown	Unknown
		STATUS: Deferred to 2020 HazMAP					
		Purchase hardware for all jurisdictions.	16 months	NETCOM	$90,000	$360,000	Individual city budgets
		STATUS: Deferred to 2020 HazMAP					
		Purchase software for dispatch center and each unit.	2 years	NETCOM	$10,000	$40,000	Individual city budgets
		STATUS: Ongoing					
Severe Thunderstorms and High Winds, Tornadoes, Flooding, Hail, Lightning, Winter Storms, Hazardous	Utilize geographic information system (GIS) to stay up-to-date on hazard mitigation information for the City of Southlake.	Obtain GIS data on types and numbers of future buildings, infrastructure, and critical facilities.	1 year	Planning and Development Services Department	$2,500	$50,000	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Materials Incident, Wildfire, Extreme Temperatures, Expansive Soils		**STATUS: Ongoing**					
		Update hazard vulnerability analysis based on land use and development trends in the city.	1 year	Fire Department, Planning and Development Services Department	$5,000	$25,000	General fund
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes, Flooding, Hail, Lightning, Winter Storms, Hazardous Materials Incident, Wildfire, Extreme Temperatures, Expansive Soils	Increase training opportunities and participating in the City of Southlake Community Emergency Response Team (CERT) program.	Conduct annual CERT class.	Continual	Fire Department	$250	$10,000	General fund
		STATUS: Deleted due to lack of public reach and funding					
		Conduct ongoing CERT drills and refresher training.	Continual	Fire Department	$150	$5,000	General fund
		STATUS: Deleted due to lack of public reach and funding					
		Organize CERT team by Southlake Program for the Involvement of Neighborhoods (SPIN) neighborhood.	2 years	Fire Department	$750	$5,000	General fund
		STATUS: Deleted due to lack of public reach and funding					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Flooding, Hail, Lightning, Winter Storms, Hazardous Materials Incident, Wildfire, Extreme Temperatures, Expansive Soils, Drought	Ensure City of Southlake citizens and businesses know how to mitigate and prepare for disasters.	Hold an annual Southlake Safety Fair.	Continual	Fire Department, Police Department	$200	$20,000	General fund
		STATUS: Ongoing					
		Hold an annual SPIN meeting on hazard mitigation and emergency preparedness.	Continual	Fire Department	$50	$20,000	General fund
		STATUS: Ongoing					
		Hold annual Safe Building Week to educate citizens and businesses about building codes and safe practices.	Continual	Planning and Development Services Department	$500	$15,000	General fund
		STATUS: Deleted due to lack of public reach and funding					
Severe Thunderstorms and High Winds, Tornadoes	Require the enforcement of building codes in the City of Southlake.	Require the enforcement of building codes to protect against winds of 90 miles per hour sustained	Continual	Planning and Development Services Department	$5,000	$1,000,000	Builders, residents

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		for up to 30 seconds.					
		STATUS: Completed					
Flooding	Improve drainage in City of Southlake residential areas.	Lodestar Drainage Improvements – improve drainage to eliminate standing water issues on Lodestar Drive.	1 year	Public Works Department	$110,000	$500,000	Stormwater utility fund
		STATUS: Completed					
		Construct drainage box culvert on Zena Rucker Road to facilitate future development.	1 month	Public Works Department	$200,000	$10,000,000	Stormwater utility fund
		STATUS: Deferred to 2020 HazMAP					
Flooding	Improve drainage and erosion control in non-residential areas of the City of Southlake.	South White Chapel Bridge scour improvements – project will address scour erosion occurring	1 month	Public Works Department	$150,000	$2,000,000	Stormwater utility fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		around bridge columns.					
		STATUS: Deferred to 2020 HazMAP					
		Drainage basin improvements at Bicentennial Park – improve drainage at Bicentennial Park by expanding stage discharge and possible volume increase.	1 year	Public Works Department	$450,000	$1,000,000	Stormwater utility fund
		STATUS: Completed					
Drought	Improve Southlake's water supply to ensure adequate firefighting ability during summer drought.	Install TW King 30 inch water supply line to increase capability of water able to be pumped in.	3 months	Public Works Department	$11,000,000	$20,000,000	General fund
		STATUS: Deferred to 2020 HazMAP					
Drought	Review and aggressively enforce Southlake's water use codes and	Review current code and ordinances for water	Annually	Public Works Department, Code Enforcement, Office of	Unknown	Unknown	City budget, grant opportunities

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	ordinances and update as necessary to mitigate effects of drought.	conservation in Southlake.		Emergency Management			
		STATUS: Ongoing					
		Develop and/or update water conservation enforcement ordinances to ensure effective practices during periods of drought.	Annually	Public Works Department, Code Enforcement, Office of Emergency Management	Unknown	Unknown	City budget, grant opportunities
		STATUS: Ongoing					
Drought	Upgrade water and irrigation systems to conserve water in Southlake city facilities.	Install efficient irrigation systems in new and existing city facilities.	Annually	Public Works Department	$50,000	$250,000	City budget, grant opportunities
		STATUS: Ongoing					

5.3 New Action Items

The City of Southlake's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[2] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms, Hazardous Materials Incident, National Security Hazard, Infectious Disease Outbreak, Power Failure**
Enhance mass notification capabilities as appropriate, to include new technology and automation.	
Participating Jurisdiction:	City of Southlake
Priority:	1
Estimated Cost:	$24,180
Estimated Benefit:	$145,080
Potential Funding Source(s):	General fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	**Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms, Hazardous Materials Incident, National Security Hazard**
Enhance outdoor warning sirens system as necessary, to include additional sirens and locations.	
Participating Jurisdiction:	City of Southlake
Priority:	2
Estimated Cost:	$9,000
Estimated Benefit:	$54,000
Potential Funding Source(s):	General fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms, Hazardous Materials Incident, National Security Hazard, Infectious Disease Outbreak, Power Failure, Telecommunications Failure
Enhance the public presence and communication via Facebook, Twitter, and Nextdoor to promote mitigation strategies for the identified hazards and announce what the city has incorporated.	
Participating Jurisdiction:	City of Southlake
Priority:	3
Estimated Cost:	$20,000
Estimated Benefit:	$120,000
Potential Funding Source(s):	General fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms Tornadoes, Wildfires, Winter Storms, Hazardous Materials Incident, National Security Hazard
Implement a multijurisdictional Automatic Vehicle Location (AVL) system for both police and fire from Colleyville, Keller, Southlake, and Westlake (NETCOM) in order to quickly locate vehicles.	
Participating Jurisdiction:	City of Southlake
Priority:	4
Estimated Cost:	$3,280
Estimated Benefit:	$19,680
Potential Funding Source(s):	City budget
Lead Agency/Department Responsible:	North East Tarrant County Communications (NETCOM)
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms Tornadoes, Wildfires, Winter Storms, Hazardous Materials Incident, National Security Hazard, Power Failure
Obtain geographic information system (GIS) data on public, private, and residential infrastructure in order to identify the location of critical and vulnerable facilities and mitigate damages from future hazards.	
Participating Jurisdiction:	City of Southlake
Priority:	5
Estimated Cost:	$30,000
Estimated Benefit:	$180,000
Potential Funding Source(s):	General fund, hazard mitigation grants
Lead Agency/Department Responsible:	Planning and Development Services Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Identify areas prone to flooding and mitigate, as appropriate, throughout the jurisdiction.	
Participating Jurisdiction:	City of Southlake
Priority:	6
Estimated Cost:	$500,000
Estimated Benefit:	$3,000,000
Potential Funding Source(s):	General fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management , Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Flooding, Thunderstorms, Tornadoes
Implement most current building codes to protect against these identified hazards.	
Participating Jurisdiction:	City of Southlake
Priority:	7
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	General fund, hazard mitigation grants
Lead Agency/Department Responsible:	Planning and Development Services Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms, Hazardous Materials Incident, National Security Hazard, Infectious Disease Outbreak, Power Failure, Telecommunications Failure
Address hazards listed in this HazMAP in the Multi Year Training and Exercise Plan.	
Participating Jurisdiction:	City of Southlake
Priority:	8
Estimated Cost:	$300,000
Estimated Benefit:	$1,800,000
Potential Funding Source(s):	General fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms, Hazardous Materials Incident, National Security Hazard, Infectious Disease Outbreak, Power Failure, Telecommunications Failure
Review this HazMAP with internal and external partners.	
Participating Jurisdiction:	City of Southlake
Priority:	9
Estimated Cost:	$0
Estimated Benefit:	$0
Potential Funding Source(s):	City funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms, Hazardous Materials Incident, National Security Hazard, Infectious Disease Outbreak, Power Failure, Telecommunications Failure
Enhance the annual Southlake Safety Fair to include a discussion about mitigation techniques to the identified hazards.	
Participating Jurisdiction:	City of Southlake
Priority:	10
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	General fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms, Hazardous Materials Incident, National Security Hazard, Infectious Disease Outbreak, Power Failure, Telecommunications Failure
Develop a hazard vulnerability analysis based on land use and development trends in the city.	
Participating Jurisdiction:	City of Southlake
Priority:	11
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	General fund, HMGP
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms, Hazardous Materials Incident, National Security Hazard, Infectious Disease Outbreak, Power Failure, Telecommunications Failure
Enhance public education (including but not limited to information booths, public safety events, flyers, digital support tools, and training) to teach the public about mitigation techniques for the identified hazards.	
Participating Jurisdiction:	City of Southlake
Priority:	12
Estimated Cost:	$40,000
Estimated Benefit:	$2,400,000
Potential Funding Source(s):	City general fund, HMGP
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Southlake
Priority:	13
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the floodplain administrator to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	City of Southlake
Priority:	14
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Southlake
Priority:	15
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Southlake
Priority:	16
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments along streams, creeks, rivers, and lakes to protect against flooding.	
Participating Jurisdiction:	City of Southlake
Priority:	17
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes, National Security Incident
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Southlake
Priority:	18
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfires
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	City of Southlake
Priority:	19
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
To protect power lines from severe weather either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Southlake
Priority:	20
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Southlake Comprehensive Plan	Department of Planning	4-5 years	Reference this HazMAP when developing the plan.	When reviewing plan, the leadership team will consult this HazMAP to see which action items can be addressed in the drought,

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
				stormwater, and sustainability annexes.
Stormwater Management Plan	Public Works Department	5 years	Reference this HazMAP when developing the plans for critical infrastructure and resources.	The plan development team will reference the HazMAP when updating this plan, in such areas as new construction, erosion, and developments of stormwater interface.
StormReady Community Certification	Office of Emergency Management (OEM)	7 years	Reference this HazMAP when developing the plans for critical infrastructure and resources.	The OEM will consult this HazMAP when developing the public warning criteria for certification.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Southlake. For additional information, see Appendices A and B.

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Unincorporated Tarrant County

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for Unincorporated Tarrant County was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the unincorporated Tarrant County alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

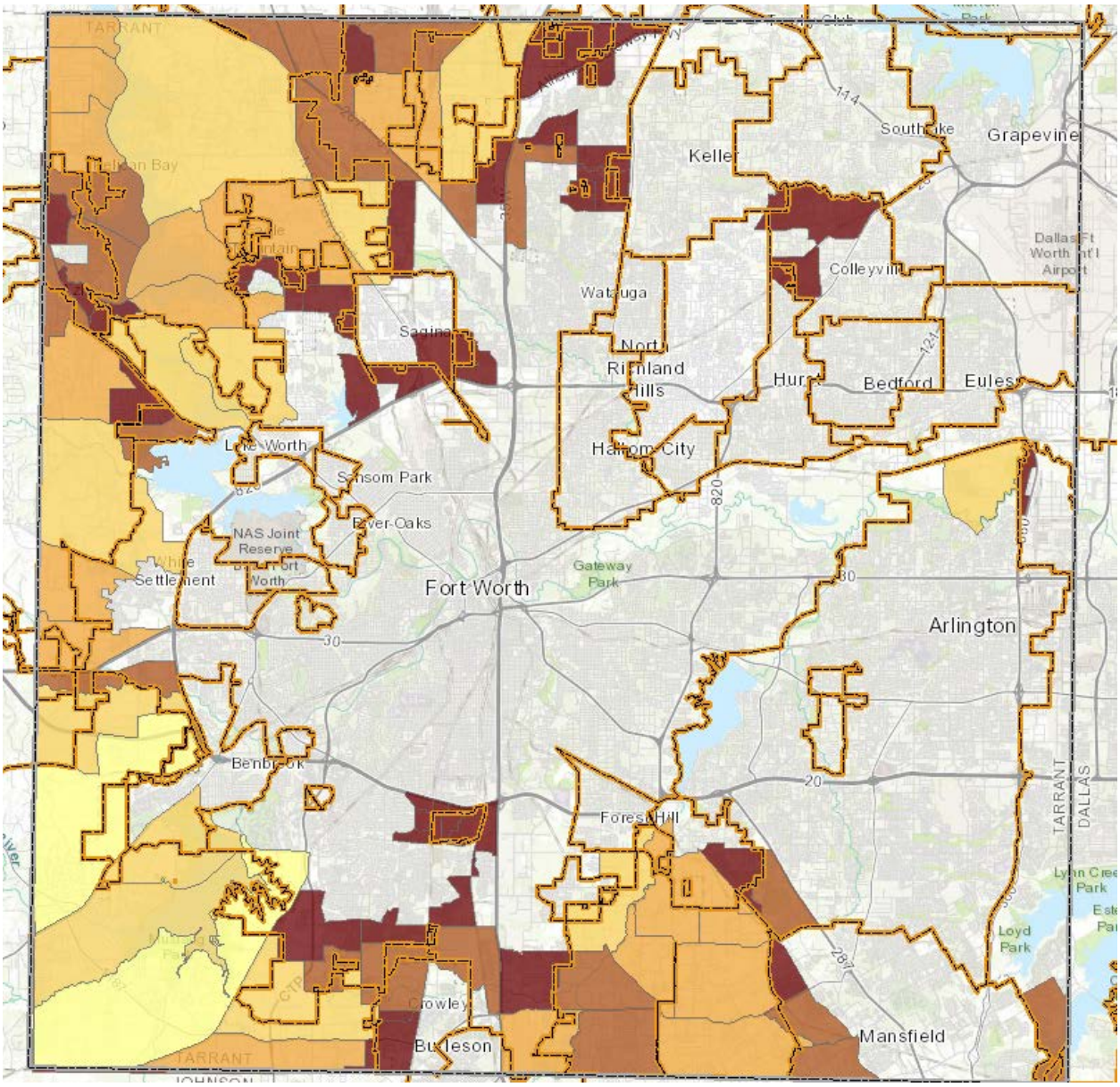
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the unincorporated Tarrant County will take the HazMAP to commissioners' court for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at NCTCOG.

1.4 Supporting Maps

The following map provides an overview of the unincorporated Tarrant County:

- Unincorporated Tarrant County Demographics



City Boundaries

City Boundaries

Census_2010_Unincorporated

2010 Census

Block Group

- 0 - 100
- 101 - 250
- 251 - 500
- 501 - 1,000
- 1,001 - 63,731

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the unincorporated Tarrant County has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped county officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The county's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The county developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the unincorporated Tarrant County's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the county's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the unincorporated Tarrant County. The county acted as the plan development consultant, providing hazard mitigation planning services.

Unincorporated Tarrant County Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
Tarrant County	Administrator's Office	Emergency Management Coordinator	General oversight, hazard identification and plan development
Tarrant County	Transportation Department	Environmental Specialist	Hazard identification and plan development
Tarrant County	Fire Marshal's Office	Assistant Fire Marshal	Hazard identification and plan development
Tarrant County	Public Health Department	Associate Director Health Protection and Response	Hazard identification and plan development
Tarrant County	County Judge	Chief of Staff	Hazard identification and plan development
Tarrant County	Administrator's Office	Assistant Emergency Management Coordinator	Hazard identification and plan development
Tarrant County	Transportation Department	County Engineer	Hazard identification and plan development
Tarrant County	Sheriff's Department	Chief Deputy	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the county, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the county in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been new development throughout the unincorporated area of Tarrant County since February 2015, though not in a floodplain. Tarrant County Transportation Services and Tarrant County Engineer have been very active in the planning process for much of this development to ensure no building occurred in a floodplain.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: Tarrant County continues to work with individuals and large developers to ensure mitigation efforts are included in the planning and approval process for the unincorporated area of the county. A full list of mitigation actions is included in Chapter 5 of this annex.

3.2 Community Profile

According to the unincorporated Tarrant County, there is a population of 47,871 people. The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the unincorporated Tarrant County.

Tarrant County Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Administration Building	Administration	261 people	114,175	$18,274,000	$750,000
Plaza Building	IT/Sheriff	362 people	311,535	$59,697,000	$1,150,000
Fire Marshal Building	Fire/Rescue	4 people	7,900	$704,000	$15,000
Greenbay Jail	Jail	65 people	196,021	$44,474,000	$125,000

Tarrant County Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Corrections Facility	Jail	235 people	469,970	$97,014,000	$3,500,000
Weatherford Street Jail Facility	Jail	Unknown	207,700	$64,905,881	$2,000,000
Lynn W. Ross Juvenile Center	Juvenile	165 people	108,702	$21,313,000	$150,000
Medical Examiner's Building	Medical	57 people	87,694	$24,152,000	$4,000,000
North Patrol	Sheriff	45 people	11,991	$1,651,000	$40,000
Criminal Courts Building	Law	14 people	169,053	$21,538,000	$150,000
Old Courthouse	Law	231 people	127,155	$43,103,000	$550,000
Tim Curry Justice Complex	Law	619people	409,252	$81,401,000	$2,750,000
Criminal Justice Building	Law	23 people	68,026	$10,662,000	$350,000
Family Law Center	Law	179 people	263,268	$51,223,000	$2,000,000
Child Protective Services	Law	5 people	33,114	$3,542,000	Unknown
Resource Connection Welcome Center	Education	12 people	10,096	$1,399,000	$30,000
Resource Connection JPS Medical Services	Education	Unknown	19,251	$2,686,000	Unknown
Resource Connection Tarrant County Veterans and Human Services	Education	31 people	40,838	$5,506,000	Unknown
Resource Connection Tarrant County Workforce	Education	11 people	40,838	$5,437,000	$15,000

Tarrant County Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Resource Connection Community Supervision and Corrections Department (CSCD) and Sheriff Training	Education	11 people	41,717	$6,116,000	$50,000
Resource Connection Housing	Education	29 people	28,600	$2,013,000	$63,500
Resource Connection My Health My Resources (MHMR)	Medical	Unknown	10,150	$835,000	Unknown
Resource Connection MHMR Storage	Medical	Unknown	5,600	$484,000	$15,000
Resource Connection Senior Citizens Kitchen/Facilities	Education	6 people	21,316	$3,026,000	Unknown
Resource Connection Juvenile Services	Education	11 people	2,400	$225,000	$10,000
Resource Connection Storage Building	Education	Unknown	720	$28,000	Unknown
Resource Connection JPS Health Center	Medical	Unknown	41,042	$5,680,000	Unknown
Public Health Facility	Medical	271 people	Unknown	Leased	$1,150,000
Central Garage	Fleet	11 people	11,480	$1,124,000	Unknown
Parking Garage Taylor Street	Garage	Unknown	229,385	$13,031,000	Unknown
Parking Garage Calhoun Street	Garage	Unknown	279,038	$12,472,000	Unknown
Plaza Parking Garage	Garage	Unknown	218,507	$8,969,000	Unknown
Elections Center	Administration	35 people	39,600	$4,326,000	$2,100,000
Precinct 1 Office Building	Administration	49 people	5,198	$742,000	$50,000
South Patrol/Storage	Sheriff	14 people	9,900	$777,000	$25,000
Precinct 1 Shop	Administration	Unknown	11,120	$1,389,000	$50,000
Precinct 1 Shed/Truck Storage	Administration	Unknown	31,800	$738,000	$5,000

Tarrant County Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Precinct 2 Office, Garage & Vehicle Storage	Administration	35 people	23,406	$2,215,000	$75,000
Precinct 2 Sign Shop & Vehicle Storage	Administration	Unknown	10,618	$375,000	$5,000
Precinct 2 Material Storage	Administration	Unknown	1,475	$110,000	Unknown
Precinct 3 Office & Garage	Administration	38 people	17,479	$1,943,000	$75,000
Precinct 3 Truck and Machinery	Administration	Unknown	23,494	$754,000	$10,000
Precinct 4 Office & Garage	Administration	50 people	6,600	$696,000	$50,000
Precinct 4 Truck, Machinery, Shop & Storage	Administration	Unknown	37,275	$1,465,000	$10,000
Plaza Parking Garage	Garage	Unknown	218,507	$8,969,000	Unknown

3.3 Natural Hazard Profiles

The unincorporated Tarrant County's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the unincorporated Tarrant County in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Thunderstorm (includes hail, wind, lightning)
2	Tornado
3	Flooding
4	Extreme Heat
5	Wildfire
6	Drought
7	Expansive Soils
8	Winter Storms
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire unincorporated Tarrant County.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Dry and shrinking soils can cause foundation problems.

Jurisdiction's ground-water supply: The Northern Trinity Groundwater Conservation District (NTGCD) has jurisdiction over groundwater in Tarrant County.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: There are no water restrictions, as residents in unincorporated areas have personal water wells.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the unincorporated area of the county was unavailable. The expansive soil issue can impact structures such foundations, roads, water systems, and other utilities.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: The total amount of damage is unknown, but roads throughout the unincorporated Tarrant County have been damaged by expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	The unincorporated Tarrant County has the potential to be impacted by extreme heat every year. Extreme heat can cause issues for elderly and the very young. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young, and those with medical conditions are most at risk to feel the effects of the extreme heat. People that work and play outside are also prone to becoming ill from extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? Cases of extreme heat in the unincorporated Tarrant County are unknown.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

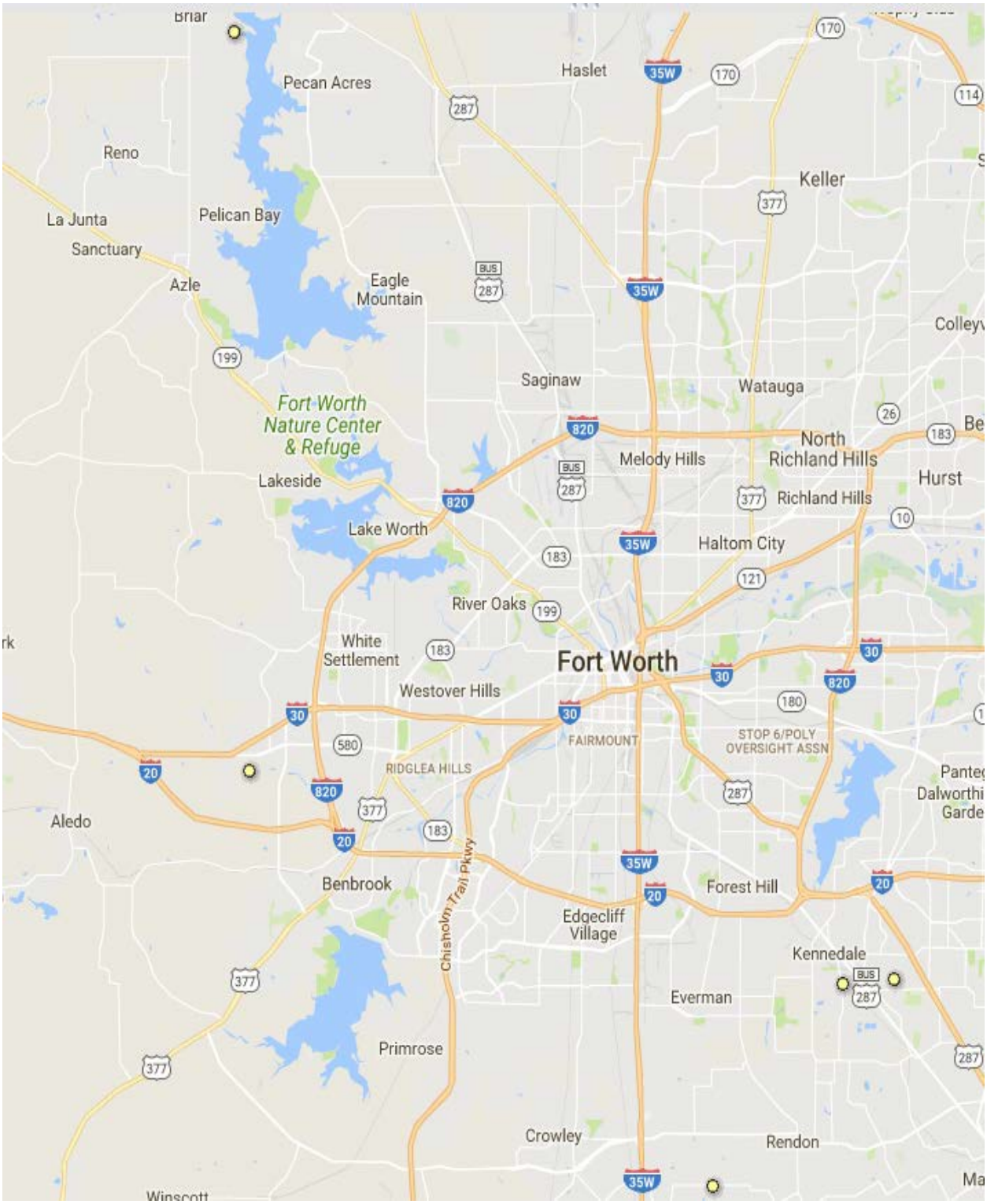
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? Yes, if in a floodplain, but no data is available.

Intersections or traffic routes impacted by flooding: See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Trinity River.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Liberty School Road	Briar Creek	Vented Ford
County Road2149 (Swiney Hiett Road)	Kee Branch	Vented Ford
Diamond Bar Trail	South Marys Creek	Bridge Class
County Road 2025	Stream VC-4, TRIB Stream VC-4A	Vented Ford
Burleson Cardinal Retta Road	Village Creek	Bridge Class

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The unincorporated Tarrant County is a participant in the NFIP and provides details about the community and their participation below. The following information was provided:

CID	480582#
Community Name	Tarrant County
County	Tarrant County
Initial FHBM Identified	02/07/75
Initial FIRM Identified	08/04/87
Current Effective Map Date	09/25/09
Reg-Emer Date	08/04/87
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Repetitive and Severe Repetitive Loss Properties: There are currently 16 residential repetitive loss properties and 2 residential severe repetitive loss properties within the unincorporated Tarrant County. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 458 Insurance in-force: $124,325,000 Written premium in-force: $422,951
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 243 claims have been filed, but 49 of the claims closed without payment. $4,086,415.57 has been paid.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	At least 458 structures are at risk to flooding.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	N/A
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Not a full-time function.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review to ensure FEMA and Tarrant County requirements are met.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Notification of public of requirements for developing in flood plain.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?	County Engineer	No.

When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	County Engineer	2010 CAV was completed by the Texas Water Development Board and FEMA.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	11/26/1973
Are the FIRMs digital or paper?	Community FPA	Both digital and paper.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes, Tarrant County requires 2 feet above base flood elevation (BFE).
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	1-Obtain permit and provide flood study showing no impact on adjacent property owners. 2- Perform work. 3- Provide elevation certificate and/or obtain flood permit.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

Unincorporated Tarrant County will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Major
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Mainly damage was done to trees, fences, roofs caused primarily by high winds.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Tornadoes have the potential to impact the entire unincorporated Tarrant County. All existing and future buildings, emergency facilities, critical facilities, critical infrastructure, improved property, and the entire population of the county is exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	There are open areas are scattered throughout the county that may be impacted by wildfires. Outbuildings, commercial, residential, and public buildings need woodlands and open fields are all at risk for potential wildfires.

Most vulnerable location (North, East, South, West) of your jurisdiction? While much of the land is undeveloped, around 45% of the unincorporated Tarrant County is in the wildland-urban interface (WUI).

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the county are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Bridges on Jackson Road, Martin Parkway, and Colleyville Boulevard have all been impacted by ice. Though not a bridge, Overland Trail is a steep road that could prevent public safety from responding to the homes at the bottom of the hill.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents. Travel from north to south is delayed and causes a longer response for first responders.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred at the county level between 2015 and 2017, impacting the unincorporated Tarrant County and all participating jurisdictions. Flooding, thunderstorms (including hail, high wind, and lightning), and tornadoes were not distinguished for the unincorporated Tarrant County. Due to the manner in which data is collected, data for events occurring in solely in unincorporated Tarrant County was unavailable. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)						
Location	Date	Event Type	Deaths	Injuries	Property Damage	Crop Damage
Tarrant (zone)	2/1/2015	Drought	0	0	$0	$2,000
Tarrant (zone)	2/22/2015	Winter Storm	0	0	$25,000	$0
Tarrant (zone)	2/28/2015	Winter Weather	0	0	$15,000	$0
Tarrant (zone)	3/1/2015	Drought	0	0	$0	$3,000
Tarrant (zone)	3/4/2015	Sleet	0	0	$0	$0
Tarrant (zone)	3/4/2015	Sleet	0	0	$10,000	$0
Tarrant (zone)	3/4/2015	Winter Weather	0	0	$0	$0
Tarrant (zone)	3/4/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/4/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/4/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/4/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Winter Weather	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)						
Location	**Date**	**Event Type**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	3/5/2015	Heavy Snow	0	0	$0	$0
Tarrant (zone)	4/1/2015	Drought	0	0	$0	$1,000
Tarrant (zone)	8/25/2015	Drought	0	0	$0	$0
Tarrant (zone)	9/1/2015	Drought	0	0	$0	$1,000
Tarrant (zone)	10/1/2015	Drought	0	0	$2,000	$0
Tarrant (zone)	6/23/2017	Heat	1	0	$0	$0
Total			**1**	**0**	**$52,000**	**$7,000**

3.5 Overall Vulnerability

The unincorporated Tarrant County identified their greatest vulnerabilities and concerns within the respective hazard sections.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the county to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the unincorporated Tarrant County's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	N/A	
Capital Improvement Plan	N/A	
Economic Development Plan	Yes	No; No; Yes
Local Emergency Operations Plan	Yes	Tarrant County Emergency Plan: Yes; No; Yes
Continuity of Operations Plan	Yes	Tarrant County Disaster Management Business Continuity: Yes; No; Yes
Transportation Plan	Yes	Using North Central Texas Council of Governments Transportation Plan
Stormwater Management Plan	Yes	Texas Pollutant Discharge Elimination System (TPDES) #TXR040052: Yes; Yes; Yes
Community Wildfire Protection Plan	Yes	Fire Wise Community 2018: Yes; Yes; Yes
Other Plans (e.g., disaster recovery, climate change adaptation)	N/A	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	N/A	
Subdivision Ordinance	Yes	Court Order #81591: Yes; Yes
Floodplain Ordinance	Yes	Court Order #106477: Yes; Yes
Flood Insurance Rate Maps	Yes	

Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Burn ban court order as needed; municipal separate storm sewer systems (MS4) stormwater permit: Yes; Yes
Acquisition of land for open space and public recreation uses	Yes	Yes; Yes
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	N/A	
Building Code Effectiveness Grading Schedule (BGEGS) Score	N/A	
Fire Department ISO Rating	Yes	**Rating:** Unknown
Site Plan Review Requirements	Yes	**Type(s) of requirement**: Goes to a review committee
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	N/A	
Mitigation Planning Committee	N/A	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Tarrant County Precinct various agreements with local governments; Yes
Mutual Aid Agreements	Yes	Tarrant County Sheriff; Tarrant County Fire Marshal; Public Works Emergency Response Team (PWERT); Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Wireless Emergency Notification System (WENS); Disaster Management Business Continuity Mass Notification System

Hazard data and information	Yes	Tarrant County Local Emergency Planning Committees (LEPC); Tier II; Yes
Grant writing	Yes	The Urban Areas Security Initiative (UASI) Program and State Homeland Security Program (SHSP); Yes
HaZUS analysis	N/A	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Tarrant County LEPC and Tarrant County Voluntary Organizations Active In Disaster (VOAD) work on hazard prevention and can assist during disasters; Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	KnoWhat2Do; Yes
Natural disaster or safety related school programs	N/A	
StormReady certification	Yes	StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education and awareness. To be officially StormReady, a community must: ▪ Establish a 24-hour warning point and emergency operations center ▪ Have more than one way to receive severe weather warnings and forecasts and to alert the public ▪ Create a system that monitors weather conditions locally ▪ Promote the importance of public readiness through community seminars ▪ Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises. Yes

Firewise Communities Certification	Yes	National Fire Protection Association's (NFPA's) Firewise USA™ program teaches people how to adapt to living with wildfire and encourages neighbors to work together and take action now to prevent losses. A Firewise community will integrate the following standards into its plan of action: • Form a board/committee that's comprised of residents and other applicable wildfire stakeholders. This group will collaborate on developing the site's risk reduction priorities, develop a multi-year action plan based on the risk assessment and oversee the completion of the annual renewal requirements needed to retain an "in good standing" status. • At a minimum, each site is required to invest the equivalent of $24.14 per dwelling unit in wildfire risk reduction actions annually (the rate is based on the 2017 annual National Hourly Volunteer Rate; which is updated every year in April when the new amount is published • Each participating site is required to have a minimum of one wildfire risk reduction educational outreach event, or related activity annually. • Every year participating sites must submit an annual renewal to maintain their "In Good Standing" status. Yes
Public/private partnership initiatives addressing disaster-related issues	Yes	Tarrant County LEPC; yes
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	N/A	
Authority to levy taxes for specific purposes	N/A	
Fees for water, sewer, gas, and/or electric services	N/A	
Impact fees for new development	N/A	
Stormwater utility fee	N/A	
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Unknown; Possible
Incur debt through private activities	Yes	
Community Development Block Grant	Yes	Unknown; Possible
Other federal funding programs	Yes	Yes; Yes
State funding programs	Yes	Unknown; Unknown
Other	No	

Tarrant County does not have the authority to implement or enforce zoning or building codes in unincorporated areas of the county. Tarrant County does not have inspection authority or responsibility. All development and new construction within a FEMA-designated floodplain will require a floodplain permit prior to any work commencing. Subdivisions in the unincorporated areas of Tarrant County may impose private deed restrictions and /or covenants that may require or disallow certain things. Tarrant County does not have the authority to enforce private property deed restrictions. Individual property owners or the Home Owners Association (HOA) of the subdivision, if there is one, may enforce these restrictions at their discretion.

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized. (This pertains to both the unincorporated Tarrant County and county owned facilities and infrastructure.)

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Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The unincorporated Tarrant County's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Improve Tarrant County warning time for citizens outside of county limits by Tarrant County.	Identify areas not covered by existing systems.	January 2014	Office of Emergency Management, Transportation Department	$4,000	$16,000	Federal Emergency Management Agency (FEMA), Tarrant County
		STATUS: Completed					
		Obtain quote and secure funding.	February 2017	Office of Emergency Management	$1,000	$ 4,000	FEMA, Tarrant County
		STATUS: Completed					
		Perform installation of system.	April 2017	Contractor/Vendor	$30,000	$180,000	FEMA, Tarrant County
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Tarrant County will purchase weather radios for distribution to common workspaces and break rooms to keep employees aware of potential weather hazards while at work.	Obtain quote for various equipment (ex. weather radios).	December 2013	Office of Emergency Management	$2,500	$10,000	FEMA, State, Tarrant County
		STATUS: Completed					
		Place order and distribute materials to the county buildings.	December 2013	Purchasing Department, Facilities Department	$10,000	$40,000	FEMA, State, Tarrant County

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes	Each jurisdiction in Tarrant County will ensure participation in the State of Texas Shelter Rebate Program.	Participate in the State of Texas Tornado Shelter Rebate Program.	Annually	Individual jurisdictions	$5,000,000	$20,000,000	Hazard Mitigation Grant Program (HMGP)
		STATUS: In progress					
Severe Thunderstorms and High Winds, Tornadoes	Use Tarrant County public education and public information officers to spread positive information regarding opportunities for installation of storm shelters.	Create pamphlets for distribution.	April 2014	Office of Emergency Management	$1,500	$120,000	FEMA, state, Tarrant County
		STATUS: In progress					
		Advertise local program to help subsidize installation cost of shelters.	December 2014	Public Information Office	$30,000	$120,000	FEMA, state, Tarrant County
		STATUS: In progress					
Flooding	Tarrant County will improve community rating through the National Flood Insurance Program (NFIP).	Tarrant County to plan with stakeholders on developing strategies to reduce vulnerability to reduce the risk to flooding.	Continual	Tarrant County, all participating jurisdictions	$100,000	$400,000	Tarrant County and potential grant funding
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Flooding	Prevent the eventual washing out of road by the encroaching creek at Winscott Plover, by Tarrant County.	Survey the intersection.	2 months	Tarrant County Transportation Department	$32,000	$128,000	100% Tarrant County
		STATUS: In progress					
		Design the new layout of the intersection.	4 months	Tarrant County Transportation Department	$125,000	$500,000	25% Tarrant County, 75% FEMA
		STATUS: Deleted- no longer a priority					
		If needed, purchase the right of way.	3.5 months	Tarrant County Transportation Department	$54,450	$217,800	100% Tarrant County
		STATUS: Deleted- no longer a priority					
		If needed, move utility lines.	6 months	Tarrant County Transportation Department	$100,000	$400,000	100% Tarrant County
		STATUS: Deleted- no longer a priority					
		Complete construction.	6 months	Tarrant County Transportation Department	$451,684	$878,293	25% Tarrant County, 75% FEMA
		STATUS: Deleted- no longer a priority					
Flooding	Create additional flow of stormwater to pass under Geraldine Road and	Survey the intersection.	1 months	Tarrant County Transportation Department	$28,000	$112,000	Tarrant County
		STATUS: Deleted- no longer a priority					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	prevent flooding or washing out of the road by increasing the conveyance of water under the street, by Tarrant County.	Design the new layout.	1 months	Tarrant County Transportation Department	$30,000	$120,000	Tarrant County
		STATUS: Completed					
		If needed, purchase the right of way.	3.5 months	Tarrant County Transportation Department	$54,450	$217,800	Tarrant County
		STATUS: Completed					
		If needed, move utility lines.	6 months	Tarrant County Transportation Department	$100,000	$400,000	Tarrant County
		STATUS: Completed					
		Complete construction.	1 week	Tarrant County Transportation Department	$20,000	$ 150,000	Tarrant County
		STATUS: Completed					
Flooding	Create additional flow of stormwater to pass under the roadway and prevent flooding or washing out of the road by larger pipes that pass under.	Survey the intersection.	1 month	Tarrant County Transportation Department	$19,200	$76,800	Tarrant County
		STATUS: Completed					
		Design the new layout.	3 months	Tarrant County Transportation Department	$45,000	$180,000	Tarrant County
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		If needed, purchase the right of way.	3.5 months	Tarrant County Transportation Department	$54,450	$217,800	Tarrant County
		STATUS: In progress					
		If needed, move utility lines.	6 months	Tarrant County Transportation Department	$100,000	$400,000	Tarrant County
		STATUS: In progress					
		Complete construction.	1 week	Tarrant County Transportation Department	$30,000	$300,000	Tarrant County
		STATUS: In progress					
Wildfire	Tarrant County to encourage the protection of Tarrant County residential and commercial structures.	Develop a Wildland Urban Interface (WUI) Plan to identify areas of Tarrant County to mitigate against the threat of wildfire in rural areas that backup to urban residential areas. Develop WUI plan with the Texas Forest Service and fire service stakeholders in the unincorporated areas of Tarrant County.	2016	Office of Emergency Management, Fire Marshal's Office	$100,000	$500,000	Grants, County budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: In progress					
		Educate homeowners during Fire Prevention month on mitigation (October).	1 month	Office of Emergency Management	$2,000	$8,000	County budget
		STATUS: In progress					
Winter Storms	Purchase additional equipment (de-ice or sand) for Tarrant County maintenance crews to use in the event of hazardous road conditions.	Identify potential shortfalls in supplies needed in winter responses.	March 2014	Tarrant County precinct garages, Office of Emergency Management	$5,000	$20,000	FEMA, state, Tarrant County
		STATUS: In progress					
		Procure materials needed in advance of winter weather.	October 2014	Office of Emergency Management, Purchasing Department	$20,000	$80,000	FEMA, state, Tarrant County
		STATUS: In progress					
Infectious Disease Outbreak	Enhance epidemiology response program at Tarrant County Public Health.	Develop Community Assessment Public Health Emergency Response Teams (CASPER).	2014	Tarrant County Public Health Department	$10,000	$30,000	Texas Department of State Health Services (DSHS)
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Purchase field deployment equipment (laptops, radios, etc.).	2015	Tarrant County Public Health Department	$50,000	$75,000	FEMA
		STATUS: Completed					
		Provide additional contract staff for data collection.	2015	Tarrant County Public Health Department	$100,000	$250,000	DSHS
		STATUS: Completed					
Infectious Disease Outbreak	Enhance surveillance and detection programs at Tarrant County Public Health.	Maintain and upgrade (as needed) current surveillance systems: Real-time Outbreak and Disease Surveillance (RODS) system, Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE), Bio Sense, and Bio Watch.	2014	Tarrant County Public Health Department	$25,000	$40,000	DSHS
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Implement Bio Watch training programs for local hazmat.	2015	Fort Worth Office of Emergency Management	$50,000	$75,000	DHS
		STATUS: Completed					
		Provide exercise and training for public health informatics, epidemiology informatics, and public health professionals.	2015	Tarrant County Public Health Department	$25,000	$50,000	FEMA
		STATUS: Completed					
Infectious Disease Outbreak	Enhance environmental health field response and laboratory testing at Tarrant County Public Health.	Increase lab surge readiness levels with new testing and processing equipment.	2014	Tarrant County Public Health Department	$75,000	$150,000	FEMA
		STATUS: In progress					
		Increase environmental health field response levels with additional vector control equipment.	2014	Tarrant County Public Health Department	$50,000	$75,000	FEMA
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Add additional lab and Environmental Health Response Team staff.	2015	Tarrant County Public Health Department	$100,000	$250,000	DSHS
		STATUS: In progress					
Infectious Disease Outbreak	Tarrant County to establish emergency medical cache for first responders in Tarrant County.	Purchase medical cache for Tarrant County first responders.	2014	Tarrant County Public Health Department, North Central Texas Trauma Regional Advisory Council (NCTTRAC)	$80,000	$120,000	FEMA
		STATUS: In progress					
		Contract local hospitals to assist with medical cache inventory and rotation.	2014	NCTTRAC	$50,000	$100,000	FEMA
		STATUS: Deleted- not feasible					
		Conduct training and exercises for alpha point of dispensing (POD) operations for delivery of first responder medical cache.	2015	Tarrant County Public Health Department, NCTTRAC	$25,000	$50,000	DSHS
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Infectious Disease Outbreak	Tarrant County to enhance POD site security program through local law enforcement in Tarrant County.	Conduct POD security training exercise for local law enforcement.	2015	Tarrant County Public Health Department, Office of Emergency Management	$25,000	$50,000	DSHS
		STATUS: In progress					
		Purchase tactical gear for county constables.	2015	Office of Emergency Management	$75,000	$100,000	FEMA
		STATUS: In progress					
Infectious Disease Outbreak	Tarrant County to improve coordination with local partners and stakeholders in Tarrant County for medical countermeasure planning.	Hire contract closed POD recruiter for private/corporate sector.	2015	Tarrant County Public Health Department	$75,000	$150,000	DSHS
		STATUS: In progress					
		Sponsor continuity of operations (COOP) training for local businesses and private sector partners.	2015	Tarrant County Public Health Department	$25,000	$50,000	FEMA
		STATUS: In progress					
Infectious Disease Outbreak	Enhance and improve isolation and quarantine protocols for Tarrant County	Provide specialized training on isolation and quarantine protocols for hospital	2015	NCTTRAC	$50,000	$75,000	DSHS

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	stakeholders and local agencies (NCTTRAC).	infection control nurses.					
		STATUS: In progress					
Infectious Disease Outbreak	Tarrant County to improve COOP readiness to incorporate pandemic preparedness measures among partners and stakeholders in Tarrant County.	Provide COOP training for private sector business partners.	2015	Tarrant County Public Health Department	$25,000	$50,000	DSHS
		STATUS: In progress					
Infectious Disease Outbreak	Tarrant County to enhance and improve situational awareness during a biological disease outbreak/pandemic for local emergency management in Tarrant County.	Develop smart phone apps for situational awareness reporting and public service announcements (PSAs).	2015	Tarrant County Information Technology Department	$50,000	$75,000	FEMA
		STATUS: In progress					
Drought	Review Tarrant Regional Water	Review current legislation for water	365 Days	Joint efforts with Tarrant Regional	$3,000	$9,000	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	District/Lake Worth water enforcement legislation and update as necessary to mitigate the effects of drought.	conservation enforcement in Lake Worth.		Water District and members.			
		STATUS: In progress					
		Develop or update water conservation enforcement legislation to ensure effective practices during periods of drought.	365 Days	Joint efforts with Tarrant Regional Water District and members.	Unknown	Unknown	Unknown
		STATUS: In progress					
Drought	Upgrade water and irrigation to conserve water for Tarrant County facilities and for Tarrant County residents. Upgrade irrigation systems, installing better water fixtures at critical infrastructure/county facilities.	Upgrade water and irrigation to conserve water for Tarrant County Facilities and for Tarrant County residents. Upgrade irrigation systems, installing better water fixtures at critical infrastructure/county facilities.	2016	Tarrant County Facilities Department	$10,000	$50,000	Tarrant County budget, grants
		STATUS: In progress					
Hail	Provide hail resistant parking areas for	Provide hail resistant parking areas for	2016	County Transportation	$100,000	$500,000	County funds,

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	county owned vehicles and equipment. Determine the need for covered parking and storage area for county owned vehicles and equipment at County Precinct Maintenance Facilities.	county owned vehicles and equipment. Determine the need for covered parking and storage area for county owned vehicles and equipment at County Precinct Maintenance Facilities.		Department, county precincts			HMGP, Pre-Disaster Mitigation (PDM)
		STATUS: In progress					
Hail	Distribute hail preparedness information to county personnel and residents of Tarrant County. Provide hail preparedness public education to citizens by publication, county website, and social media.	Distribute hail preparedness information to county personnel and residents of Tarrant County. Provide hail preparedness public education to citizens by publication, county website, and social media.	2016	Office of Emergency Management	$2,500	$10,000	Tarrant County budget and HMGP grants
		STATUS: In progress					
Lightning	Protect communication	Protect communication	2018	Tarrant County Information	$10,000	$50,000	None identified

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	infrastructure for Tarrant County from lightning. Determine the need for lightning protection on communications infrastructure in Tarrant County.	infrastructure for Tarrant County from lightning. Determine the need for lightning protection on communications infrastructure in Tarrant County.		Technology Department, Facilities Department			
		STATUS: In progress					
Lightning	Install lightning rods on existing and future communications infrastructure.	Install lightning rods on existing and future communications infrastructure.	2018	Tarrant County Information Technology Department, Facilities Department	$10,000	$50,000	None identified
		STATUS: In progress					
Lightning	Protect Tarrant County critical infrastructure and facilities to protect from lightning. Install lightning rods and other protective equipment on critical facilities such as downtown high rises.	Protect Tarrant County critical infrastructure and facilities to protect from lightning. Install lightning rods and other protective equipment on critical facilities such as downtown high rises.	Unknown	Unknown	$300,000	$1,000,000	None identified

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: In progress					
Winter Storms	Equip county vehicles and equipment with digital thermometers to identify pavement and asphalt temperatures to determine freeze levels. Purchase digital thermometers to equipment county public works/precinct equipment to determine freeze levels on bridges, overpasses, and roadways.	Equip county vehicles and equipment with digital thermometers to identify pavement and asphalt temperatures to determine freeze levels. Purchase digital thermometers to equipment county public works/precinct equipment to determine freeze levels on bridges, overpasses, and roadways.	2016	Tarrant County Transportation Department, county precincts	$50,000	$200,000	County budget, HMGP
		STATUS: In progress					
Winter Storms	Protect critical infrastructure such as Central Garage to provide critical services to county vehicles and the	Protect critical infrastructure such as Central Garage to provide critical services to county vehicles and the	2016	Tarrant County Transportation Department	$200,000	$1,000,000	County budget, HMGP, PDM

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	ability to use fuel pumps to fuel county vehicles during power outages from a winter storm.	ability to use fuel pumps to fuel county vehicles during power outages from a winter storm.					
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Identify Tarrant County critical infrastructure that does not currently have emergency power generation capability to provide heating, ventilation, and air-conditioning (HVAC) during extreme temperatures (hot and cold).	Identify Tarrant County critical infrastructure that does not currently have emergency power generation capability to provide HVAC during extreme temperatures (hot and cold).	2017	Tarrant County Facilities Department	$300,000	$1,200,000	Unknown
		STATUS: In progress					
Expansive Soils	Provide public education to residents of Tarrant County on expansive soils.	Provide public education to residents of Tarrant County on expansive soils.	2016	Office of Emergency Management	$ 2,500	$10,000	Unknown
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Expansive Soils	Identify critical infrastructure that may be affected by expansive soils to create a plan to repair damage that may have been caused by expansive soils.	Identify critical infrastructure that may be affected by expansive soils to create a plan to repair damage that may have been caused by expansive soils.	2018	Tarrant County Facilities Department	$10,000	$50,000	County budget and grants
		STATUS: In progress					
Dam Failure	Identify critical infrastructure located adjacent to Echo Lake Dam and develop a vulnerability analysis and inundation study to determine threats and vulnerability for a potential dam failure.	Identify critical infrastructure located adjacent to Echo Lake Dam and develop a vulnerability analysis and inundation study to determine threats and vulnerability for a potential dam failure.	2018	Tarrant County Transportation Department	$100,000	$500,000	Tarrant County budget, HMGP, PDM
		STATUS: Deleted- Fort Worth 2017					
Dam Failure	Provide public education to citizens about the risk of dam failure in Tarrant County.	Provide public education to citizens about the risk of dam failure in Tarrant County.	2016	Office of Emergency Management, Transportation Department	$2,500	$10,000	Tarrant County budget, HMGP

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: In progress					
Flooding	Tarrant County will participate in ensuring proper mitigation efforts are utilized during high water events.	Oak Grove Road north of Farm to Market 1187 – the low water crossing.	2017	Transportation Department	$500,000	$2,000,000	Unknown
		STATUS: In progress					
Flooding	Tarrant County will participate in ensuring proper mitigation efforts are utilized during high water events.	New roadway connection from Tiger Trail to Pearl Ranch Road to become an emergency roadway.	2016	Transportation Department	$500,000	$2,000,000	Unknown
		STATUS: In progress					
Flooding	Tarrant County will participate in ensuring proper mitigation efforts are utilized during high water events.	Rendon Road at Village Creek – structure replacement.	2018	Transportation Department	Unknown	Unknown	County budget and grants
		STATUS: In progress					
Flooding	Tarrant County will participate in ensuring proper mitigation efforts are	Shelby relief structures replacement near Timberview Drive. Precinct 2 has	2018	Transportation Department	$170,000	$680,000	County budget and grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	utilized during high water events.	requested a flood study.					
		STATUS: In progress					
Flooding	Tarrant County will participate in ensuring proper mitigation efforts are utilized during high water events.	Precinct 2 Retta Mansfield Bridge at Walnut Creek overtops at high water events. Requires construction for amendments.	2018	Transportation Department	$1,000,000	$4,000,000	Unknown
		STATUS: In progress					
Flooding	Tarrant County will participate in ensuring proper mitigation efforts are utilized during high water events.	Precinct 1 Wincott Plover Bridge requires restructuring. Serves as Godly Independent School District's only corridor in transferring students into the Mustang Creek Subdivision.	2018	Transportation Department	$500,000	$2,000,000	County budget
		STATUS: In progress					
Flooding	Tarrant County will participate in ensuring proper mitigation efforts are	Precinct 2 Wilson Road at Elm Branch Bridge has wing wall separation issues	2018	Transportation Department	$200,000	$800,000	County budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	utilized during high water events.	that need to be addressed. Wing walls will need to be addressed. Often draws outside concern of its integrity.					
		STATUS: In progress					

5.3 New Action Items

The unincorporated Tarrant County's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Earthquakes, Expansive Soils, Flooding, Thunderstorms, Tornadoes, Wildfires**
Though Tarrant County cannot enforce buildings codes, the county will encourage the use of the most current building codes to meet International Code Council standards.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	1
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	County budget, grants
Lead Agency/Department Responsible:	Code Compliance Department, Planning & Zoning Commission, Economic Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	**Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms**
Purchase and install generators for new and existing critical facilities to reduce the damage from power failure due to the identified hazards.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	2
Estimated Cost:	$15,000
Estimated Benefit:	$90,0000
Potential Funding Source(s):	County budget, grants
Lead Agency/Department Responsible:	Purchasing Department, Public Works Department, facility owner
Implementation Schedule:	12 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Install safe rooms in new and existing critical facilities.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	3
Estimated Cost:	$4,000,000
Estimated Benefit:	$24,000,000
Potential Funding Source(s):	County budget, grants
Lead Agency/Department Responsible:	Purchasing Department, Public Works Department, facility owner
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
Enhance and implement the comprehensive public education program that includes recommended actions to mitigate the impacts of these hazards.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	County budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Participate in the Federal Emergency Management Agency's Community Rating System to lower flood insurance premiums for residents with flood insurance.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	5
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	County budget, grants
Lead Agency/Department Responsible:	Public Works Department, Economic Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Create and implement a drought contingency plan for the county facilities and property that addresses the use of low flow fixtures, xeriscaping, or drought-tolerant plants.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	6
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	County budget, grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Winter Storms
Protect critical infrastructure, such as Central Garage and fuel pumps, from winter weather using mitigation strategies, to include the installation of generators and insulation of pipes.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	7
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	County budget, grants
Lead Agency/Department Responsible:	Transportation Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the county is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	8
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	County general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the floodplain administrator to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	9
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	County general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	10
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	County general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	11
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	County general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments along streams, creeks, rivers, and lakes to protect against flooding.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	12
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	County general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	13
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	County general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfires
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	14
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	County general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfires, Winter Storms
To protect power lines from severe weather either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	Unincorporated Tarrant County
Priority:	15
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	County general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the county were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the county, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Stormwater Plan	Engineering Department	Every 10 years	Reference this HazMAP when developing the plan.	The planning team will reference the HazMAP when updating this plan to see which action items can be addressed.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvements	Leadership team	Every 5 years	Reference this HazMAP when budgeting and improving critical infrastructure and resources.	The leadership team will reference the HazMAP when updating this plan, in such areas as strengthening critical infrastructure and key resources based on HazMAP hazard analysis; incorporating vulnerability data and action items.
Strategic Plan	Tarrant County Administration	Every 5 years	Reference this HazMAP when developing the plan.	The planning team will reference the HazMAP when updating this plan to see which action items can be addressed.
Emergency Operations Plan	Office Emergency Management	Every 5 years	Reference this HazMAP when developing the plan.	The planning team will reference the HazMAP when updating this plan to see which action items can be addressed.
Continuity of Operations Plan	Office Emergency Management	Every 3-5 years	Reference this HazMAP when developing the plan.	The planning team will reference the HazMAP when updating this plan to see which action items can be addressed.
Mass Fatality Plan	Medical Examiner, Office Emergency Management, Public Health	Every 3-5 years	Reference this HazMAP when developing the plan.	The planning team will reference the HazMAP when updating this plan to see which action items can be addressed.
Debris Management Plan	Office of Emergency Management	Every 3-5 years	Reference this HazMAP when developing the plan.	The planning team will reference the HazMAP when updating this plan to see which action items can be addressed.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for unincorporated Tarrant County. For more information, see Appendices A and B.

University of North Texas Health Science Center*

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

The University of North Texas Health Science Center (UNTHSC) is a new participant in the Tarrant County Hazard Mitigation Action Plan (HazMAP) and does not have a previous mitigation plan.

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County HazMAP planning process for the University of North Texas Health Science Center was the Associate Director of Emergency Management and Business Continuity. The University of North Texas Health Science Center will be referred to as the University or UNTHSC for the remainder of this HazMAP.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the University alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

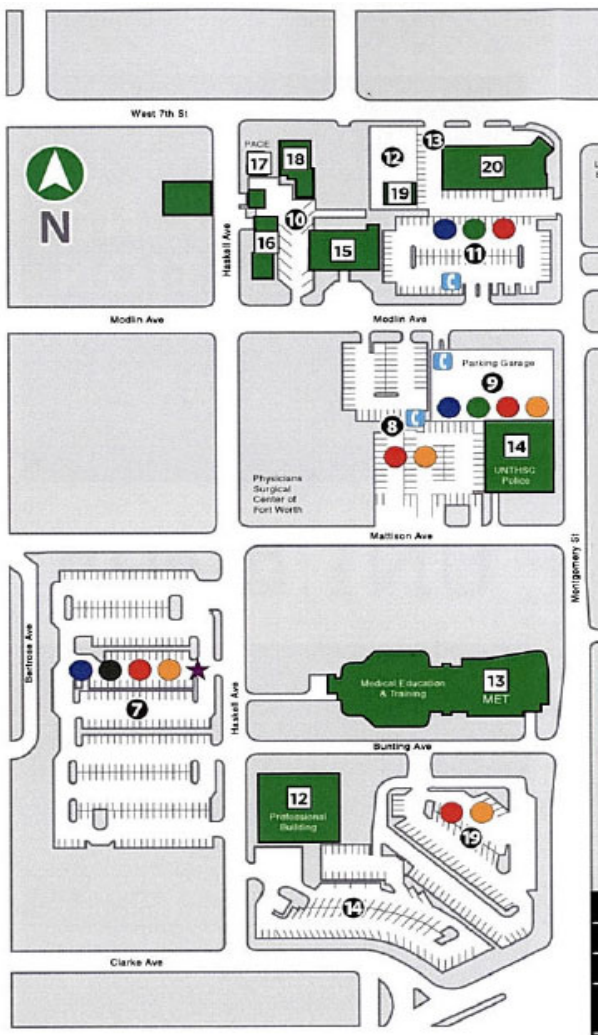
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the University will take the HazMAP to the President's Cabinet for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

The following map provides an overview of the University:

- Campus and Critical Facilities Map



*No UNT Health Science Center permit parking in the following lots:	
Lots 1 & 2	Patient Care Center only
Lot 3	UNTHSC Facilities vehicles only
Lot 7	No UNTHSC parking in spaces designated for Piola's Restaurant. This is enforced 24 hours a day.
Lot 10	Center for Sleep Medicine and Ellis Child Development Center only
Lot 12	St. Emilion only
Lot 13	Professional Offices and St. Emilion only
Lot 14	Professional Building only
Lot 15	Dialysis Center only
Lot 16	Radiology Associates only

1. **Carl E. Everett Education & Administration** 3500 Camp Bowie Blvd
2. **Research & Education** 1055 Montgomery St
3. **Gibson D. Lewis Library** 955 Montgomery St
4. **Patient Care Center** 855 Montgomery St
5. **Founder's Activity Center** 3515 W. 7th St
6. **Geriatric Annex** 3501 W. 7th St
7. **General Services** 3420 Darcy St
8. **Facilities Management** 3416 Darcy St
9. **Center for BioHealth** 3400 Camp Bowie Blvd
10. **Office of Healthcare Quality & Risk Management** 3430 Camp Bowie Blvd
11. **Office of Strategy & Measurement** 3440 Camp Bowie Blvd
12. **Professional Building** 1051 Haskell Ave
13. **Medical Education & Training** 1000 Montgomery St
14. **UNTHSC Police** 3600 Mattison Ave
15. **Ellis Child Development Center** 3620 Modlin Ave
16. **Internal Medicine/Center for Sleep Medicine** 3632 Modlin Ave
17. **Professional and Continuing Education (PACE)** 3633 W. 7th St
18. **Storage/Ground Shop** 3629 W. 7th St
19. **St. Emilion French Restaurant** 3617 W. 7th St
20. **Professional Offices** 3603, 3605, 3607, 3609 W. 7th St 802 Montgomery St

B Buildings

P Parking

PARKING KEY
Visitor
Reserved
Faculty
Employee
Student
GS Parking Attendant Guard Shack
Emergency Phone Location

UNT | HEALTH SCIENCE CENTER

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the University has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped university officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The university's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The University developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the University's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the university's Associate Director of Emergency Management and Business Continuity. The LPT was assembled in 2017 with representatives from the University. The university acted as the plan development consultant, providing hazard mitigation planning services.

UNTHSC Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
University of North Texas Health Science Center (UNTHSC)	Environmental Health and Safety Department	Associate Director, Emergency Management and Business Continuity	General oversight, hazard identification, and plan development
UNTHSC	Environmental Health and Safety Department	Director	Hazard identification and plan development
UNTHSC	Financial Resources Department, Assurance and Policy Analysis Department	Vice President Finance and Planning	Hazard identification and plan development
UNTHSC	Facilities Management	Executive Director, Facilities Administration	Hazard identification and plan development
UNTHSC	University of North Texas-Denton, Office of Risk Management	Director	Hazard identification and plan development
UNTHSC	Police Department	Lieutenant	Hazard identification and plan development
UNTHSC	Information Technology Systems & Services Department, Telecommunications Services Department	Telecommunications Tech II	Hazard identification and plan development
UNTHSC	UNTHSC	Student	Hazard identification and plan development
UNTHSC	Denton County Technology Services, Texas Emergency Geographic Information System (GIS) Response Team	GIS Manager	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the university, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the university in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

As the University is a new participant in the Tarrant County HazMAP, there are no changes in development.

3.2 Community Profile

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified by the University.

UNTHSC Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Carl E. Everett Education and Administration Building	University building
Research and Education Building	Medical
Gibson D. Lewis Library	University building
Patient Care Center	Medical
Founder's Activity Center	University building
Geriatric Annex	University building
General Services Building	University building
Facilities Management Building	University building
Surgical Center	Medical
Student Service Center	University building
Medical Education and Training Building	University building
UNTHSC Police Building	Law enforcement
Child Development Center	University building
Internal Medicine/Center for Sleep Medicine Building	University building
Healthy Start Building	University building
Storage/Ground Shop	University building
Professional Offices	Faculty building

*The capacity, square footage, and structure/content value for these assets were unavailable.

3.3 Natural Hazard Profiles

The University's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the University in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
N/A	Wildfire
1	Thunderstorm (includes hail, wind, lightning)
2	Tornado
3	Winter Storms
4	Extreme Heat
5	Expansive Soils
6	Drought
7	Flooding
8	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire University.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	Medium	Major
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00

Extent Scale			
	Minor	**Medium**	**Major**
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Negative impact on personnel, to include water restrictions and lack of drinkable water supply
Vulnerabilities	There is no historical data for drought damage in the university. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Describe any water restrictions used in your jurisdiction: The University is subject to the City of Fort Worth water restriction requirements. When Fort Worth initiates Stage 1 of its Drought Contingency Plan, landscape watering is limited to a twice-per-week schedule. The University also adheres to the year-round Fort Worth requirements which includes:

- No watering with irrigation systems or sprinklers between 10 a.m. to 6 p.m.
- No watering hard surfaces.
- No watering during precipitation.
- No water waste through runoff, missing, misaligned or broken sprinkler heads.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced personnel Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages to the university was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Unknown. Damage from expansive soils is not tracked.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	The elderly, homeless, and outdoor laborers need to take proper precautions. People should stay indoors to prevent heatstroke. The UNTHSC patient care clinics have the highest percentage of vulnerable populations; however, all UNTHSC community members are vulnerable to extreme heat.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. People who work outside are also at high risk to the direct effects of extreme heat.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? No.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced personnel Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. Commuters and any buildings in a low areas are considered most at risk.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? The University is required to acquire permits from the City of Fort Worth, but no flooding data is available.

Intersections or traffic routes impacted by flooding: No impacted intersections or traffic routes have been reported, though routes through the City of Fort Worth have the potential of impacting commute to the University.

Names of any creeks or rivers that flood: The University is situated on a hill .95 miles north of the Trinity River. So far, there has been no impact to the campus when the river floods.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. **The University of North Texas Health Science Center (UNTHSC) is not a participant in the NFIP.**

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly likely
Maximum Probable Extent	Major
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): There is no data available for past damage from thunderstorms.

Number of homes lost due to lightning-induced fires: N/A.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced personnel Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. The negative impact on the University could reach millions of dollars if a large tornado impacted critical facilities and research buildings.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	N/A
Probability of Future Occurrence	N/A
Maximum Probable Extent	N/A
Potential Impact	N/A
Vulnerabilities	Given the location of the University within the City of Fort Worth, a wildfire is not a threat to the campus.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments on campus are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: There are no bridges or overpasses located on the campus.

3.4 Historical Events

The University of North Texas Health Science Center does not have historical data for natural hazards or severe weather events that specifically impacted the University. The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Fort Worth that could have potentially impacted the University in some capacity. The material is organized by location and date.

Historical Events From The National Centers For Environmental Information (www.ncdc.noaa.gov)								
Location	Date	Event Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Magnitude Type
Fort Worth	5/14/1994	Hail	2.75	0	0	$0	$0	
Fort Worth	5/14/1994	Hail	1	0	0	$0	$0	
Fort Worth	5/14/1994	Hail	1	0	0	$0	$0	
Fort Worth	6/11/1994	Thunderstorm Wind	0	0	0	$5,000	$0	
Fort Worth	7/8/1994	Thunderstorm Wind	0	0	0	$5,000	$0	
Fort Worth	11/20/1994	Thunderstorm Wind	0	0	0	$50,000	$0	
Fort Worth	11/20/1994	Tornado	F0	0	0	$500,000	$0	
Fort Worth	4/10/1995	Thunderstorm Wind	0	0	0	$10,000	$0	
Fort Worth	4/10/1995	Hail	0.75	0	0	$0	$0	
Fort Worth	4/17/1995	Thunderstorm Wind	0	0	0	$2,000	$0	
Fort Worth	4/17/1995	Thunderstorm Wind	0	0	0	$0	$0	
Fort Worth	4/19/1995	Thunderstorm Wind	69	0	0	$0	$0	
Fort Worth	4/19/1995	Tornado	F2	0	0	$4,000,000	$0	
Fort Worth	5/5/1995	Hail	3.5	0	109	$0	$0	
Fort Worth	5/5/1995	Hail	2.75	0	0	$0	$0	
Fort Worth	5/5/1995	Hail	4	0	0	$0	$0	
Fort Worth	5/5/1995	Hail	1.5	0	0	$0	$0	
Fort Worth	5/5/1995	Thunderstorm Wind	65	0	0	$0	$0	
Fort Worth	5/5/1995	Hail	4	0	0	$0	$0	
Fort Worth	5/5/1995	Hail	2.75	0	0	$0	$0	
Fort Worth	5/5/1995	Thunderstorm Wind	0	0	0	$0	$0	
Fort Worth	5/5/1995	Thunderstorm Wind	0	0	0	$0	$0	
Fort Worth	7/5/1995	Hail	1.25	0	0	$0	$0	

Fort Worth	7/5/1995	Hail	0.75	0	0	$0	$0	
Fort Worth	8/19/1995	Thunderstorm Wind	52	0	0	$5,000	$0	
Fort Worth	1/17/1996	Hail	0.88	0	0	$0	$0	
Fort Worth	3/24/1996	Hail	0.75	0	0	$0	$0	
Fort Worth	3/24/1996	Hail	1.75	0	0	$30,000	$0	
Fort Worth	3/24/1996	Hail	0.75	0	0	$0	$0	
Fort Worth	4/12/1996	Hail	0.75	0	0	$0	$0	
Fort Worth	4/12/1996	Hail	0.75	0	0	$0	$0	
Fort Worth	4/12/1996	Hail	0.88	0	0	$0	$0	
Fort Worth	4/12/1996	Hail	0.75	0	0	$0	$0	
Fort Worth	4/12/1996	Hail	1	0	0	$0	$0	
Fort Worth	4/22/1996	Lightning		0	0	$100,000	$0	
Fort Worth	6/13/1996	Thunderstorm Wind		0	0	$10,000	$0	
Fort Worth	6/13/1996	Thunderstorm Wind		0	0	$10,000	$0	
Fort Worth	6/13/1996	Thunderstorm Wind		0	0	$50,000	$0	
Fort Worth	7/9/1996	Flash Flood		0	0	$0	$0	
Fort Worth	7/10/1996	Thunderstorm Wind		0	0	$2,000	$0	
Fort Worth	7/12/1996	Heavy Rain		0	0	$50,000	$0	
Fort Worth	7/23/1996	Thunderstorm Wind		0	0	$0	$0	
Fort Worth	8/31/1996	Flash Flood		0	0	$0	$0	
Fort Worth	10/21/1996	Hail	2	0	0	$1,000,000	$0	
Fort Worth	10/21/1996	Hail	0.75	0	0	$0	$0	
Fort Worth	10/21/1996	Hail	1.75	0	0	$0	$0	
Fort Worth	10/21/1996	Thunderstorm Wind	52	0	0	$0	$0	
Fort Worth	10/21/1996	Hail	1.75	0	0	$0	$0	
Fort Worth	10/21/1996	Hail	1	0	0	$0	$0	
Fort Worth	10/21/1996	Hail	0.88	0	0	$0	$0	
Fort Worth	10/27/1996	Flash Flood		0	0	$4,000	$0	
Fort Worth	10/27/1996	Flash Flood		0	0	$0	$0	
Fort Worth	11/6/1996	Flash Flood		0	0	$0	$0	
Fort Worth	11/7/1996	Flash Flood		0	0	$0	$0	
Fort Worth	2/20/1997	Flash Flood		0	0	$0	$0	
Fort Worth	4/11/1997	Thunderstorm Wind		0	0	$10,000	$0	
Fort Worth	4/20/1997	Thunderstorm Wind		0	0	$0	$0	
Fort Worth	4/20/1997	Lightning		0	0	$25,000	$0	
Fort Worth	4/20/1997	Thunderstorm Wind	61	0	0	$2,000	$0	

Fort Worth	4/20/1997	Hail	1.5	0	0	$0	$0	
Fort Worth	4/20/1997	Flash Flood		0	0	$0	$0	
Fort Worth	4/22/1997	Hail	0.75	0	0	$0	$0	
Fort Worth	4/22/1997	Thunderstorm Wind	52	0	0	$0	$0	
Fort Worth	5/15/1997	Flash Flood		0	0	$20,000	$0	
Fort Worth	5/30/1997	Flash Flood		0	0	$0	$0	
Fort Worth	5/30/1997	Flash Flood		0	0	$0	$0	
Fort Worth	5/30/1997	Thunderstorm Wind		0	0	$0	$0	
Fort Worth	6/15/1997	Thunderstorm Wind	52	0	0	$0	$0	
Fort Worth	6/15/1997	Thunderstorm Wind		0	0	$25,000	$0	
Fort Worth	6/16/1997	Thunderstorm Wind	52	0	0	$0	$0	
Fort Worth	6/16/1997	Hail	2	0	0	$0	$0	
Fort Worth	10/23/1997	Flash Flood		0	0	$0	$0	
Fort Worth	12/21/1997	Flash Flood		0	0	$0	$0	
Fort Worth	12/23/1997	Hail	0.75	0	0	$0	$0	
Fort Worth	1/5/1998	Hail	1.75	0	0	$0	$0	
Fort Worth	1/5/1998	Hail	1	0	0	$0	$0	
Fort Worth	1/5/1998	Hail	0.88	0	0	$0	$0	
Fort Worth	2/25/1998	Hail	0.75	0	0	$0	$0	
Fort Worth	2/25/1998	Hail	0.75	0	0	$0	$0	
Fort Worth	3/16/1998	Flash Flood		0	0	$0	$0	
Fort Worth	3/30/1998	Hail	0.88	0	0	$0	$0	
Fort Worth	5/8/1998	Thunderstorm Wind		0	0	$0	$0	
Fort Worth	5/8/1998	Hail	1	0	0	$0	$0	
Fort Worth	5/8/1998	Hail	0.75	0	0	$0	$0	
Fort Worth	4/13/2015	Flash Flood		0	0	$1,000	$0	
Fort Worth	4/18/2015	Thunderstorm Wind	51	0	0	$5,000	$0	MG
Fort Worth	4/24/2015	Thunderstorm Wind	61	0	0	$15,000	$0	EG
Fort Worth	11/17/2015	Thunderstorm Wind	35	0	0	$5,000	$0	EG
Fort Worth	3/17/2016	Hail	1.75	0	0	$50,000,000	$0	
Fort Worth	3/17/2016	Hail	1	0	0	$0	$0	
Fort Worth	6/27/2016	Flash Flood		0	0	$0	$0	
Fort Worth	9/25/2016	Flood		0	0	$0	$0	
Fort Worth	4/11/2017	Hail	1	0	0	$0	$0	
Fort Worth	7/9/2017	Hail	1	0	0	$0	$0	
Fort Worth	7/9/2017	Thunderstorm Wind	55	0	0	$10,000	$0	EG

Fort Worth	7/9/2017	Flood		0	0	$0	$0	
Fort Worth	7/9/2017	Flood		0	0	$0	$0	
Fort Worth	7/9/2017	Flood		0	0	$0	$0	
Total:				**0**	**109**	**$55,951,000**	**$0**	

*MG- Measured Wind Gusts
*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The University identified their greatest vulnerabilities and concerns:

- Thunderstorms produce damage from winds, hail, and lightning multiple times each year in the City of Fort Worth, where the University of North Texas Health Science Center (UNTHSC) is located.
- Multiple UNTHSC buildings are not hazard resistant, especially to hazards that create strong winds or flying debris, as many have glass roofs and windows. Buildings include a mobile medical unit, critical campus equipment, and patient clinics.
- All UNTHSC structures are vulnerable to water lines and power lines breaking during winter storms.
- Much of the UNTHSC community is unaware and unprepared for the hazards UNTHSC is vulnerable to.
- UNTHSC lacks geographic information system (GIS) capabilities to map vulnerable areas and collect data specific to the area.
- UNTHSC clinic patients, students, faculty, and staff are vulnerable to extreme heat. This also includes children who are guests attending outdoor summer activities on campus, as well as small children who are students at the UNTHSC day care facility.
- Expansive soils have caused damage to areas on campus.
- If a hazard damaged all the university properties, it could cost the university an estimated $403,028,379.63 in damages (building value + content value + time element value).

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the university to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the University's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	No; No; Yes
Capital Improvement Plan	Yes	No; No; Yes
Economic Development Plan	N/A	
Local Emergency Operations Plan	Yes	No; No; Yes
Continuity of Operations Plan	Yes	No; No; Yes
Transportation Plan	N/A	
Stormwater Management Plan	N/A	
Community Wildfire Protection Plan	N/A	
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	N/A	
Subdivision Ordinance	N/A	
Floodplain Ordinance	N/A	
Flood Insurance Rate Maps	N/A	
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	N/A	

Acquisition of land for open space and public recreation uses	N/A	
Building Code, Permitting, and Inspections	**Have capability?**	
Building Code	N/A	
Building Code Effectiveness Grading Schedule (BGEGS) Score	N/A	
Fire Department ISO Rating	N/A	
Site Plan Review Requirements	N/A	
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	N/A	
Mitigation Planning Committee	Yes	Initiated HazMAP Planning Committee in 2017. Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Landscape planning and maintenance. Yes
Mutual Aid Agreements	Yes	None that apply to mitigation actions. Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	N/A	
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	N/A	
Civil Engineer	FT	Yes; Yes; Yes
GIS Coordinator	No	
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Red Alert System for notification and warnings via text, e-mail, website, and phone call. Yes
Hazard data and information	Yes	Use for risk assessment and continuity planning purposes. No
Grant writing	Yes	Personnel used for various grant opportunities. No
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	The UNTHSC Office of Sustainability within the Facilities Management Department commits to creating solutions for a healthier community by implementing strategies to be good stewards of resources. These initiatives include reducing energy usage, conserving water, and recycling. Yes.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	The UNTHSC Environmental Health and Safety Office provides public education on a regular basis to the community. The Environmental Health and Safety Office administers multiple programs including management of radiological and biosafety hazards, hazardous materials, and the Emergency Management Program. The UNTHSC Office of Sustainability offers guidance on responsible water use and environmental conservation. Yes.
Natural disaster or safety related school programs	N/A	
StormReady certification	No	Applying in the near future upon completion of increasing emergency operations center capabilities.
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	No	
Other	No	

Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes, this resource was used to construct/renovate facilities, as well as purchase property. The source of these funds would come from institutional funds, including higher education funds (state-appropriated funds). Yes
Authority to levy taxes for specific purposes	No	
Fees for water, sewer, gas, and/or electric services	No	
Impact fees for new development	No	
Stormwater utility fee	No	
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes, this resource was used to construct/renovate facilities, as well as purchase property. The source of these funds would come from institutional funds, including higher education funds (state-appropriated funds). Yes
Incur debt through private activities	No	
Community Development Block Grant	No	
Other federal funding programs	No	
State funding programs	No	Currently, the state has not set aside a specific amount of funding to mitigate any actions. However, if the incident was serious enough, including financial impact, a supplemental appropriations could be made through the Governor's Office as well as the State Legislature.
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

As a new participant, the University of North Texas Health Science Center (UNTHSC) does not have previous mitigation actions to review.

5.3 New Action Items

The University's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery,[2] we used this data to develop a cost-benefit analysis: *Estimated Cost x 6 =* **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Extreme Heat, Thunderstorms, Winter Storms
Install hardened coverage over parking lots in order to mitigate the damage to campus vehicles/equipment and provide temporary shelter to nearby pedestrians.	
Participating Jurisdiction:	University of North Texas Health Science Center (UNTHSC)
Priority:	1
Estimated Cost:	$500,000
Estimated Benefit:	$3,000,000
Potential Funding Source(s):	Hazard mitigation grants, department budgets
Lead Agency/Department Responsible:	Facilities Management Services Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Thunderstorms, Tornadoes
Retrofit UNTHSC buildings with hail- and wind-resistant roofing as necessary.	
Participating Jurisdiction:	University of North Texas Health Science Center (UNTHSC)
Priority:	2
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	Hazard mitigation grants, department budgets
Lead Agency/Department Responsible:	Facilities Management Services Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Thunderstorms
Assess the extent of lightning strikes on UNTHSC structures, facilities, and people. Use this data to subsequently assess UNTHSC's vulnerability to lightning and upgrade to lightning resistant construction and/or lightning rods when necessary and possible.	
Participating Jurisdiction:	University of North Texas Health Science Center (UNTHSC)
Priority:	3
Estimated Cost:	$100,000
Estimated Benefit:	$600,000
Potential Funding Source(s):	Hazard mitigation grants, department budgets
Lead Agency/Department Responsible:	Facilities Management Services Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Enforce gaining for freestanding furniture to prevent injury to people from falling or floating debris.	
Participating Jurisdiction:	University of North Texas Health Science Center (UNTHSC)
Priority:	4
Estimated Cost:	$15,000
Estimated Benefit:	$90,000
Potential Funding Source(s):	Hazard mitigation grants, department budgets
Lead Agency/Department Responsible:	Facilities Management Services Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Expansive Soils
Use Texas Smartscape on UNTHSC property.	
Participating Jurisdiction:	University of North Texas Health Science Center (UNTHSC)
Priority:	5
Estimated Cost:	$84,000
Estimated Benefit:	$504,000
Potential Funding Source(s):	Hazard mitigation grants, department budgets
Lead Agency/Department Responsible:	Facilities Management Services Department
Implementation Schedule:	36 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Evaluate the campus community's satisfaction with the UNTHSC notification systems and emergency shelters, and make improvements and adjustments as necessary.	
Participating Jurisdiction:	University of North Texas Health Science Center (UNTHSC)
Priority:	6
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	Hazard mitigation grants, department budgets
Lead Agency/Department Responsible:	Environmental Health and Safety Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Develop a public education and awareness program to addresses mitigation strategies for all identified hazards.	
Participating Jurisdiction:	University of North Texas Health Science Center (UNTHSC)
Priority:	7
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Hazard mitigation grants, department budgets
Lead Agency/Department Responsible:	Facilities Management Services Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Evaluate vulnerability to dam failures and the extent of potential damage in the event of flooding from dam failure.	
Participating Jurisdiction:	University of North Texas Health Science Center (UNTHSC)
Priority:	8
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	Hazard mitigation grants, department budgets
Lead Agency/Department Responsible:	Facilities Management Services Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Winter Storms
Improve the UNTHSC's resiliency to winter/ice storms through enhancing the sanding capacity, tree limb pick up, and other services.	
Participating Jurisdiction:	University of North Texas Health Science Center (UNTHSC)
Priority:	9
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	Hazard mitigation grants, department budgets
Lead Agency/Department Responsible:	Facilities Management Services Department
Implementation Schedule:	12 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the university were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the university, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plan	Facilities Management	Every 2 years	Reference this HazMAP when developing the plan.	The leadership team will review this HazMAP when updating this plan to see which action items can be addressed with the fiscal and administrative capabilities of the university.
UNTHSC Master Plan	Facilities Management	Every 5 years	Reference this HazMAP when developing the plans for critical infrastructure and resources.	The plan development team will reference the HazMAP when updating this plan, in such areas as strengthening critical infrastructure and key resources based on HazMAP hazard analysis; incorporating vulnerability data and action items.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the University of North Texas Health Science Center. For additional information, see Appendices A and B.

City of Watauga

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Watauga was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Watauga alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Watauga will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Watauga has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Watauga's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Watauga. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Watauga Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Watauga	Fire Department	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Watauga	Fire Department	Fire Chief	Hazard identification and plan development
City of Watauga	Police Department	Police Chief	Hazard identification and plan development
City of Watauga	Public Works Department	Director	Hazard identification and plan development
City of Watauga	Planning and Economic Development Department	Director	Hazard identification and plan development
City of Watauga	City Council	Mayor	Hazard identification and plan development
City of Watauga	City Administration	City Manger	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no recorded change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: A full list of completed mitigation actions items are described in Chapter 5 of this annex.

3.2 Community Profile

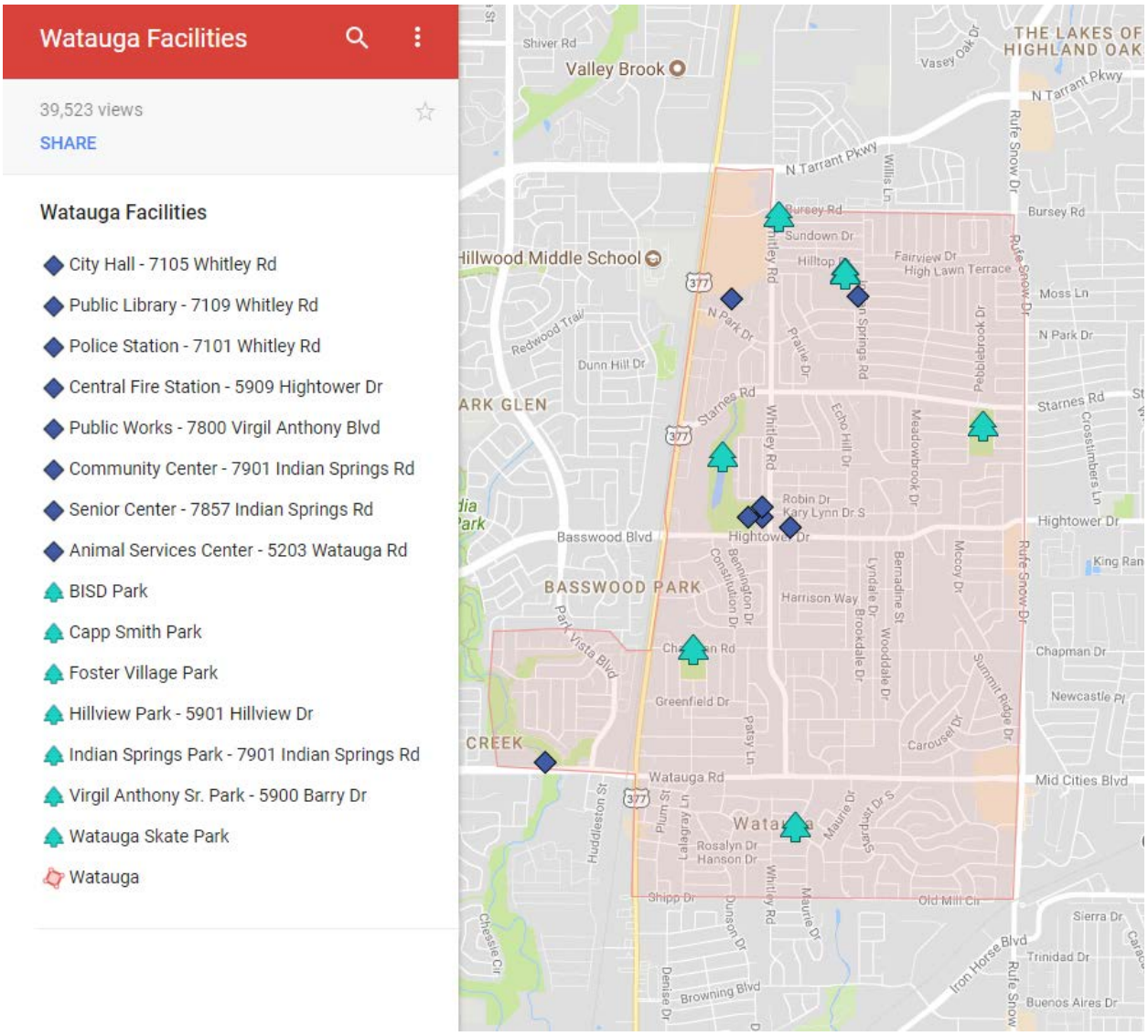
The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Watauga.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	24,602
Persons under 5 years (%)	7.2
Persons 65 years and over (%)	8.7
Language other than English spoken at home (%)	18.3
With a disability, under age 65 (%)	8.6
Persons without health insurance, under age 65 (%)	19.2
Persons in poverty (%)	9.2
Median household income	$65,329
Households, 2012-2016	8,048
Median value of owner-occupied housing units, 2012-2016	$109,500

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Watauga.

City of Watauga Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
City Hall 7105 Whitley Road	Administration	410 people	18,300	$3,400,000	$410,000
Police Department 7101 Whitley Road	Law Enforcement	100 people	21,500	$3,200,000	$500,000
Fire Station 5909 Hightower Drive	Fire/Rescue	137 people	14,000	$3,000,000	$500,000
Public Works/Water Tower 7800 Virgil Anthony Boulevard	Utility/Administration	231 people	14,500	$5,500,000	$1,000,000
Recreation Center 7105 Whitley Road	City Emergency & Red Cross Shelter	1,347 people	20,500	$300,000	$50,000
Library 7105 Whitley Road	Backup Shelter	408 people	20,500	$2,700,000	$3,450,000

Additional critical facilities and assets are shown on the following map. Capacity, square feet, structure value, and content value were not available for most locations on this map.


Watauga Facilities
39,523 views
SHARE
Watauga Facilities
City Hall - 7105 Whitley Rd
Public Library - 7109 Whitley Rd
Police Station - 7101 Whitley Rd
Central Fire Station - 5909 Hightower Dr
Public Works - 7800 Virgil Anthony Blvd
Community Center - 7901 Indian Springs Rd
Senior Center - 7857 Indian Springs Rd
Animal Services Center - 5203 Watauga Rd
BISD Park
Capp Smith Park
Foster Village Park
Hillview Park - 5901 Hillview Dr
Indian Springs Park - 7901 Indian Springs Rd
Virgil Anthony Sr. Park - 5900 Barry Dr
Watauga Skate Park
Watauga
Valley Brook
THE LAKES OF HIGHLAND OAK
N Tarrant Pkwy
Bursey Rd
Sundown Dr
Hillwood Middle School
Hilltop
Fairview Dr
High Lawn Terrace
Moss Ln
N Park Dr
Redwood Trail
Dunn Hill Dr
Starnes Rd
Whitley Rd
Prairie Dr
Indian Springs Rd
Pebblebrook Dr
Rufe Snow Dr
Echo Hill Dr
Meadowbrook Dr
Crosstimbers Ln
Robin Dr
Kary Lynn Dr S
Basswood Blvd
Hightower Dr
BASSWOOD PARK
Harrison Way
Bennington Dr
Constitution Dr
Lyndale Dr
Bernadine St
Mccoy Dr
King Ran
Park Vista Blvd
Brookdale Dr
Wooddale Dr
Chapman Dr
Greenfield Dr
Patsy Ln
Summit Ridge Dr
Newcastle Pl
Carousel Dr
CREEK
Watauga Rd
Mid Cities Blvd
Huddleston St
Plum St
Lalagray Ln
Maurie Dr
Rosalyn Dr
Hanson Dr
Shipp Dr
Dunson Dr
Old Mill Cir
Sierra Dr
Trinidad Dr
Iron Horse Blvd
Buenos Aires Dr
Chessie Cir
Denise Dr
Browning Blvd
377

3.3 Natural Hazard Profiles

The City of Watauga's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Watauga in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
N/A	Wildfire
1	Thunderstorm (includes hail, wind, lightning)
2	Tornado
3	Drought
4	Extreme Heat
5	Expansive Soils
6	Winter Storms
7	Flooding
8	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Watauga.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	Medium	Major
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00

Extent Scale			
	Minor	**Medium**	**Major**
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Extended drought could affect the sandy soil in the region and cause shifting of building foundations and roads.

Jurisdiction's ground-water supply: City of Fort Worth.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: Stage 1 mandatory water conservation.

Beginning June 3, 2013, the City of Watauga implemented Stage 1 of the Drought Contingency Plan at the request of the Tarrant Regional Water District (TRWD). The focus of Stage 1 is to reduce outdoor watering, which can account for more than 50 percent of the daily residential water used during the summer. Stage 1 limits outdoor watering to no more than twice a week based on address. No irrigation may occur between 10 a.m. and 6 p.m. on any day

Property owners are also required to properly maintain their sprinkler systems and make sure they are not wasting water because sprinkler heads are broken, leaking, or spraying in the wrong direction.

Additional Stage 1 restrictions include no hosing of driveways, sidewalks, patios, and other hard surfaces. The washing of vehicles in driveways may only be done with a hand-held bucket or hose equipped with a shutoff nozzle for quick rinses. Foundations may be watered up to two hours on any day using a hand-held hose, soaker hose or drip irrigation system placed within 24 inches of the foundation that does not produce a spray of water on the ground.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data. Damage to Birdville Independent School District and the Target retail store could result in loss of tax dollars from sales tax revenue directly impacting the city's ability to provide services that are funded form the general fund.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Expansive soils consistently causes major damage to city roads every year. Expansive soils are a major consideration to all existing and future structures, as soil movement can lead to foundation damage and cracking and falling buildings. This could lead to extensive damage to the city's over 8,000 single-family residential structures as well as to critical infrastructure like police stations, fire stations, City Hall, and other critical structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Watauga spends approximately $35,000 per year rebuilding roads due to cracking, heaving, and buckling caused by expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	The elderly, very young, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. People who work outside or in buildings without air-conditioning are also at high risk to the direct effects of extreme heat. These populations are present throughout the city.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? No cases have been recorded since 2015.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

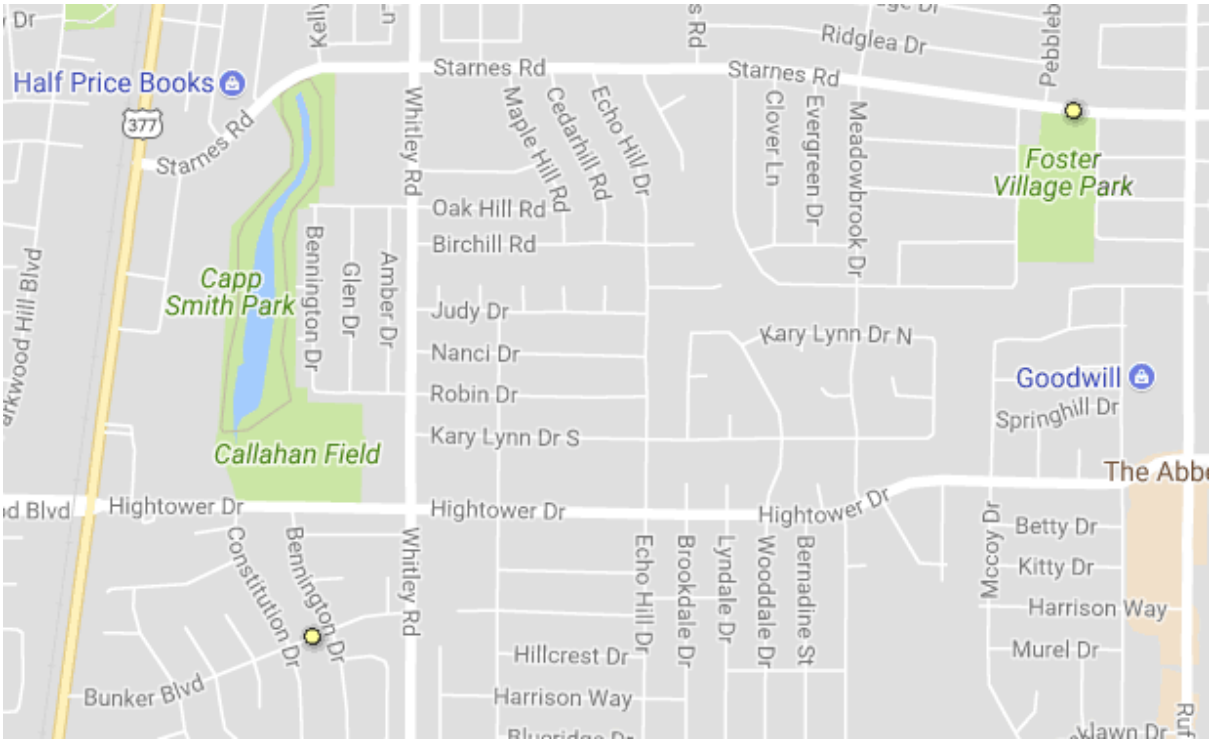
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Little Fossil Creek, Bunker Hill Creek, and Singing Hills Creek.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Bunker Boulevard	Bunker Hill Creek	Vented Ford
Starnes Road	Singing Hills Creek	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Watauga is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480613#
Community Name	City of Watauga
Counties	Tarrant County
Initial FHBM Identified	03/08/74
Initial FIRM Identified	06/01/82
Current Effective Map Date	09/25/09
Reg-Emer Date	06/01/82
Tribal	NO

Source: http://www.fema.gov/cis/TX.html.

Repetitive and Severe Repetitive Loss Properties: There are 14 residential repetitive loss properties and no severe repetitive loss properties within the City of Watauga. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Watauga's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 95 Insurance in-force: $16,350,600 Written premium in-force: $74,500
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Since 1978: Around 85 claims have been filed, but 17 of the claims closed without payment. $533,697.51 has been paid.
NFIP Topic	**Source of Information**	**Comments**

How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	Approximately 95 structures are exposed to flood risks.
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	Data not available.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, GIS, education or outreach, inspections, and engineering capability.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Data not available.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Data not available.
Is a CAV or CAC scheduled or needed?		Data not available.
Regulation		

NFIP Topic	Source of Information	Comments
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	06/01/82
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	(1) Application for a Floodplain Development Permit shall be presented to the Floodplain Administrator on forms furnished by him/her and may include, but not be limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to areas of special flood hazard. Additionally, the following information is required: (a) After forms are set for the lowest floor, a letter completed by a licensed engineer or surveyor indicating the proposed lowest floor elevation (in relation to mean sea level), including basement and finished garage of all new and substantially improved structures; (b) After construction and before final inspection, an elevation certificate completed by a licensed engineer or surveyor; (c) Elevation in relation to mean sea level to which any nonresidential structure shall be floodproofed; (d) A certificate from a registered professional engineer or architect that the nonresidential floodproofed structure shall meet the floodproofing criteria of Section 5.02 (2); (e) Description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of proposed development;

		(f) Maintain a record of all such information in accordance with Section 4.02(1).
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Watauga will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of thunderstorms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): $21,000 worth of damage has occurred from thunderstorm winds and hail.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	N/A
Probability of Future Occurrence	N/A
Maximum Probable Extent	N/A
Potential Impact	N/A
Vulnerabilities	The City of Watauga is not vulnerable to wildfire due to the urbanized landscape of the city.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Two bridges are located on Watauga Road, the 5300 block and the 6700 block. There is also a bridge located in the 6700 block of Chapman Road.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, are natural hazard events that occurred within the City of Watauga between 2015 and 2017. The material is organized by location and date.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Watauga	4/18/2015	Thunderstorm Wind	52	0	0	$7,000	$0	EG
Watauga	3/8/2016	Thunderstorm Wind	62	0	0	$8,000	$0	MG
Watauga	3/8/2016	Thunderstorm Wind	50	0	0	$5,000	$0	MG
Watauga	8/12/2016	Thunderstorm Wind	58	0	0	$1,000	$0	MG
Watauga	3/29/2017	Thunderstorm Wind	50	0	0	$0	$0	MG
Watauga	4/2/2017	Hail	1	0	0	$0	$0	
Total				**0**	**0**	**$21,000**	**$0**	

*MG- Measured Wind Gusts

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Watauga identified their greatest vulnerability and concern:

- If struck by a major hazard, potential damage to city owned buildings could be over $18 million.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Watauga's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	No; No; No
Capital Improvement Plan	Yes	No; No; No
Economic Development Plan	Yes	No; No; No
Local Emergency Operations Plan	Yes	Emergency Management Plan: Yes; Yes; Yes
Continuity of Operations Plan	No	
Transportation Plan	No	
Stormwater Management Plan	Yes	Yes; No; No
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	Yes	Tarrant County HazMAP
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	No	
Acquisition of land for open space and public recreation uses	No	

Building Code, Permitting, and Inspections	Have capability?	
Building Code	Yes	**Version/Year: 2012 IBC**
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating: 3**
Site Plan Review Requirements	Yes	**Type(s) of requirement:** plan review and Planning and Zoning Board review
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning & Zoning Board; Yes
Mitigation Planning Committee	Yes	Hazard Identification & Planning; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Public Works cleans and maintains waterways and other areas; Yes
Mutual Aid Agreements	Yes	Multiple mutual aid plans with all surrounding jurisdictions; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	FT	Yes; Yes; Yes
Emergency Manager	PT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	PT	Contracted-Yes; Yes; Yes
GIS Coordinator	No	
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	Outdoor warning sirens and Blackboard Connect are used to notify citizens; Yes
Hazard data and information	Yes	Tier II reports; Yes
Grant writing	No	
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Volunteers on Patrol program for the police department assist with general safety. Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Responsible water program is included in the water bill and once a year in presentation to the school. Messages also distributed on social media and website. Fire safety messages are on city website and social media sites. Yes
Natural disaster or safety related school programs	Yes	Fire safety programs in the schools and on social media. Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	American Red Cross shelter program. No
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes, water, sewer, draining projects. Yes
Authority to levy taxes for specific purposes	Yes	Yes, park funds, street maintenance. Yes
Fees for water, sewer, gas, and/or electric services	Yes	Yes, pay for water system purchase, repairs, and maintenance. Yes
Impact fees for new development	Yes	No; Yes
Stormwater utility fee	Yes	Yes, used to improve and maintain current system. Yes
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes, multiple projects through the years for storm drain and street improvements. Yes
Incur debt through private activities	No	

Community Development Block Grant	Yes	Yes, used for street overlay and stormwater improvements. Yes
Other federal funding programs	No	
State funding programs	No	
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Watauga's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	Notify all citizens within Watauga city parks of impending inclement weather.	Design and install warning sirens in all city parks.	5 years	Office of Emergency Management	$250,000	$7,500,000	City funds, grants
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes	Replace outdated outdoor sirens within the City of Watauga.	Design and replace 3 outdoor warning sirens.	5 years	Office of Emergency Management	$250,000	$7,500,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Purchase a mobile command center for the City of Watauga.	Purchase a mobile command center.	1 year	Office of Emergency Management	$500,000	$2,000,000	City funds, grants
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes,	Train City of Watauga personnel in damage assessment.	Train personnel to conduct damage assessments.	18 months	Office of Emergency Management	$3,000	$12,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires							
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Establish a Rapid Response Team (RRT) in the City of Watauga.	Establish policy regarding RRT.	December 2013	Police Department	$500	$2,000	Department budget
		STATUS: Deferred to 2020 HazMAP					
		Establish goals and objectives.	October 2014	Police Department	$4,000	$16,000	Department budget
		STATUS: Deferred to 2020 HazMAP					
		Develop team organizational chart.	May 2014	Police Department	$250	$1,000	Department budget
		STATUS: Deferred to 2020 HazMAP					
		Determine team selection and equipment.	October 2014	Police Department	$8,000	$24,000	Department budget
		STATUS: Deferred to 2020 HazMAP					
		Provide training for team.	Completed and ongoing	Police Department	$7,500	$22,000	Department budget
		STATUS: Completed and ongoing					
Severe Thunderstorms	Maintain a current business	Create business database.	October 2013	Police Department	$2,500	$10,000	City budget
		STATUS: Completed					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	database for Watauga.	Maintain the current business list.	Completed and ongoing	Police Department, Fire Department	$500	$2,000	City budget
		STATUS: Completed and ongoing					
Flooding	Improve drainage of rainwater runoff in the streets of the Watauga Heights subdivision.	Design and install new stormwater drains along the streets in subdivision.	5 years	Public Works Department	$1,500,000	$7,000,000	City funds, debt, grants
		STATUS: Completed and ongoing					
Power Failure	Ensure City of Watauga critical facilities have alternate power supply.	Identify appropriate size and type of generator for critical facilities.	12 months	Building Maintenance Department	$1,000	$4,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Purchase/order generator for critical facilities.	6 months	Building Maintenance Department	$60,000	$240,000	City funds, grants
		STATUS: Deferred to 2020 HazMAP					
		Deliver and install critical facility generators.	12 Months	Building Maintenance Department	$15,000	$60,000	City funds, grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
Power Failure	Ensure City of Watauga critical facilities have emergency lighting systems in place.	Evaluate emergency lighting systems in critical facilities.	3 months	Building Maintenance Department	$1,000	$4,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Install emergency lighting systems in critical facilities.	12 months	Building Maintenance Department	$60,000	$240,000	City funds, grants
		STATUS: Deferred to 2020 HazMAP					
Drought	Review City of Watauga water enforcement legislation and update as necessary to mitigate the effects of drought.	Review current legislation for water conservation enforcement in City of Watauga.	Completed	Public Works Department, Water Department	$2,500	$10,000	City funds
		STATUS: Completed and ongoing					
		Develop or update water conservation enforcement legislation to ensure effective practices during periods of drought.	12 months	Public Works Department, Water Department	$10,000	$40,000	City funds
		STATUS: Completed and ongoing					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Drought	Develop contingency plans for City of Watauga to ensure adequate power and water supply during prolonged periods of drought.	Review current contingency plans.	Completed	Public Works Department	$10,000	$40,000	City funds
		STATUS: Completed and ongoing					
		Develop or update potable water contingency plans.	3 months	Public Works Department, Water Department	$10,000	$40,000	City funds
		STATUS: Completed and ongoing					
		Develop or update power supply contingency plans.	12 months	Public Works Department	$10,000	$40,000	City funds
		STATUS: Completed and ongoing					
Drought	Upgrade water and irrigation systems to conserve water in Watauga.	Renewed approximately 20 water mains.	Completed	Public Works Department, Water Department	$2,000,000	$8,000,000	City funds
		STATUS: Completed					
		Renew the remaining water mains to stop breakage and leakage.	24 months	Public Works Department, Water Department	$50,000,000	$200,000,000	City funds, grants
		STATUS: Completed and ongoing					
Drought	Develop a drought awareness education program for City	Evaluate the hazards posed by drought in City of Watauga.	Completed	Public Works Department, Water Department	$5,000	$20,000	City funds
		STATUS: Completed and ongoing					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	of Watauga citizens.	Develop a drought awareness education program that provides tips and pertinent information for ensuring the protection of property and the environment against drought.	Completed	Public Works Department, Water Department	$10,000	$40,000	City funds
		STATUS: Completed and ongoing					
Drought	Distribute drought awareness information to City of Watauga citizens.	Provide drought awareness information to City of Watauga citizens through a social media campaign.	12 months	Information Technology Department, Public Information Office	$5,000	$20,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Provide drought awareness information through the City of Watauga website.	Completed	Information Technology Department, Public Information Office	$5,000	$20,000	City funds
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Extreme Temperatures	Ensure City of Watauga has an extreme heat plan in place.	Review current plans and procedures related to extreme heat.	18 months	Office of Emergency Management	$1,500	$6,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Develop or update extreme heat plans and ensure they provide procedures for opening cooling centers and providing public information.	12 months	Office of Emergency Management	$3,000	$12,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Identify extreme heat plans for critical infrastructure in City of Watauga.	Evaluate the need for extreme heat plans for critical infrastructure to ensure essential functions continue in the event of high temperatures.	3 months	Office of Emergency Management	$1,500	$6,000	City funds
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Develop or update plans and procedures for critical infrastructure when high temperatures are present.	12 months	Office of Emergency Management	$3,000	$12,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Develop an extreme heat preparedness education program for City of Watauga citizens.	Evaluate the hazards posed by extreme heat in the City of Watauga.	12 months	Office of Emergency Management	$1,500	$6,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Develop an extreme heat preparedness education program that provides tips and pertinent information for ensuring the health and safety of citizens during extreme heat.	18 months	Office of Emergency Management	$1,500	$6,000	City funds
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Extreme Temperatures	Distribute extreme heath mitigation information to City of Watauga citizens.	Provide extreme heat mitigation information to the City of Watauga citizens through a social media campaign.	18 months	Information Technology Department, Office of Emergency Management	$5,000	$20,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Provide extreme heat mitigation information through the City of Watauga's website.	18 months	Information Technology Department, Office of Emergency Management	$5,000	$20,000	City funds
		STATUS: Deferred to 2020 HazMAP					
Expansive Soils	Mitigate expansive soils in Watauga.	Improve construction techniques through building code enhancements.	12 months	Building Official	$25,000	$100,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Educate construction contractors, homeowners, and business owners	24 months	Building Official	$10,000	$40,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		about mitigation techniques.					
		STATUS: Deferred to 2020 HazMAP					
Tornadoes	Enhance warning systems to help warn the citizens of Watauga, concerning the potential of tornadic activity.	Implement outdoor warning siren upgrades to address potential areas where growth has and will occur that may impact the ability of the system to reach its intended service area.	Project will be implemented as funds become available.	Office of Emergency Management	$85,000	The impact of warning our population of the impending tornado is difficult to measure with the impact to life and property. This number could be in the millions of dollars.	General fund
		STATUS: Deferred to 2020 HazMAP					
Tornadoes	Update our Blackboard Connect phone notification system with a more robust system.	Update the Blackboard Connect notification system with a more robust process for notifying our citizens by way of smart phone applications, texting and other forms of social	Completed with annual updates as community grows.	Office of Emergency Management	$15,000	The impact of warning our population of the impending tornado is difficult to measure with the impact to life and property. This number could be in the	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		media. This will have the potential of reaching a more active and social community. This will also allow for our whole community to be more informed of the approaching severe weather that may be producing a tornado.				millions of dollars.	
		STATUS: Completed and ongoing					
Flooding	Add high water warning devices on our roadways that are prone to high water.	Add measures such as an enhanced warning system that will offer a measuring system for high water that will notify our Public Works department to barricade the area to	3-5 years, as funding is available	Public Works Department	$225,000	$400,000	Certificate of Obligation, bond issues

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		reduce the potential for loss of life					
		STATUS: Deferred to 2020 HazMAP					
Flooding	Enhance and enforce our flood plain regulations in Watauga.	Annual repetitive losses due to flooding will continue to be assessed and mapped. Insuring FEMA Insurance Rate Map mapping is adequate and above all correct as it relates to properties that may be raised above the flood elevations.	5-10 years, as funding becomes available	Engineering Department	$10,000,000	$40,000,000	Federal Emergency Management Agency Hazard Mitigation Grant Program (FEMA HMGP)
		STATUS: Deferred to 2020 HazMAP					
Thunderstorms and High Wind	Enhance warning systems to help warn the citizens of Watauga, concerning the potential of severe storms (severe	Update the Blackboard Connect notification system with a more robust process for notifying our citizens by way of smart phone	Completed with annual updates as community grows.	Office of Emergency Management	$15,000	The impact of warning our population of the impending severe storm is difficult to measure with the impact to life and	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	thunderstorms, high winds).	applications, texting and other forms of social media. This will have the potential of reaching a more active and social community. This will allow for our whole community to be warned of this potential.				property. This number could be in the millions of dollars.	
		STATUS: Completed and ongoing					
Thunderstorms and High Wind	Increase awareness through public service announcements (PSAs) such as the KnoWhat2Do program and continue our efforts to increase the coverage of indoor warning devices, such as weather radios.	This effort would be to better inform our population of actions they can take to better prepare and ultimately survive the effects of severe storms. Add weather radios for indoor warning devices to all homes and businesses.	3-5 years	Office of Emergency Management	$200,000	The impact is difficult to measure.	General fund, grants, donations

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
Hail	Enhance warning systems to help warn the citizens of Watauga, concerning the potential of severe storms producing large hail.	Update the Blackboard Connect notification system with a more robust process for notifying our citizens by way of smart phone applications, texting, and other forms of social media in an effort to reach a more active and social community to the potential hazard of hail, associated with severe storms.	Completed with annual updates as community grows.	Office of Emergency Management	$7,700	The impact of warning our population of the impending severe storm with the potential of hail is difficult to measure with the impact of life and property. This number could be in the millions of dollars.	General fund
		STATUS: Completed and ongoing					
Hail	Increase awareness through PSAs such as the KnoWhat2Do program and	This effort would be to better inform the population of actions they can take to better	3-5 years	Office of Emergency Management	$400,000	The impact of warning our population of the impending severe storm with the	General fund, bond issuance

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	continue our efforts to increase the coverage of indoor warning devices, such as weather radios.	prepare and ultimately survive the effects of hail associated with severe storms by adding weather radios for the home and or business.				potential of hail is difficult to measure with the impact to life and property. This number could be in the millions of dollars.	
		STATUS: Deferred to 2020 HazMAP					
Lightning	Enhance warning systems to help warn the citizens of Watauga, concerning the potential of severe storms producing cloud to ground and cloud to cloud lightning.	Adding additional weather stations with lightning detection capability. The ability to detect the potential for lightning offers life saving measures. Additional mitigation actions concern adding hand held lightning detection devices for public works and parks personnel.	1-3 years	Office of Emergency Management	$78,000	The impact of warning our population Concerning lightning associated with a severe storm is difficult to measure with the impact to life and property. This number could be in the millions of dollars.	General fund, bond issuance

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: Deferred to 2020 HazMAP					
Lightning	Increase awareness through PSAs such as the KnoWhat2do program and continue our efforts to increase the coverage of indoor warning devices, such as weather radios.	This effort would be to better inform the population of actions they can take to better prepare and ultimately survive the effects of lightning associated with severe storms by adding weather radios for the home and or business.	3–5 year project	Office of Emergency Management	$400,000	The impact of warning our population of lightning associated with severe storm is difficult to measure with the impact to life and property. This number could be in the millions of dollars.	General fund, bond issuance
		STATUS: Deferred to 2020 HazMAP					
Winter Storms	Enhance warning systems to help warn the citizens of Watauga, concerning the potential of winter storms. These storms can impact the city in numerous ways, from slick	Update the Blackboard Connect notification system with a more robust process for notifying citizens by way of smart phone applications,	Annual project	Office of Emergency Management	$7,700	The impact of warning our population of a winter storm is difficult to measure with the impact to life and property. This number could be in the	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	roads to loss of power from down power lines.	texting and other forms of social media. This will have the potential of reaching a more active and social community. This would also allow for the whole community to be warned of the potential hazard associated with winter storms. The impact of this action will reduce the amount of potential accidents and it would offer citizen more of advanced warning to prepare for loss of power and heat.				millions of dollars.	
		STATUS: Completed and ongoing					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Wildlife	Reduce the amount of fuel available for the spread of a wildfire.	Aggressively enforce the high weed and grass ordinance to reduce the height of grasses and other natural habitat that does offer fuel for advancing wildfires. This enforcement does offer a great deal of mitigation against the rapid growth of wildfires.	As funding is available	Code Enforcement Division	Cost associated with personnel.	Unknown	General fund
		STATUS: Deleted- wildfires are no longer a threat					
Wildfire	Increase training of our fire personnel.	Increase training for wild land firefighting operations. Add additional firefighting equipment to better respond and mitigate the effects of a wildfire.	3-5 years, as funding is available	Fire Department	$145,000	The impact of protecting our population from wildfires is difficult to measure with the impact of life and property. This number could be in the	General fund, bond issuance

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
						millions of dollars.	
		STATUS: In progress					
Extreme Temperatures	During these times of extreme heat we will initiate PSAs to target the population that may be at the highest risk from the effects of extreme heat.	Watauga will actively determine parameters for the opening of cooling centers to allow citizens, especially vulnerable populations, to seek refuge from extreme temperatures.	As funding is available	Parks Department	The City currently has several facilities that could be utilized for cooling centers, the costs are minimal. Mainly additional utility and personnel related costs.	Unknown	General fund
		STATUS: Deferred to 2020 HazMAP					
Expansive soils	Identify areas of the city that have a history of soil related damage to structures and roadways.	Add inspections and geological data to identify potential soil composition that is favorable to the effects of soil expansion. This inspection will assist with identifying the	By building code adoption with an appendix adopted by ordinance.	Inspections Department	Determined by personnel costs.	Unknown	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		correct soil preparation and construction methods to limit the effects of expansive soils on both structures and roadways.					
		STATUS: Deferred to 2020 HazMAP					
Expansive soils	Improve construction techniques through building code enhancements.	Educate construction contractors, home owners, and business owners about mitigation techniques.	5 Years	Building Official	$1,000	$7,000	General fund
		STATUS: Deferred to 2020 HazMAP					
Dam Failure	Improve ability to inform the citizens of the risks associated with living near a dam that is a barrier that impounds a body of water.	Maintain awareness of the condition of the structural integrity of the dam. Increase inspections of the dam. Add those living near the dam to an early alerting system in	3-5 year project	Engineering Department	$200,000	$800,000	General fund

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		the event of a dam failure.					
		STATUS: Deferred to 2020 HazMAP					
Dam Failure	Participate in the Federal Emergency Management Agency's (FEMA) Community Rating System (CRS) program.	Work with city officials to become a member of the CRS program.	March 2014	City Planner	$1,000	$2,000	City Planner budget
		STATUS: Deferred to 2020 HazMAP					

5.3 New Action Items

The City of Watauga's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Earthquakes, Expansive Soils, Flooding, Thunderstorms, Tornadoes**
Implement most current buildings codes to meet most current International Code Council (ICC) standards.	
Participating Jurisdiction:	City of Watauga
Priority:	1
Estimated Cost:	$50,000
Estimated Benefit:	$300,000
Potential Funding Source(s):	City budget, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Code Compliance Department, Planning & Zoning Commission
Implementation Schedule:	24 months

Hazard(s) Addressed	**Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms**
Purchase and install generators for new and existing critical facilities to reduce the damage from power failure due to the identified hazards.	
Participating Jurisdiction:	City of Watauga
Priority:	2
Estimated Cost:	$150,000
Estimated Benefit:	$900,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Purchasing Department, Public Works Department, facility owner
Implementation Schedule:	12 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Earthquakes, , Thunderstorms, Tornadoes
Install safe rooms in new and existing critical facilities.	
Participating Jurisdiction:	City of Watauga
Priority:	3
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	City budget, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department, facility owner
Implementation Schedule:	48 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Develop and implement a comprehensive public education program that includes recommended actions to mitigate the impacts of these hazards.	
Participating Jurisdiction:	City of Watauga
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Create and implement a drought contingency plan for new and existing city facilities and property that addresses the use of low flow fixtures and xeriscaping or drought-tolerant plants.	
Participating Jurisdiction:	City of Watauga
Priority:	5
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City budget, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Watauga
Priority:	6
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the Stormwater Department and Floodplain Manager to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	City of Watauga
Priority:	7
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Watauga
Priority:	8
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Watauga
Priority:	9
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding.	
Participating Jurisdiction:	City of Watauga
Priority:	10
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Watauga
Priority:	11
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Promote conservation of open space to alleviate pressure on stormwater runoff and to promote water absorption through the soil.	
Participating Jurisdiction:	City of Watauga
Priority:	12
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Watauga
Priority:	13
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.

5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plan	City Administration	Every 10 years	Reference this HazMAP when updating this plan.	When reviewing the Capital Improvement Plan, the leadership team will review the HazMAP to see which action items can be addressed with the fiscal and administrative capabilities of the city during budget cycles.
Comprehensive Plan updates	Planning Department, Zoning Department, Public Works Department	Annually	Reference this HazMAP when updating this plan.	Administration, developers, and the planning and zoning committee will review the impacts of land use based on this HazMAP, such as stormwater drainage and building codes, for severe weather.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Watauga. For additional information, see Appendices A and B.

Town of Westlake

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the Town of Westlake was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the Town of Westlake alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the Town of Westlake will take the HazMAP to Town Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

The following maps provide an overview of the Town of Westlake:

- Development Activities Map
- Land Use Plan Map
- Parks and Open Space Plan Map
- Residential Subdivisions Map
- Planned Developments Map

TOWN OF WESTLAKE
CITY OF ROANOKE
TOWN OF TROPHY CLUB
DENTON COUNTY TARRANT COUNTY
DENTON COUNTY TARRANT COUNTY
CITY OF SOUTHLAKE
CITY OF FORT WORTH
CITY OF KELLER
CITY OF SOUTHLAKE
TOWN LIMIT
MAP GUIDE
1. Retail Corner
65,72,76,78 Andorra Drive
2. Terra Bella
Residential Development
3. Carlyle Court
Residential Development
4. Quail Hollow
Residential Development
5. Granada
Residential Development
6. Project Blizzard
Mixed-Use Development
7. Schwab Corporate Campus
Office Campus
8. Entrada Block E, I, & J
Residential Townhomes
9. Fire/EMS Station
Government Facility
LEGEND
Subdivision Roads
Collector/Arterial Roads
Highways
Future Traffic Signal
Completed Building
Site Plan Submitted
Building Permit Submitted
Under Construction
N
W
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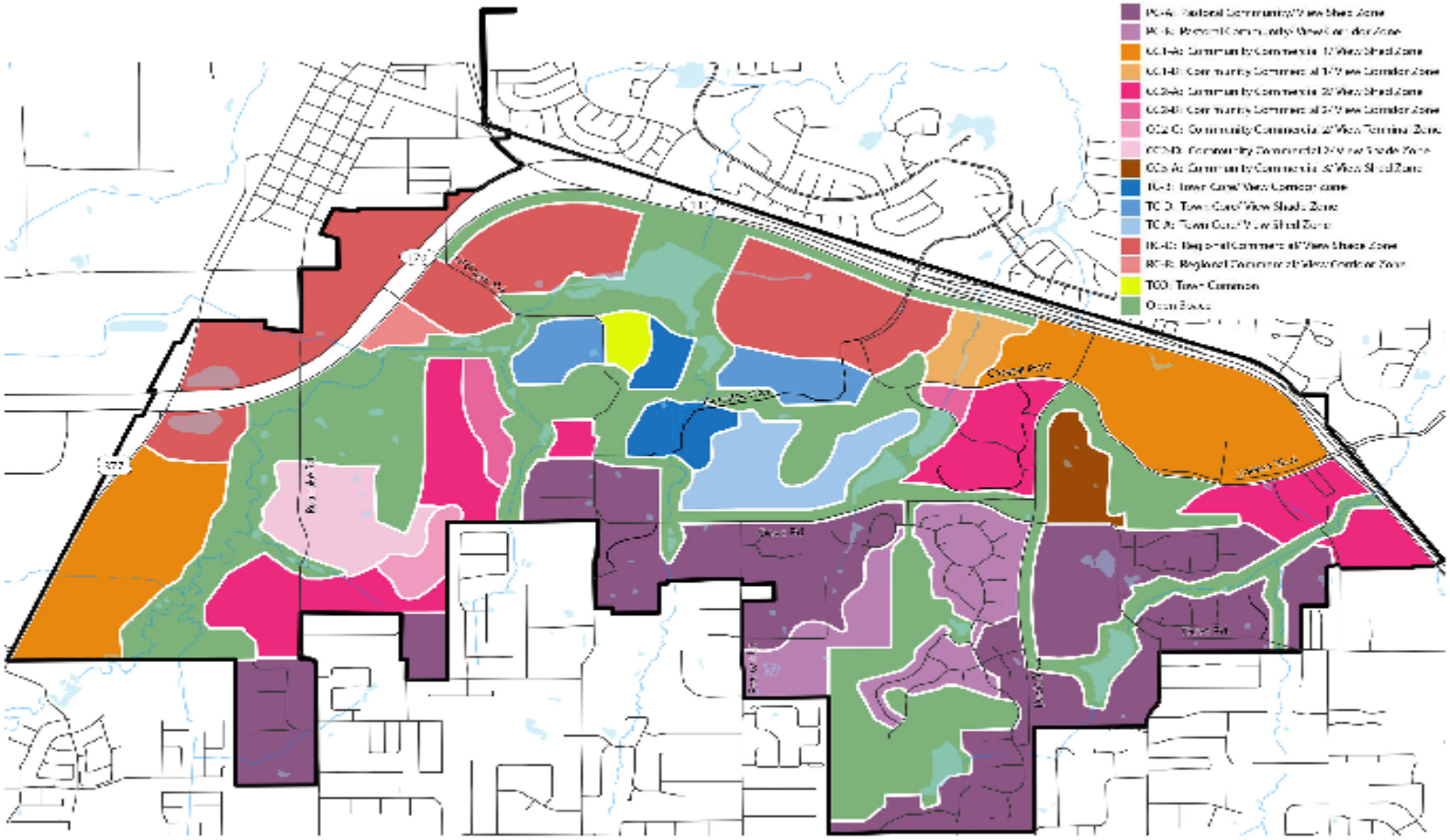
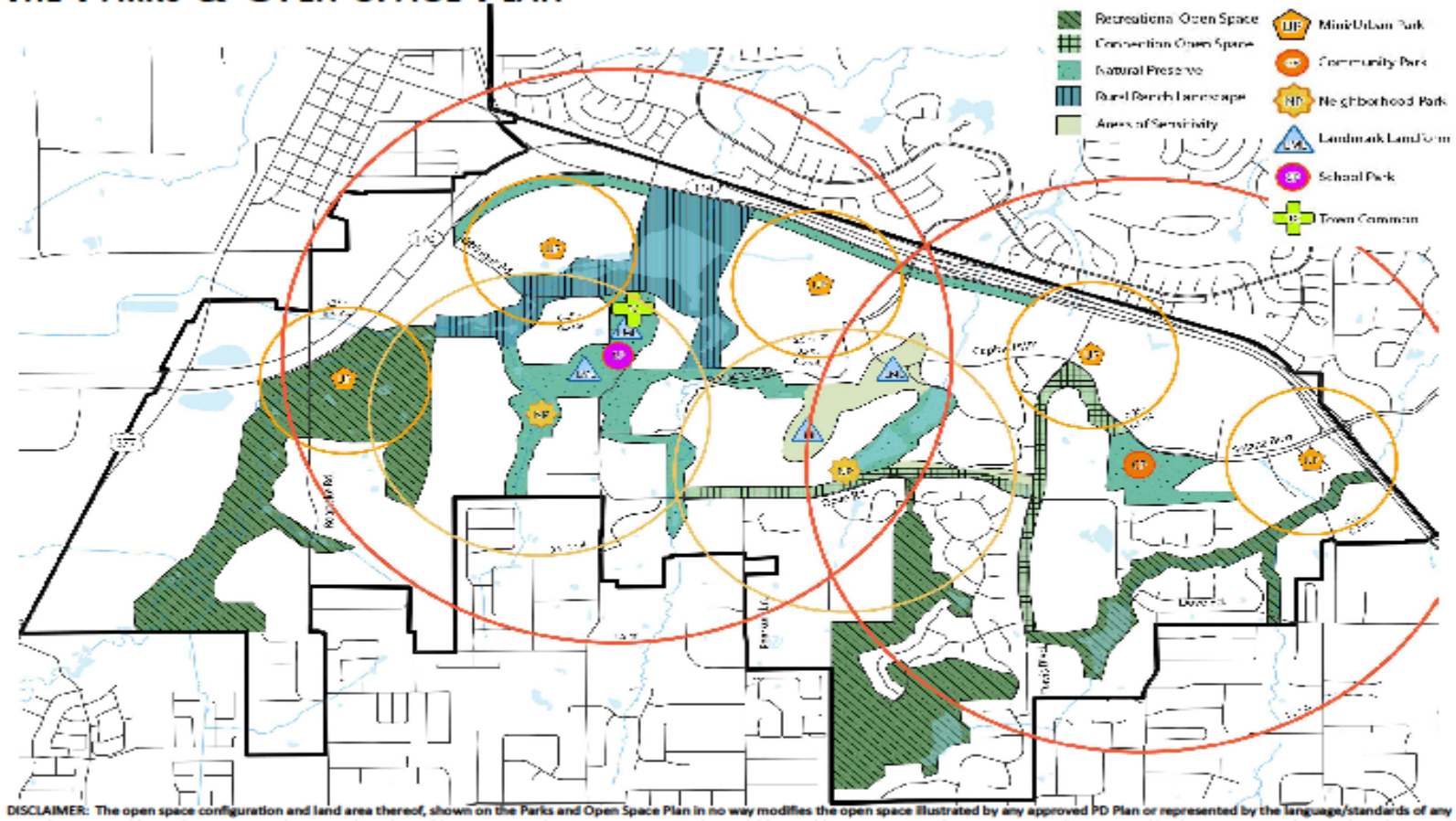
DEVELOPMENT ACTIVITIES MAP
November
2017
This map is for information purposes only.

The Land Use Plan



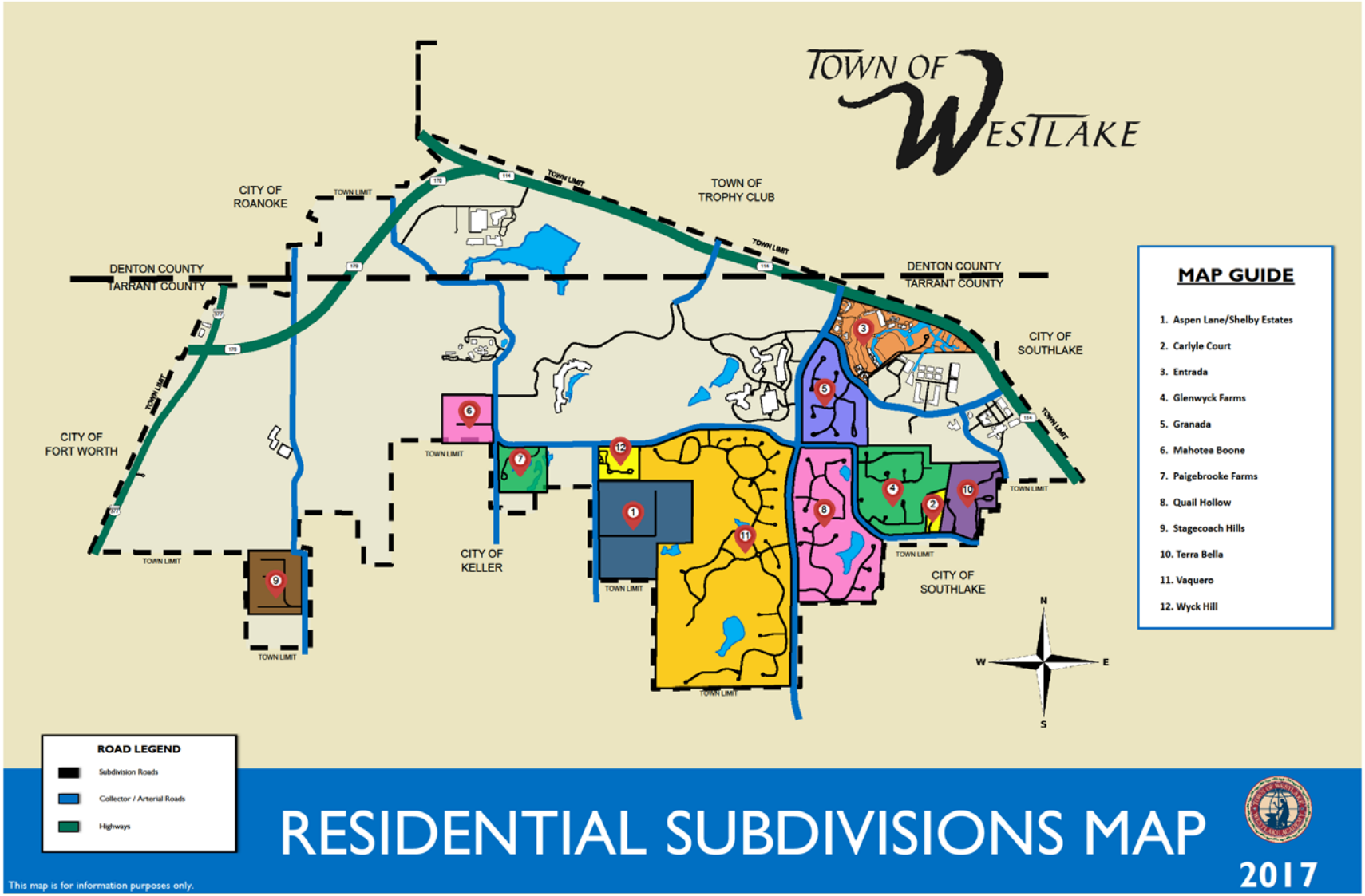
DISCLAIMER: The land use districts shown on this map in no way modify the permitted uses and/ or conditions of use (FAR, building height, etc.) specified in any zoning or Planned Development Ordinance approved by the Town of Westlake. These land use districts are intended to guide the Council in their evaluation of site plans submitted for their approval and/ or property owner requests to transfer commercial square footage from one land use district to another when the legal mechanism for such transfer has been adopted by the Town of Westlake. See Policy Section A in the Implementation Document for rates of transfer, trigger points, and other implementation language.

THE PARKS & OPEN SPACE PLAN



DISCLAIMER: The open space configuration and land area thereof, shown on the Parks and Open Space Plan in no way modifies the open space illustrated by any approved PD Plan or represented by the language/standards of any PD Ordinance. In addition, the open space shown may be either public or private and an open space may not be available to public use or access. This open space configuration and land area is meant to be a guide to the Council in their review of development site plans submitted for their approval, requests by any property owner to amend/ revise any PD plan or PD Ordinance language, request a change of zoning, and/or requests to transfer commercial square footage from one land use district to another are submitted for Council approval (when the legal mechanism for such transfer has been adopted by the Town of Westlake). See Section C of the Implementation Plan for trigger points and other policy related information.

The recreation and park facilities shown on the Parks and Open Space Plan in no way modifies the language of any approved PD Plan or Ordinance. The location of a public recreation or park facility is to be determined through a cooperative Town/ property owner process which takes place as site plans, requests for amendment of any existing Planned Development Ordinance, a request for rezoning, and/or requests to transfer commercial square footage from one land use district to another are submitted for Council approval (when the legal mechanism for such transfer has been adopted by the Town of Westlake). See Section C of the Implementation Plan for trigger points and other policy related information.


TOWN OF WESTLAKE
CITY OF ROANOKE
TOWN OF TROPHY CLUB
DENTON COUNTY TARRANT COUNTY
DENTON COUNTY TARRANT COUNTY
CITY OF SOUTHLAKE
CITY OF FORT WORTH
CITY OF KELLER
CITY OF SOUTHLAKE
TOWN LIMIT
MAP GUIDE
1. Aspen Lane/Shelby Estates
2. Carlyle Court
3. Entrada
4. Glenwyck Farms
5. Granada
6. Mahotea Boone
7. Paigebrooke Farms
8. Quail Hollow
9. Stagecoach Hills
10. Terra Bella
11. Vaquero
12. Wyck Hill
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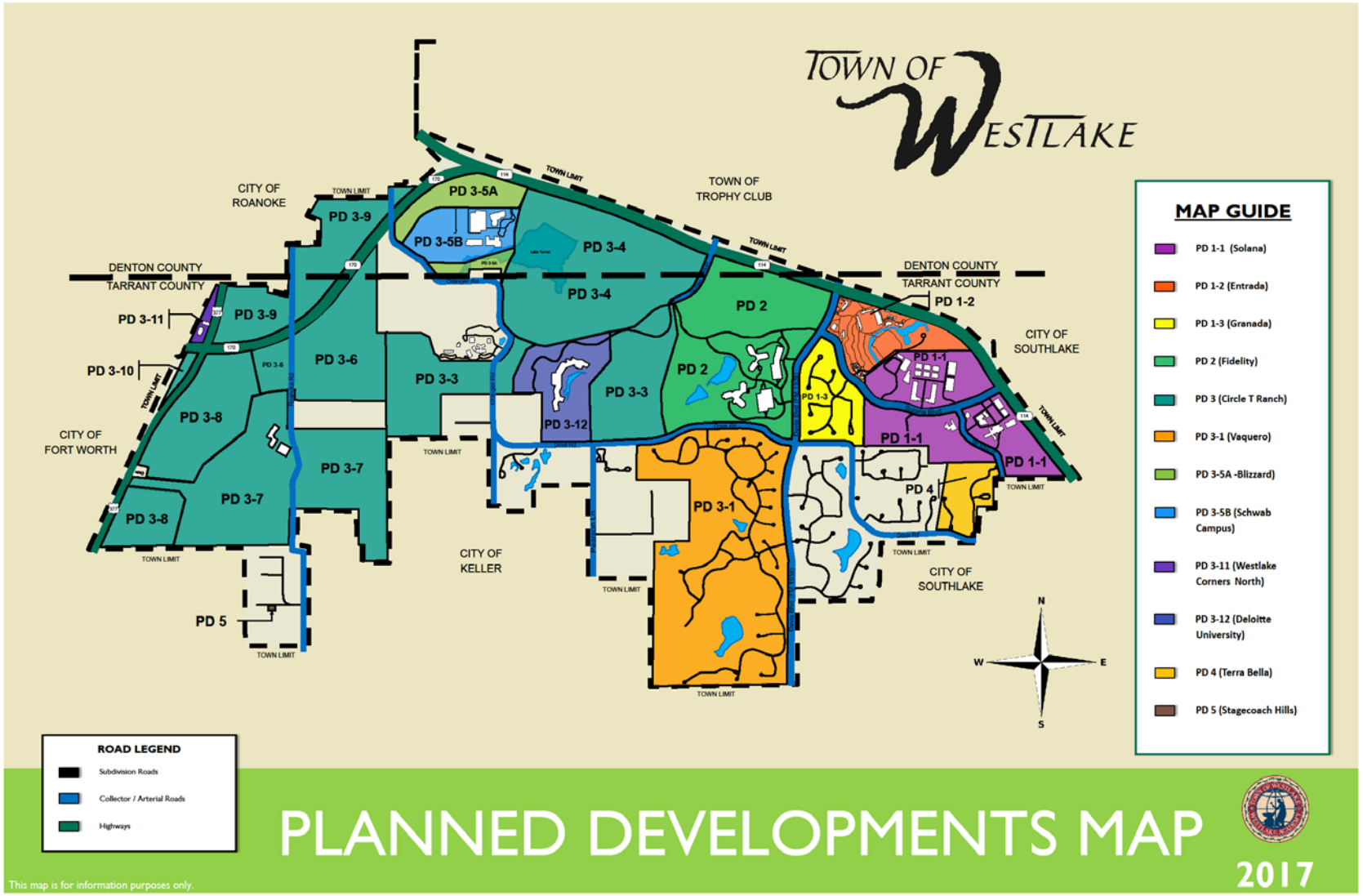
ROAD LEGEND
Subdivision Roads
Collector / Arterial Roads
Highways
RESIDENTIAL SUBDIVISIONS MAP
2017
This map is for information purposes only.


TOWN OF WESTLAKE
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CITY OF FORT WORTH
CITY OF KELLER
CITY OF SOUTHLAKE
TOWN LIMIT
PD 3-5A
PD 3-5B
PD 3-4
PD 3-9
PD 3-11
PD 3-10
PD 3-6
PD 3-3
PD 3-12
PD 2
PD 1-2
PD 1-3
PD 1-1
PD 3-8
PD 3-7
PD 3-1
PD 4
PD 5
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MAP GUIDE
PD 1-1 (Solana)
PD 1-2 (Entrada)
PD 1-3 (Granada)
PD 2 (Fidelity)
PD 3 (Circle T Ranch)
PD 3-1 (Vaquero)
PD 3-5A -Blizzard)
PD 3-5B (Schwab Campus)
PD 3-11 (Westlake Corners North)
PD 3-12 (Deloitte University)
PD 4 (Terra Bella)
PD 5 (Stagecoach Hills)
ROAD LEGEND
Subdivision Roads
Collector / Arterial Roads
Highways
PLANNED DEVELOPMENTS MAP
2017
This map is for information purposes only.

Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the Town of Westlake has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped town officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The town's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The town developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the Town of Westlake's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the town's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the Town of Westlake. The town acted as the plan development consultant, providing hazard mitigation planning services.

Town of Westlake Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
Town of Westlake	Fire/Emergency Medical Services (EMS) Department	Emergency Management Coordinator	General oversight, hazard identification, and plan development
Town of Westlake	Fire/EMS Department	Fire Chief	Hazard identification and plan development
Town of Westlake	Fire/EMS Department	Deputy Fire Chief	Hazard identification and plan development
Town of Westlake	Fire/EMS Department	Assistant Emergency Management Coordinator	Hazard identification and plan development
Town of Westlake	Public Works Department	Public Works Director	Hazard identification and plan development
Town of Westlake	Economic Development	Assistant to Town Manager	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the town, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the town in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no recorded change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: Adopted the 2015 International Building and Fire Codes in January, 2017. A full list of completed mitigation actions items are described in Chapter 5 of this annex.

3.2 Community Profile

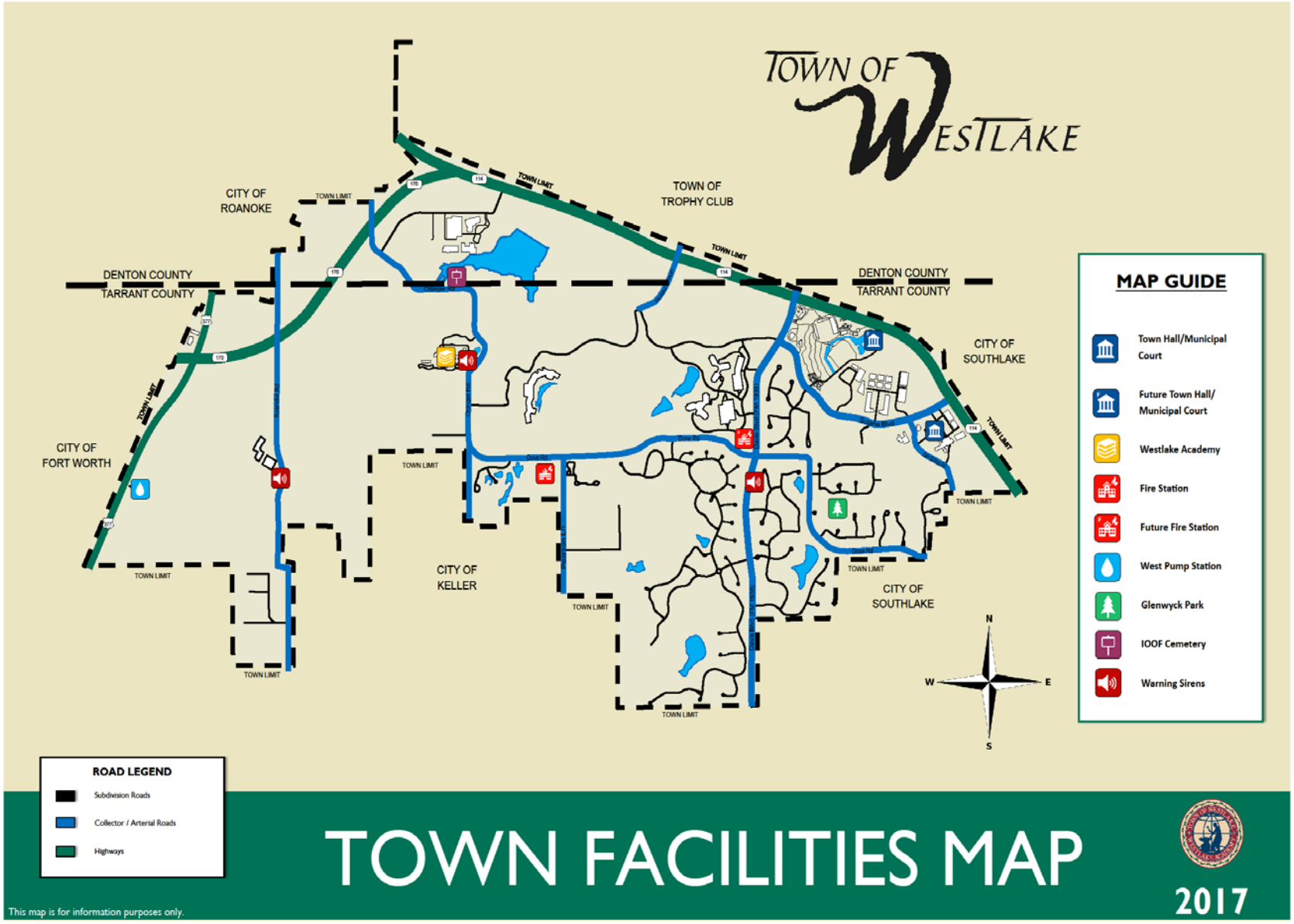
The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the Town of Westlake.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	1,483
Persons under 5 years (%)	Data unavailable
Persons 65 years and over (%)	Data unavailable
Language other than English spoken at home (%)	Data unavailable
With a disability, under age 65 (%)	Data unavailable
Persons without health insurance, under age 65 (%)	1.1
Persons in poverty (%)	5.6
Median household income	$250,000+
Households, 2012-2016	382
Median value of owner-occupied housing units, 2012-2016	$1,604,900

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the Town of Westlake.

Town of Westlake Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
Solana Business Complex	Government / Commercial	1,100 people	2,128,001	$259,959,403	$129,979,500
Westlake Water Pump /Storage Station	Utility	2 people	N/A	$4,000,000	$4,800,000
Fidelity Investments	Commercial	4,500 people	3,054,288	$141,135,543	$70,567,500
Deloitte University	Commercial	3,000 people	765,000	$139,130,626	$68,000,000
Westlake Fire Station (Temporary Structures)	Fire Rescue	20 people	4,500	$300,000	$4,500,000
Westlake Academy	Primary / Secondary Charter School	660 people	55,704	$6,662,849	$3,386,520

Additional critical facilities and assets are shown on the following map. Capacity, square feet, structure value, and content value were not available for most locations on this map.


TOWN OF WESTLAKE
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CITY OF SOUTHLAKE
CITY OF FORT WORTH
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Town Hall/Municipal Court
Future Town Hall/ Municipal Court
Westlake Academy
Fire Station
Future Fire Station
West Pump Station
Glenwyck Park
IOOF Cemetery
Warning Sirens
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ROAD LEGEND
Subdivision Roads
Collector / Arterial Roads
Highways
This map is for information purposes only.
TOWN FACILITIES MAP
2017

3.3 Natural Hazard Profiles

The Town of Westlake's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the Town of Westlake in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Thunderstorm (includes hail, wind, lightning)
2	Tornado
3	Wildfire
4	Winter Storms
5	Flooding
6	Extreme Heat
7	Drought
8	Earthquake
9	Expansive Soils

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire Town of Westlake.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Negligible
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Jurisdiction's ground-water supply: City of Fort Worth.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: There is voluntary compliance in conjunction with the "Eye on Water" software.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Because of the manner in which data for expansive soils is collected, the amount of damages in the town was unavailable. Expansive soils are a major consideration to all existing and future structures.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: No historical data was found of any damage to critical infrastructure or roads due to expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: Westlake is an affluent community, and does not have resident populations who are vulnerable to extreme heat. The vulnerable populations would only include daytime outdoor laborers (e.g. construction and landscape laborers).

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? There have been few special events in Westlake and rare incidents of heat exposure.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

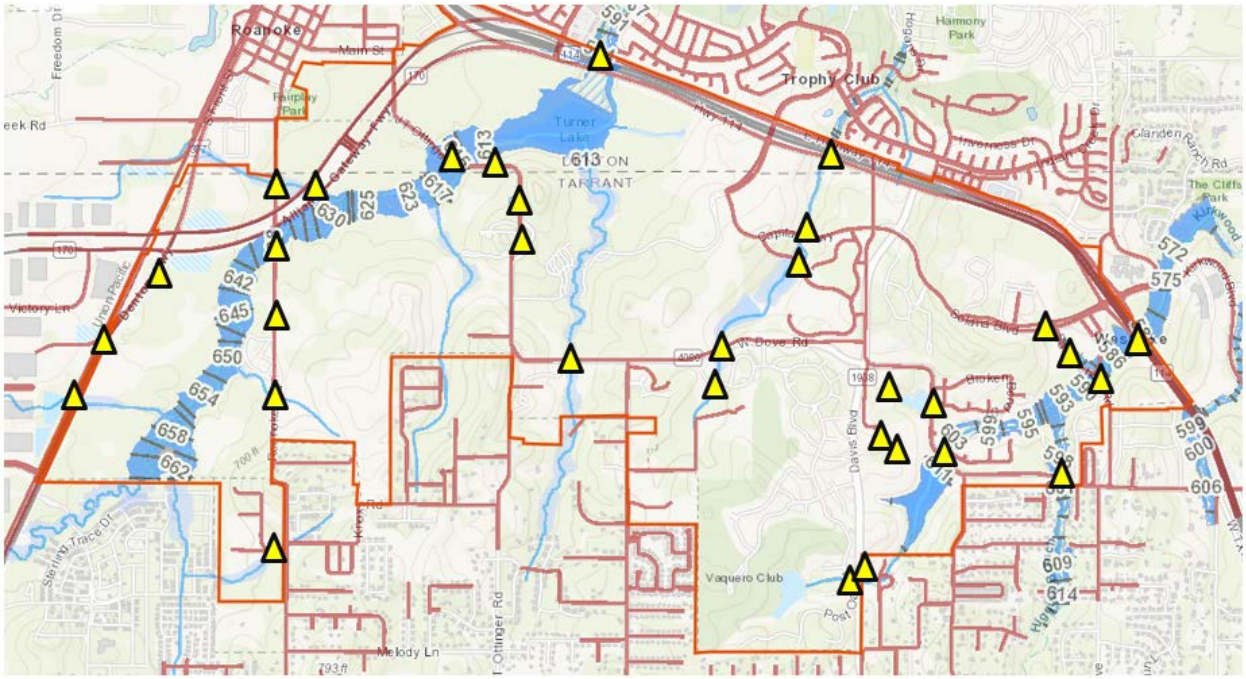
Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? Yes, though there is no historical data indicating this expense.

Intersections or traffic routes impacted by flooding: Roanoke Road at Marshall Branch, J.T. Ottinger Road at Marshall Branch, and Dove Road at Kirkwood Branch and Higgins Branch. See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Marshall Branch, Higgins Branch, and Kirkwood Branch.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
2200 Highway 377	Marshall Branch	Vented Ford
2000 Highway 377	Marshall Branch	Vented Ford
1800 Highway 377	Marshall Branch	Vented Ford
2400 Roanoke Road	Marshall Branch	Vented Ford
3600 Highway 170	Marshall Branch	Vented Ford
2200 Roanoke Road	Marshall Branch	Vented Ford
2000 Roanoke Road	Marshall Branch	Vented Ford
1800 Roanoke Road	Marshall Branch	Vented Ford
3700 Thornton Drive	Marshall Branch	Non-vented Ford
3200 J. T. Ottinger Road	Marshall Branch	Vented Ford
3100 J. T. Ottinger Road	Marshall Branch	Vented Ford
2300 J. T. Ottinger Road	Marshall Branch	Vented Ford
2800 Highway 114	Marshall Branch	Bridge
2900 Dove Road	Marshall Branch	Vented Ford
2400 Dove Road	Marshall Branch	Vented Ford
2400 King Fisher Drive	Marshall Branch	Bridge
2100 Highway 114	Marshall Branch	Vented Ford
2200 Capital Parkway	Marshall Branch	Vented Ford
2200 Destiny Way	Marshall Branch	Vented Ford
1300 Davis Boulevard	Marshall Branch	Vented Ford
1300 Post Oak Place	Marshall Branch	Bridge

Road	Flooding Source	Low Water Crossing Type
1800 Placid Oaks Place	Marshall Branch	Vented Ford
1500 Meandering Drive	Marshall Branch	Vented Ford
1800 Lakeshore Drive	Marshall Branch	Bridge
1800 Dove Road	Marshall Branch	Vented Ford
1700 Dove Road	Marshall Branch	Vented Ford
1400 Solana Boulevard	Kirkwood Branch	Vented Ford
2000 Sam School Road	Kirkwood Branch	Vented Ford
1900 Sam School Road	Kirkwood Branch	Vented Ford
1400 Dove Road	Higgins Branch	Vented Ford
2000 Highway 114	Kirkwood Branch	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The Town of Westlake is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480614#
Community Name	Town of Westlake
Counties	Tarrant and Denton Counties
Initial FHBM Identified	12/10/76
Initial FIRM Identified	6/02/93
Current Effective Map Date	4/18/11
Reg-Emer Date	6/2/93
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Graham Associates, Inc. is the town's engineer and floodplain administrator.

What specific flooding ordinances and plans does your jurisdiction have? Chapter 42-Floods, which includes mitigation efforts.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? Must comply with Chapter 42, Article XI: Drainage, and FEMA.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? All town ordinances and 2015 International Building and Residential Codes.

Repetitive and Severe Repetitive Loss Properties: There are no repetitive loss properties and severe repetitive loss properties within the Town of Westlake. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

There are 2 dams and 12 residential parcels located in the 100-year floodplain, according to the Public Works Department and Geographic Information Systems (GIS) Department.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the Town of Westlake's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 19 Insurance in-force: $7,740,000 Written premium in-force: $12,820
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	7 losses, $111,200, none substantial
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	None based on FIRM.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	N/A
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	No.

Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Floodplain permit required and development in floodplain restricted by town ordinance.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Town ordinances restrict development in floodplain.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Unknown.
Is a CAV or CAC scheduled or needed?		No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	12/10/76
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes .
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP	Unknown.

	Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The Town of Westlake will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Major
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Westlake is a predominantly newer construction community, built to modern building standards that provide high levels of protection to the population. The vulnerable populations would only include daytime outdoor laborers (e.g. construction and landscape laborers).

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): No recorded damage has occurred since 2015.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. There are several corporate campuses with high occupancies. There is one educational campus of 800 students.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the town are exposed to this hazard, though the majority of the population lives in affluent neighborhoods separated from the vulnerable areas.

Most vulnerable location (North, East, South, West) of your jurisdiction? Westlake has approximately 70% of undeveloped land that is primarily grazing pasture. The areas of most concern are the fields throughout the town that are along the roadways and have the greatest chance of being in contact with an ignition source.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the town are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: Highways 114, 170, and 377 overpasses.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Minor traffic issues due to having to slow down to navigate iced over bridges, potential traffic accidents.

3.4 Historical Events

According to the National Centers for Environmental Information, there have been no natural hazards that have occurred in the Town of Westlake since 2015, though neighboring cities of Keller and Southlake have experienced a variety of events, including thunderstorms, flash flooding, and tornadoes.

3.5 Overall Vulnerability

The Town of Westlake identified their greatest vulnerabilities and concerns:

- Commuters and outside laborers are the most vulnerable to the damaging effects of all the identified hazards. Westlake has current building standards; therefore, existing or future structures experience minimal risk from thunderstorms, severe weather, and other natural hazards. In addition, the majority of current homes and facilities have installed lightning rods.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the town to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the Town of Westlake's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; Yes; Yes
Capital Improvement Plan	Yes	Yes; Yes; Yes
Economic Development Plan	Yes	Yes; Yes; Yes
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	No	
Transportation Plan	Yes	Yes; Yes; Yes
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Yes; Yes
Acquisition of land for open space and public recreation uses	Yes	Yes; Yes

Building Code, Permitting, and Inspections	Have capability?	
Building Code	Yes	**Version/Year:** 2015 International Building Code
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating**: 2
Site Plan Review Requirements	Yes	**Type(s) of requirement:** With all new development
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and Zoning Commission; Yes
Mitigation Planning Committee	Yes	Planning and hazard assessment; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Progressive landscape development standards and ordinance; Yes
Mutual Aid Agreements	Yes	All neighboring communities; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	PT	Third Party: Yes; Yes; Yes
Emergency Manager	FT	Yes; Yes; Yes
Community Planner	FT	Yes; Yes; Yes
Civil Engineer	PT	Third Party: Yes; Yes; Yes
GIS Coordinator	FT	Yes; Yes; Yes
Other:	FT	Public Works Director, Fire Marshal: Yes; Yes; Yes
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	Yes	CodeRed, Outdoor Warning System, Reverse 911; Yes
Hazard data and information	Yes	Tier II Reporting; Threat and Hazard Identification and Risk Assessment (THIRA); No
Grant writing	Yes	Fire Chief; Yes
HaZUS analysis	No	
Other	N/A	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	A corporate campus partners group hosts quarterly meetings; Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Website, water bill mailings, public education activities, and social media; Yes
Natural disaster or safety related school programs	Yes	Website, social media, and public education activities; Yes
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	No	
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	Yes, street and culvert improvements, outdoor warning siren installation, and new fire station; Yes
Authority to levy taxes for specific purposes	Yes	Yes, property tax implementation; Yes
Fees for water, sewer, gas, and/or electric services	Yes	Yes, improved water, sewer, stormwater mitigation; Yes
Impact fees for new development	Yes	Yes, new development; Yes
Stormwater utility fee	No	
Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Yes, new fire station; Yes
Incur debt through private activities	No	

Community Development Block Grant	No	
Other federal funding programs	No	
State funding programs	No	
Other		

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The Town of Westlake's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes	Ensure effective communications are in place for emergency situations in the Town of Westlake.	Purchase and install town-wide outdoor warning sirens for severe weather events.	24 months	Westlake Fire Department, Office of Emergency Management	$90,000	$5,000,000	Town funds, state and federal grant programs, donor funding
		STATUS: Completed					
		Purchase and install town-wide voice, e-mail, and smart device "all-hazard" warning system.	6 months	Westlake Fire Department	$3,000/ year	$5,000,000	Town funds, state and federal grant programs, donor funding
		STATUS: Completed					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Construct and equip permanent structure to serve as Fire Department/ Training Facility/ Emergency Operations Center (EOC) in the Town of Westlake.	Perform design and financial study to determine facility requirements.	6 months	Westlake Fire Department, Office of Emergency Management, Planning and Development Department	$2,500 in staff time	$10,000	Town funds
		STATUS: Completed					
		Contract for engineering and design of facility.	3 months	Outside Contractor	$20,000	$80,000	Town funds, donor funds
		STATUS: Completed					
		Construct and equip permanent	2 years	Various Contractors	$6,000,000	$24,000,000	Town funds, bonds, hazard

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		fire station/ training/ Emergency Operations Center facility.					mitigation grants, state funds
		STATUS: In progress					
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Implement a multi-jurisdictional Automatic Vehicle Location (AVL) system for both police and fire from Colleyville, Keller, Southlake, and Westlake (NETCOM).	Survey the eight departments and ascertain need and want as well as determine the number of users needed.	7 months	North East Tarrant County Communications (NETCOM)	Unknown	Unknown	Unknown
		STATUS: Deleted- no longer an objective					
		Determine vendor for purchase.	1 year	NETCOM with a representative from all cities	Unknown	Unknown	Unknown
		STATUS: Deleted- no longer an objective					
		Purchase hardware for all jurisdictions.	16 months	NETCOM	$90,000	$360,000	Individual town budgets
		STATUS: Deleted- no longer an objective					
		Purchase software for dispatch center and each unit.	2 years	NETCOM	$10,000	$40,000	Individual town budgets
		STATUS: Deleted- no longer an objective					
Severe Thunderstorms	Ensure effective communications	Provide Westlake homeowners with	12 months	Town leadership, Westlake Fire	$8,000	$5,000,000	Hazard mitigation

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	are in place for emergency situations in the Town of Westlake.	weather alert radios.		Department, Office of Emergency Management.			matching grants, donor funds
		STATUS: Deleted due to alternative communications medium					
Severe Thunderstorms and High Winds, Tornadoes	Reduce property loss/damage due to high winds in the Town of Westlake.	Mandate "storm hardened" construction guidelines in Westlake.	2 years	Planning and Zoning Department, Planning Department, Permitting Office	$5,000	$1,000,000/ year	Internal
		STATUS: Deferred to 2020 HazMAP					
		Install wind resistant window shutters at Westlake Academy.	3 years	Westlake Fire Department, management, school board	$50,000	$100,000	Hazard mitigation grants
		STATUS: Deleted due to costs					
Dam Failure	Mitigate flooding from dam failure in the Town of Westlake.	Conduct inundation studies and develop Emergency Action Plans for all high	18 months	Westlake Fire Department, Fort Worth Office of Emergency Management, Tarrant County	$200,000	$500,000	Hazard Mitigation Grant Program (HMGP), private

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		hazard dams in Westlake.		Office of Emergency Management (support)			foundations, dam owner
		STATUS: Deleted due to reallocation of resources					
		Conduct a search for previously unidentified high hazard dams in Westlake.	9 months	Westlake Fire Department, Fort Worth Office of Emergency Management, Tarrant County Office of Emergency Management (support)	$20,000	$80,000	The cost of this project is low compared to the potential benefits of locating previously unknown high hazard dams.
		STATUS: Deleted due to reallocation of resources					
Hail	Ensure Town of Westlake citizens have information regarding hail resilience.	Evaluate town buildings to determine feasibility of installing hail-resistant roofing and window coverings with a focus on critical infrastructure.	1 year	Westlake Town Engineer	$25,000	$100,000	Hazard mitigation grant sources, insurance industry partnerships, town funds
		STATUS: Deleted due to reallocation of resources					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Hail	Ensure Westlake citizens have information regarding hail resilience.	Develop and implement a public education campaign to encourage "hail-resistant" roofing in new construction and roof replacements.	9 months	Westlake Planning and Development Department, Westlake Fire Department	$1,000	$250,000	HMGP, insurance industry partnerships
		STATUS: Completed					
Drought	Mitigate drought in the Town of Westlake.	Develop a contingency plan to identify potential impacts of drought on the community to include utilities such as power generation and drinking water; health and safety including pre-existing health conditions and special needs; and emergency response such as	1 year	Westlake Fire Department, Office of Emergency Management, Fort Worth Office of Emergency Management , Tarrant County Office of Emergency Management (support)	$10,000	$40,000	HMGP, private foundations, water suppliers

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		fire suppression operations.					
		STATUS: Deferred to 2020 HazMAP					
Drought	Mitigate drought in the Town of Westlake.	Participate in the design and implementation of the Tarrant County-specific water conservation public education efforts to complement existing programs.	1 year	Westlake Fire Department, Office of Emergency Management, Fort Worth Office of Emergency Management , Tarrant County Office of Emergency Management (support)	$1,000	$4,000	HMGP, private foundations, water suppliers
		STATUS: Deleted due to lack of resources					
Drought	Upgrade water and irrigation systems to conserve water in Town of Westlake facilities.	Install efficient irrigation systems in new and existing town facilities.	Annually	Public Works Department	$50,000	$250,000	Town budget, grant opportunities
		STATUS: Deleted due to lack of funding and resources					
Extreme Temperatures	Reduce the loss of life and property	Conduct a study to determine the feasibility of	1 year	Tarrant County Public Health Department,	$5,000	$20,000	HMGP, other state or

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	damage resulting from extreme heat in Westlake.	expanding monitoring of populations at risk from extreme heat.		Westlake Fire Department, Office of Emergency Management			federal public health grants
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Reduce the loss of life and property damage resulting from extreme heat in Westlake.	Enhance public education concerning extreme heat/severe weather preparedness.	6 months	Westlake Fire Department, Office of Emergency Management	$2,000	$8,000	HMGP, town funds
		STATUS: Deferred to 2020 HazMAP					
Expansive Soils	Mitigate expansive soils in Westlake.	Continue to improve construction techniques through building code enhancements.	Previously implemented/ ongoing	Planning and Development Department	$1,000/ year	$50,000/ year	Internal funding sources
		STATUS: Deferred to 2020 HazMAP					
		Continue to educate construction contractors, homeowners, and business owners	Previously implemented/ ongoing	Planning and Development Department, Office of Emergency Management	$1,000/ year	$50,000/ year	Internal funding sources

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		about mitigation techniques.					
		STATUS: Deferred to 2020 HazMAP					
Tornadoes	Reduce loss of life/injury resulting from tornadic weather events.	Develop and adopt an outreach program promoting the construction and use of safe rooms by: ▪ Encouraging the construction and use of safe rooms in homes, critical infrastructure, and other vulnerable public structures. ▪ Encouraging builders and homeowners to locate tornado safe rooms inside or directly adjacent to houses to prevent injuries due to flying debris or hail.	2 years/ continuous	Westlake Fire Department, Office of Emergency Management, Engineering Department	$5,000	$2,000,000	Staff time, grants, donors
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Update Westlake building and construction codes and ensure that they require or encourage wind engineering measures and construction techniques.	2 years/ continuous	Westlake Facilities Department, Engineering Department	$5,000	$5,000,000	Staff time
		STATUS: Deferred to 2020 HazMAP					
		Purchase and activate town-wide outdoor warning sirens and emergency warning notification system with the ability to contact each resident phone, email, and smart devices.	6 months	Westlake Fire Department, Westlake Office of Emergency Management	$130,000	$5,000,000	Town budget
		STATUS: Completed					
Flooding	Reduce potential for property loss due to flooding.	Perform relocation and protection for all critical facilities and infrastructure	12 months/ continuous	Westlake Facilities Department, Engineering Department	$20,000	$1,500,000	Staff time, town budget, grants
Town of Westlake	Annex						

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		that may lie within known or designated floodplain areas.					
		STATUS: Deferred to 2020 HazMAP					
		Replace existing Ottinger Road bridge, located between Westlake Cemetery and State Highway 170. This bridge lies below historic flood levels and is regularly inundated.	48 months	Westlake Facilities Department, Engineering Department	$350,000	$1,000,000	Town budget
		STATUS: Deferred to 2020 HazMAP					
Severe Thunderstorms and High Winds	Mitigate loss of life and damage from severe thunderstorm or high wind events.	Retrofit (where necessary) town-owned buildings and critical facilities to reduce future wind damage.	4 years	Office of Emergency Management, Facilities Department, Engineering Department	$10,000	$100,000	Grants, donor funding, insurance industry partnerships
		STATUS: Deleted due to cost and resources					
		Update (where necessary) Westlake construction	5 years	Planning and Permitting Department, Facilities	$20,000	$1,000,000	Grants, insurance, industry partnerships

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		guidelines requiring that storm hardened and wind resistant materials and techniques are utilized.		Department, Maintenance Department			
		STATUS: Deferred to 2020 HazMAP					
Hail	Protect against property loss and loss of life or injury from hail events.	Install hail-resistant roofing and siding, structural bracing, shutters, laminated glass window panes, and hail-resistant roof coverings where needed on town-owned buildings and critical infrastructure to minimize damage.	4 years	Facilities Department, Engineering Department, Office of Emergency Management, Fire Department, Planning Department	$30,000	$1,000,000	HMGP, donor, sources
		STATUS: Delete due to cost and resources					
		Develop and adopt an outreach program to increase public awareness of hail	24 months/ continuous	Office of Emergency Management, Facilities Department, Engineering	$5,000	$20,000	HMGP, donor, sources

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		dangers, including: ▪ Mailing safety brochures with monthly water bills. ▪ Post warning signage at local parks and other outdoor venues. ▪ Teaching school children about the dangers of hail and how to take safety precautions.		Department, Utilities Department			
		STATUS: Deleted due to lack of resources					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Lightning	Protect against property loss and injury or death form lightning strikes.	Protect critical facilities and infrastructure from lighting damage with the following measures: ▪ Installing lightning protection devices such as lightning rods and grounding, on communications infrastructure and other critical facilities.	36 months/ continuous	Maintenance Department, Facilities Department, Engineering Department, Fire Department, Information Technology Department	$5,000	$1,000,000	HMGP, insurance partnerships
		STATUS: Deferred to 2020 HazMAP					
		Installing and maintaining surge protection on critical electronic equipment.	36 months/ continuous	Maintenance Department, Facilities Department, Engineering Department, Fire Department, Information	$5,000	$1,000,000	HMGP, insurance partnerships

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
				Technology Department			
		STATUS: Completed					
		Adopt new standards for hardening existing lightning protection materials and systems.	36 months/ continuous	Maintenance Department, Facilities Department, Engineering Department, Fire Department, Information Technology Department	$5,000	$1,000,000	HMGP, insurance partnerships
		STATUS: Deferred to 2020 HazMAP					
		Conduct outreach programs to promote awareness of lightning dangers ▪ Develop lightning "KnoWhat2Do" brochure for distribution through classroom. ▪ Mailing safety brochures	24 months	Office of Emergency Management, Fire Department, Utility Department	$5,000	$20,000	Town budget, staff time

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		with monthly water bills. ▪ Posting warning signage at local parks. ▪ Teaching school children about the dangers of lightning and how to take safety precautions.					
		STATUS: Deferred to 2020 HazMAP					
Winter Storms	Reduce potential for property loss, damage, injury, or loss of life due to winter storms.	Reduce impacts to roadways by: ▪ Plan for adequate roads and debris clearing capabilities. ▪ Partner with county and state agencies for co-utilization of snow and Ice hazard	12 months	Office of Emergency Management, Fire Department, Utility Department	$5,000	$250,000	HMGP, local business donation, foundation grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		removal assets.					
		STATUS: Completed					
		Assist vulnerable populations by identifying specific residents who may be exceptionally vulnerable in the event of protracted winter storm events or power outages.	12 months	Office of Emergency Management	Staff Time	Unknown	Staff time
		STATUS: Deferred to 2020 HazMAP					
Winter Storms	Develop a winter weather awareness mitigation program for Town of Westlake residents.	Develop a winter weather outreach program that provides tips and pertinent information to mitigate against hypothermia and icy conditions.	Annually	Office of Emergency Management	$10,000	Unknown	Budget
		STATUS: Deferred to 2020 HazMAP					
Wildfire	Reduce potential for property loss, damage, injury,	Increase public education on how to reduce the risks to wildfires	6 months/ continuous	Office of Emergency Management, Westlake Fire Department	$1,000	$200,000	HMGP, town budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	or loss of life due to wildfire.	(construction, landscaping, etc.).					
		STATUS: Deleted- no longer a priority					
Wildfire	Reduce potential for property loss, damage, injury, or loss of life due to wildfire.	Enact building permit codes that include wildfire resistant construction.	1 year	Westlake Fire Marshal, Planning and Permitting Department	$1,000	$200,000	HMGP, town budget
		STATUS: Completed					
Wildfire	Reduce potential for property loss, damage, injury, or loss of life due to wildfire.	Identify wildfire hazard areas and assess overall community vulnerability. Regulate development in wildfire hazard areas.	3 years	Planning and Zoning Department	$1,000	$200,000	HMGP, town budget
		STATUS: Deferred to 2020 HazMAP					
Extreme Temperatures	Reduce potential for property loss, damage, injury, or loss of life due to temperature extremes.	Increase awareness of extreme temperature risk and safety by educating citizens regarding the dangers of	3 years/ continuous	Office of Emergency Management, Westlake Fire Department	$2,000	$100,000	HMGP, insurance partnerships, donor funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		extreme heat and cold and the steps they can take to protect themselves when extreme temperatures occur.					
		STATUS: Deferred to 2020 HazMAP					
Dam Failure	Participate in the Federal Emergency Management Agency's (FEMA) Community Rating System (CRS) program.	Work with the town officials to become a member of the CRS program.	March 2014	Town Planner	$1,000	$2,000	Town Planner budget
		STATUS: Deleted due to lack of resources					
Dam Failure	Develop a buyout program for properties in the floodplain.	Develop a buyout program for properties in the floodplain.	As funding is available	Public Works Department	To be determined	To be determined	Local funds, HMGP, Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA)
		STATUS: Deleted due to lack of resources					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Dam Failure	Reduce potential for property loss, damage, injury, or loss of life due to dam failure.	Conduct inundation studies and develop Emergency Action Plans for all high hazard dams in Westlake.	5 years	Engineering Department	$40,000	$1,000,000	HMGP, dam owners
		STATUS: Deleted due to lack of resources					
		Conduct a search for previously unidentified high hazard dams in Westlake.	5 years	Engineering	$40,000	$1,000,000	HMGP, dam owners
		STATUS: Deleted due to lack of resources					

5.3 New Action Items

The Town of Westlake's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Earthquake, Thunderstorm, Tornadoes**
Ensure the structure to serve as Fire Department/Training Facility/Emergency Operations Center in the Town of Westlake is tornado-resistant and hail-resistant, to include but not limited to, the installation of a safe room.	
Participating Jurisdiction	Town of Westlake
Priority:	1
Estimated Cost:	$9,000,000
Estimated Benefit:	$54,000,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	24 months

Hazard(s) Addressed	**Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms**
Provide the Public Works Department with a hardened facility/workshop for housing critical equipment to mitigate the damages from the identified hazards.	
Participating Jurisdiction	Town of Westlake
Priority:	2
Estimated Cost:	$2,000,000
Estimated Benefit:	$12,000,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Winter Storms
Enhance sanding and de-icing capabilities with more equipment to mitigate the impact of winter storms.	
Participating Jurisdiction	Town of Westlake
Priority:	3
Estimated Cost:	$6,000
Estimated Benefit:	$36,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	6 months

Hazard(s) Addressed	Thunderstorms
Implement lightning protection device standards (e.g., lightning rods) within building codes/standards.	
Participating Jurisdiction	Town of Westlake
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	Property owners, hazard mitigation grants
Lead Agency/Department Responsible:	Building Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Implement standards for storm hardened construction or safe rooms into building codes/standards for new and existing critical and vulnerable facilities.	
Participating Jurisdiction	Town of Westlake
Priority:	5
Estimated Cost:	$6,000
Estimated Benefit:	$36,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Building Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Review and enhance the Town of Westlake's floodplain mitigation ordinances and policies as needed.	
Participating Jurisdiction	Town of Westlake
Priority:	6
Estimated Cost:	$4,500
Estimated Benefit:	$27,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Review Town of Westlake's water conservation/drought contingency plan and update as necessary to mitigate the effects of drought.	
Participating Jurisdiction	Town of Westlake
Priority:	7
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Extreme Heat
Conduct a study to determine the feasibility of expanding monitoring of populations at risk from extreme heat.	
Participating Jurisdiction	Town of Westlake
Priority:	8
Estimated Cost:	$1,5000
Estimated Benefit:	$9,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Flooding
Replace existing bridge at Ottinger Road, located between Westlake Cemetery and State Highway 170. This bridge lies below historic flood levels and is regularly inundated.	
Participating Jurisdiction	Town of Westlake
Priority:	9
Estimated Cost:	$350,000
Estimated Benefit:	$2,100,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Enforce latest edition of buildings codes.	
Participating Jurisdiction	Town of Westlake
Priority:	10
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Building Department, Office of Emergency Management
Implementation Schedule:	36 months

Hazard(s) Addressed	Earthquakes
Conduct an earthquake risk assessment within the community using HaZUS data and geographic information system (GIS) mapping.	
Participating Jurisdiction	Town of Westlake
Priority:	11
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Enhance existing public integrated outreach program, informing residents on hazard mitigation measures related to the identified hazards.	
Participating Jurisdiction	Town of Westlake
Priority:	12
Estimated Cost:	$1,500
Estimated Benefit:	$9,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Implement an education program, separate from the public education for residents, to educate construction contractors, homeowners, and business owners about mitigation techniques.	
Participating Jurisdiction	Town of Westlake
Priority:	13
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Building Department, Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Wildfire
Identify wildfire hazard areas, assess overall community vulnerability, and regulate development in wildfire hazard areas.	
Participating Jurisdiction	Town of Westlake
Priority:	14
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Fire Department, Office of Emergency Management
Implementation Schedule:	12 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
Provide alternative power solutions to new and existing critical facilities and infrastructure, to include the purchase and installation of generators.	
Participating Jurisdiction	Town of Westlake
Priority:	15
Estimated Cost:	$20,000
Estimated Benefit:	$120,000
Potential Funding Source(s):	Town funds, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	Town of Westlake
Priority:	16
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Require that the floodplain administrator be certified.	
Participating Jurisdiction:	Town of Westlake
Priority:	17
Estimated Cost:	$2,000
Estimated Benefit:	$12,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	Town of Westlake
Priority:	18
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	Town of Westlake
Priority:	19
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding.	
Participating Jurisdiction:	Town of Westlake
Priority:	20
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	Town of Westlake
Priority:	21
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Wildfire
Promote conservation of open space or wildland-urban interface boundary zones to separate developed areas from high-hazard areas.	
Participating Jurisdiction:	Town of Westlake
Priority:	22
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Wildfire, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	Town of Westlake
Priority:	23
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the town were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the town, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Capital Improvement Plan	Public Works Department	Annually	Drainage improvement project; Roanoke Road	When reviewing the Capital Improvement Plan, the leadership team will review this HazMAP to see which action items can be addressed with the fiscal and administrative capabilities of the town.
Comprehensive Plan	Town Administration	As needed	Development guidelines	The town staff will review development plans for alignment with the Comprehensive Plan.
Flood Hazard Prevention Ordinance	Public Works Department	As needed	Flood hazard prevention activities and processes	Town staff will review identified mitigation action items and consider plan revision as necessary.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the Town of Westlake. For additional information, see Appendices A and B.

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2020

City of Westworth Village

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County Hazard Mitigation Action Plan (HazMAP) planning process for the City of Westworth Village was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Westworth Village alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

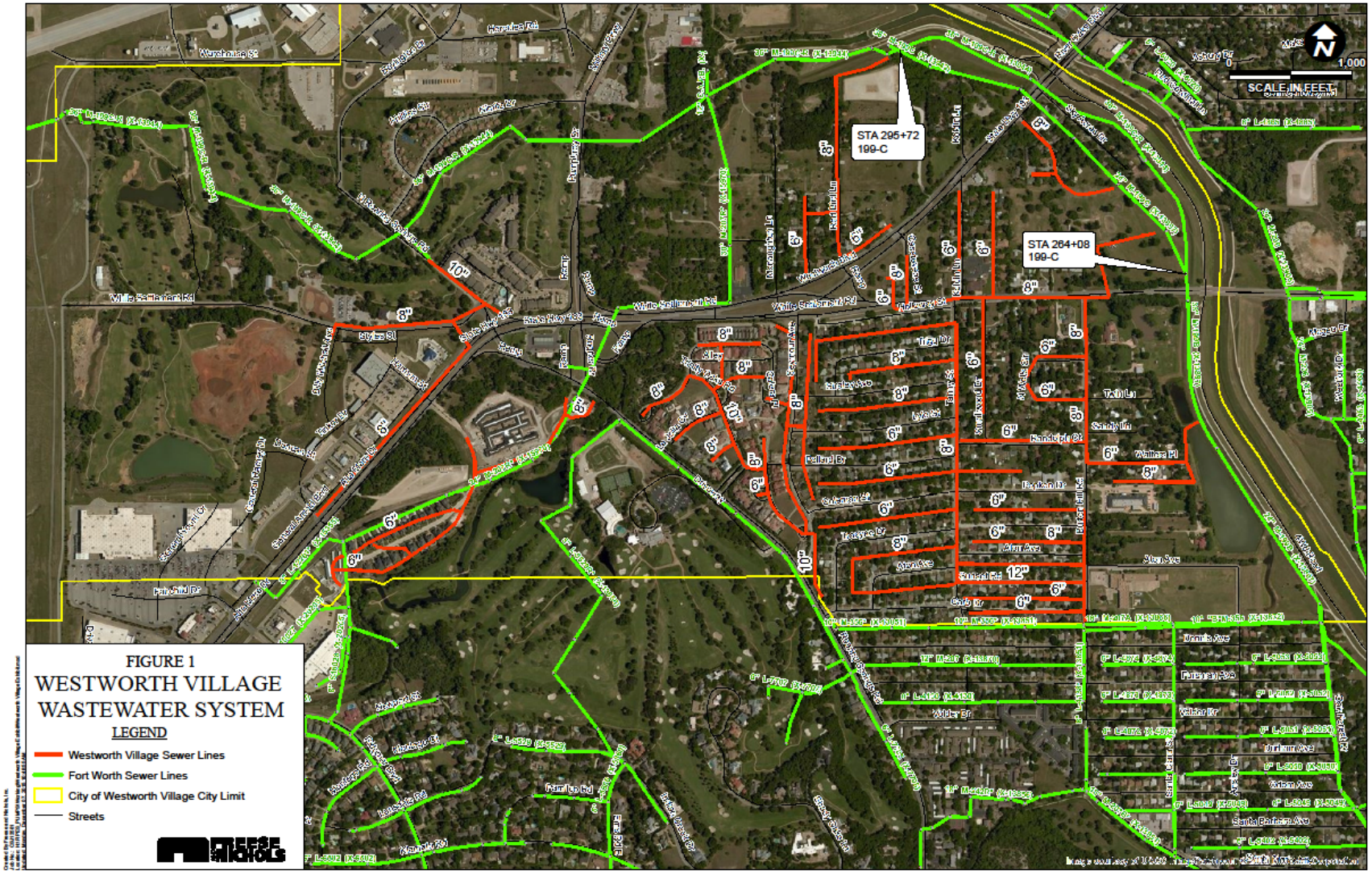
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

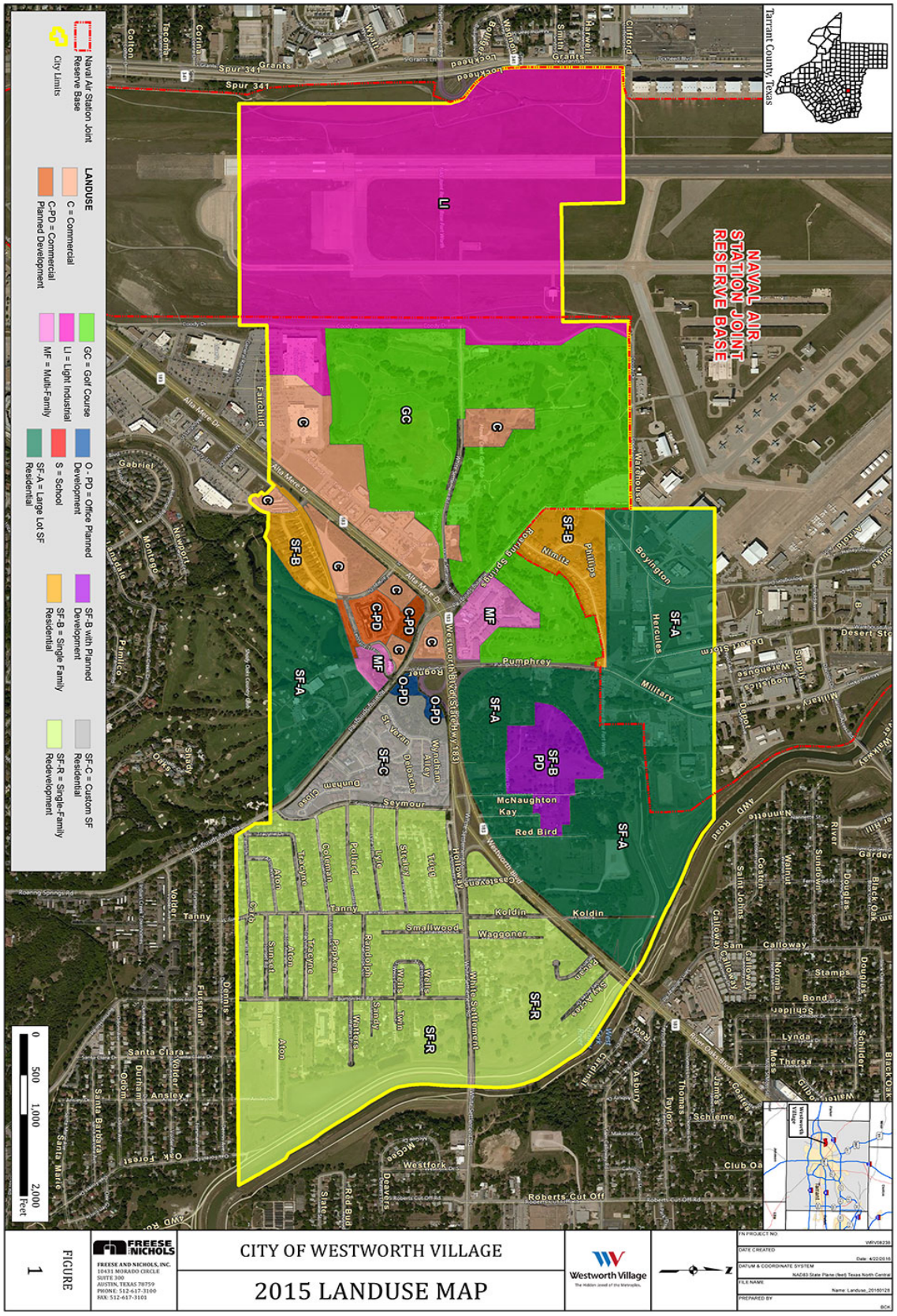
Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Westworth Village will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

1.4 Supporting Maps

The following maps provide an overview of the City of Westworth Village:

- Wastewater System Map
- Land Use Map


STA 295+72
199-C
STA 264+08
199-C
SCALE IN FEET
0
1,000
FIGURE 1
WESTWORTH VILLAGE
WASTEWATER SYSTEM
LEGEND
Westworth Village Sewer Lines
Fort Worth Sewer Lines
City of Westworth Village City Limit
Streets


Naval Air Station Joint Reserve Base
City Limits
LANDUSE
C = Commercial
C-PD = Commercial Planned Development
MF = Multi-Family
LI = Light Industrial
GC = Golf Course
S = School
O - PD = Office Planned Development
SF-A = Large Lot SF Residential
SF-B = Single Family Residential
SF-B with Planned Development
SF-R = Single-Family Redevelopment
SF-C = Custom SF Residential
Tarrant County, Texas
NAVAL AIR STATION JOINT RESERVE BASE
LI
GC
C
SF-B
C-PD
MF
O-PD
SF-A
SF-C
SF-B PD
SF-R
Spur 341
Alta Mere Dr
Westworth Blvd (State Hwy 183)
Pumphrey
Military
Boyington
Hercules
Phillips
Nimitz
Edwards Ranch
Roaring Springs Rd
Seymour
McNaughton
Kay
Red Bird
Koldin
Waggoner
Smallwood
Tanny
Roberts Cut Off
Westfork
Calloway
Stamps
Bond
Lynda
Thersa
Moss
Schieme
Club Oa
Santa Clara
Ansley
Durham
Gordon
Santa Barbara
Santa Maria
Oak Forest
Fairchild
Gabriel
Newport
Manteo
Pamlico
Shady Oaks
Dunham Close
Wyndham Alley
St. Verde
Dodo-chic
Rogner
Desert Storm
Warehouse
Loop 820
Nanette
Garden
River
Walnut
Sundown
Douglas
Black Oak
Saint Johns
Colton
Tacoma
Cortina
Grants
Lockheed
Washington
Smith
Hayworth
Clifford
Wyatt
0
500
1,000
2,000
Feet
FIGURE 1
FREESE NICHOLS
FREESE AND NICHOLS, INC.
10431 MORADO CIRCLE
SUITE 300
AUSTIN, TEXAS 78759
PHONE: 512-617-3100
FAX: 512-617-3101
CITY OF WESTWORTH VILLAGE
2015 LANDUSE MAP
Westworth Village
The Hidden Jewel of the Metroplex
FN PROJECT NO:
DATE CREATED
DATUM & COORDINATE SYSTEM
NAD83 State Plane (feet) Texas North Central
FILE NAME
PREPARED BY

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Westworth Village has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Westworth Village's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Westworth Village. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Westworth Village Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Westworth Village	City Management	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Westworth Village	City Management	Chief of Police	Hazard identification and plan development
City of Westworth Village	Public Works Department	Director	Hazard identification and plan development
City of Westworth Village	City Management	Administrative Assistant	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1 Changes in Development since 2015

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: There has been no recorded change since 2015.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: There were revisions made to planning and Zoning ordinances and updates made to building codes. Enforcements options for code compliance, as necessary, has also been added. A full list of completed mitigation actions items are described in Chapter 5 of this annex.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Westworth Village.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	2,726
Persons under 5 years (%)	Data unavailable
Persons 65 years and over (%)	Data unavailable
Language other than English spoken at home (%)	Data unavailable
With a disability, under age 65 (%)	Data unavailable
Persons without health insurance, under age 65 (%)	12.9
Persons in poverty (%)	10.5
Median household income	$54,917
Households, 2012-2016	1,184
Median value of owner-occupied housing units, 2012-2016	$106,200

The critical and vulnerable facilities listed below are in the hazard area for all or some of the hazards identified in the City of Westworth Village.

City of Westworth Village Critical and Vulnerable Facility/Asset Inventory					
Facility/Asset Name or Description and Address	**Type of Asset**	**Capacity**	**Square Feet**	**Structure Value**	**Content Value**
City Hall 311 Burton Hill Road	Administration Law Enforcement Code Enforcement Public Works Utilities Community Center	350 people	4,500	$4,702,000	$500,000
Public Works Building 128 Koldin Lane	Public Works Facility	4 people	2,000	$211,400	$200,000
Burton Hill Elementary 519 Burton Hill Road	Education	1,500 people	63,500	Unknown	Unknown

3.3 Natural Hazard Profiles

The City of Westworth Village's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Westworth Village in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
N/A	Wildfire
1	Thunderstorm (includes hail, wind, lightning)
2	Tornado
3	Winter Storms
4	Flooding
5	Extreme Heat
6	Expansive Soils
7	Earthquake
8	Drought

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Westworth Village.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Significant
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Property damage Loss of water supply Increases grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Jurisdiction's ground-water supply: City of Fort Worth. Several property owners maintain the water rights to personal water wells dating back to when Westworth Village was originally founded in 1941, prior to the contract with the City of Fort Worth.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: Tarrant County and the City of Fort Worth water restrictions are followed.

3.3.2 Earthquake

Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Negligible
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Medium
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: No prior earthquakes reported.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Expansive soils consistently causes major damage to city roads every year. Expansive soils are a major consideration for all existing and future structures, as soil movement can lead to foundation damage and cracking and falling buildings.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Westworth Village spends approximately $6,000 per year to rebuild roads due to cracking, heaving, and buckling caused by expansive soils. The road damage is spread evenly throughout the city. City buildings have no documented damages directly attributable to expansive soils.

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	The elderly, very young, and outdoor laborers need to take proper precautions. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The elderly, very young people, and people with poor health are most at risk from extreme heat. People who work outside or in buildings without air-conditioning are also at high risk to the direct effects of extreme heat. These populations are present throughout the city.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? No. During extreme heat events, the City Hall Community Room is opened to provide a place for those who need a break from the heat. In addition, there is one church that routinely opens its doors to assist the elderly or those who financially cannot, or do not, utilize their air conditioners.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Limited
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Based on historical data, flooding has caused zero injuries and fatalities per year and is expected to have the same results in the future. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. There are no properties within the floodplain.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: No damage has been reported since 2015.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? No.

Intersections or traffic routes impacted by flooding: When debris is not removed, a section on Pumphrey Road, near the Naval Air Station Joint Reserve Base entrance, has standing water; however, by promptly clearing the storm drain this issue is resolved. Therefore, the city's Public Works crew has put this location on an increased schedule cleanout to mitigate this issue. There are three streets that would be damaged if the Lake Worth dam broke and caused wide spread flooding. These streets are near the banks of the Trinity River; however, there are numerous buffer ponds in place, which should allow time for evacuation.

Names of any creeks or rivers that flood: The city has no creeks or rivers that have flooded.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. The City of Westworth Village does **not** have low water crossings within the city.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Westworth Village is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	48061#
Community Name	City of Westworth Village
Counties	Tarrant County
Initial FHBM Identified	03/08/74
Initial FIRM Identified	06/03/86
Current Effective Map Date	09/25/09
Reg-Emer Date	06/03/86
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Director of Community Development.

What specific flooding ordinances and plans does your jurisdiction have? Article 3.06 Flood Hazard Prevention of the City's Codified Ordinance, Ordinance No. 439.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? Flood Hazard Insurance is required for any new construction located in the flood plain.

What building restrictions, in regard to floodplains, does your jurisdiction enforce? Under the provisions of 44 CFR chapter 1, section 65.12, of the National Flood Insurance Program regulations, Westworth Village may approve certain development in zones A1-30, AE, AH, on the city's FIRM which increases the water surface elevation of the base flood by more than 1 foot, provided we complete all of the provisions required by section 65.12.

Repetitive and Severe Repetitive Loss Properties: There are no residential repetitive loss properties and no severe repetitive loss properties within the City of Westworth Village. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Westworth Village's ability.

Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Policies in-force: 6 Insurance in-force: $1,860,000 Written premium in-force: $2,143
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	There is no record of claims filed within the city.
NFIP Topic	**Source of Information**	**Comments**
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	Approximately 6 properties are exposed to flood risks.
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	Data not available.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, GIS, education or outreach, inspections, and engineering capability.

What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Community buy-in. NFIP premiums must be paid in full and cannot be split into monthly payments.
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		Data not available.
Is a CAV or CAC scheduled or needed?		Data not available.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	03/08/74
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP	Data not available.

Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The City of Westworth Village will continue to address the gaps in data over the next five years and expand the capabilities of the NFIP program by implementing NFIP-related mitigation actions identified in Chapter 5 of this annex.

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of thunderstorms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. The golf course and personnel on the golf course are most at risk.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): No recorded damage has occurred since 2015.

Number of homes lost due to lightning-induced fires: None.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Medium
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: There have been no reports of a tornado since 2015.

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	N/A
Geographic Area Affected	N/A
Probability of Future Occurrence	N/A
Maximum Probable Extent	N/A
Potential Impact	N/A
Vulnerabilities	The City of Westworth Village is not vulnerable to wildfire due to the urbanized landscape of the city.

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Extensive
Probability of Future Occurrence	Likely
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: None.

3.4 Historical Events

The following, taken from the National Centers for Environmental Information, is the natural hazard event that occurred within the City of Westworth Village between 2015 and 2017.

Historical Events (Since 2015) from the National Centers for Environmental Information (www.ncdc.noaa.gov)								
Location	**Date**	**Event Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**	**Magnitude Type**
Westworth Village	5/10/2016	Thunderstorm Wind	61	0	0	$0	$0	EG
Total				**0**	**0**	**$0**	**$0**	

*EG-Wind Estimated Gusts

3.5 Overall Vulnerability

The City of Westworth Village identified their greatest vulnerabilities and concerns:

- Westworth Village is most vulnerable to thunderstorms, specifically lightning, at the municipal golf course. There are plans to install additional lightning rods on the clubhouse and on other city buildings to mitigate damage.

Chapter 4: Capabilities Assessment

(In compliance with 201.6(c)(3))

The following capability assessment examines the ability of the city to implement and manage a comprehensive mitigation strategy. Strengths, weaknesses, and resources of the jurisdiction are identified as a means to develop an effective Hazard Mitigation Action Plan (HazMAP). The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A questionnaire was distributed to the City of Westworth Village's Local Planning Team (LPT) to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including: legal and regulatory capabilities; administrative and technical capabilities; and fiscal capabilities.

Planning and Regulatory Assessment		
Type of Plans	**Have capability?**	**Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	Yes	Yes; Yes; Yes
Capital Improvement Plan	Yes	No; No; No
Economic Development Plan	Yes	No; No; No
Local Emergency Operations Plan	Yes	Yes; Yes; Yes
Continuity of Operations Plan	Yes	No; Yes, Yes
Transportation Plan	Yes	No; Yes, Yes
Stormwater Management Plan	Yes	Yes; Yes; Yes
Community Wildfire Protection Plan	No	
Other Plans (e.g., disaster recovery, climate change adaptation)	No	
Land Use Planning and Ordinances	**Have capability?**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Yes	Yes; Yes
Subdivision Ordinance	Yes	Yes; Yes
Floodplain Ordinance	Yes	Yes; Yes
Flood Insurance Rate Maps	Yes	Yes; Yes
Natural Hazard Specific Ordinance (e.g., stormwater, wildfire)	Yes	Yes; Yes
Acquisition of land for open space and public recreation uses	Yes	Yes; Yes

Building Code, Permitting, and Inspections	Have capability?	
Building Code	Yes	**Version/Year:** ICC Energy 2015; ICC Electrical 2011; all others are 2012
Building Code Effectiveness Grading Schedule (BGEGS) Score	No	
Fire Department ISO Rating	Yes	**Rating:** 5
Site Plan Review Requirements	Yes	**Type(s) of requirement:** Planning and Zoning review, approve and recommend to city council and Zoning Board of Adjustment.
Administrative and Technical Assessment		
Administration	**Have capability?**	**Describe capability. Is coordination effective?**
Planning Commission	Yes	Planning and Zoning Board and Zoning Board of Adjustment; Yes
Mitigation Planning Committee	Yes	Hazard identification and planning; Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Per City Ordinance; Yes
Mutual Aid Agreements	Yes	Response and assistance; Yes
Staff	**Have capability? FT/PT***	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes; Yes; Yes
Floodplain Administrator	PT	Yes; Yes; Yes
Emergency Manager	PT	Yes; Yes; Yes
Community Planner	PT	Yes; Yes; Yes
Civil Engineer	No	
GIS Coordinator	PT	No; No; Yes
Other:	No	
***Full-time (FT) or part-time (PT) position**		
Technical	**Have capability?**	**Describe capability. Has capability been used to assess or mitigate risk in the past?**
Warning Systems/Services (e.g., Reverse 911, outdoor warning signals)	No	Because the city is so small, residents hear the Joint Reserve Base, City of Fort Worth, and City of River Oaks outdoor warning sirens; Yes
Hazard data and information	No	
Grant writing	Yes	As needed, when staffing levels allow
HaZUS analysis	No	
Other	No	

Education and Outreach Assessment		
Program or Organization	**Have capability?**	**Describe program or organization and how it relates to disaster resilience and mitigation. Could the program or organization help implement future mitigation activities?**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	Use mutual aid.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Community newsletter, monthly community luncheon, and targeted door hangers as needed.
Natural disaster or safety related school programs	Yes	Westworth Village Police Department has a volunteer police officer assigned to the Fort Worth Independent School District elementary school within the city limits. The officer provides ongoing safety education to the students, faculty, staff and parents.
StormReady certification	No	
Firewise Communities Certification	No	
Public/private partnership initiatives addressing disaster-related issues	Yes	There are two local churches who are active with the police department, and both have limited space available, if needed, to perform kitchen and short-term staging.
Other	No	
Financial Assessment		
Funding Resources	**Have capability?**	**Has the funding resource been used in past? If yes, for what type of activities? Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	Yes	City infrastructure improvements; Yes
Authority to levy taxes for specific purposes	Yes	Crime control and prevention district, streets, economic development; Yes
Fees for water, sewer, gas, and/or electric services	Yes	Franchise fees are collected for use of the city's right-of-ways; Yes
Impact fees for new development	Yes	Fees collected by the city and passed on to the City of Fort Worth; Yes
Stormwater utility fee	Yes	Fees collected by the City and passed on to the City of Fort Worth; Yes

Incurrence of debt through general obligation bonds and/or special tax bonds	Yes	Municipal building construction; Yes
Incur debt through private activities	No	
Community Development Block Grant	Yes	City street repairs and upgrading; Yes
Other federal funding programs	No	Transportation Alternative Grant; Yes
State funding programs	No	
Other	No	

How can any of these capabilities be expanded and improved to reduce risk?

Actions that can expand and improve existing authorities, plans, polices, and resources for mitigation include: budgeting for mitigation actions; passing policies and procedures for mitigation actions; adopting and implementing stricter mitigation regulations; approving mitigation updates; and additions to existing plans as new needs are recognized.

Chapter 5: Mitigation Strategy

(In compliance with 201.6(c)(3)(i), 201.6(c)(3)(i), 201.6(c)(3)(ii), 201.6(c)(3)(iv), 201.6(c)(3)(iii), and 201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Stafford Act directs local mitigation plans to describe hazard mitigation action and establish a strategy to implement those actions.[1] Therefore, all other requirements for a local mitigation plan (or hazard mitigation action plan) lead to and support the mitigation strategy.

5.1 Mitigation Goals

The Tarrant County Hazard Mitigation Planning Team (HMPT) collectively reviewed the extensive list of mitigation goals of the 2015 Hazard Mitigation Action Plan (HazMAP) and unanimously chose to streamline the mitigation goals for this update. Therefore, the new goals are to protect life and reduce bodily harm from natural hazards, and to lessen the impacts of natural hazards on property and the community through hazard mitigation.

5.2 2015 Action Items

The City of Westworth Village's action items in the 2015 Tarrant County HazMAP were determined by the 2015 Local Planning Team (LPT). Below are the action items from the 2015 plan and the status of each action.

[1] Section 322(b), Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, 42 U.S.C. 5165.

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Improve multiagency response to all emergencies and disasters in Westworth Village.	Schedule and conduct Incident Command System (ICS) training annually for all law enforcement, fire, and emergency medical services (EMS) as a pre-requisite for National Incident Management System (NIMS) training.	2 years	Office of Emergency Management	$3,000	$50,000	Grant funds, multiagency funds
		STATUS: Deferred to 2020 HazMAP					
		Schedule and conduct NIMS training annually.	2 years	Office of Emergency Management	$3,000	$50,000	Grant funds, multiagency funds
		STATUS: In progress					
		Conduct annual tabletop disaster training exercises involving all emergency response agencies.	3 years	Office of Emergency Management	$3,000	$50,000	Grant funds, multiagency funds
		STATUS: Deferred to 2020 HazMAP					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Severe Thunderstorms and High Winds, Tornadoes, Hail, Lightning, Winter Storms, Flooding, Dam Failure, Wildfires	Provide hazard awareness, preparedness, and training information to citizens of Westworth Village.	Develop/maintain a website for citizen information: shelter in-place, safe room information, citizen training, Federal Emergency Management Agency (FEMA) course listing, and links to websites.	1 year	Office of Emergency Management	$500	$20,000	City budget
		STATUS: Completed					
		Partner with volunteers, and emergency response agencies to post monthly notices of training available to citizens.	1 year	Office of Emergency Management	$500	$20,000	City budget
		STATUS: In progress					
Power Failure, Winter Storms, Severe Thunderstorms	To have automatic emergency power generators for the Westworth Village Fire and Public	Identify appropriate size and type of generator for the building.	1 year	Public Works Department, Fire Department	Unknown	Unknown	Unknown

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
and High Winds, Tornadoes	Works building in the event that the main power supply is disrupted.	**STATUS: Deferred to 2020 HazMAP**					
		Purchase/order generator.	2 years	Public Works Department, Fire Department	$30,000	$60,000	City funds
		STATUS: Deferred to 2020 HazMAP					
		Delivery and installation of fire station generators.	3 years	Public Works Department	Unknown	Unknown	Unknown
		STATUS: Deferred to 2020 HazMAP					
Drought	Review water enforcement legislation and update as necessary to mitigate the effects of drought in Westworth Village.	Review current legislation for water conservation enforcement.	Mar-2015	City Administration	$100	Unknown	City funds
		STATUS: In progress					
		Develop or update water conservation enforcement legislation to ensure effective practices during periods of drought.	Mar-2015	City Administration	$250	Unknown	City funds
		STATUS: In progress					
Drought	Develop contingency plans to ensure adequate power and water supply to	Review current contingency plans and supplier contracts.	Oct-2015	All city departments	$0	$0	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	Westworth Village during prolonged periods of drought.	**STATUS: In progress**					
		Develop or update potable water contingency plans and supplier contracts.	Dec-2015	Public Works Department, Office of Emergency Management	$100	$1,000	City budget
		STATUS: In progress					
		Develop or update power supply contingency plans and supplier contracts.	Dec-2015	Office of Emergency Management	$100	$1,000	City budget
		STATUS: In progress					
Drought	Upgrade water and irrigation systems to conserve water in Westworth Village.	Upgrade irrigation systems at city parks and recreation facilities.	Dec-2017	Public Works Department	$25,000	$100,000	City funds, grants
		STATUS: Deferred to 2020 HazMAP					
		Complete the installation of stormwater drainage with street improvement.	Ongoing	Public Works Department	Unknown	Unknown	City funds, grants
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Drought	Develop a drought awareness education program for Westworth Village citizens.	Evaluate the hazards posed by drought.	December 2014 and ongoing	City Administration	$250	$10,000	City funds
		STATUS: In progress					
		Develop a drought awareness education program that provides tips and pertinent information for ensuring the protection of property and the environment against drought.	December 2014 and ongoing annually	City Administration, Office of Emergency Management	$1,500	$5,000	City funds, grants
		STATUS: In progress					
Drought	Distribute drought awareness information to Westworth Village citizens.	Provide drought awareness information to citizens through website and monthly meetings.	Oct-2014	City Administration, Office of Emergency Management	$100	$2,500	City funds
		STATUS: In progress					
		Provide drought awareness information through the public	May-2015	Office of Emergency Management,	$500	$5,000	City funds, grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		school, educating children on doing their part to protect and conserve water.		Code Enforcement			
		STATUS: In progress					
Extreme Temperatures	Ensure Westworth Village has an extreme heat plan in place.	Review current plans and procedures related to extreme heat.	Aug-2015	City Administration	$0	$0	NA
		STATUS: In progress					
		Open cooling centers and provide public information.	Dec-2015	City Administration	$250	$5,000	City funds, grants
		STATUS: In progress					
Extreme Temperatures	Identify extreme heat plans for critical infrastructure in Westworth Village.	Ensure essential functions continue in the event of high temperatures, by conducting mitigation activities.	Aug-2015	City Administration	$250	$5,000	City funds, grants
		STATUS: In progress					
Extreme Temperatures	Develop an extreme heat preparedness	Evaluate the hazards posed by	Aug-2015	City Administration	$500	$3,000	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	education program for Westworth Village citizens.	extreme heat in Westworth Village.					
		STATUS: In progress					
		Develop an extreme heat preparedness education program that provides tips and pertinent information for ensuring the health and safety of citizens during extreme heat.	Dec-2015	City Administration	$1,000	$10,000	City funds, grants
		STATUS: In progress					
Extreme Temperatures	Distribute extreme heath preparedness information to Westworth Village citizens.	Provide extreme heat mitigation information to the Westworth Village citizens through a social media campaign.	Jan-2016	City Administration	$500	$5,000	City funds, grants
		STATUS: Completed					
		Provide extreme heat mitigation information through the city	Jan-2016	City Administration	$100	$5,000	City funds, grants

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		police department's website.					
		STATUS: In progress					
Expansive Soils	Mitigate expansive soils in Westworth Village.	Improve construction techniques through building code enhancements.	Aug-2018	Zoning Department, Code Enforcement	$250	$5,000	City budget
		STATUS: In progress					
		Educate construction contractors, homeowners, and business owners about mitigation techniques.	Dec-2018	Zoning Department, Code Enforcement	$500	$5,000	City budget, grants
		STATUS: In progress					
Tornadoes	Ensure outdoor spaces/parks/trails projects in the future in Westworth Village have adequate shelter for high wind events.	Evaluate current shelters in proximity to outdoor spaces within Westworth Village.	Dec-2016	City Administration	$500	Unknown	City funds
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	such as thunderstorms or tornadoes.	Determine the size and space needed for shelters, based on the anticipated attendance at each location, and include those requirements in future developments.	Dec-2016	City Administration	$2,000	Unknown	City funds
		STATUS: In progress					
		Install outdoor storm shelters at outdoor locations that are deemed inadequate after review in 1.1.1 and 1.1.2	Jan-2018	City Administration	$10,000	Unknown	City funds
		STATUS: In progress					
Tornadoes	Ensure critical facilities in Westworth Village have adequate safe rooms to protect against high wind events and tornadoes.	Evaluate the current conditions of critical facilities to determine which ones, if any, need safe rooms installed.	Annually	Code Compliance Department	$0	$0	City budget
		STATUS: In progress					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		Install safe rooms as needed in critical facilities.	Dec-2016	Public Works Department	$2,000	$2,000	City budget
		STATUS: In progress					
Flooding	Improve Westworth Village's flooding information distribution and warning to citizens.	Continue efforts to lower the City's Community Rating System (CRS) rating.	Annually	City Administration, Code Compliance Department	Unknown	Unknown	City funds
		STATUS: In progress					
Flooding	Improve drainage and erosion in new and redeveloping areas of Westworth Village.	Identify the proper mitigation measures for developments that eliminate flooding, by insuring participation in storm drains & safe ponds.	With each permit review	Code Compliance Department, Public Works Department	$0	$0	City budget
		STATUS: In progress					
		Review building and development ordinances to insure current mitigation strategies are included and	Annually	City Administration, Code Compliance Department	$0	$0	City budget

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		penalties are assessed for failing to comply with ordinance.					
		STATUS: In progress					
Severe Thunderstorms and High Winds	Provide Educational Materials to citizens of Westworth Village in securing property, and how to plan to shelter in place or when to temporarily relocate in the event of a long term power outage.	Obtain Tarrant County materials and modify them if needed for Westworth Village specific needs.	Annually	City Administration, Code Compliance Department	$0	Unknown	City funds
		STATUS: In progress					
		Speak at city council and community wide luncheon on the benefits of having an emergency plan for residents as well as businesses.	Annually	City Administration, Office of Emergency Management	$0	Unknown	City funds
		STATUS: In progress					
Hail	Provide hail-resistant parking areas for Westworth Village city vehicles.	Evaluate the need for covered parking for city vehicles to protect them against hail.	Dec-2015	City Administration	$0	Unknown	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: In progress					
		Install covered parking areas as determined needed.	Dec-16	City Administration	$20,000	Unknown	City funds
		STATUS: In progress					
Hail	Provide citizens and business owners in Westworth Village information regarding the effects of hail and how to mitigate them.	Provide hail mitigation information to citizens through water bills, social media and at one monthly community luncheon annually.	Annually	Office of Emergency Management, City Administration	$0	$0	City budget
		STATUS: In progress					
		Provide high risk targets additional education on how to mitigate hail related damage.	Annually	City Administration, Code Compliance Department	$0	$0	City budget
		STATUS: In progress					
Wildfire	Mitigate wildfires by instituting landscaping practices that reduce	Prevent wildfires from spreading to critical facilities by maintaining	Annually	Code Enforcement, Public Works Department	$0	Unknown	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
	overgrown vegetation on all city property	landscaping, reducing overgrowth and increasing no/low growth barriers.					
		STATUS: Deleted - wildfire is no longer a threat					
		Maintain needed equipment to ensure water systems are adequate.	Annually	Code Enforcement, Public Works Department	$0	Unknown	City funds
		STATUS: Deleted - wildfire is no longer a threat					
Wildfire	Review city ordinances to ensure mitigation practices are in effect in the Westworth Village.	Enact building permit process that encourages wildfire resistant construction.	Ongoing	Code Compliance	$0	$0	City budget
		STATUS: Deleted - wildfire is no longer a threat					
		Work with contracted fire marshal to ensure that annual inspections review wildfire assessments.	Annually	Code Compliance	$0	$0	City budget
		STATUS: Deleted - wildfire is no longer a threat					

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
Extreme Temperatures	Improve Westworth Village's capability to mitigate against severe winter storms.	Establish programs to protect the poor, ill, and elderly during extreme winter temperatures.	Dec-2016	Office Emergency Management	$0	Unknown	City funds
		STATUS: In progress					
Winter Storms	Improve Westworth Village's citizens mitigation activities related to winter storms.	Distribute severe winter weather mitigation information via Water Bills, city website and community luncheons.	Ongoing	Office Emergency Management	$0	$0	City budget
		STATUS: In progress					
		Purchase and install an emergency generator at Public Works' facility.	Dec-2017	City Administration, Public Works Department	$150,000	$0	City budget
		STATUS: In progress					
Lightning	Protect Westworth Village communication infrastructure from lightning.	Evaluate the need for lightning protection on communication infrastructure.	Dec-2016	Police Department, Office Emergency Management	$800	Unknown	City funds

Hazard Addressed	Objective	Action/Project Description	Projected Time to Completion	Department or Agency Responsible	Estimated Cost	Estimated Benefit	Funding Sources
		STATUS: In progress					
		Install lightning rods on all existing and future communication infrastructure.	Dec-2016	Police Department, Office Emergency Management	$15,000	Unknown	FEMA
		STATUS: In progress					
Lightning	Develop a lightning mitigation education program for citizens of Westworth Village.	Evaluate the hazards posed by lightning.	Ongoing	Office of Emergency Management	$1,500	$0	City budget
		STATUS: In progress					

5.3 New Action Items

The City of Westworth Village's action items were determined by the Local Planning Team for the 2020 Hazard Mitigation Action Plan (HazMAP). These actions include mitigation actions that qualify for mitigation funding as well as enforcement, maintenance, and response actions that the city has identified as opportunities to increase their resiliency to hazards.

During the capabilities assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard. As $1 spent in mitigation saves a community an average of $6 in recovery[2], we used this data to develop a cost-benefit analysis: *Estimated Cost x 6* = **Estimated Benefit**.

Priority will go towards projects with the highest positive impact on community resilience, including life safety and property protection. Below are the action items for this HazMAP.

Hazard(s) Addressed	**Flooding**
Clean out, shore up, and improve drainage capabilities on the Aton Storm drain system (last updated in 1978), which provides stormwater drainage to the Trinity River for most of the residential areas.	
Participating Jurisdiction	City of Westworth Village
Priority:	1
Estimated Cost:	$200,000
Estimated Benefit:	$1,200,000
Potential Funding Source(s):	City funds, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	**Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms**
Enhance current city-wide notification system for phone, text, and email by implementing a system such as CodeRed or Everbridge.	
Participating Jurisdiction	City of Westworth Village
Priority:	2
Estimated Cost:	$10,000
Estimated Benefit:	$60,000
Potential Funding Source(s):	City funds, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

[2] Natural Hazard Mitigation Saves: 2017 Interim Report. National Institute of Building Science. < https://www.nibs.org/page/mitigationsaves>

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Educate city employees on the most "at-risk" populations in the city and how to mitigate the risks to these populations.	
Participating Jurisdiction	City of Westworth Village
Priority:	3
Estimated Cost:	$8,000
Estimated Benefit:	$48,000
Potential Funding Source(s):	City funds, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Enhance current public education program that includes recommended actions to mitigate the impacts of these hazards.	
Participating Jurisdiction	City of Westworth Village
Priority:	4
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City funds, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought
Create and implement a drought contingency plan for new and existing city facilities and property that addresses the use of low flow fixtures, xeriscaping, or drought-tolerant plants.	
Participating Jurisdiction	City of Westworth Village
Priority:	5
Estimated Cost:	$5,000
Estimated Benefit:	$30,000
Potential Funding Source(s):	City funds, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Provide flood mitigation risk mapping via geographic information systems (GIS) to property owners and developers in floodplains.	
Participating Jurisdiction	City of Westworth Village
Priority:	6
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	City funds, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management, Community Development Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Expansive Soils
Review and enhance the city's vision and comprehensives plans along with corresponding ordinances and planning and zoning regulations to incorporate "Smartscape" designs in city-owned property and future developments.	
Participating Jurisdiction	City of Westworth Village
Priority:	7
Estimated Cost:	$3,000
Estimated Benefit:	$18,000
Potential Funding Source(s):	City funds, hazard mitigation grants, city funding for staff time
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	24 months

Hazard(s) Addressed	Drought, Earthquakes, Expansive Soils, Extreme Heat, Flooding, Thunderstorms, Tornadoes, Winter Storms
Install automatic flow controls and special breakers on new and existing pipelines and power lines to mitigate damage to critical infrastructure and the environment caused by these hazards.	
Participating Jurisdiction	City of Westworth Village
Priority:	8
Estimated Cost:	$150,000
Estimated Benefit:	$900,000
Potential Funding Source(s):	City funds, hazard mitigation grants
Lead Agency/Department Responsible:	Public Works Department
Implementation Schedule:	18 months

Hazard(s) Addressed	Flooding
Schedule a Community Assistance Visit (CAV) by FEMA or a State agency on behalf of FEMA to assure that the city is adequately enforcing its floodplain management regulations.	
Participating Jurisdiction:	City of Westworth Village
Priority:	9
Estimated Cost:	$1,000
Estimated Benefit:	$6,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Work with the Stormwater Department and Floodplain Manager to create a document to track progress on repetitive loss and severe repetitive loss properties.	
Participating Jurisdiction:	City of Westworth Village
Priority:	10
Estimated Cost:	$100
Estimated Benefit:	$600
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	
Participating Jurisdiction:	City of Westworth Village
Priority:	11
Estimated Cost:	$500
Estimated Benefit:	$3,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Remove existing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving land subject to repetitive flooding.	
Participating Jurisdiction:	City of Westworth Village
Priority:	12
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding
Use bioengineered bank stabilization techniques and revetments to protect against flooding.	
Participating Jurisdiction:	City of Westworth Village
Priority:	13
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Earthquakes, Thunderstorms, Tornadoes
Require construction of safe rooms in new schools, daycares, and nursing homes.	
Participating Jurisdiction:	City of Westworth Village
Priority:	14
Estimated Cost:	$1,000,000
Estimated Benefit:	$6,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

Hazard(s) Addressed	Flooding, Thunderstorms, Tornadoes, Winter Storms
To protect power lines, either bury overhead power lines, ensure ordinances for proper vegetation management practices, replace wood poles with steel or composite ones, or reinforce utility poles with guy wires.	
Participating Jurisdiction:	City of Westworth Village
Priority:	15
Estimated Cost:	$300,000,000
Estimated Benefit:	$1,200,000,000
Potential Funding Source(s):	City general fund, hazard mitigation grants
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	24 months

5.4 Plan Incorporation into Existing Planning Mechanisms

Based on Requirement 201.6(c)(4(ii) and the State of Texas Mitigation Plan, the vulnerability and capabilities assessment for the city were carefully reviewed and considered when developing the mitigation actions for this plan. The Local Planning Team (LPT) will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the LPT will coordinate implementation with the responsible parties in the city, as well as external stakeholders as needed.

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Existing planning mechanisms in which the HazMAP will be integrated are listed below.

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
Vision Plan	City Council, City Administration	Reviewed bi-annually	"Smartscape" design expectations.	The Office of Emergency Management will participate in the review process of this plan and

Type of Plan or Activity	Department Responsible	Update Schedule	Actions to be Integrated	Integration Method
				suggest changes based on mitigation goals.
Ordinances	City Council, City Ordinance Committee, City Administration	As needed, by topic of concern	Mitigation actions in all areas of design and construction standards.	The Office of Emergency Management will participate in the review process of this plan and suggest changes based on mitigation goals.
Planning and Zoning	City Council, Zoning Commission, City Administration, Community Development Department	As needed, by topic of concern, total review every 4 years	Mitigation actions in all areas of design and construction standards.	The Office of Emergency Management will participate in the review process of this plan and suggest changes based on mitigation goals.

Although it is recognized that there are many possible benefits to integrating components of this Hazard Mitigation Action Plan (HazMAP) into other planning mechanisms, the LPT considers this HazMAP, including development and maintenance, to be the primary vehicle to ensure implementation of local hazard mitigation actions.

This completes the annex for the City of Westworth Village. For additional information, see Appendices A and B.

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Section 6: Executing the Plan

Requirement	
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

6.1 Plan Implementation

The Tarrant County Hazard Mitigation Action Planning process was overseen by the North Central Texas Council of Governments (NCTCOG). The plan was submitted to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for approval. It is expected that all participating jurisdictions will formally adopt the plan by resolution once the "Approved Pending Adoption" designation is received by FEMA, in accordance with the Disaster Mitigation Act of 2000.

Each jurisdiction participating in this plan is responsible for implementing specific mitigation actions as prescribed in the mitigation strategies. In each mitigation strategy, every proposed action is assigned to a specific local department or agency in order to assign responsibility and accountability and increase the likelihood of subsequent implementation. This approach enables individual jurisdictions to update their unique mitigation strategy as needed without altering the broader focus of the county-wide plan. The separate adoption of locally-specific actions also ensures that each jurisdiction is not held responsible for monitoring and implementing the actions of other jurisdictions involved in the planning process.

The Tarrant County Emergency Management Coordinator or their designee is the lead position for plan implementation and will work with the Tarrant County Hazard Mitigation Planning Team (HMPT) to ensure mitigation actions are implemented into jurisdictional planning procedures. Each participating jurisdiction will implement the plan and their individual mitigation actions in the timeframe appropriate for their planning processes. As necessary, the HMPT will seek outside funding sources to implement mitigation projects in both the pre-disaster and post-disaster environments. When applicable, potential funding sources have been identified for proposed actions listed in the mitigation strategies.

6.2 Evaluation

All members of the Tarrant County Hazard Mitigation Planning Team (HMPT) will be responsible for ensuring that the Tarrant County Hazard Mitigation Action Plan (HazMAP) is evaluated as required. Specifically, the Tarrant County Emergency Management Coordinator, or their designee, will convene the HMPT and ensure an evaluation is conducted in a thorough manner. This evaluation will include analysis of current mitigation projects, evaluation of success, reevaluation of future mitigation needs, and prioritization based upon changes in needs and/or capabilities of Tarrant County.

The HMPT will reconvene annually to ensure that projects are on track and to reevaluate the mitigation goals, objectives, and action items. The mitigation plan shall be viewed as an evolving, dynamic document.

6.3 Multijurisdictional Strategy and Considerations

Tarrant County will lead activities for mitigation planning county-wide. Although Tarrant County will be responsible for maintaining this plan, including the documentation of in-progress and completed action items, each participating jurisdiction is responsible for reporting hazards, their costs, and a status report on mitigation actions to the North Central Texas Council of Governments (NCTCOG) for recording in the plan.

Each jurisdiction is responsible for completing mitigation activities by providing the capabilities and authorities needed to carry out activities. Participating jurisdictions completed an analysis of their current legal, staffing, and fiscal capabilities as they relate to hazard mitigation planning. Jurisdictional capabilities and authorities identified to ensure successful mitigation planning are located within the jurisdictional annexes.

6.4 Plan Update

The Disaster Mitigation Act of 2000 requires that the Tarrant County Hazard Mitigation Action Plan be updated at least once every five years. During this process, all sections of the plan will be updated with current information, and analyses and new and/or modified mitigation actions will be developed. The revised plan will be submitted for state and federal review and approval and presented for approval to the Tarrant County Commissioners Court and the respective councils of incorporated cities included in this HazMAP. Likewise, each participating jurisdiction will undergo the same process for reviewing, revising and updating their respective plans and submitting them for approval by state, federal, and the local jurisdiction's governing body. The plan will be updated every five years in accordance with federal requirements. Tarrant County's Emergency Management Coordinator or their designee will be responsible for ensuring that this requirement is met. Tarrant County and the Hazard Mitigation Planning Team will review the HazMAP annually for needed updates. The HMPT will be involved in this process to ensure all jurisdictions provide input into the planning process. The public will be invited to participate in this process through public hearings.

6.5 Plan Maintenance

It is the intention of all documented plan participants to formally adopt the Tarrant County Hazard Mitigation Action Plan after each maintenance revision. Once all participants adopt the changes, the revised HazMAP and proof of adoption will be submitted to the Texas Division of Emergency Management and the Federal Emergency Management Agency. The plan will be revised and maintained as required under the guidance of the HazMAP and formally adopted by Tarrant County and jurisdiction elected officials after each revision.

Following formal adoption Tarrant County's Commissioners Court, and formal adoption of the plan by the governing council of each participating jurisdiction, the actions outlined in the HazMAP will be implemented by the county and participating jurisdictions as described throughout this document.

The Tarrant County Emergency Management Coordinator (EMC), or their designee, is responsible for ensuring the HazMAP and its components are monitored, evaluated, and reviewed semiannually by the responsible personnel. The EMC will use email to request the monitoring activities noted below be implemented and changes documented. The progress of action items will be tracked electronically as "in progress," "deferred," or "completed."

These and other changes affecting the plan will be documented within the Tarrant County HazMAP file and identified as updates. Updates will be shared between participants by email or in a meeting (if deemed appropriate) twice a year, and included in annual evaluations and reviews, and five-year update of the plan.

The lead of each Local Planning Team (LPT) is responsible for ensuring their mitigation annex is monitored, evaluated, and reviewed on an annual basis. This will be accomplished by calling an annual meeting of the LPT and HMPT, whose members will provide assistance and expertise for plan review, evaluation, updates, and monitoring. This meeting will be open to the public and public notices will encourage community participation.

During this annual meeting, the LPT point of contact will provide information and updates on the implementation status of each action item included in the plan. As part of the evaluation, the LPT will assess whether goals and objectives address current and expected conditions, whether the nature and/or magnitude of the risks have changed, if current resources are appropriate for implementing the HazMAP, whether outcomes have occurred as expected, and if agencies and other partners participated as originally proposed. These activities will take place according to the following timetable:

Responsible Personnel	Activity	Update Schedule
LPT Point of Contact	Monitoring Plan: track implementation and action items, changes to risk assessment, changes to Local Planning Team (LPT), changes to capabilities, and plan integrations.	Twice a year
	Evaluate Plan: assess effectiveness by evaluating completed actions, implementation processes, responsible personnel, and lessons learned.	Annually
	Update Plan	Once every five years

At least once every five years, or more frequently if such a need is determined by the participants, the HazMAP will undergo a major update. During this process, all sections of the plan will be updated with current information and analyses and new and/or modified mitigation action plans will be developed. The revised plan will be submitted for review and approval to the Texas Division of Emergency Management and the Federal Emergency Management Agency and presented to the governing council for approval and adoption. The plan will be updated every five years in accordance with regulations.

6.6 Continued Public Involvement

As stated in Requirement 201.6(c)(4)(iii), the plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process.

Ongoing public participation will be encouraged throughout the entire planning and implementation process. A copy of the plan will be provided on the jurisdiction's websites and/or in the office of the LPT point of contact. Annual meetings held for monitoring, evaluating, and updating the HazMAP will be open to the public and public notices will encourage community participation.

Public participation will be sought throughout the implementation, evaluation, and maintenance of the HazMAP. This participation will be sought in a multitude of ways, including but not limited to periodic presentations on the plan's progress to elected officials, schools, or other community groups; annual questionnaires or surveys; public meetings; and postings on social media and interactive websites.

6.7 Incorporation into Existing Planning Mechanisms

The primary means for integrating mitigation strategies into other local planning mechanisms will be through the revision, update, and implementation of each jurisdiction's individual plans that require specific planning and administrative tasks (for example, plan amendments, ordinance revisions, and capital improvement projects).

The members of the HMPT will remain charged with ensuring that the goals and strategies of new and updated local planning documents for their jurisdictions are consistent with the goals and actions of the Tarrant County HazMAP and will not contribute to increased hazard vulnerability in Tarrant County or its participating jurisdictions.

During the planning process for new and updated local planning documents, such as a comprehensive plan, capital improvement plan, or emergency management plan, Tarrant County and its participating jurisdictions will provide a copy of the Tarrant County HazMAP to the appropriate parties and recommend that all goals and strategies of new and updated local planning documents are consistent with and support the goals of the Tarrant County HazMAP and will not contribute to increased hazards in the affected jurisdiction(s).

The following steps will be taken in implementing this HazMAP into local plans:

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication may be made by posting the agenda on the city's website, in the city newsletter, or on a public bulletin board.
4. Proposal is discussed at the public meeting, including any comments by members of the public attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority.

Section 7: Conclusion

Through the development of this plan, Tarrant County has developed a thorough hazard history, an inventory of critical facilities, and an updated contact list for emergency contacts at critical facilities. This data, when used in conjunction with the updated information about hazard threats and vulnerabilities, will prove to be invaluable to Tarrant County and its participating jurisdictions.

Natural hazards have been identified county-wide and technological hazards have been listed for selected jurisdictions that opted to include these hazards. Mitigation projects that could reduce the risk of lives and property due to the identified threats have been compiled and prioritized.

The creation of the Tarrant County Hazard Mitigation Planning Team (HMPT) brought together stakeholders from communities and organizations onto one planning team. This group has been able to work together effectively and efficiently to produce this document and establish a greater awareness of risks and mitigation strategies.

In addition to the HMPT, the creation of the Local Planning Team (LPT) in each jurisdiction brought together stakeholders and departments within the jurisdiction onto one planning team. This group was able to work together effectively and efficiently to produce jurisdictional data for this document and establish a greater awareness of risks and mitigation strategies.

This plan will continue to evolve as necessary to properly represent the threats and vulnerabilities affecting Tarrant County. Continued public participation is encouraged and will continue through the ongoing multijurisdictional hazard mitigation process.

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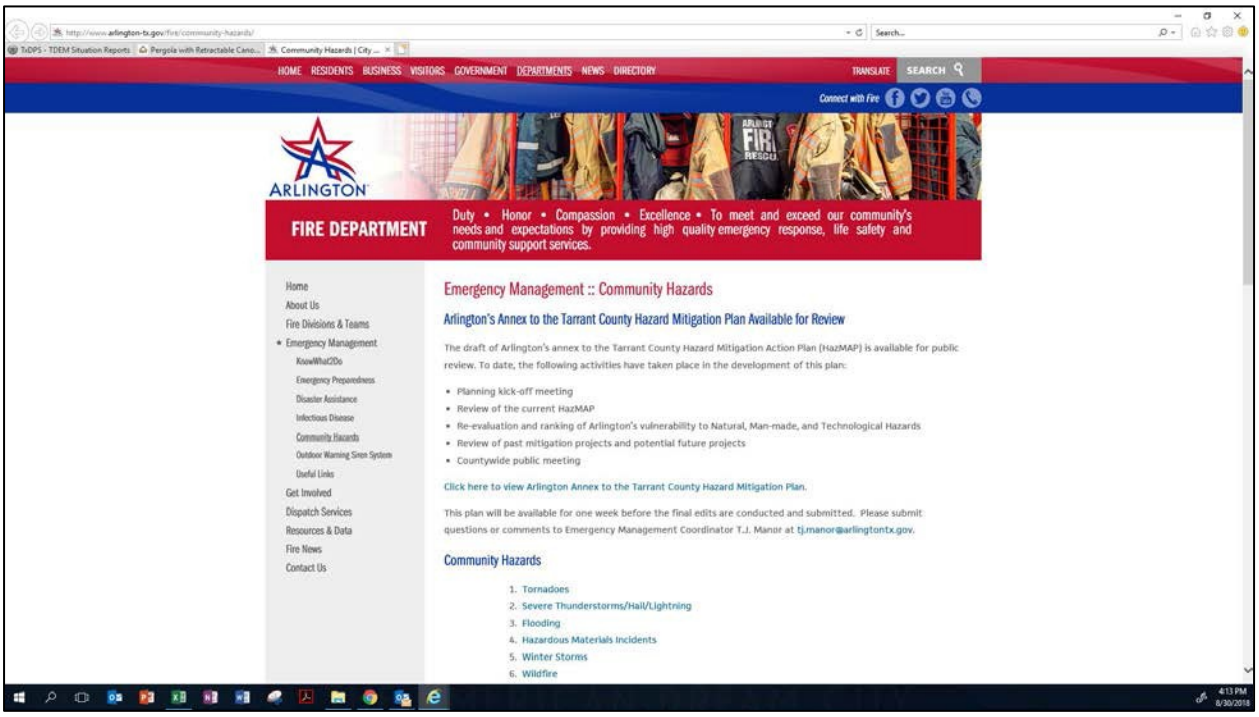
Appendix A: Meeting Documentation

The following pages in Appendix A include the public meeting announcements and attendance records from the participating jurisdictions.

Public Announcements

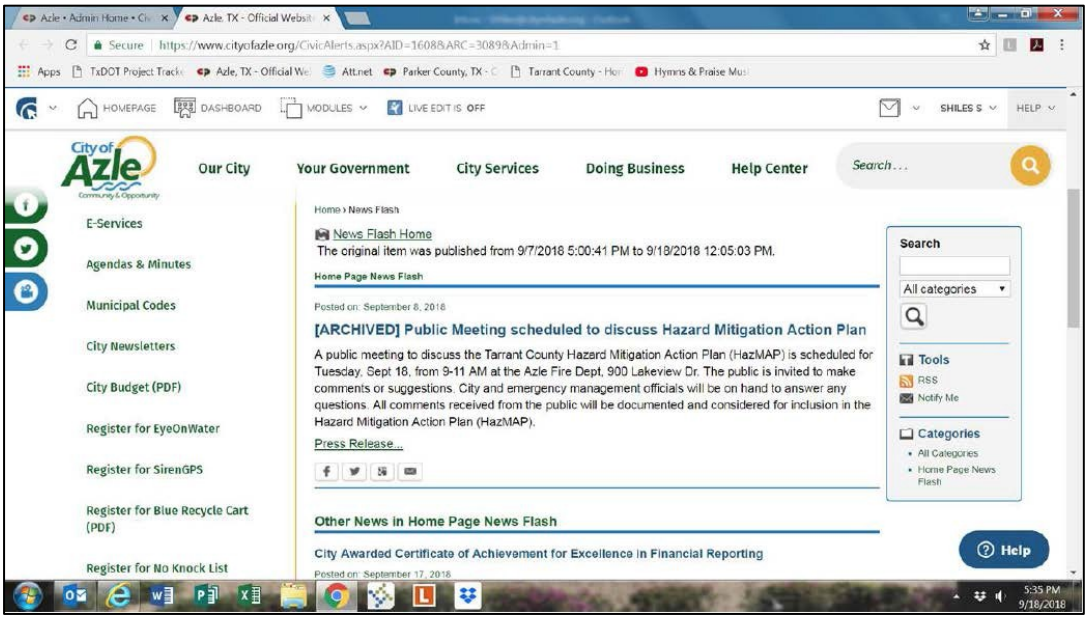
City of Arlington



Arlington city website.

City of Azle

The City of Azle hosted a public meeting on September 18, 2018 at the Azle Fire Department. The meeting was advertised on the city website and public bulletin. No public comment was received.



Azle city website.

North Central Texas Council of Governments

EMERGENCY MANAGEMENT
TARRANT COUNTY, TEXAS

Contact Thomas Scott
Telephone 817-444-7093
Email Tscott@cityofazle.org

Alternate Contact Local Emergency Manager

FOR IMMEDIATE RELEASE
September 7, 2018

PUBLIC MEETING SCHEDULED TO DISCUSS THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

1BSeptember 7, 2018– A public meeting to discuss the Tarrant County Hazard Mitigation Action Plan (HazMAP) is scheduled for Tuesday, September 18 from 9-11 AM at the Azle Fire Department located at 900 Lakeview Dr., Azle TX 76020, according to the Tarrant County Hazard Mitigation Planning Team.

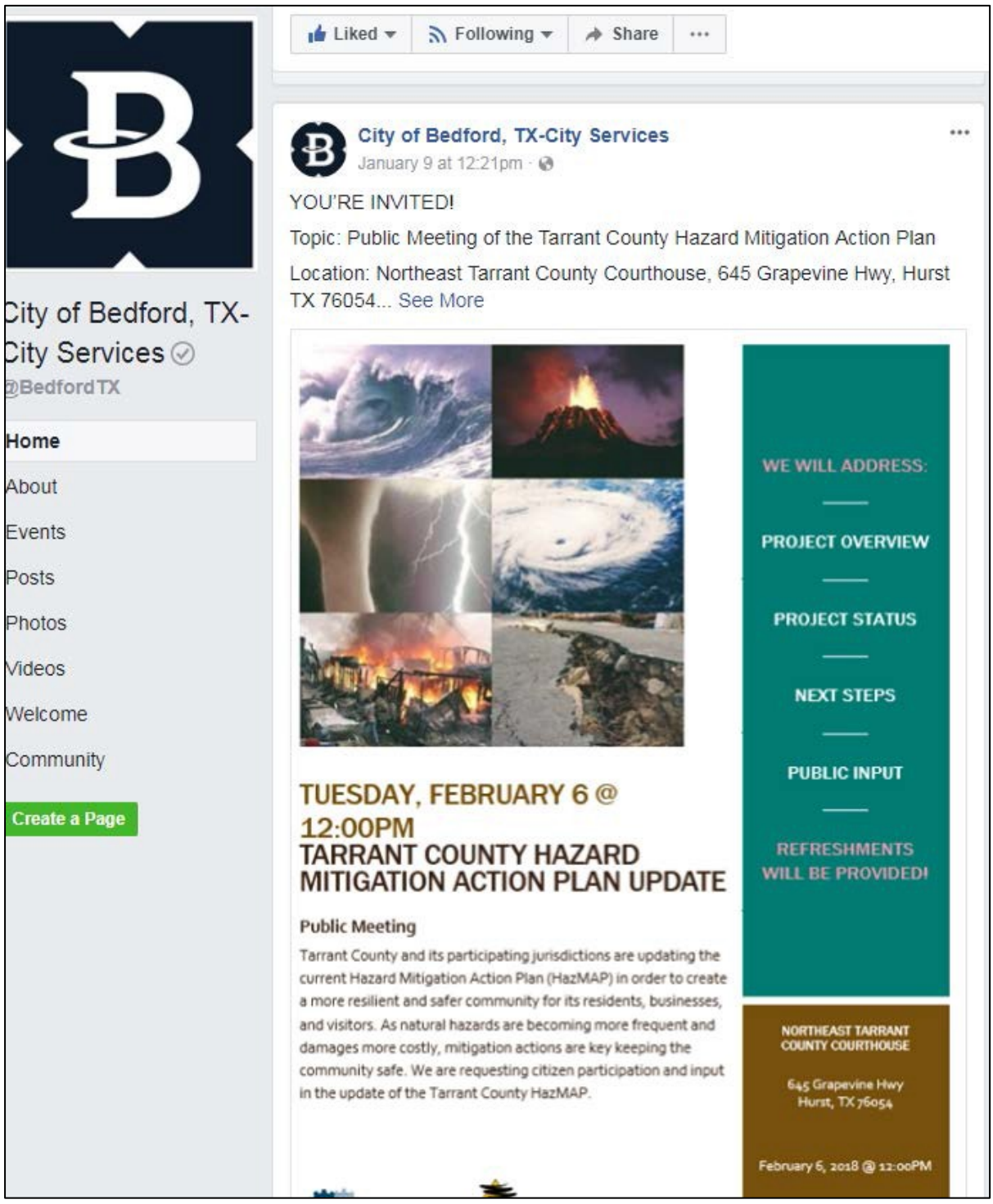
During the meeting, the public is invited to make comments or suggestions. City and emergency management officials will be on hand to answer any questions. All comments received from the public will be documented and considered for inclusion in the Hazard Mitigation Action Plan (HazMAP).

This HazMAP is being completed through a cooperative effort of officials from Tarrant County and the City/Township of Arlington, Azle, Bedford, Blue Mound, Colleyville, Crowley, Dalworthington Gardens, DFW Airport, Edgecliff Village, Euless, Everman, Forest Hill, Fort Worth, Grapevine, Haltom City, Haslet, Hurst, Keller, Kennedale, Lake Worth, Lakeside, Mansfield, North Richland Hills, Pantego, Richland Hills, River Oaks, Saginaw, Southlake, Watauga, Westlake, and Westworth Village. The Dallas Fort Worth International Airport, University of North Texas Health and Science Center (UNTHSC) and the North Central Texas Council of Governments (NCTCOG) are also participating in this edition of the Tarrant County HazMAP.

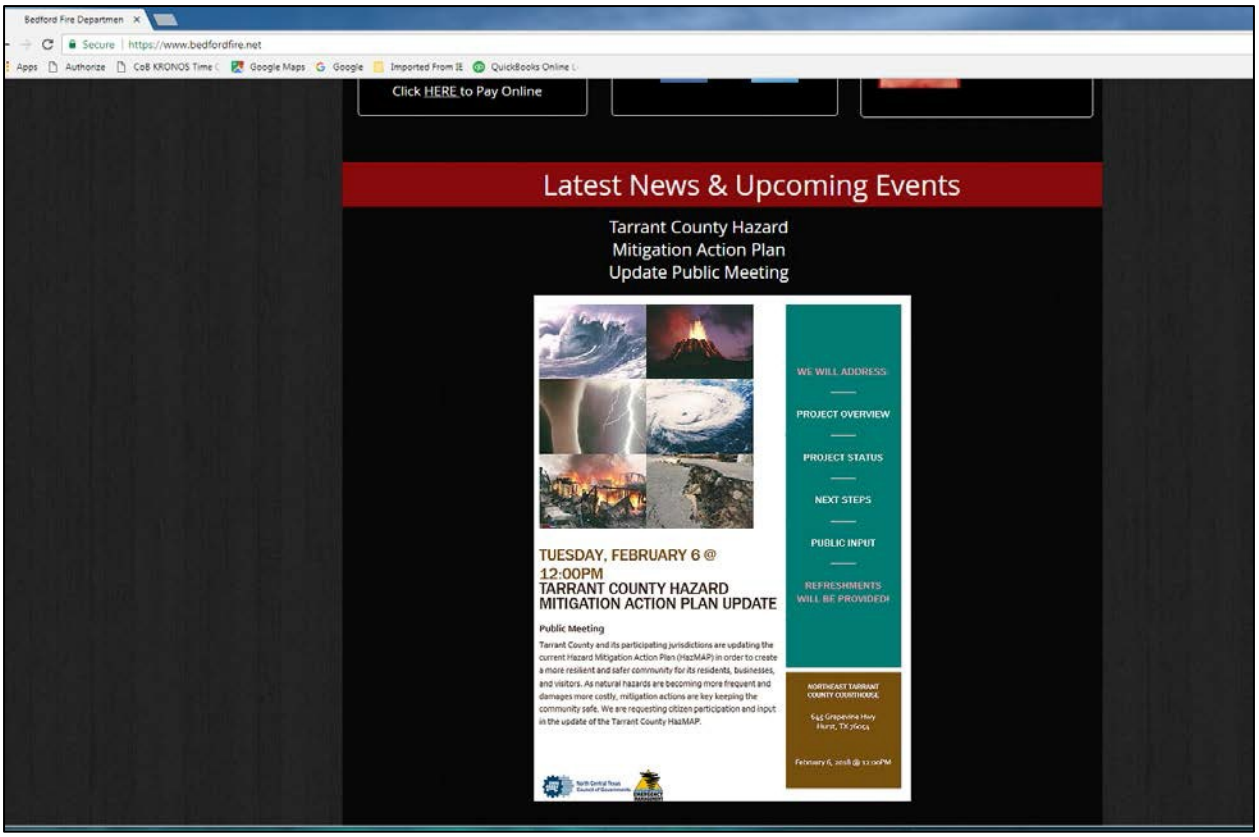
By completing and updating the HazMAP, Tarrant County and participating jurisdictions are entitled to apply for future federal relief dollars to fund specific mitigation projects, designed to reduce and/or eliminate vulnerabilities resulting from disaster events throughout the County.

Azle press release.

City of Bedford



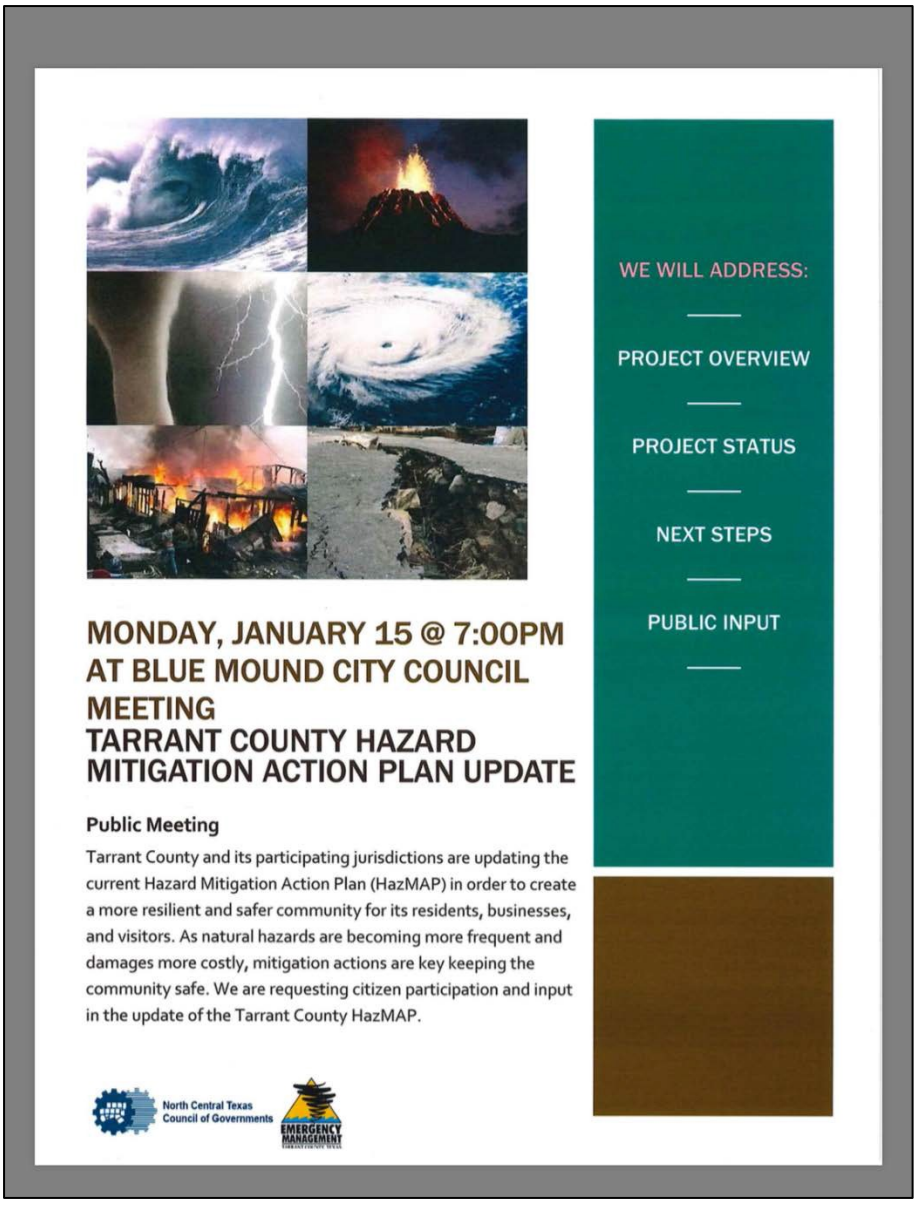
Bedford Facebook page.



Bedford city website.

City of Blue Mound

Blue Mound Facebook page.

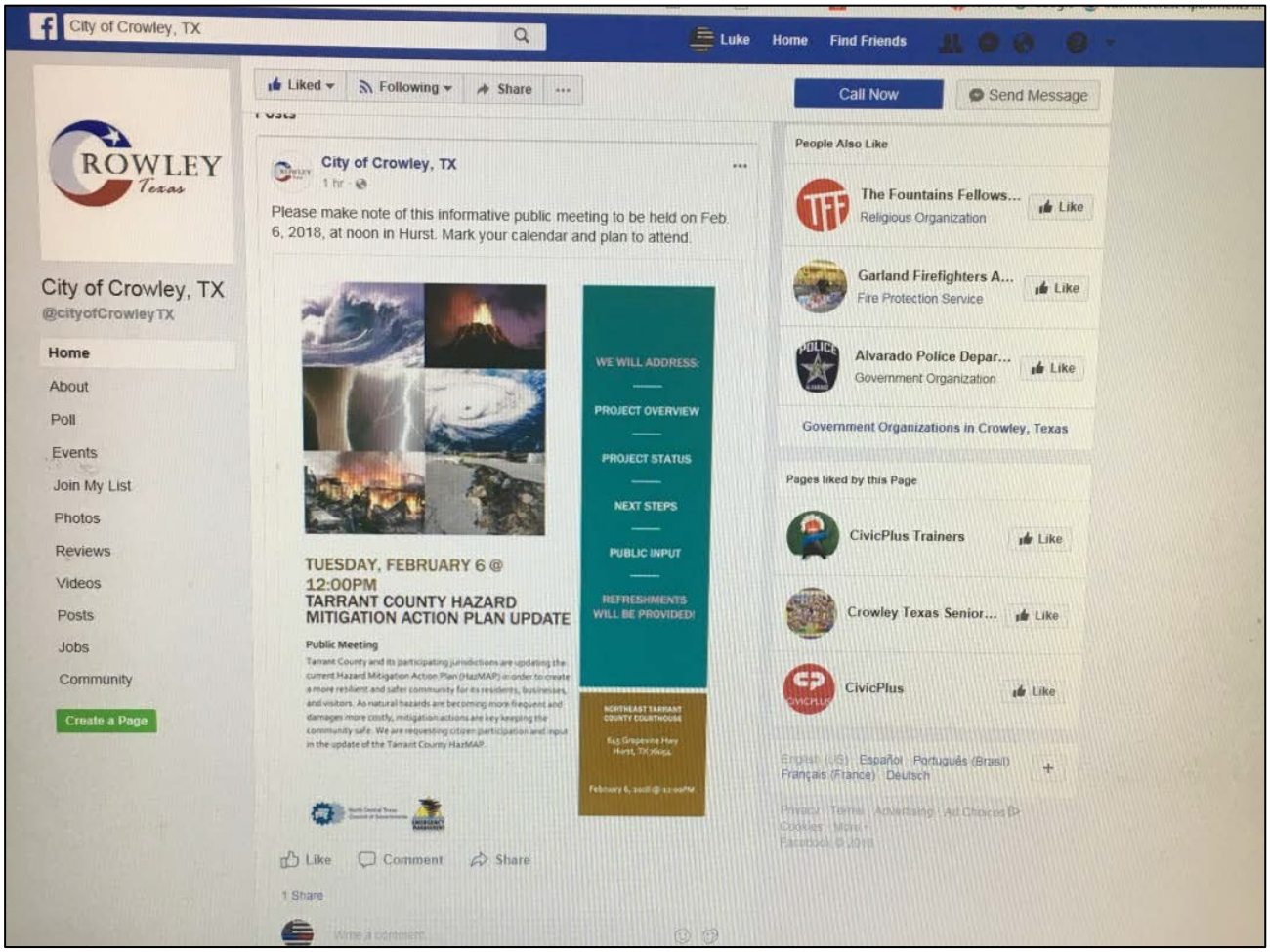


Blue Mound city website.

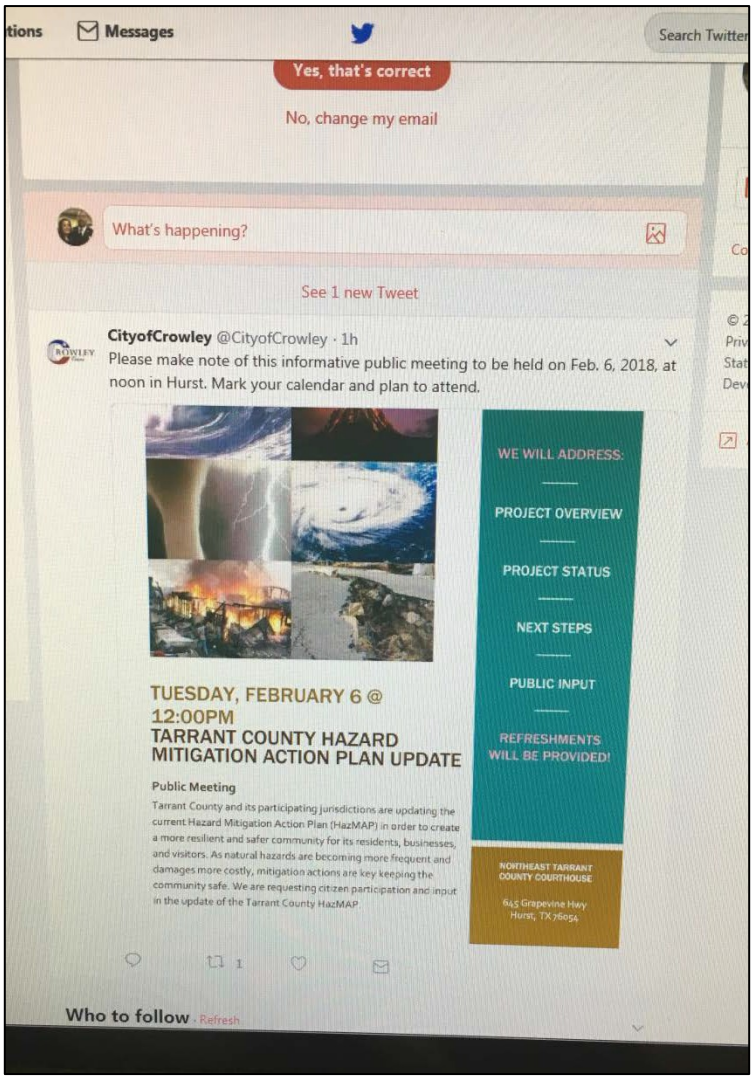
City of Colleyville

Colleyvile city website.

City of Crowley



Crowley Facebook page.



Crowley Twitter page

January 17, 2018

201 E. Main Street, Crowley TX 76036 | Official City Website

CALENDAR

Crowley City Council
Thursday, 7 p.m.
City Hall
201 E. Main Street

CISD Board Meeting
Jan. 25, 6:30 p.m.
CISD Admin
512 Peach Street

Health & Wellness Fair
Jan. 27, 10 a.m.
Crowley Rec Center
405 S. Oak Street

Crowley City Council
Feb. 1, 7 p.m.
City Hall
201 E. Main Street

Crowley City Council
Feb. 8, 7 p.m.
City Hall
201 E. Main Street

CISD Board Meeting
Feb. 22, 6:30 p.m.
CISD Admin
512 Peach Street

QUICK LINKS

Oncor Outage Map
Crowley Public Library
Report Power Outage
View/Pay Utility Bill
View/Pay EMS Bill
View/Pay Citations
View Court Docket
Crowley Rec Center
Crowley FD
Crowley PD
House of Hope

CITY OF CROWLEY

Candidate Packet for Crowley City Council

Crowley residents who are interested in running for a position on the Crowley City Council can pick up a candidate packet from the City Secretary's Office at City Hall located at 201 E. Main Street. Packet information is also available online.
Candidate Packet Information

EMPLOYEE OF THE YEAR

Crowley Employee of the Year

Congratulations to Crowley Animal Control Officer Sandy Mansfield for being named the City of Crowley's Employee of the Year for 2017. See more about the great things Mansfield and her team are doing by viewing the Crowley Animal Shelter's Facebook Page.

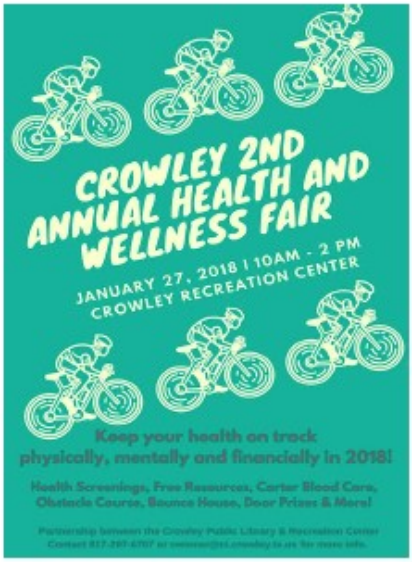
CITY ACTIVITIES / PUBLIC SERVICE ANNOUNCEMENTS

TUESDAY, FEBRUARY 6 @ 12:00PM
TARRANT COUNTY HAZARD MITIGATION ACTION PLAN UPDATE

Public Meeting

Tarrant County and its participating jurisdictions are updating the current Hazard Mitigation Action Plan (HazMAP) in order to create a more resilient and safer community for its residents, businesses, and visitors. As natural hazards are becoming more frequent and damages more costly, mitigation actions are key keeping the community safe. We are requesting citizen participation and input in the update of the Tarrant County HazMAP.

Tarrant County

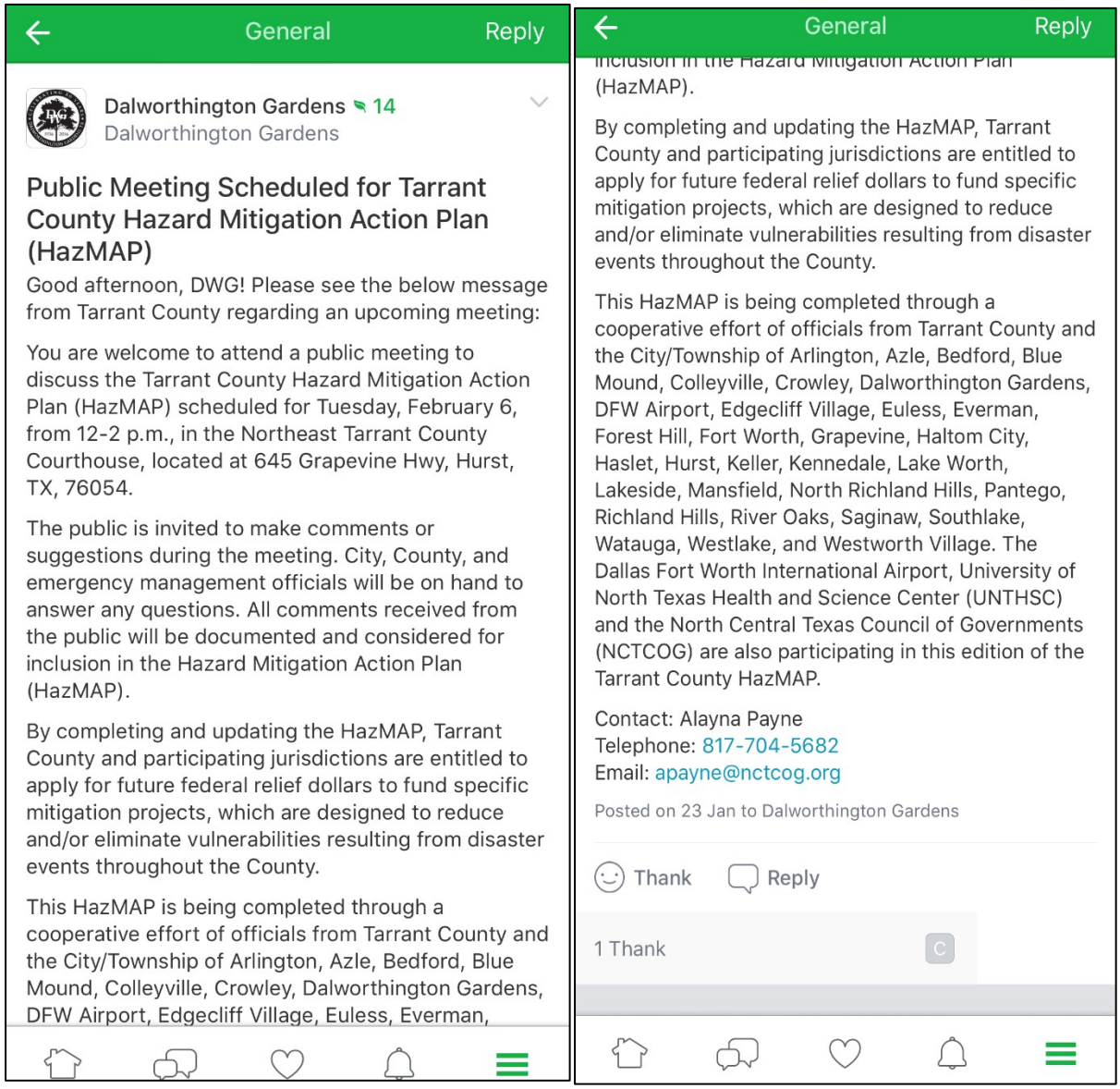


Crowley Recreation Center (click here for more info)

1 of 2 1/17/18, 11:44 AM

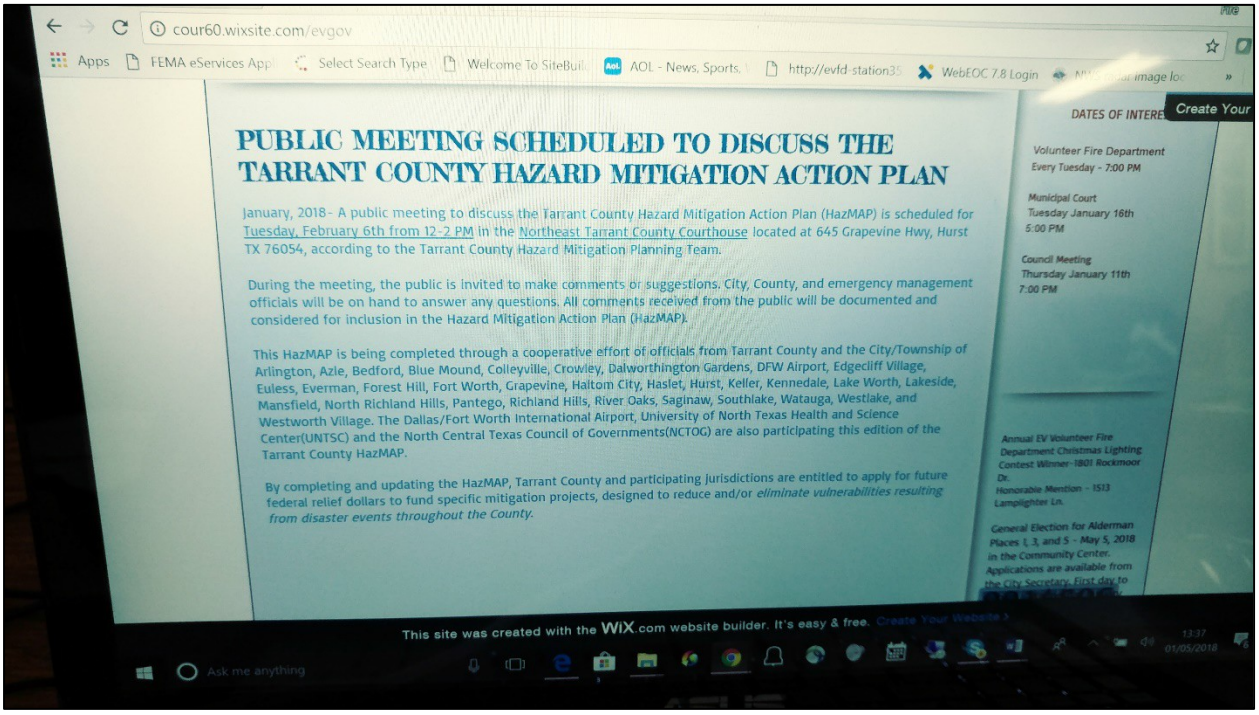
Crowley electronic city newsletter.

City of Dalworthington Gardens



Dalworthington Gardens' Nextdoor app.

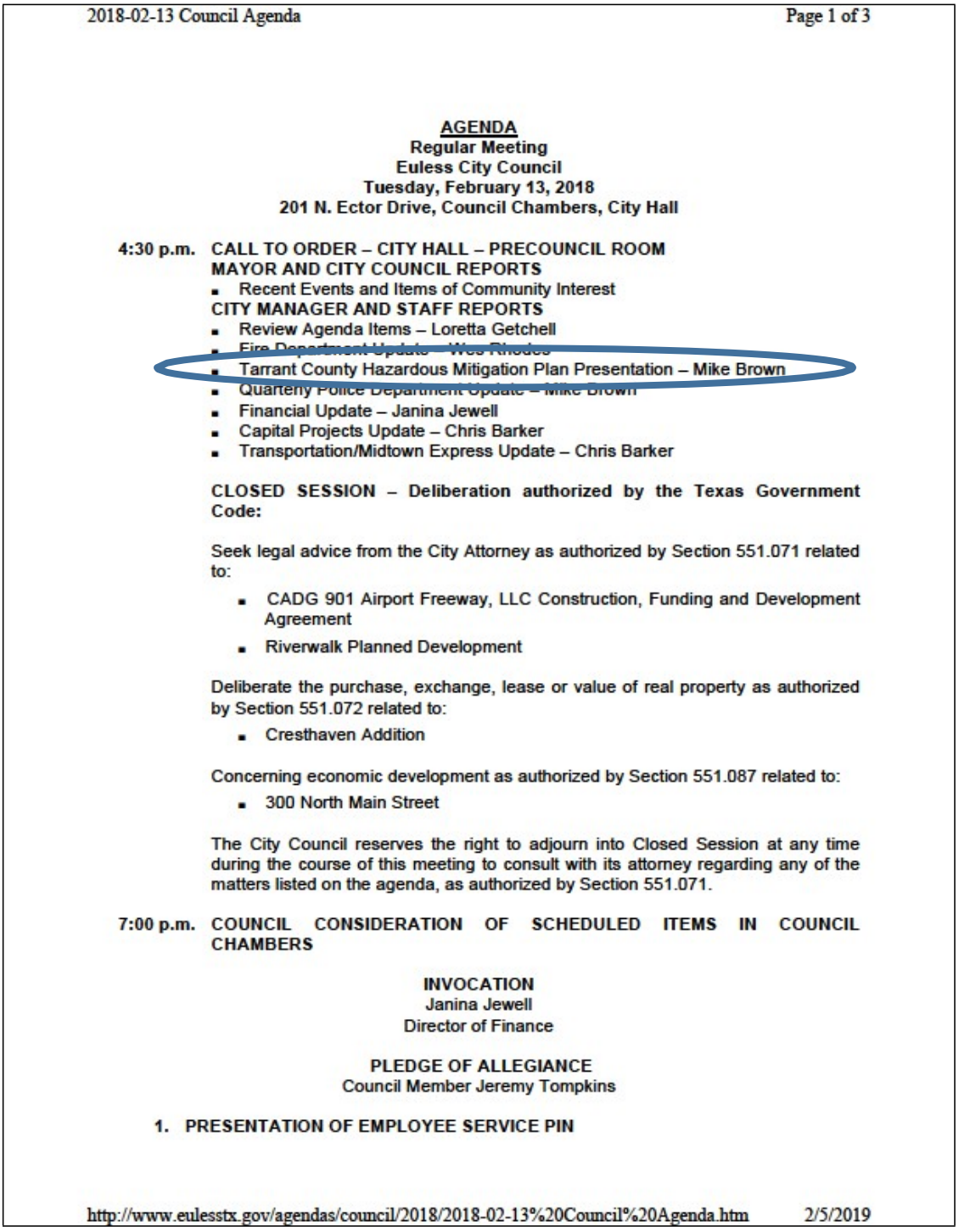
Town of Edgecliff Village



Edgecliff Village town website.

City of Euless

The mitigation plan was discussed at the public City Council meeting on February 13, 2018. Meetings are announced on the city website. No public comment was recorded.



2018-02-13 Council Agenda Page 1 of 3

AGENDA
Regular Meeting
Euless City Council
Tuesday, February 13, 2018
201 N. Ector Drive, Council Chambers, City Hall

4:30 p.m. CALL TO ORDER – CITY HALL – PRECOUNCIL ROOM
MAYOR AND CITY COUNCIL REPORTS
- Recent Events and Items of Community Interest

CITY MANAGER AND STAFF REPORTS
- Review Agenda Items – Loretta Getchell
- Fire Department Update – Wes Rhodes
- Tarrant County Hazardous Mitigation Plan Presentation – Mike Brown
- Quarterly Police Department Update – Mike Brown
- Financial Update – Janina Jewell
- Capital Projects Update – Chris Barker
- Transportation/Midtown Express Update – Chris Barker

CLOSED SESSION – Deliberation authorized by the Texas Government Code:

Seek legal advice from the City Attorney as authorized by Section 551.071 related to:
- CADG 901 Airport Freeway, LLC Construction, Funding and Development Agreement
- Riverwalk Planned Development

Deliberate the purchase, exchange, lease or value of real property as authorized by Section 551.072 related to:
- Cresthaven Addition

Concerning economic development as authorized by Section 551.087 related to:
- 300 North Main Street

The City Council reserves the right to adjourn into Closed Session at any time during the course of this meeting to consult with its attorney regarding any of the matters listed on the agenda, as authorized by Section 551.071.

7:00 p.m. COUNCIL CONSIDERATION OF SCHEDULED ITEMS IN COUNCIL CHAMBERS

INVOCATION
Janina Jewell
Director of Finance

PLEDGE OF ALLEGIANCE
Council Member Jeremy Tompkins

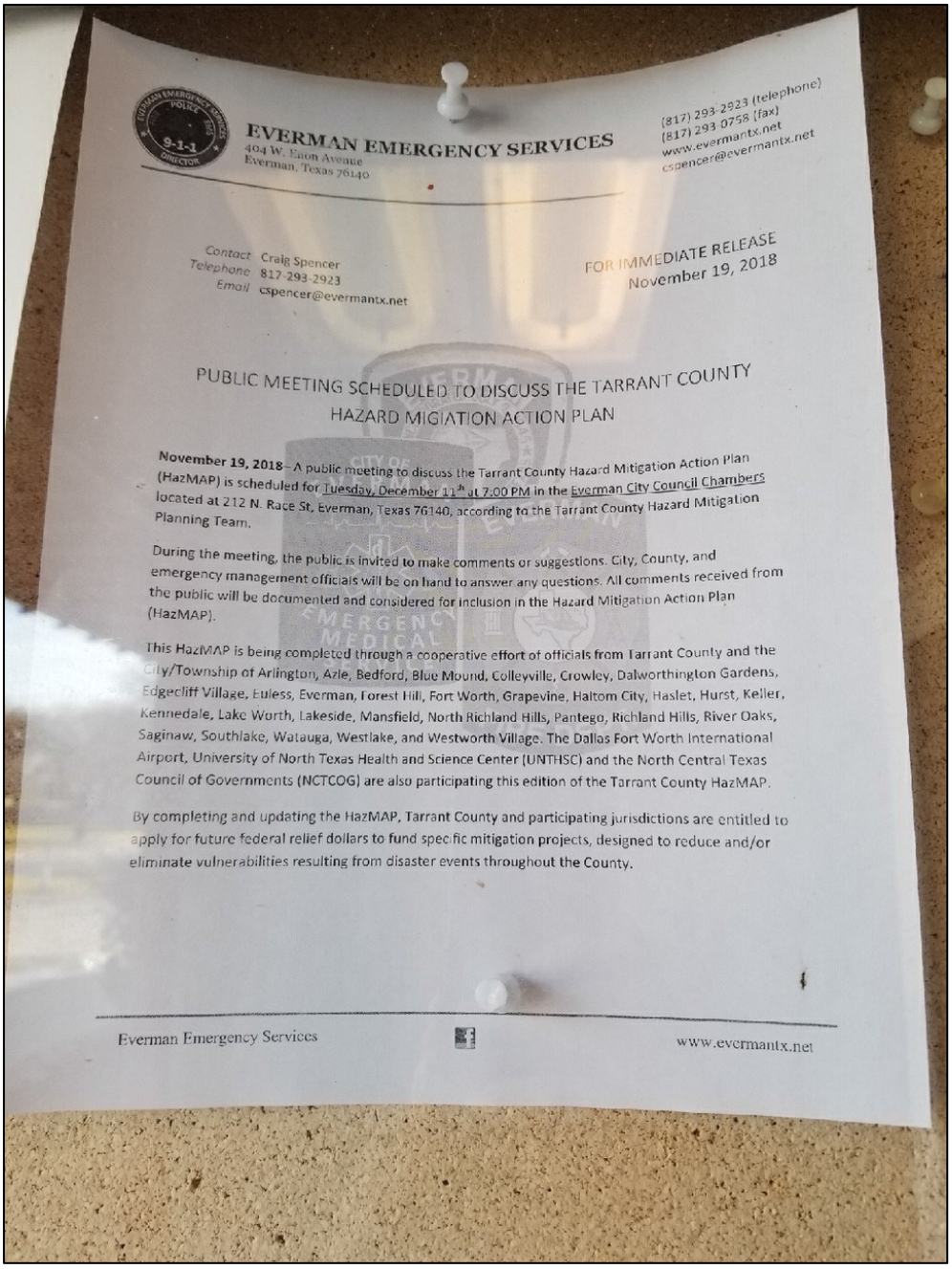
1. PRESENTATION OF EMPLOYEE SERVICE PIN

http://www.eulesstx.gov/agendas/council/2018/2018-02-13%20Council%20Agenda.htm 2/5/2019

Euless City Council agenda.

City of Everman

A public hearing was scheduled as part of the regularly scheduled City Council meeting on December 11, 2018 at 6:30 pm at the City Hall located at 212 North Race Street, Everman, Texas 76140. The meeting was posted to the bulletin board outside City Hall on November 19th. The City Council meeting was later rescheduled for December 18. There was no public comment recorded.



EVERMAN EMERGENCY SERVICES
404 W. Enon Avenue
Everman, Texas 76140

(817) 293-2923 (telephone)
(817) 293-0758 (fax)
www.evermantx.net
cspencer@evermantx.net

Contact Craig Spencer
Telephone 817-293-2923
Email cspencer@evermantx.net

FOR IMMEDIATE RELEASE
November 19, 2018

PUBLIC MEETING SCHEDULED TO DISCUSS THE TARRANT COUNTY HAZARD MIGIATION ACTION PLAN

November 19, 2018 – A public meeting to discuss the Tarrant County Hazard Mitigation Action Plan (HazMAP) is scheduled for Tuesday, December 11th at 7:00 PM in the Everman City Council Chambers located at 212 N. Race St. Everman, Texas 76140, according to the Tarrant County Hazard Mitigation Planning Team.

During the meeting, the public is invited to make comments or suggestions. City, County, and emergency management officials will be on hand to answer any questions. All comments received from the public will be documented and considered for inclusion in the Hazard Mitigation Action Plan (HazMAP).

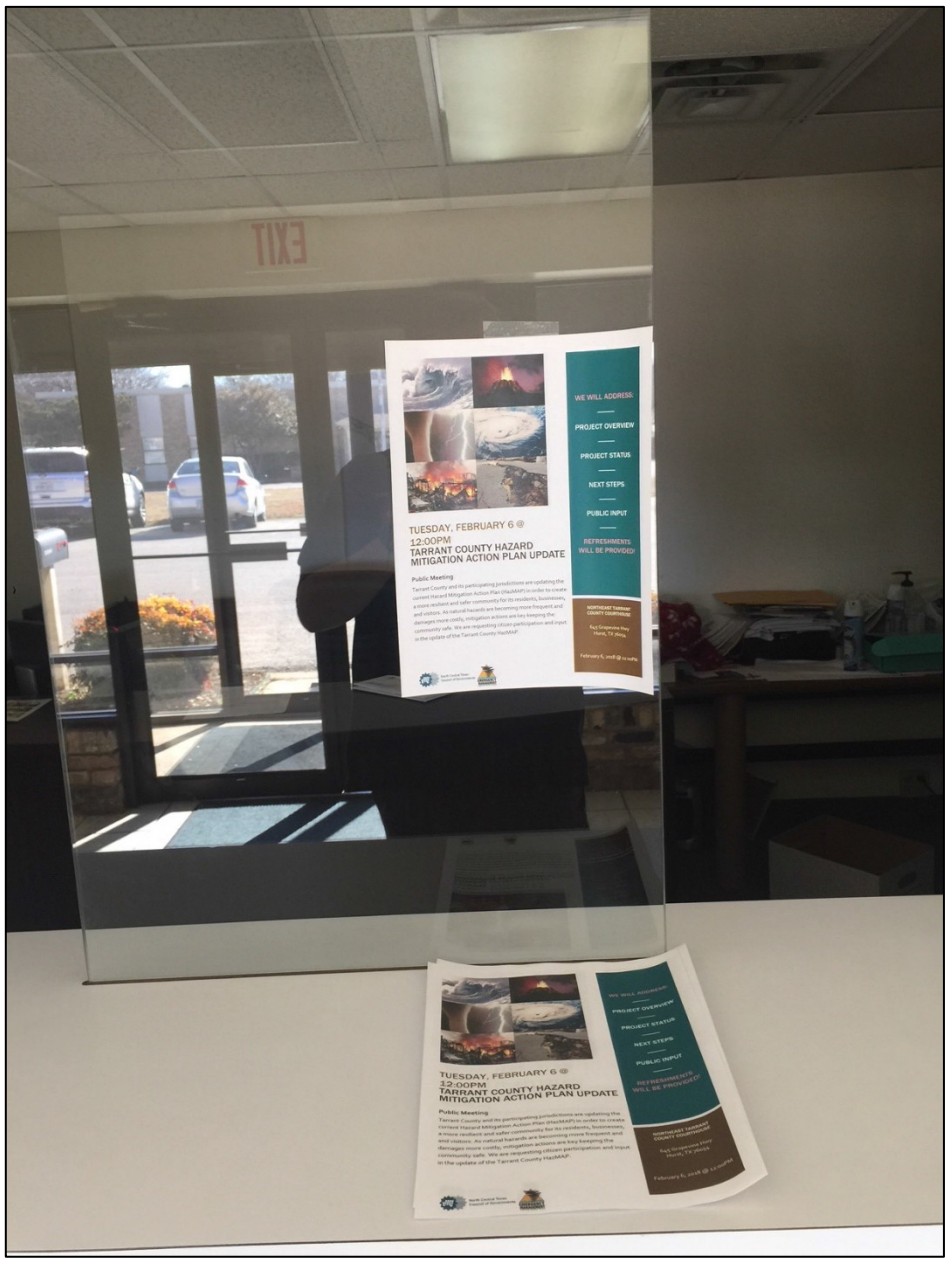
This HazMAP is being completed through a cooperative effort of officials from Tarrant County and the City/Township of Arlington, Azle, Bedford, Blue Mound, Colleyville, Crowley, Dalworthington Gardens, Edgecliff Village, Euless, Everman, Forest Hill, Fort Worth, Grapevine, Haltom City, Haslet, Hurst, Keller, Kennedale, Lake Worth, Lakeside, Mansfield, North Richland Hills, Pantego, Richland Hills, River Oaks, Saginaw, Southlake, Watauga, Westlake, and Westworth Village. The Dallas Fort Worth International Airport, University of North Texas Health and Science Center (UNTHSC) and the North Central Texas Council of Governments (NCTCOG) are also participating this edition of the Tarrant County HazMAP.

By completing and updating the HazMAP, Tarrant County and participating jurisdictions are entitled to apply for future federal relief dollars to fund specific mitigation projects, designed to reduce and/or eliminate vulnerabilities resulting from disaster events throughout the County.

Everman Emergency Services www.evermantx.net

Everman City Hall bulletin.

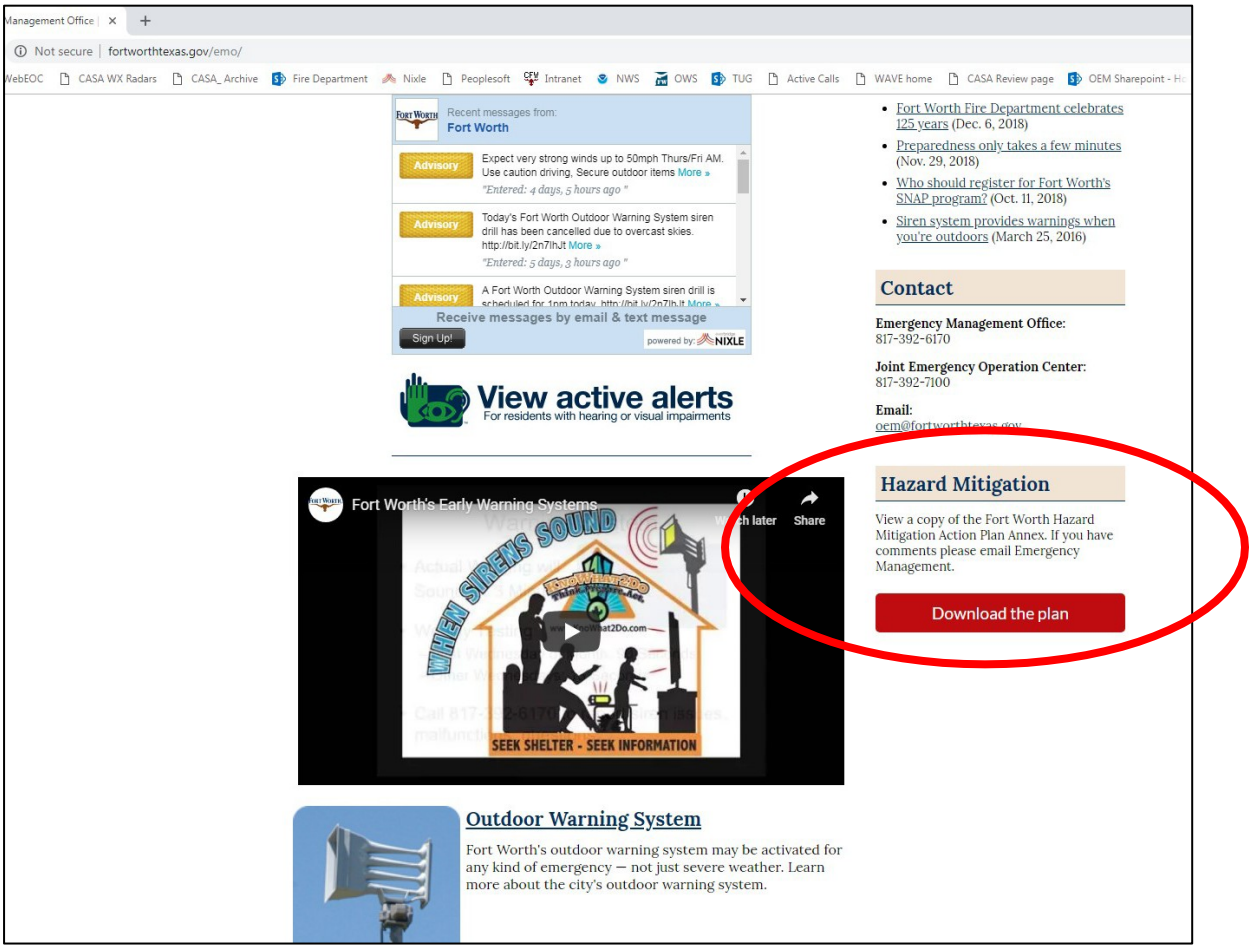
City of Forest Hill



Forest Hill public building.

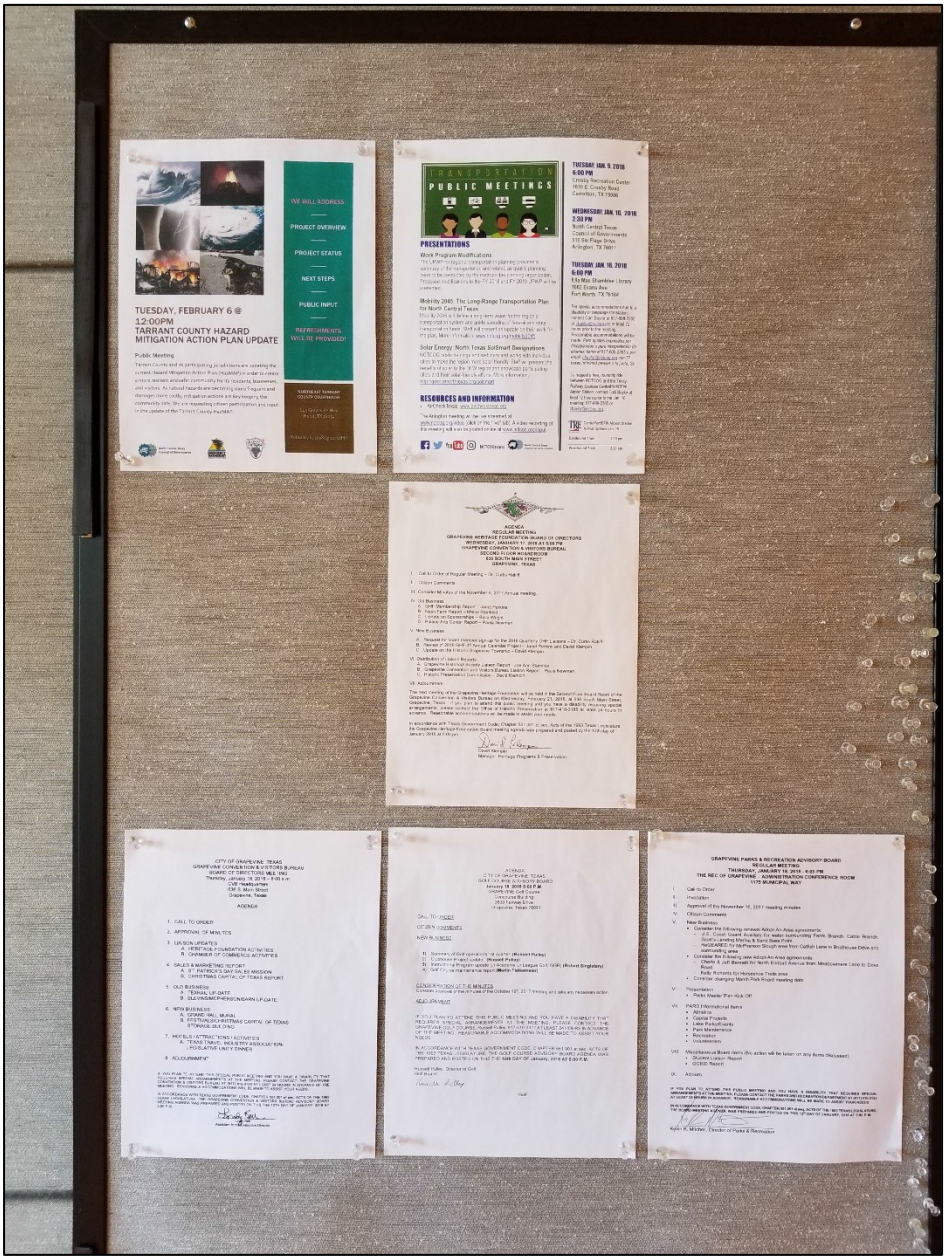
City of Fort Worth

The City of Fort Worth published the Fort Worth Annex on their Office of Emergency Management website. There was no public comment received.



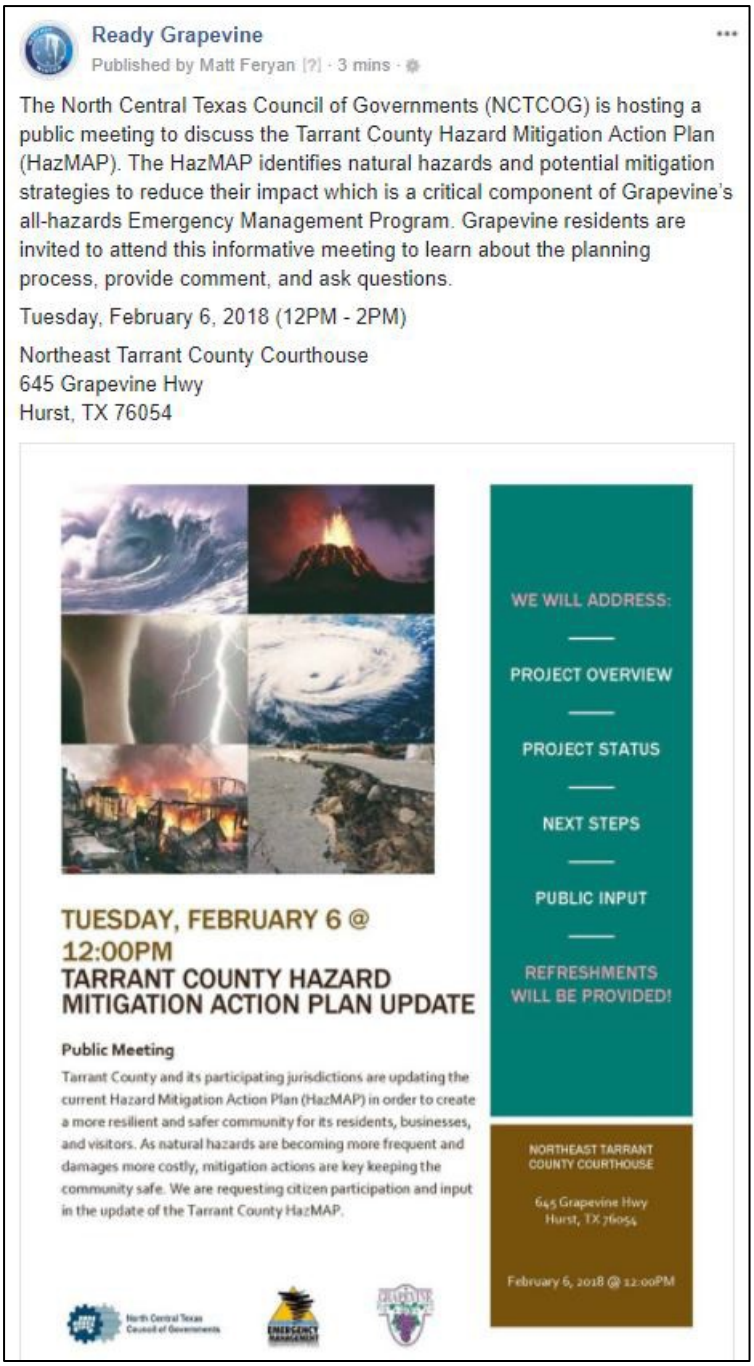
Fort Worth Office of Emergency Management website.

City of Grapevine



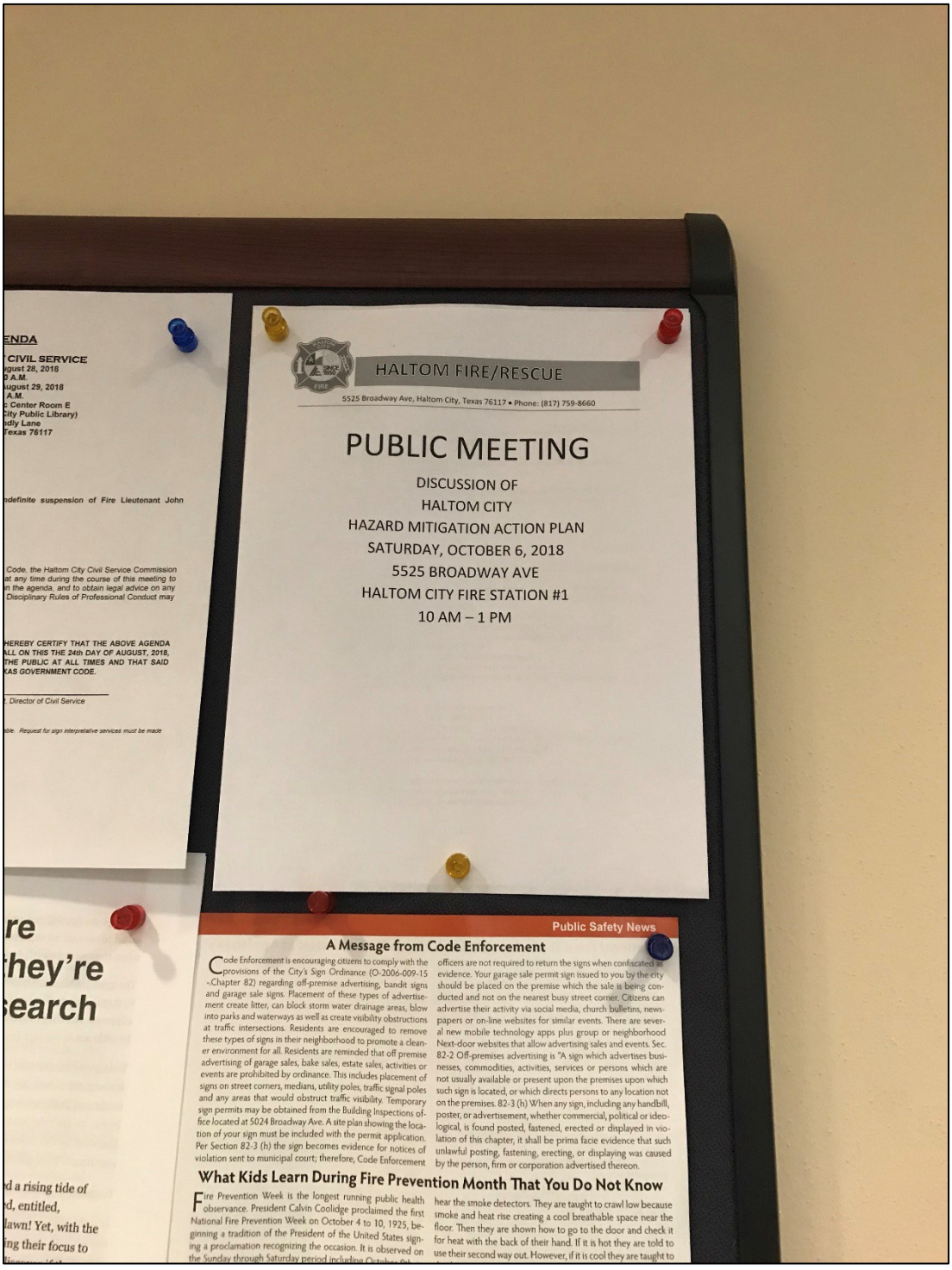
Grapevine City Hall bulletin.

Grapevine City Hall bulletin.



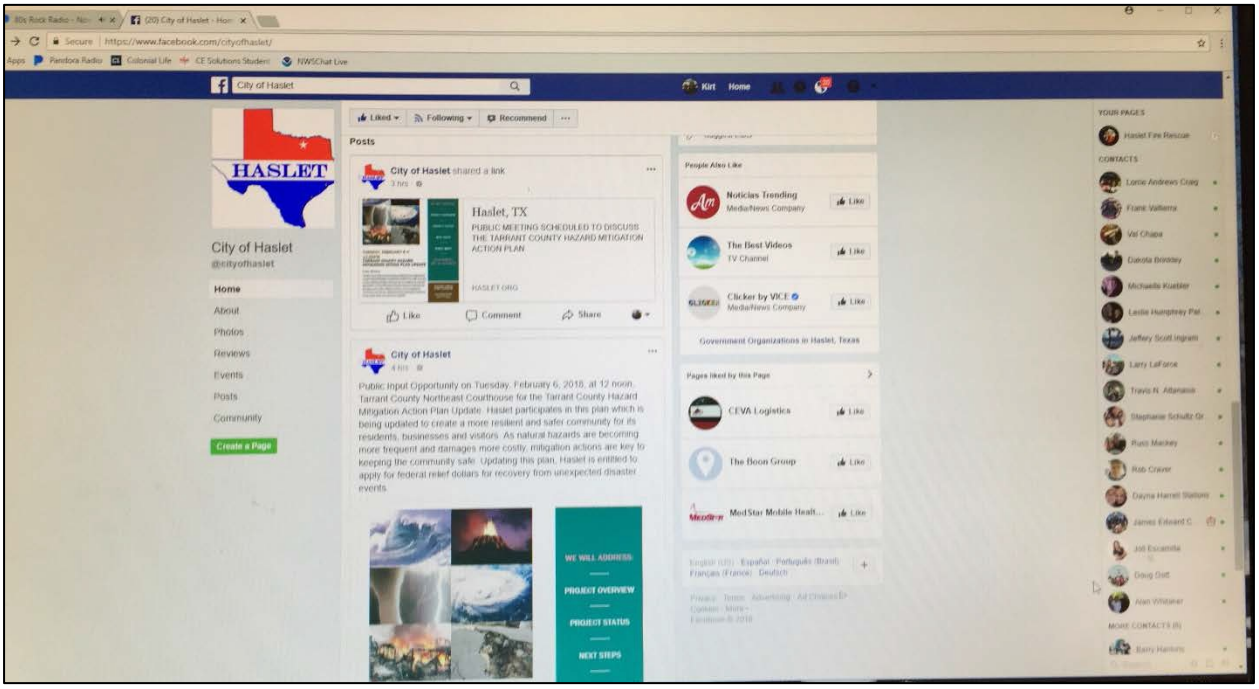
Grapevine Facebook page.

City of Haltom City

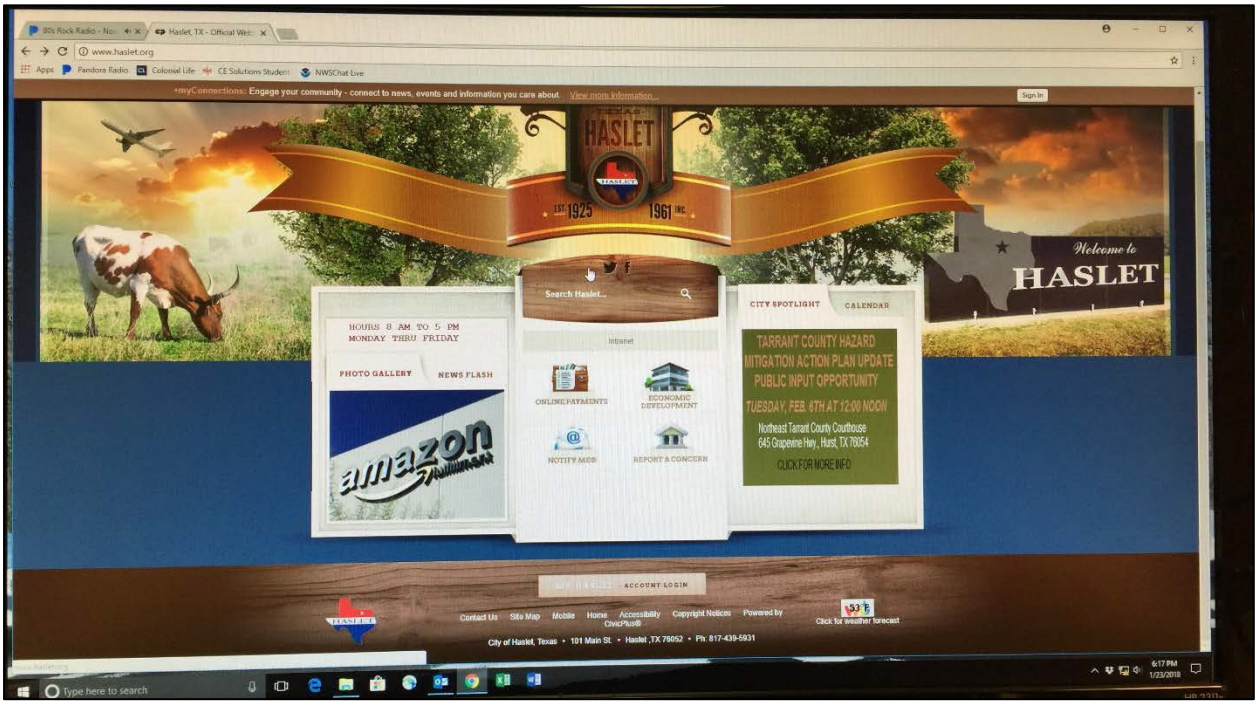


Public bulletin board at Haltom City fire station.

City of Haslet



Haslet Facebook page.



Haslet city website.

City of Hurst

Hurst city website.

City of Keller

Keller city website.

Keller Connect weekly e-news

Feb. 2-9, 2018

Meetings

Keller City Council Regular Meeting
7 p.m. Feb. 6
Keller Town Hall

Feb. 5 / Library Board
Feb. 8 / Parks & Recreation Board
Feb. 12 / Planning & Zoning Comm.
Feb. 13 / Keller Development Corp.
Feb. 14 / Public Arts Board

City Events

February Night Hike
Feb. 5, 6 p.m., start at the K-9 Pointe Dog Park parking lot, 405 Rufe Snow Drive
The first Monday of each month, we'll explore different sections of our 24 miles of trail system under the stars! Children under 16 must be accompanied by an adult.

Coffee with a Cop
Feb. 6, 9-10 a.m., DeVivo Bros. Eatery, 750 S. Main St., Ste. 165
No formal agenda! Just stop by to meet, chat up and ask questions of your Keller Police officers. DeVivo Bros. will be providing attendees with free coffee and danishes.

Walk, Run Push
Feb. 10, 9 a.m. to noon, Bear Creek Park, 400 Bear Creek Park Road
Keller's first special needs fun run benefitting Keller ISD Special Olympics. Find details on the city website or Facebook event.

Pet of the Week

Games of Thrones doesn't return until April 2019, but you can take home Jon Snow today!

Regional Animal Adoption Center
330 Rufe Snow Drive

Join us Tuesday to discuss Tarrant County's hazard mitigation plan

A public meeting to discuss the Tarrant County Hazard Mitigation Action Plan (HazMAP) is scheduled from noon to 2 p.m. Tuesday, Feb. 6 at the Northeast Tarrant County Courthouse located at 645 Grapevine Hwy, Hurst TX 76054, the Tarrant County Hazard Mitigation Planning Team has announced.

During the meeting, the public is invited to make comments or suggestions. City, County, and emergency management officials will be on hand to answer any questions. All comments received from the public will be documented and considered for inclusion in the Hazard Mitigation Action Plan update.

Filing period ends Feb. 16 for Keller City Council election

Those interested in running for Place 1 or Place 2 on the Keller City Council have until Feb. 16 to file for candidacy. The filing period for the May 5, 2018 election began Wednesday, Jan. 17. All Keller City Council members are elected at-large for three-year terms. Those up for re-election this spring are Mayor Pro Tem and Place 1 Councilwoman Debbie Bryan, and Place 2 Councilman Armin Mizani.

Candidacy packets are available for download on the city website or from City Secretary Kelly Ballard's office at Keller Town Hall, 1100 Bear Creek Parkway. Office hours are 8 a.m. to 5 p.m., Monday through Friday. Early voting for the May 2018 election will run from April 23 through May 1.

Tickets available now for Fort Worth Symphony Orchestra concert

The Fort Worth Symphony Orchestra returns to Keller for its annual concert hosted by Keller Public Arts at 7 p.m. Saturday, March 3 at Keller High School's Fine Arts Center, 601 Pate Orr Road. Alejandro Gomez Guillen will be conducting the orchestra in selections from Rossini, Stravinsky, Britten, Faure, Brahms and Dvorak.

Tickets, $5 per person, may be purchased at The Keller Pointe, 405 Rufe Snow Drive; Keller Town Hall, 1100 Bear Creek Pkwy; and the Keller Senior Activities Center, 660 Johnson Road. A limited number of tickets will also be available on site the evening of the concert, though only cash will be accepted at the door.

For additional details, call 817-743-4000 or email publicarts@cityofkeller.com.

Spring recycling event set for Saturday, March 3

Keller residents are invited to bring their household hazardous waste, recyclable electronics and personal documents in need of shredding to the spring recycling event scheduled the morning of Saturday, March 3 at the Municipal Service Center, 151 Bear Creek Pkwy. West.

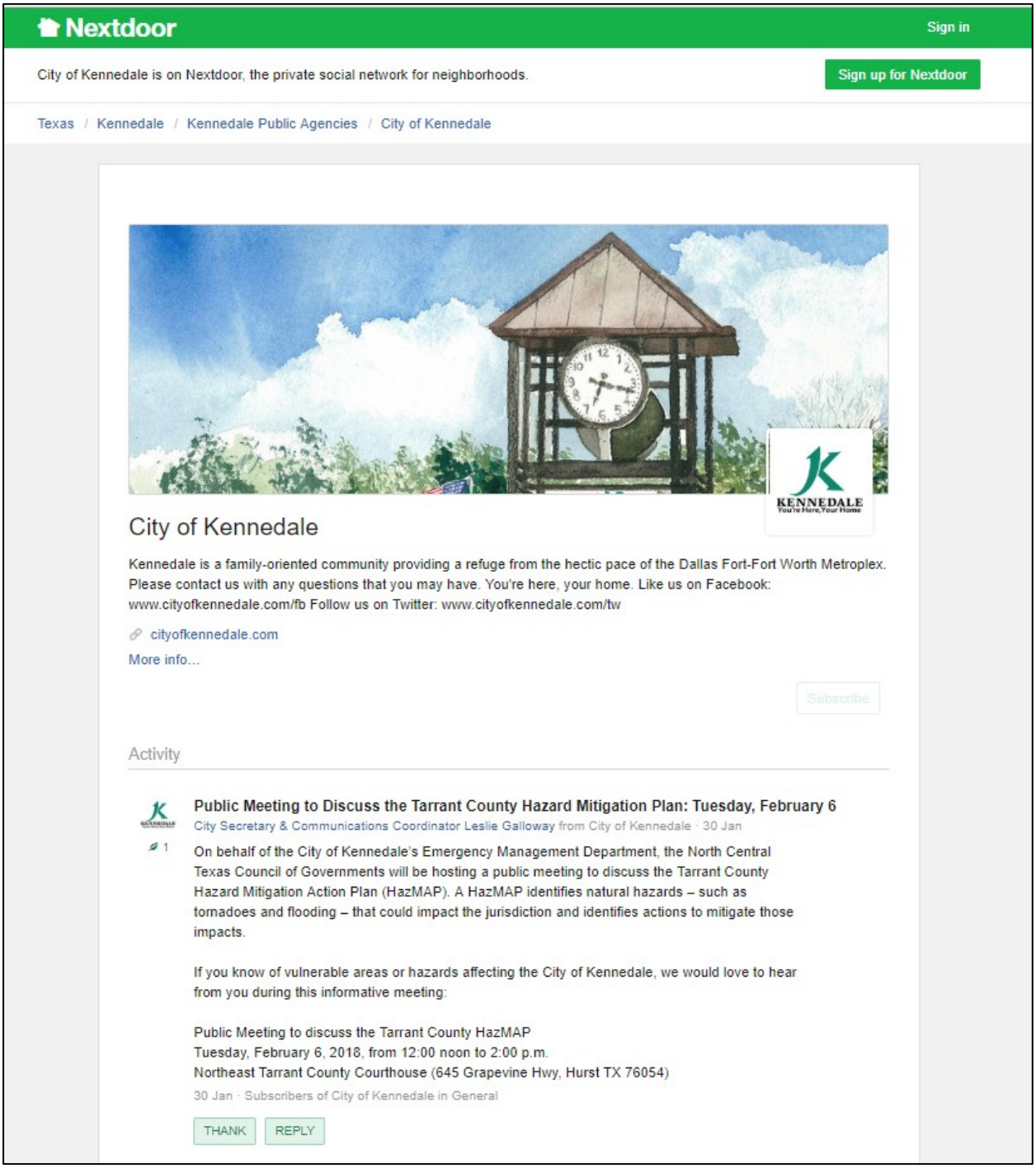
Household hazardous waste (open to Keller residents only) will be collected from 9-11 a.m. or until the Crud Cruiser is full, whichever comes first. Electronics recycling and document shredding available to Keller residents and businesses (limit of 3 banker boxes or tall kitchen garbage bags) will be available until noon. A current water bill or driver's license showing your Keller address will be required for access to the drop-off site.

Please note: All Main Street/Hwy. 377 traffic will be directed to turn west on Wall-Price Keller Road and take the first right onto Chisholm Trail, approaching the MSC from the south. Signage and Keller PD officers will assist in directing residents to the unloading stations. For safety and efficiency, residents are not allowed to walk or bike their items to this event. Participants must stay in their vehicles at all times and watching of shredding will not be permitted in order to keep traffic moving. Volunteers will handle unloading. A list of permitted household hazardous waste and electronics is available on the city website. Questions? Call 817-743-4000.

visit www.cityofkeller.com/kellerconnect to adjust your news & event email preferences

Keller electronic city newsletter.

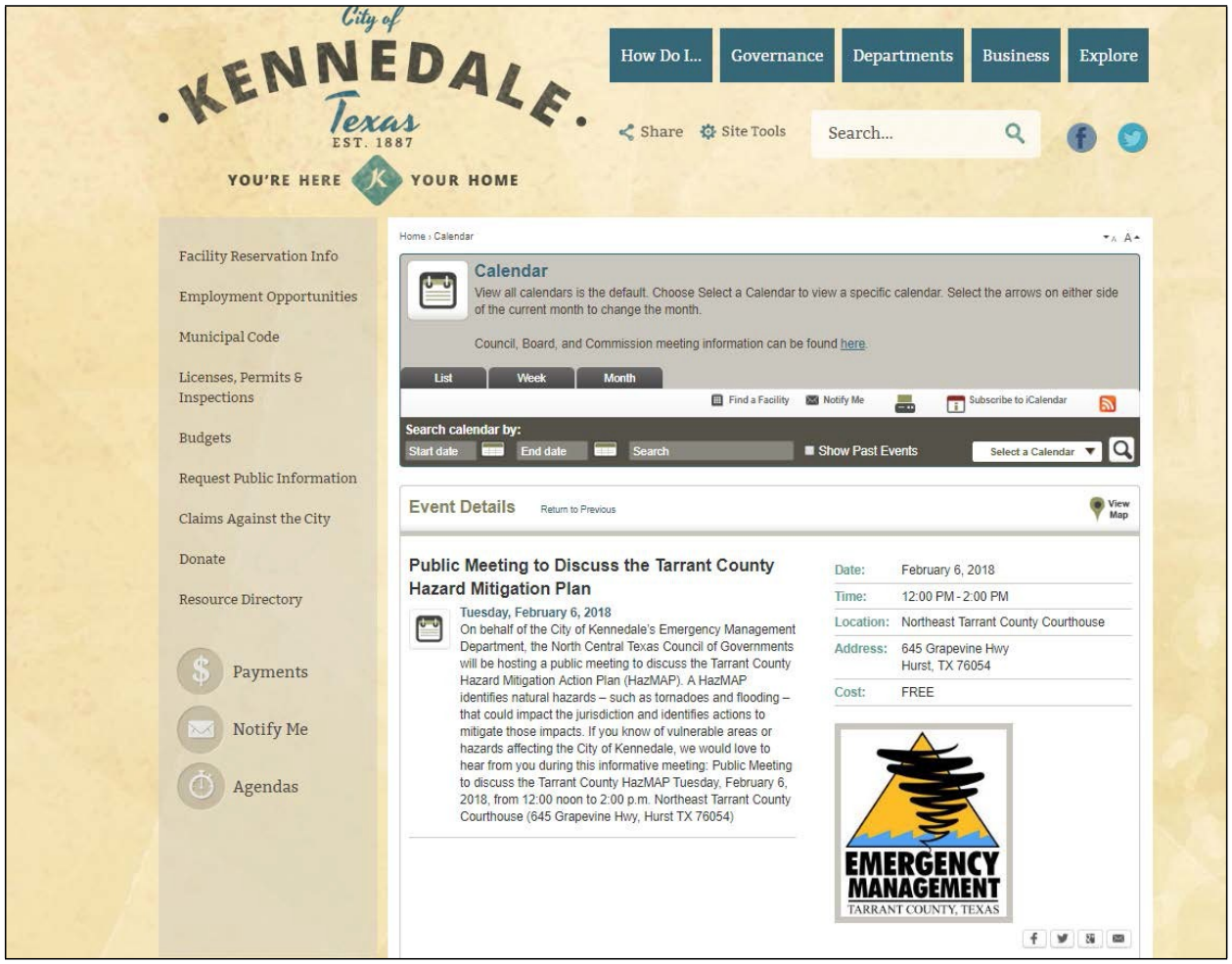
City of Kennedale



Kennedale Nextdoor app.

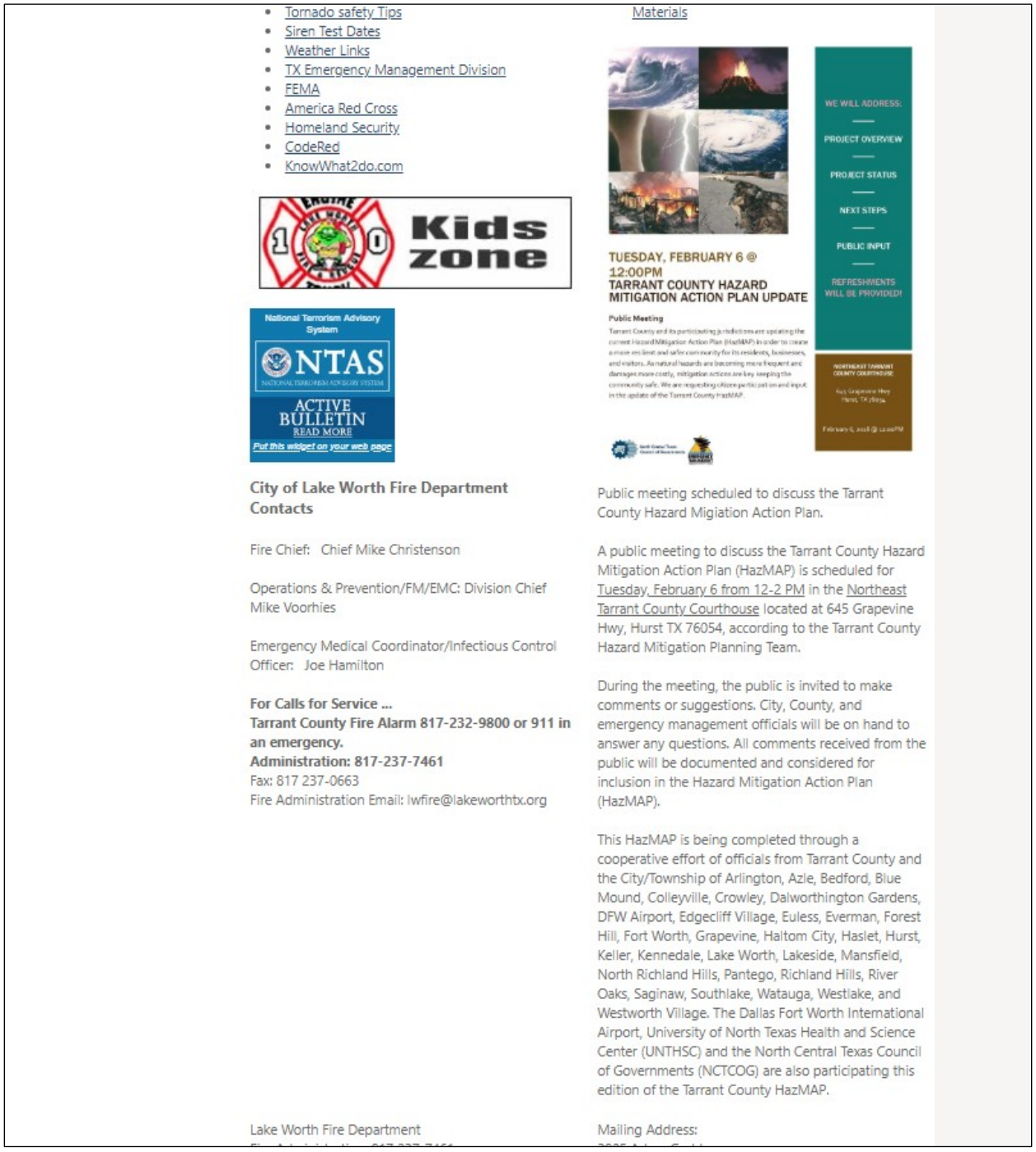
Kennedale Facebook page.

Kennedale Twitter page.



Kennedale city website.

City of Lake Worth



Lake Worth city website.

City of Lakeside

North Central Texas Council of Governments

EMERGENCY MANAGEMENT
TARRANT COUNTY, TEXAS

Contact Alayna Payne
Telephone 817-704-5682
Email apayne@nctcog.org

Alternate Contact: Local Emergency Manager

FOR IMMEDIATE RELEASE
January 18, 2018

PUBLIC MEETING SCHEDULED TO DISCUSS THE TARRANT COUNTY HAZARD MIGIATION ACTION PLAN

January 18, 2018– A public meeting to discuss the Tarrant County Hazard Mitigation Action Plan (HazMAP) is scheduled for Thursday, February 8 @ 6:30 PM Lakeside Town Hall, 9830 Confederate Park Rd.

During the meeting, the public is invited to make comments or suggestions. City, County, and emergency management officials will be on hand to answer any questions. All comments received from the public will be documented and considered for inclusion in the Hazard Mitigation Action Plan (HazMAP).

This HazMAP is being completed through a cooperative effort of officials from Tarrant County and the City/Township of Arlington, Azle, Bedford, Blue Mound, Colleyville, Crowley, Dalworthington Gardens, DFW Airport, Edgecliff Village, Euless, Everman, Forest Hill, Fort Worth, Grapevine, Haltom City, Haslet, Hurst, Keller, Kennedale, Lake Worth, Lakeside, Mansfield, North Richland Hills, Pantego, Richland Hills, River Oaks, Saginaw, Southlake, Watauga, Westlake, and Westworth Village. The Dallas Fort Worth International Airport, University of North Texas Health and Science Center (UNTHSC) and the North Central Texas Council of Governments (NCTCOG) are also participating this edition of the Tarrant County HazMAP.

By completing and updating the HazMAP, Tarrant County and participating jurisdictions are entitled to apply for future federal relief dollars to fund specific mitigation projects, designed to reduce and/or eliminate vulnerabilities resulting from disaster events throughout the County.

Lakeside public announcement.

THURSDAY, FEBRUARY 8 @ 6:30PM

TARRANT COUNTY HAZARD MITIGATION ACTION PLAN UPDATE

Public Meeting

Tarrant County and its participating jurisdictions are updating the current Hazard Mitigation Action Plan (HazMAP) in order to create a more resilient and safer community for its residents, businesses, and visitors. As natural hazards are becoming more frequent and damages more costly, mitigation actions are key keeping the community safe. We are requesting citizen participation and input in the update of the Tarrant County HazMAP.

North Central Texas Council of Governments

EMERGENCY MANAGEMENT

WE WILL ADDRESS:

PROJECT OVERVIEW

PROJECT STATUS

NEXT STEPS

PUBLIC INPUT

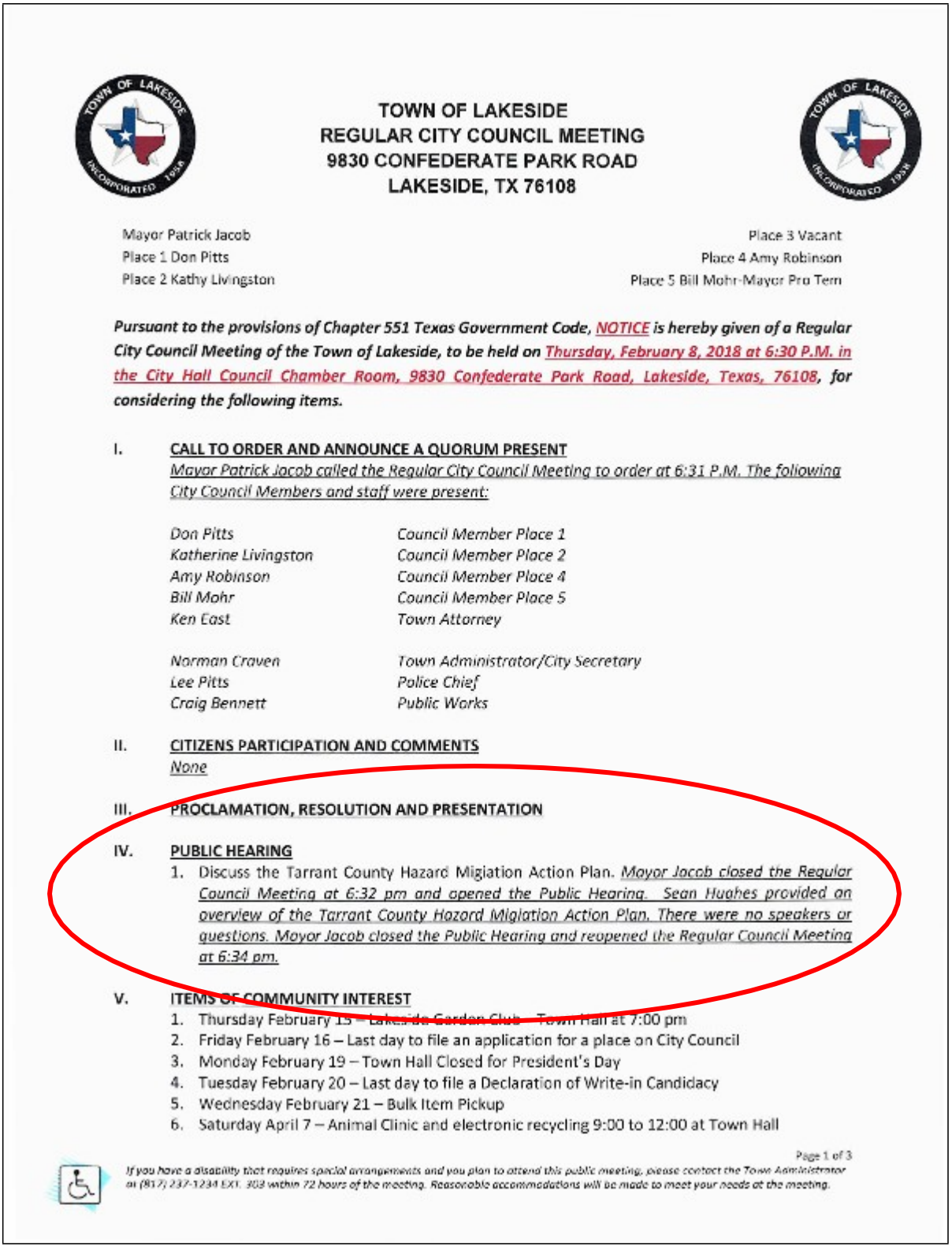
TOWN OF LAKESIDE

TOWN HALL

9830 Confederate Park Rd
Lakeside, TX 76108

February 8, 2018 @ 6:30PM

Lakeside public announcement.



TOWN OF LAKESIDE
REGULAR CITY COUNCIL MEETING
9830 CONFEDERATE PARK ROAD
LAKESIDE, TX 76108

Mayor Patrick Jacob
Place 1 Don Pitts
Place 2 Kathy Livingston
Place 3 Vacant
Place 4 Amy Robinson
Place 5 Bill Mohr-Mayor Pro Tem

Pursuant to the provisions of Chapter 551 Texas Government Code, NOTICE is hereby given of a Regular City Council Meeting of the Town of Lakeside, to be held on Thursday, February 8, 2018 at 6:30 P.M. in the City Hall Council Chamber Room, 9830 Confederate Park Road, Lakeside, Texas, 76108, for considering the following items.

I. **CALL TO ORDER AND ANNOUNCE A QUORUM PRESENT**
Mayor Patrick Jacob called the Regular City Council Meeting to order at 6:31 P.M. The following City Council Members and staff were present:

Don Pitts	*Council Member Place 1*
Katherine Livingston	*Council Member Place 2*
Amy Robinson	*Council Member Place 4*
Bill Mohr	*Council Member Place 5*
Ken East	*Town Attorney*
Norman Craven	*Town Administrator/City Secretary*
Lee Pitts	*Police Chief*
Craig Bennett	*Public Works*

II. **CITIZENS PARTICIPATION AND COMMENTS**
None

III. **PROCLAMATION, RESOLUTION AND PRESENTATION**

IV. **PUBLIC HEARING**
1. Discuss the Tarrant County Hazard Migiation Action Plan. *Mayor Jacob closed the Regular Council Meeting at 6:32 pm and opened the Public Hearing. Sean Hughes provided an overview of the Tarrant County Hazard Migiation Action Plan. There were no speakers or questions. Mayor Jacob closed the Public Hearing and reopened the Regular Council Meeting at 6:34 pm.*

V. **ITEMS OF COMMUNITY INTEREST**
1. Thursday February 15 – Lakeside Garden Club – Town Hall at 7:00 pm
2. Friday February 16 – Last day to file an application for a place on City Council
3. Monday February 19 – Town Hall Closed for President's Day
4. Tuesday February 20 – Last day to file a Declaration of Write-in Candidacy
5. Wednesday February 21 – Bulk Item Pickup
6. Saturday April 7 – Animal Clinic and electronic recycling 9:00 to 12:00 at Town Hall

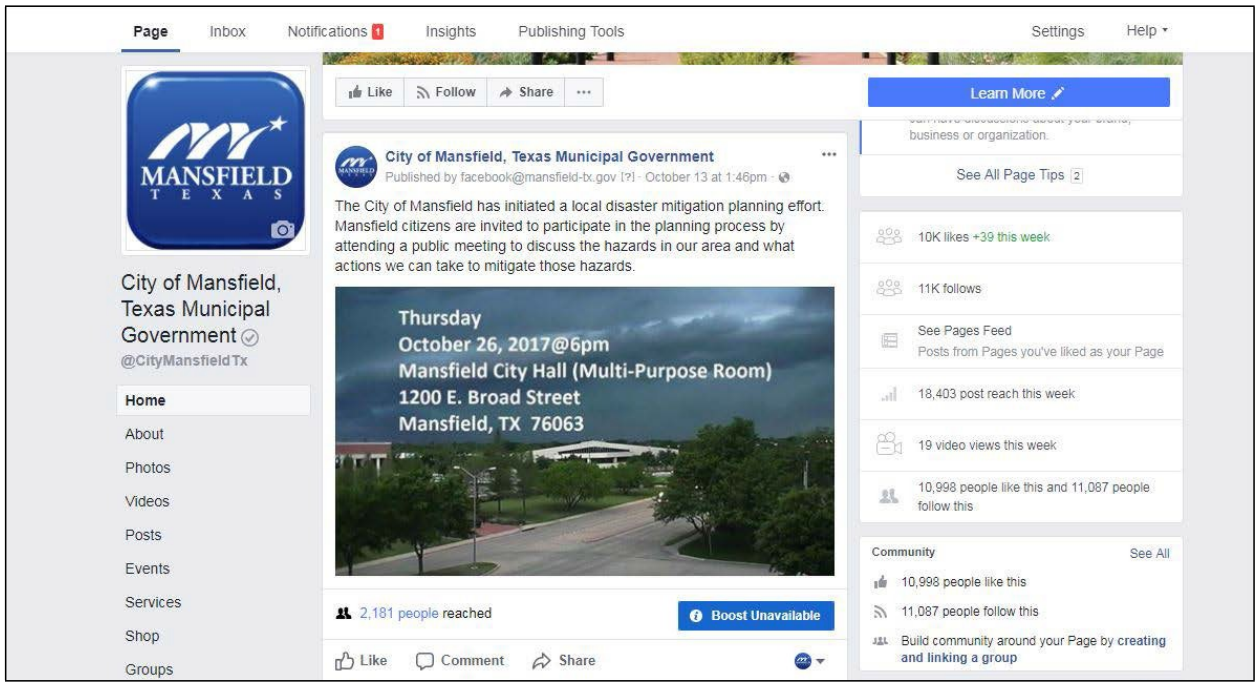
Page 1 of 3

If you have a disability that requires special arrangements and you plan to attend this public meeting, please contact the Town Administrator at (817) 237-1234 EXT. 303 within 72 hours of the meeting. Reasonable accommodations will be made to meet your needs at the meeting.

Lakeside council minutes.

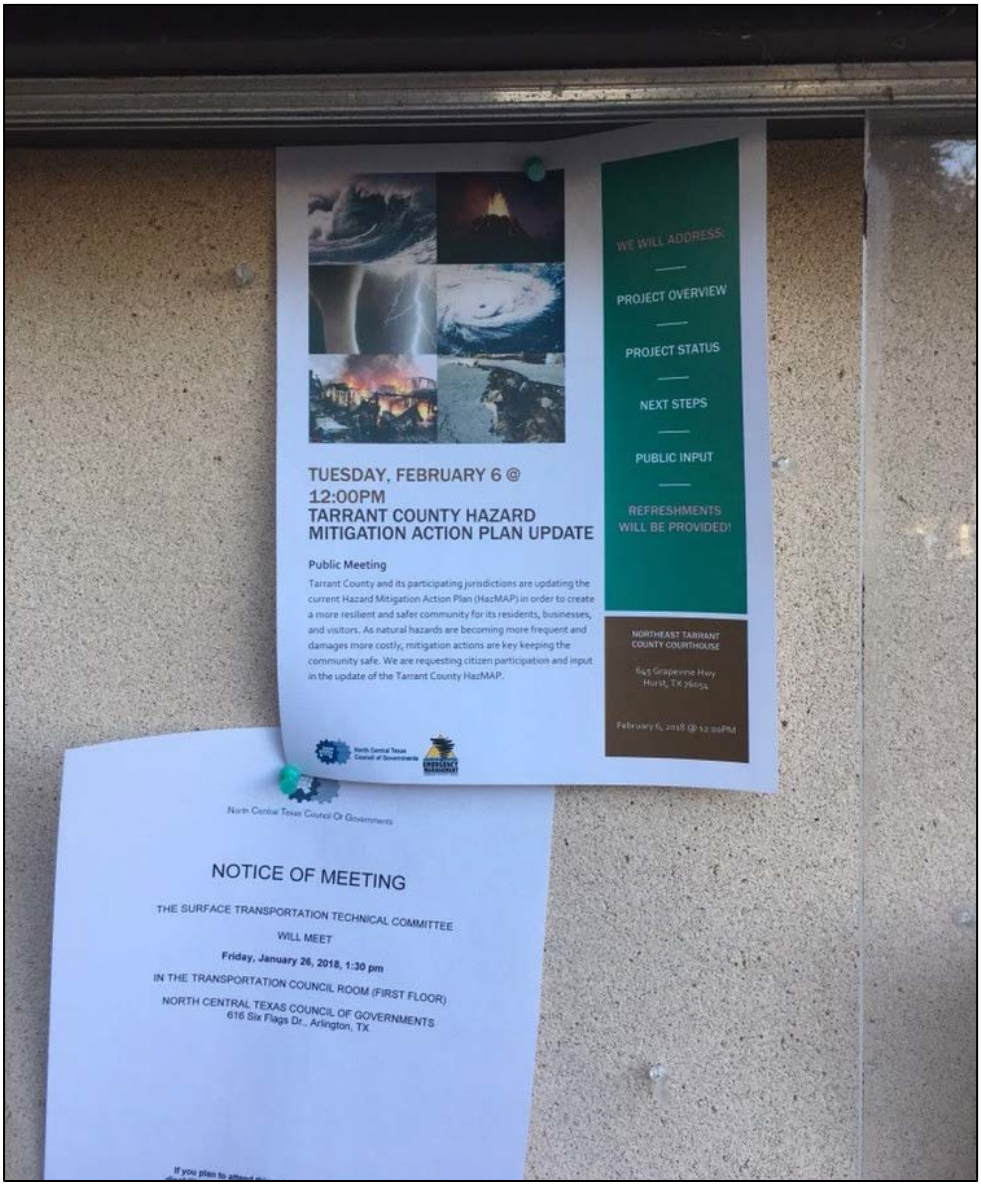
City of Mansfield

Mansfield Twitter page.



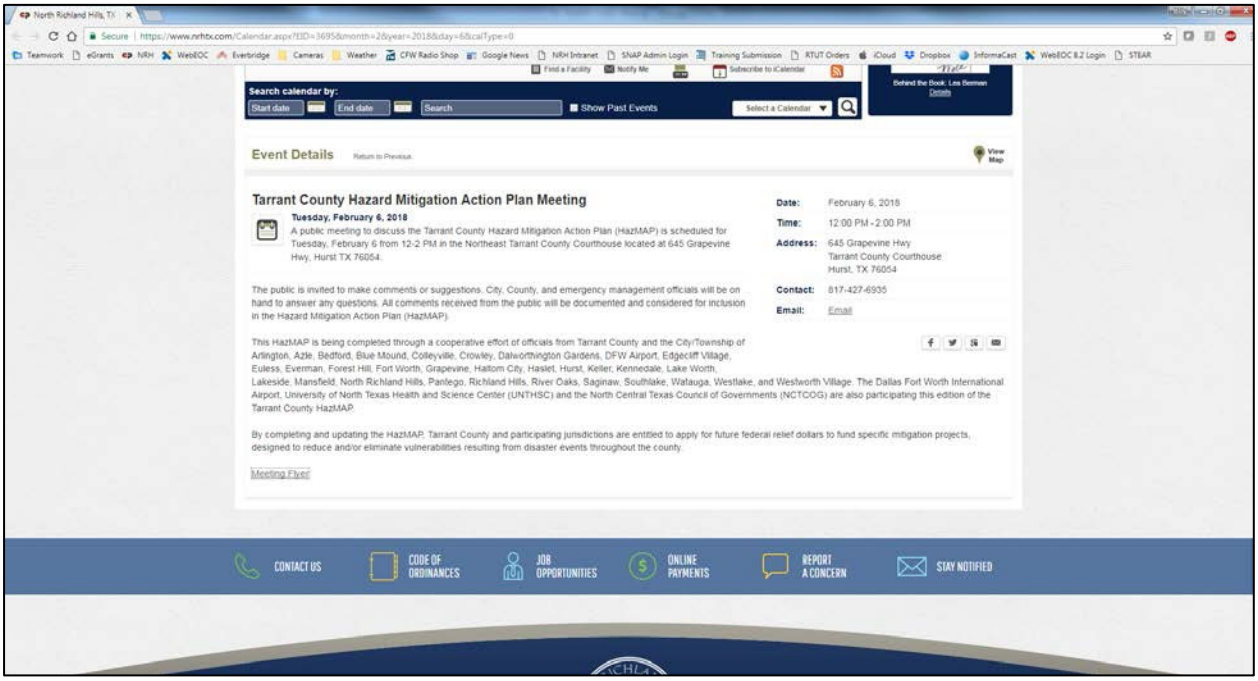
Mansfield Facebook page.

North Central Texas Council of Governments (NCTCOG)

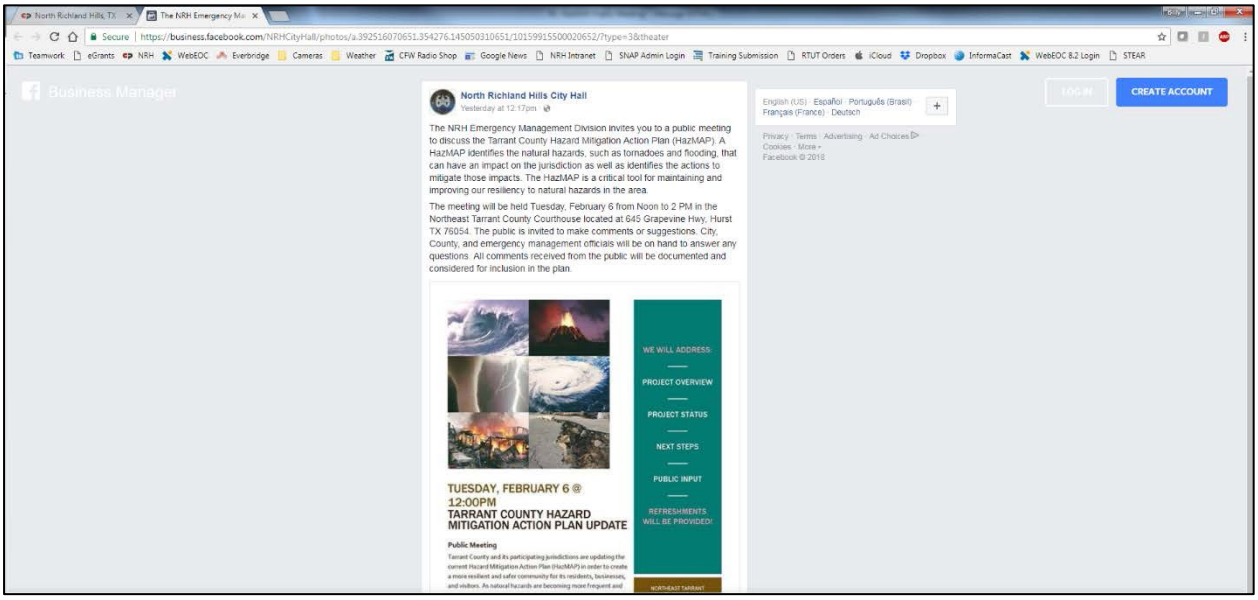


NCTCOG public bulletin.

City of North Richland Hills

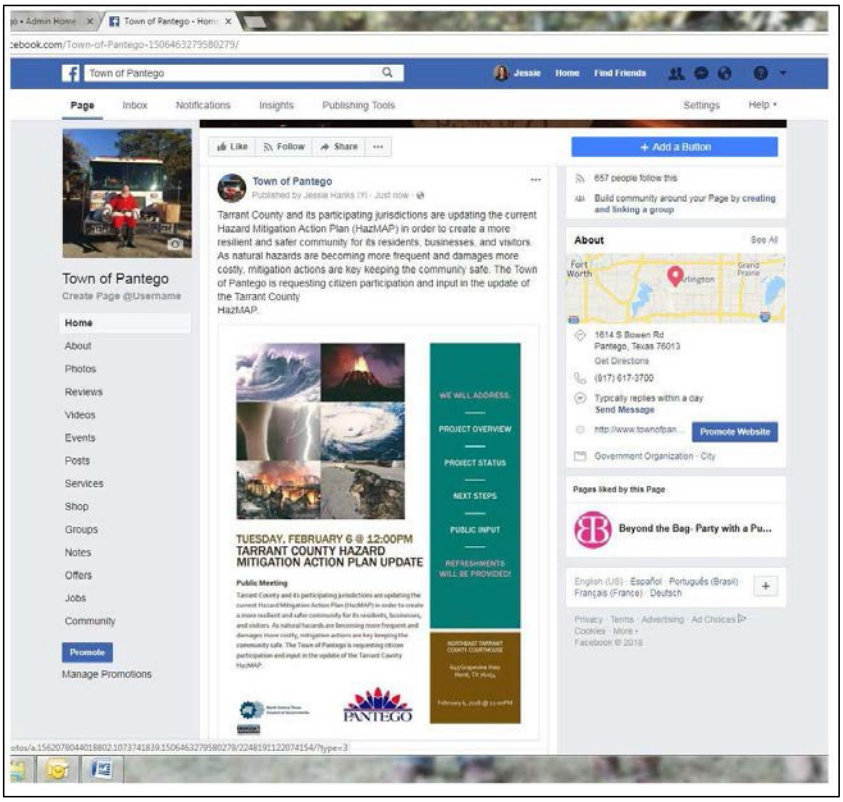


North Richland Hills city website.

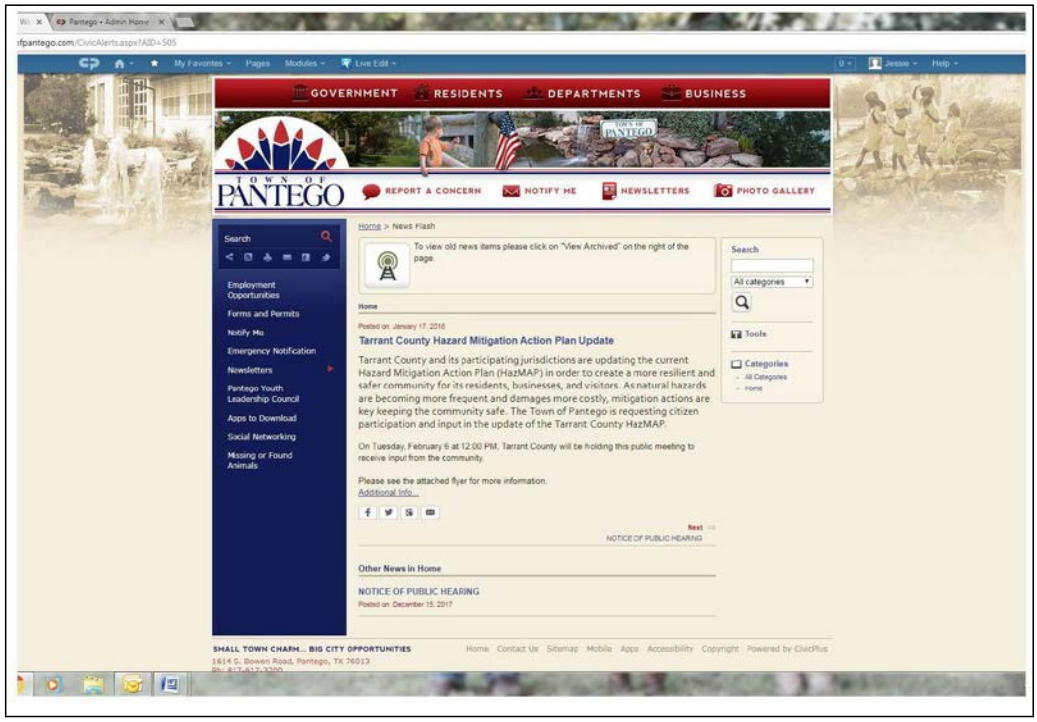


North Richland Hills Facebook page.

Town of Pantego



Pantego Facebook page.



Pantego town website.

Pantego town website.

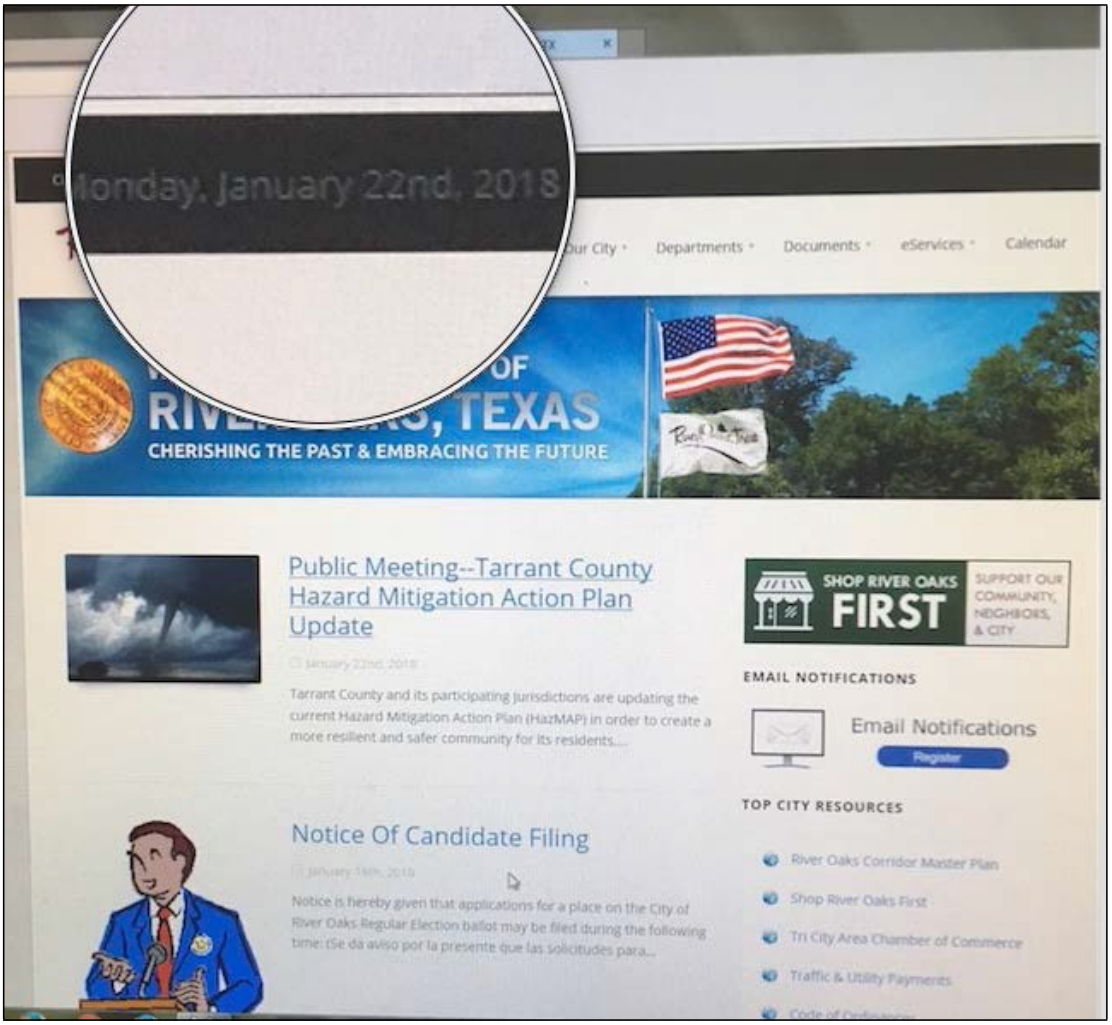
City of Richland Hills

A public hearing was held as part of the regularly scheduled City Council meeting on November 13, 2017 at 7pm in the City Council chambers located at 3200 Diana Dr. Richland Hills, TX 76118. The meeting was posted to the bulletin board outside City Hall on October 30th and published to the City website on the same date.

Richland Hills' city website.

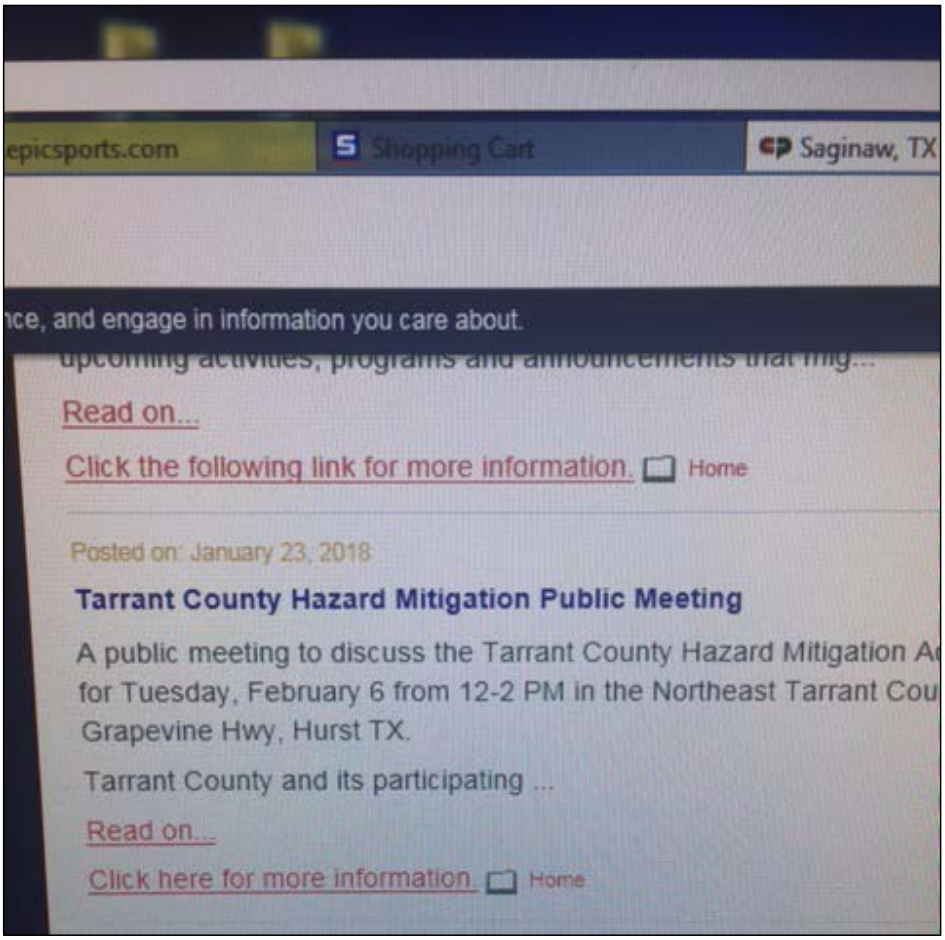
Richland Hills public bulletin board.

City of River Oaks

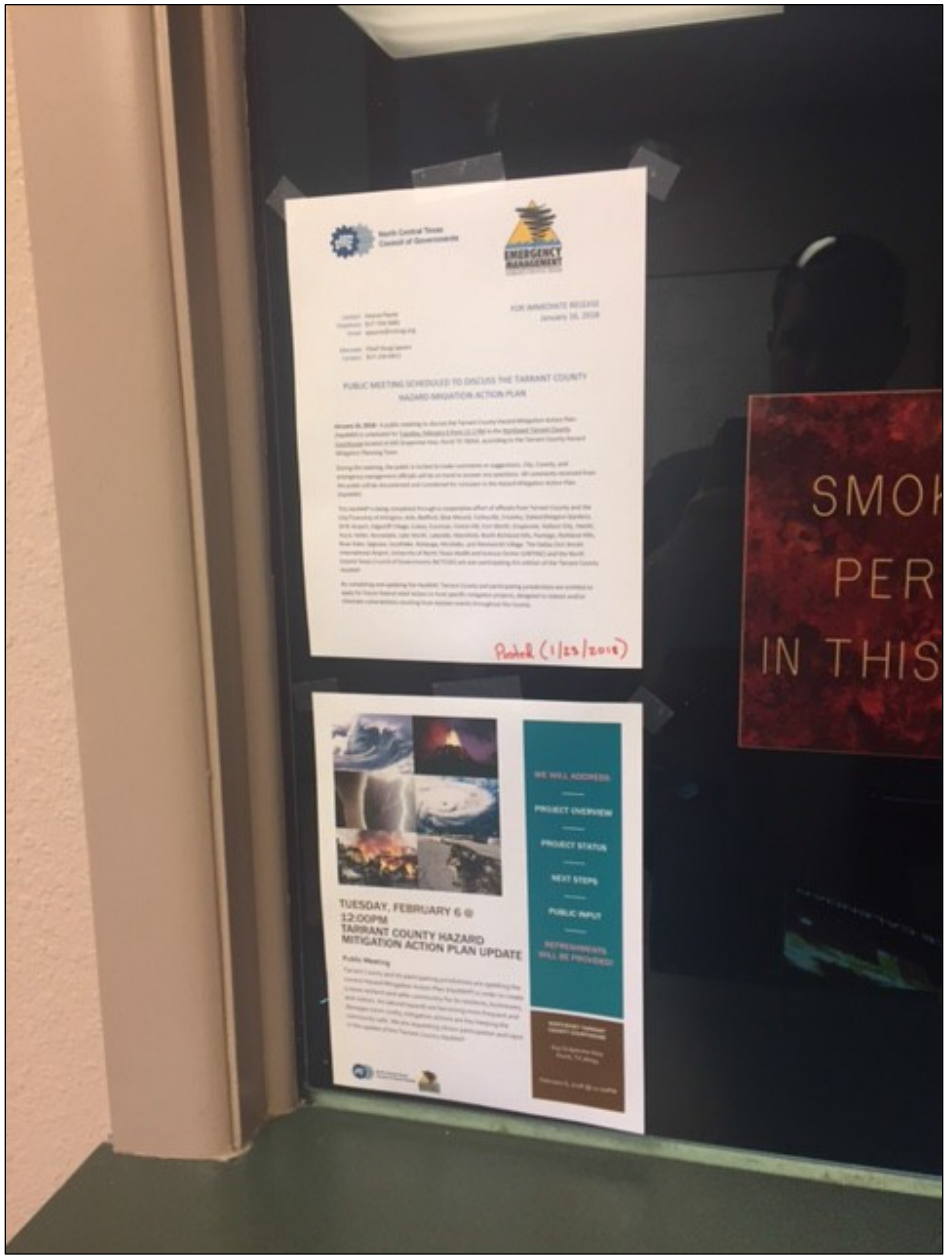


River Oaks' city website.

City of Saginaw



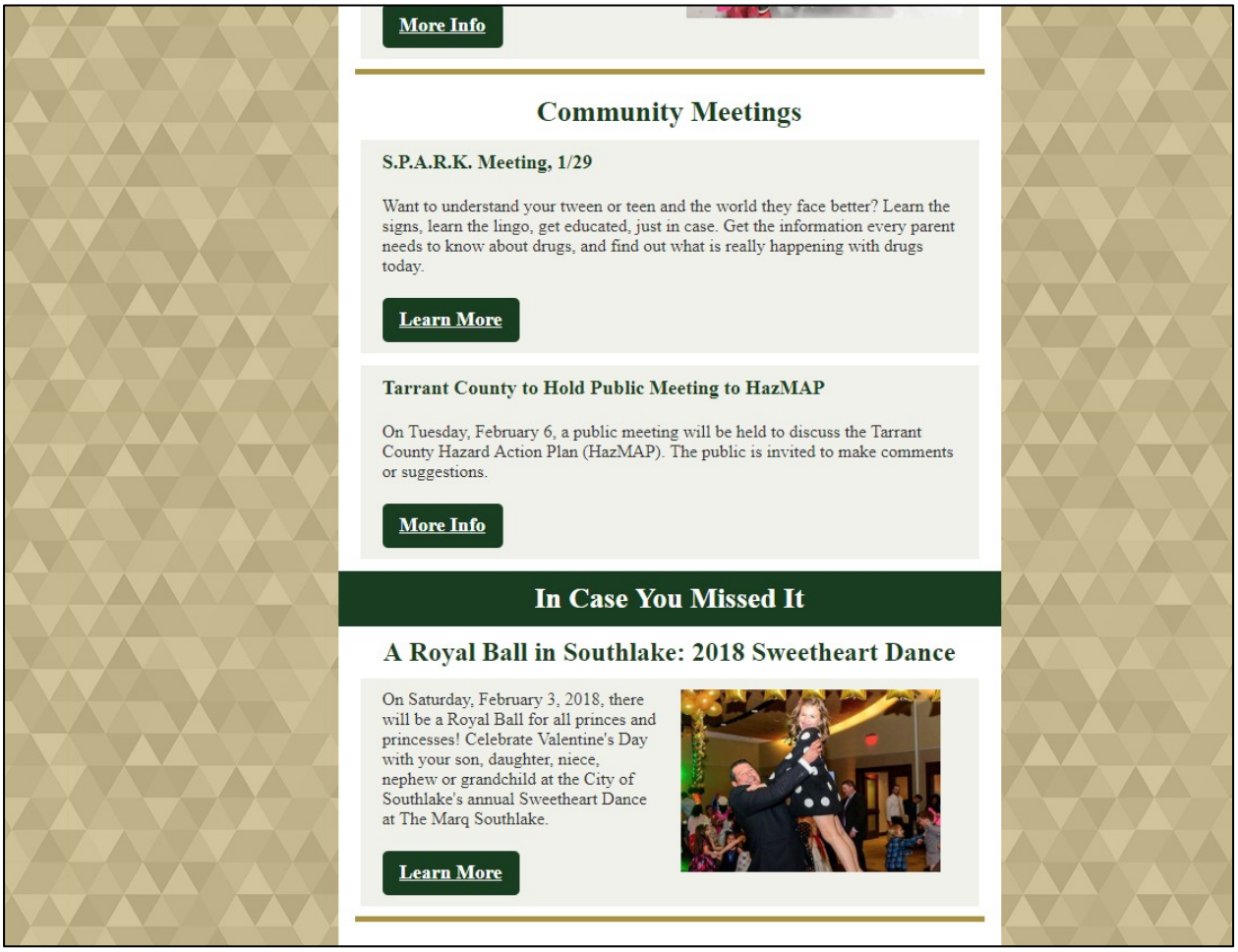
Saginaw city website.



Saginaw public building.

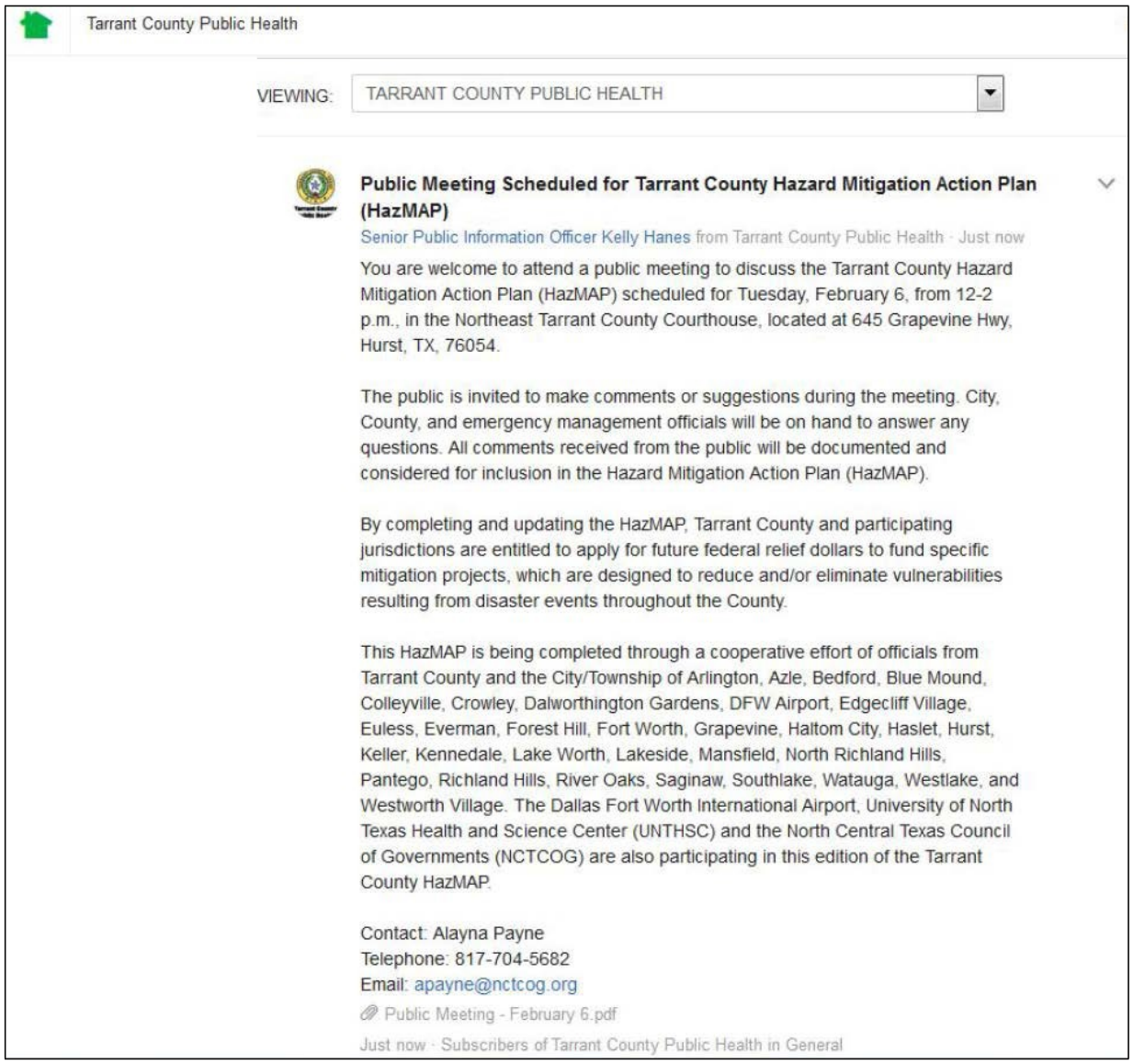
City of Southlake

Southlake Department of Public Safety Facebook page.



Southlake city website.

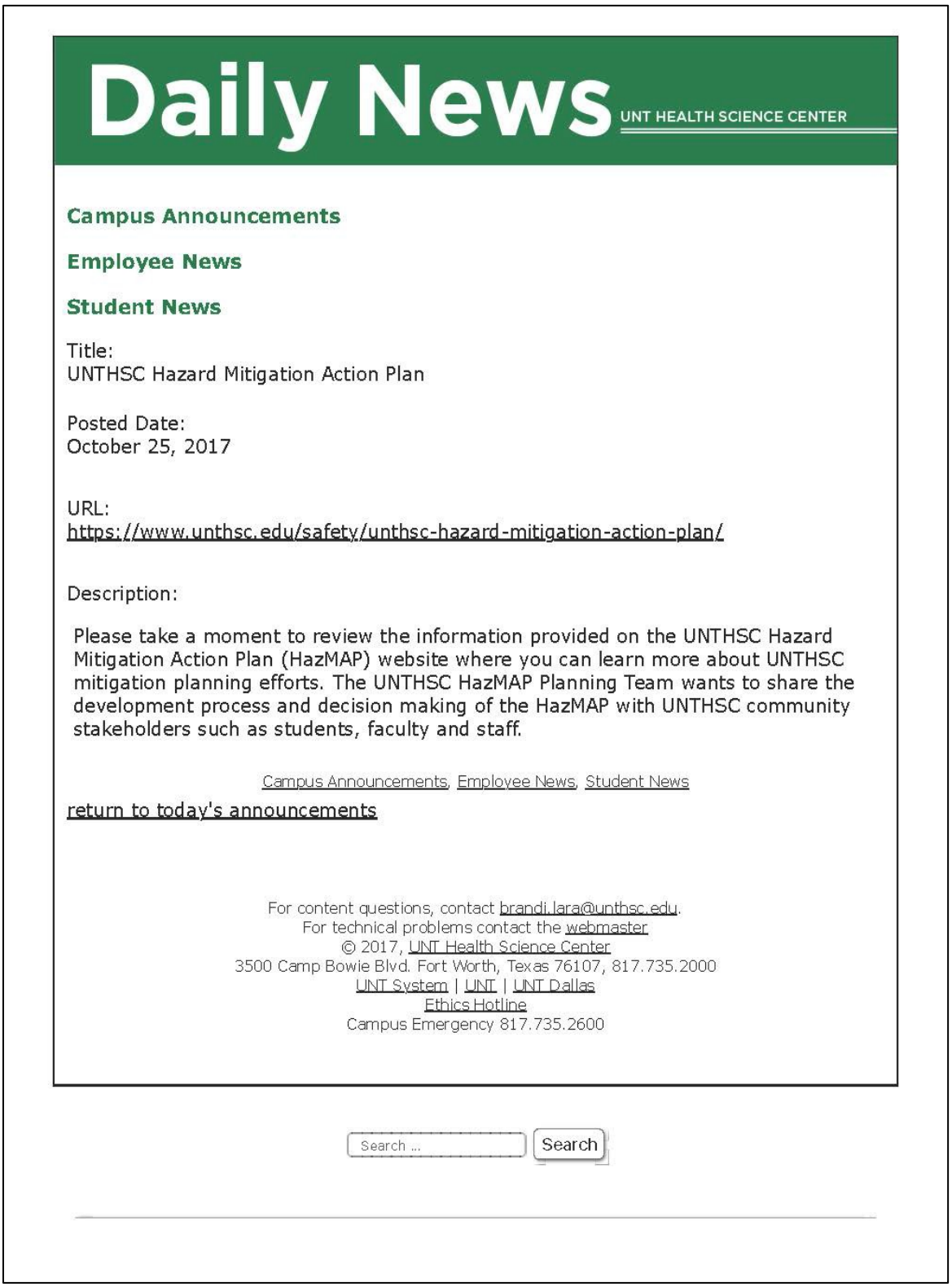
Unincorporated Tarrant County



Tarrant County Public Health Nextdoor app.

Tarrant County public bulletin.

University of North Texas Health Science Center (UNTHSC)



Daily News
UNT HEALTH SCIENCE CENTER

Campus Announcements

Employee News

Student News

Title:
UNTHSC Hazard Mitigation Action Plan

Posted Date:
October 25, 2017

URL:
https://www.unthsc.edu/safety/unthsc-hazard-mitigation-action-plan/

Description:

Please take a moment to review the information provided on the UNTHSC Hazard Mitigation Action Plan (HazMAP) website where you can learn more about UNTHSC mitigation planning efforts. The UNTHSC HazMAP Planning Team wants to share the development process and decision making of the HazMAP with UNTHSC community stakeholders such as students, faculty and staff.

Campus Announcements, Employee News, Student News
return to today's announcements

For content questions, contact brandi.lara@unthsc.edu.
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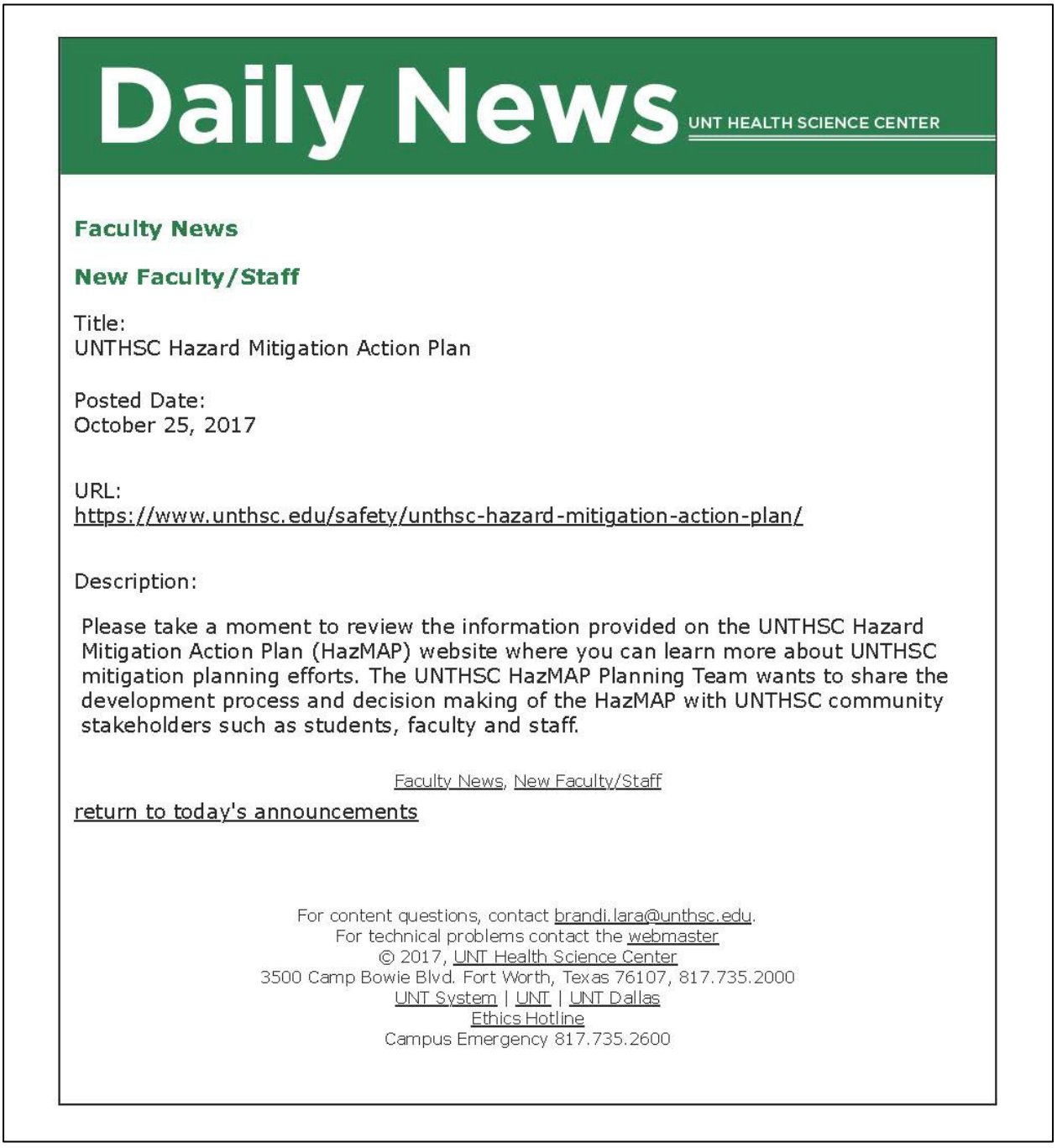
Ethics Hotline
Campus Emergency 817.735.2600

Search ... Search

UNTHSC online newsletter.



Daily News
UNT HEALTH SCIENCE CENTER

Faculty News

New Faculty/Staff

Title:
UNTHSC Hazard Mitigation Action Plan

Posted Date:
October 25, 2017

URL:
https://www.unthsc.edu/safety/unthsc-hazard-mitigation-action-plan/

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Faculty News, New Faculty/Staff

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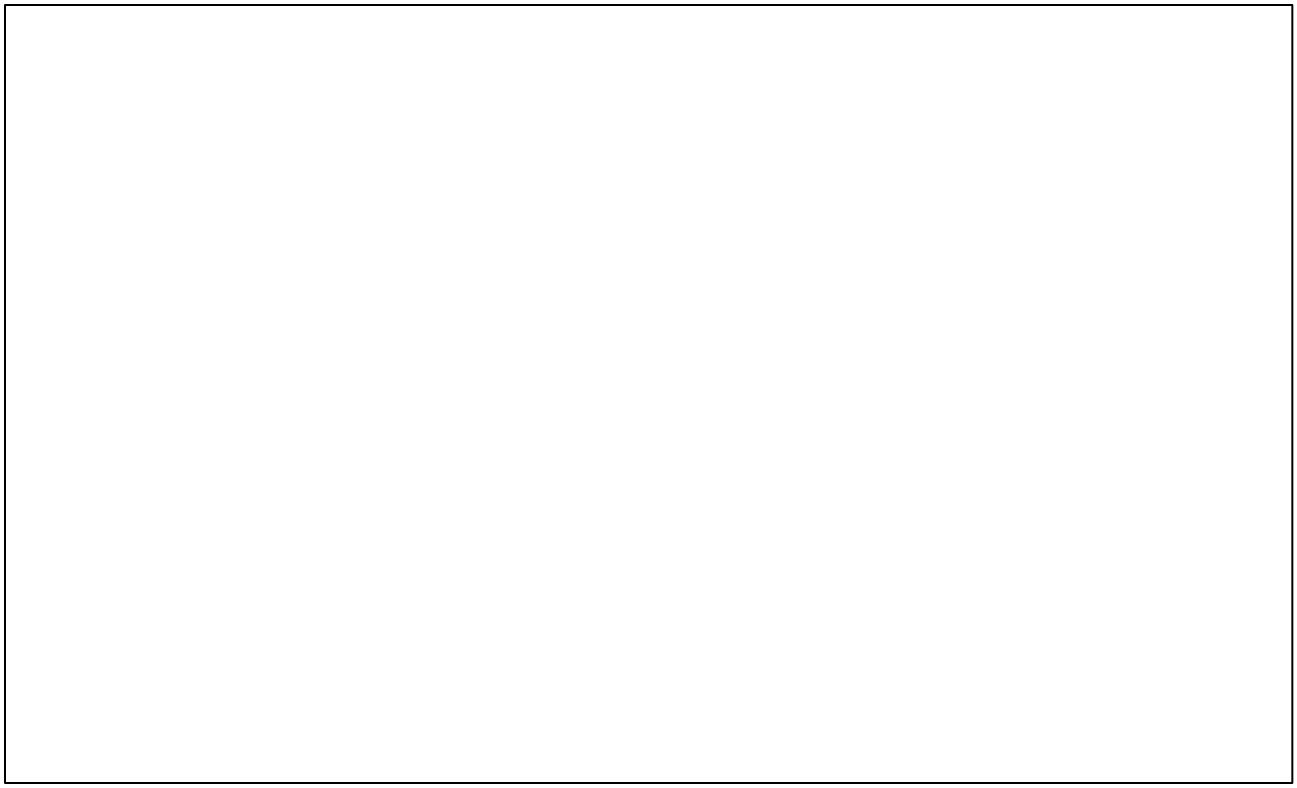
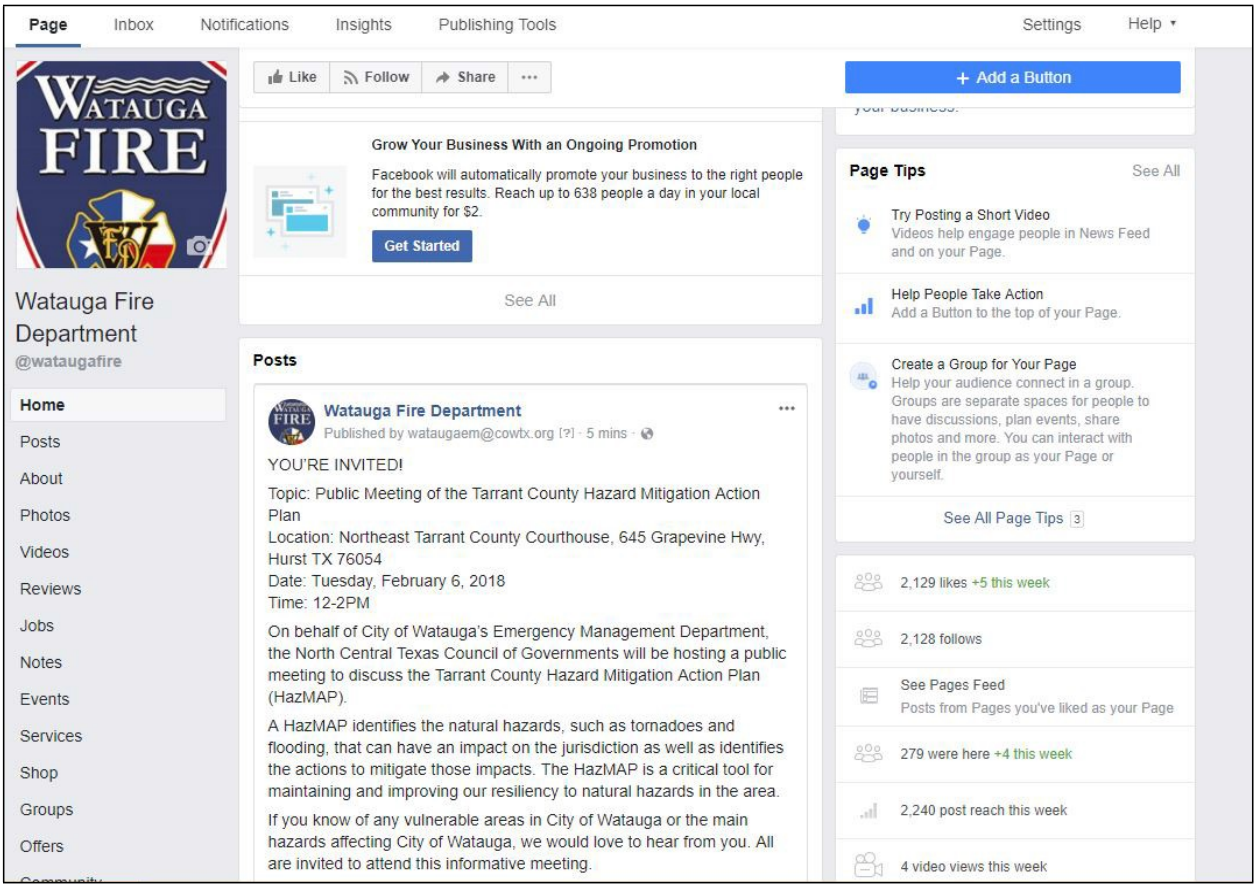


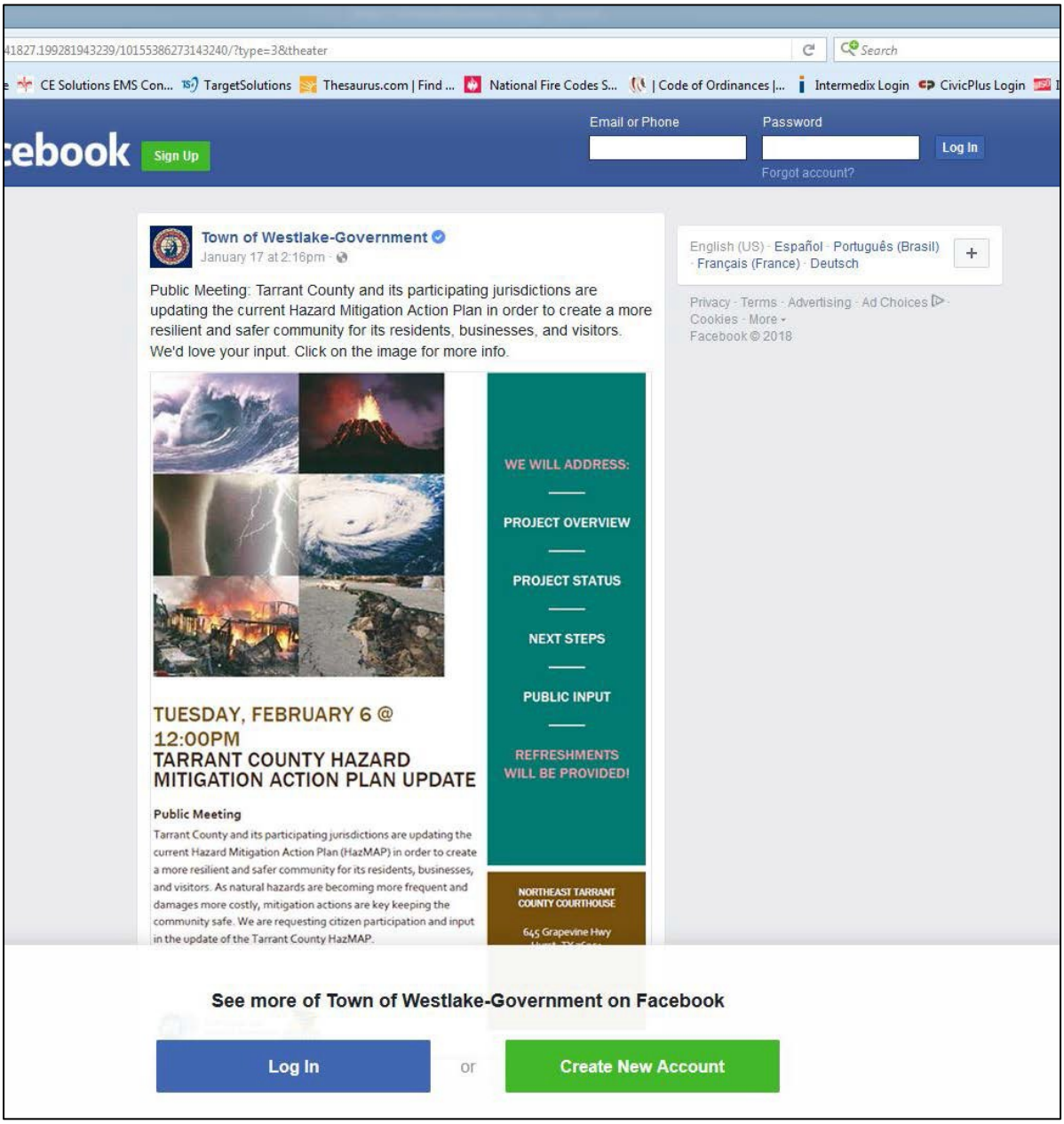
UNTHSC university website.

City of Watauga



Watauga Facebook page.

Town of Westlake



Westlake Facebook page.

City of Westworth Village

Westworth Village passed out citizen surveys at a local citizen's meeting. The survey was four pages long and asked questions regarding local hazards, community assets, trusted resources, and mitigation activities that would be taken into consideration when developing the city's annex in the Tarrant County Hazard Mitigation Action Plan.

The following pages are the results of these surveys.

Westworth Village Hazardous Mitigation Survey

1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?			
YES	NO (If no, skip to Question 3)		
2. If you answered yes to question 1, please indicate which disaster(s) was experienced.			
Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?	**Very Concerned**	**Somewhat Concerned**	**Neutral**	**Not Very Concerned**	**No Concern**	**Not Applicable**
Dam Failure					✓	
Hail		✓				
Drought			✓			
High Winds		✓				
Earthquake			✓			
Lightning		✓				
Expansive Soils			✓			
Tornado		✓				
Extreme Heat		✓				
Wildfire			✓			
Flooding		✓				
Winter Storms			✓			

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?			
YES	NO (If no, skip to Question 7)		
5. If you answered Yes to question 4, how recently did you receive this information?			
Within last 6 months	6-12 months	1-2 years	2-5 years
6. What source most recently provided you with the information?			
News Media	Elected Official	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbor/Friend	Other:		
7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)			
News Media	Elected Official	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbor/Friend	Other:		
8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)			
Newspaper Stories	Online News	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:
9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?			
Yes	No		
10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?			
Yes	No		

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

11. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, which of the following categories are most susceptible to the impacts caused by natural hazards in your city? The answers will be displayed as Community Asset - Potential Natural Hazard Impact

(Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

1	Human - Loss of life and/or injuries
6	Economic - Business closures and/or job losses
3	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
5	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
4	Environmental - Damage or loss of forests, rangeland, waterways, etc.
2	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities	✓					
Schools (K-12)		✓				
Hospitals		✓				
Major Bridges		✓				
Fire/Police Stations		✓				
Museums/Historic Bldgs			✓			
Major Employers			✓			
Small Businesses			✓			
College/Universities			✓			
City Hall/Courthouse		✓				
Parks			✓			
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk		✓				
I support a mix of both regulatory and non-regulatory approaches to reducing risk	✓					
I support policies to prohibit development in areas subject to natural hazards	✓					
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards		✓				

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of local tax dollars to reduce risks and loss from natural disasters.		✓				
I support protecting historical and cultural structures.		✓				
I would be willing to make my home more disaster resilient.	✓					
I support steps to safeguard the local economy following a disaster event.		✓				
I support improving the disaster preparedness of local schools.	✓					
I support a local inventory of at-risk buildings and infrastructure.	✓					
I support disclosure of natural hazard risks during real estate transactions.	✓					

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	✓					
Protecting critical facilities (transportation networks, hospitals, fire stations)	✓					
Preventing development in hazard areas	✓					
Enhancing the function of natural features (i.e., streams)		✓				
Protecting historical and cultural landmarks		✓				
Protecting and reducing damage to utilities	✓					
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	✓					

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	✓			
Talked with members in your household about what to do in case of a natural disaster or emergency?	✓			
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?		✓		
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?		✓		
In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?			✓	

General Household Information:
Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	85					
17. Your gender	(Male)		Female			
18. Education Level: (X the appropriate box)	High School	Some College / Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-19,999	$20,000 - $29,000	$30,000 - $39,000	$40,000 - $49,000	$50,000 - $59,000
	$60,000-69,999	$70,000 - $79,000	$80,000 - $89,000	$90,000 - $99,000	$100,000 - $149,000	More than $150,000
20. City & Zip Code	Westworth Village (please list if other)				76114	

21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic X	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived in Westworth Village? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years X	
23. Do you rent or own your home? (X the appropriate box)	Rent	Own X				
24. Do you rent / own a: (X the appropriate box)	Single Family home X	Duplex	Apartment (Less than 5 units in structure)	Apartment (5 or more units in structure)	Condominium Or Townhouse	Manufactured or Mobile Home
25. Please feel free to provide any additional comments in the space below and thank you for participating in our survey.						

Please return all surveys to City of Westworth Village, 311 Burton Hill Road, Westworth Village, TX 76114 Attn: Brandy Barrett or scan and email to bbarrett@cityofwestworth.com

Westworth Village Hazardous Mitigation Survey

1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?					
YES	NO (If no, skip to Question 3)				
2. If you answered yes to question 1, please indicate which disaster(s) was experienced.					
Dam Failure	Hail		Drought	High Winds	
Earthquake	Lightning		Expansive Soils	Tornado	
Extreme Heat	Wildfire		Flooding	Winter Storms	
3. How concerned are you about the following natural disasters?					
	Very Concerned	**Somewhat Concerned**	**Neutral**	**Not Very Concerned**	**No Concern**	**Not Applicable**
Dam Failure					✓	
Hail		✓				
Drought			✓			
High Winds		✓				
Earthquake					✓	
Lightning						
Expansive Soils					✓	
Tornado						
Extreme Heat				✓		
Wildfire					✓	
Flooding					✓	
Winter Storms		✓				
4. Have you ever received information about how to make members of your household and your home safer from natural disasters?					
YES	NO (If no, skip to Question 7)				
5. If you answered Yes to question 4, how recently did you receive this information?					
Within last 6 months	6-12 months ✓		1-2 years	2-5 years	
6. What source most recently provided you with the information?					
News Media	Elected Official		Government Agency	Amer. Red Cross	
Insurance Company	Utility Company		Social Media	University/Institution	
Neighbor/Friend	Other: City Employee				
7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)					
News Media ✓	Elected Official		✓ Government Agency	Amer. Red Cross	
Insurance Company	Utility Company		Social Media	University/Institution	
Neighbor/Friend	Other:				
8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)					
Newspaper Stories	Online News		Chamber of Commerce	Newspaper Ads	
Social Media	✓ Pamphlet/Brochure		✓ Television News	School	
✓ Public Meetings	Outdoor Ads		Television Ads	Magazines	
Radio News	Books		Universities	Mail	
Radio Ads	Email Newsletters		Fire Dept/Rescue	Other:	
9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?					
Yes ✓	No				
10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?					
Yes	No ✓				

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

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(Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

	Human - Loss of life and/or injuries
	Economic - Business closures and/or job losses
	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
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	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
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Schools (K-12)		✓				
Hospitals						
Major Bridges						✓
Fire/Police Stations	✓					
Museums/Historic Bldgs						
Major Employers						✓
Small Businesses			✓			
College/Universities						✓
City Hall/Courthouse			✓			
Parks						✓
Other						

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	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
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I support policies to prohibit development in areas subject to natural hazards	✓					
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards					✓	

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of local tax dollars to reduce risks and loss from natural disasters.					1	
I support protecting historical and cultural structures.			1			
I would be willing to make my home more disaster resilient.						1
I support steps to safeguard the local economy following a disaster event.						1
I support improving the disaster preparedness of local schools.	1					
I support a local inventory of at-risk buildings and infrastructure.			1			
I support disclosure of natural hazard risks during real estate transactions.	1					

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Protecting critical facilities (transportation networks, hospitals, fire stations)	1					
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Enhancing the function of natural features (i.e., streams)		1				
Protecting historical and cultural landmarks		1				
Protecting and reducing damage to utilities	1					
Strengthening emergency services (i.e. police, fire, ems)	1					
Disclosing natural hazard risks during real estate transactions	1					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	1					

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In the last year, has anyone in your household been trained in First Aid or CPR?			/	
Prepared your home by having smoke detectors on each level?	/			
Discussed or created a utility shutoff procedure in the event of a natural disaster?	/			

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3. How concerned are you about the following natural disasters?					
	Very Concerned	**Somewhat Concerned**	**Neutral**	**Not Very Concerned**	**No Concern**	**Not Applicable**
Dam Failure					X	
Hail		X				
Drought			X			
High Winds			X			
Earthquake				X		
Lightning			X			
Expansive Soils				X		
Tornado		X				
Extreme Heat				X		
Wildfire				X		
Flooding				X		
Winter Storms			X			
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YES	NO (If no, skip to Question 7)				
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9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?					
Yes	No				
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Yes	No				

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Schools (K-12)		X				
Hospitals						X
Major Bridges				X		
Fire/Police Stations			X			
Museums/Historic Bldgs						X
Major Employers			X			
Small Businesses		X				
College/Universities						X
City Hall/Courthouse		X				
Parks			X			
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk		X		X		
I support a mix of both regulatory and non-regulatory approaches to reducing risk			X			
I support policies to prohibit development in areas subject to natural hazards			X			
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards		X				

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of local tax dollars to reduce risks and loss from natural disasters.			X			
I support protecting historical and cultural structures.						X
I would be willing to make my home more disaster resilient.						X
I support steps to safeguard the local economy following a disaster event.	X					
I support improving the disaster preparedness of local schools.			X			
I support a local inventory of at-risk buildings and infrastructure.			X			
I support disclosure of natural hazard risks during real estate transactions.			X			

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	X					
Protecting critical facilities (transportation networks, hospitals, fire stations)	X					X
Preventing development in hazard areas	X					
Enhancing the function of natural features (i.e., streams)			X			
Protecting historical and cultural landmarks						X
Protecting and reducing damage to utilities	X					
Strengthening emergency services (i.e. police, fire, ems)			X			
Disclosing natural hazard risks during real estate transactions		X				
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	X					

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	X			
Talked with members in your household about what to do in case of a natural disaster or emergency?			X	
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?			X	
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?			X	
In the last year, has anyone in your household been trained in First Aid or CPR?			X	
Prepared your home by having smoke detectors on each level?	X			
Discussed or created a utility shutoff procedure in the event of a natural disaster?			X	

General Household Information:
Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age						
17. Your gender	Male		Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-19,999	$20,000 - $29,000	$30,000 - $39,000	$40,000 - $49,000	$50,000 - $59,000
	$60,000-69,999	$70,000 - $79,000	$80,000 - $89,000	$90,000 - $99,000	$100,000 - $149,000	More than $150,000
20. City & Zip Code	Westworth Village (please list if other)				76114	

21. Race **(X the appropriate box)**	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic X	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived in Westworth Village? **(X the appropriate box)**	Less than one year	1-5 Years	5-9 Years	10-19 Years X	20 or more years	
23. Do you rent or own your home? **(X the appropriate box)**	Rent	Own X				
24. Do you rent / own a: **(X the appropriate box)**	Single Family home X	Duplex	Apartment (Less than 5 units in structure)	Apartment (5 or more units in structure)	Condominium Or Townhouse	Manufactured or Mobile Home
25. Please feel free to provide any additional comments in the space below and thank you for participating in our survey.						

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Westworth Village Hazardous Mitigation Survey

1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?			
YES	(NO) (If no, skip to Question 3)		
2. If you answered yes to question 1, please indicate which disaster(s) was experienced.			
Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure				✓		
Hail		✓				
Drought		✓				
High Winds		✓				
Earthquake				✓		
Lightning				✓		
Expansive Soils			✓			
Tornado		✓				
Extreme Heat		✓				
Wildfire		✓				
Flooding		✓				
Winter Storms		✓				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?			
(YES)	NO (If no, skip to Question 7)		
5. If you answered Yes to question 4, how recently did you receive this information?			
(Within last 6 months)	6-12 months	1-2 years	2-5 years
6. What source most recently provided you with the information?			
News Media	Elected Official	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbor/Friend	(Other:) Westworth Community Luncheon		
7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)			
News Media ✓	Elected Official	✓ Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbor/Friend ✓	Other:		
8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)			
Newspaper Stories	Online News	Chamber of Commerce	Newspaper Ads
Social Media ✓	Pamphlet/Brochure ✓	Television News	School
Public Meetings ✓	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:
9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?			
(Yes)	No		
10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?			
Yes	(No)		

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

11. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, which of the following categories are most susceptible to the impacts caused by natural hazards in your city? The answers will be displayed as Community Asset - Potential Natural Hazard Impact

(Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

1	Human - Loss of life and/or injuries
6	Economic - Business closures and/or job losses
2	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
5	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
4	Environmental - Damage or loss of forests, rangeland, waterways, etc.
3	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities		✓				
Schools (K-12)		✓				
Hospitals	✓					
Major Bridges		✓				
Fire/Police Stations		✓				
Museums/Historic Bldgs				✓		
Major Employers				✓		
Small Businesses				✓		
College/Universities		✓		✓		
City Hall/Courthouse		✓		✓		
Parks		✓				
Other					✓	

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk		✓				
I support a mix of both regulatory and non-regulatory approaches to reducing risk	✓					
I support policies to prohibit development in areas subject to natural hazards					✓	
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards					✓	

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of local tax dollars to reduce risks and loss from natural disasters.	✓					
I support protecting historical and cultural structures.		✓				
I would be willing to make my home more disaster resilient.	✓					
I support steps to safeguard the local economy following a disaster event.		✓				
I support improving the disaster preparedness of local schools.	✓					
I support a local inventory of at-risk buildings and infrastructure.				✓		
I support disclosure of natural hazard risks during real estate transactions.			✓			

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	✓					
Protecting critical facilities (transportation networks, hospitals, fire stations)	✓					
Preventing development in hazard areas				✓		
Enhancing the function of natural features (i.e., streams)	✓					
Protecting historical and cultural landmarks	✓					
Protecting and reducing damage to utilities				✓		
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses		✓				

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	✓			
Talked with members in your household about what to do in case of a natural disaster or emergency?		✓		
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	✓			
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?		✓		
In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?			✓	
Discussed or created a utility shutoff procedure in the event of a natural disaster?			✓	

General Household Information:
Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	67					
17. Your gender	Male		Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-19,999	$20,000 - $29,000	$30,000 - $39,000	$40,000 - $49,000	$50,000 - $59,000
	$60,000-69,999	$70,000 - $79,000	$80,000 - $89,000	$90,000 - $99,000	$100,000 - $149,000	More than $150,000
20. City & Zip Code Westworth Village 76114	Westworth Village (please list if other)				76114	

21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived in Westworth Village? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years	
23. Do you rent or own your home? (X the appropriate box)	Rent	Own				
24. Do you rent / own a: (X the appropriate box)	Single Family home	Duplex	Apartment (Less than 5 units in structure)	Apartment (5 or more units in structure)	Condominium Or Townhouse	Manufactured or Mobile Home
25. Please feel free to provide any additional comments in the space below and thank you for participating in our survey.						

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YES	NO (If no, skip to Question 3)		
2. If you answered yes to question 1, please indicate which disaster(s) was experienced.			
Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?	**Very Concerned**	**Somewhat Concerned**	**Neutral**	**Not Very Concerned**	**No Concern**	**Not Applicable**
Dam Failure						X
Hail				X		
Drought		X				
High Winds		X				X
Earthquake						X
Lightning		X				
Expansive Soils			X			
Tornado			X			
Extreme Heat			X			
Wildfire				X		
Flooding					X	
Winter Storms					X	

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?			
YES	NO (If no, skip to Question 7)		
5. If you answered Yes to question 4, how recently did you receive this information?			
Within last 6 months	6-12 months	1-2 years	2-5 years
6. What source most recently provided you with the information?			
News Media	Elected Official	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbor/Friend	Other:		
7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)			
News Media	Elected Official	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbor/Friend	Other: ALL		
8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)			
Newspaper Stories	Online News	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:
9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?			
Yes	No		
10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?			
Yes	No		

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In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

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(Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

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	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
	Environmental - Damage or loss of forests, rangeland, waterways, etc.
	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities						
Schools (K-12)						
Hospitals						
Major Bridges						
Fire/Police Stations						
Museums/Historic Bldgs						
Major Employers						
Small Businesses						
College/Universities						
City Hall/Courthouse						
Parks						
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk						
I support a mix of both regulatory and non-regulatory approaches to reducing risk						
I support policies to prohibit development in areas subject to natural hazards						
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards						

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of local tax dollars to reduce risks and loss from natural disasters.						
I support protecting historical and cultural structures.						
I would be willing to make my home more disaster resilient.						
I support steps to safeguard the local economy following a disaster event.						
I support improving the disaster preparedness of local schools.						
I support a local inventory of at-risk buildings and infrastructure.						
I support disclosure of natural hazard risks during real estate transactions.						

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Protecting critical facilities (transportation networks, hospitals, fire stations)						
Preventing development in hazard areas						
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Protecting historical and cultural landmarks						
Protecting and reducing damage to utilities						
Strengthening emergency services (i.e. police, fire, ems)						
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Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses						

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15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?				
Talked with members in your household about what to do in case of a natural disaster or emergency?				
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?				
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?				
In the last year, has anyone in your household been trained in First Aid or CPR?				
Prepared your home by having smoke detectors on each level?				
Discussed or created a utility shutoff procedure in the event of a natural disaster?				

General Household Information:
Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age						
17. Your gender	Male		Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-19,999	$20,000 - $29,000	$30,000 - $39,000	$40,000 - $49,000	$50,000 - $59,000
	$60,000-69,999	$70,000 - $79,000	$80,000 - $89,000	$90,000 - $99,000	$100,000 - $149,000	More than $150,000
20. City & Zip Code	Westworth Village (please list if other)				76114	

21. Race **(X the appropriate box)**	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived in Westworth Village? **(X the appropriate box)**	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years	
23. Do you rent or own your home? **(X the appropriate box)**	Rent	Own				
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Westworth Village Hazardous Mitigation Survey

1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

YES	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail ✓	Drought	High Winds ✓
Earthquake	Lightning ✓	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure			✓			
Hail	✓					
Drought	✓					
High Winds	✓					
Earthquake				✓		
Lightning	✓					
Expansive Soils			✓			
Tornado	✓					
Extreme Heat	✓					
Wildfire			✓			
Flooding	✓					
Winter Storms			✓			

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES	NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months ✓	6-12 months	1-2 years	2-5 years

6. What source most recently provided you with the information?

News Media ✓	Elected Official	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbor/Friend	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media ✓	Elected Official	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	✓ University/Institution
Neighbor/Friend ✓	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories ✓	Online News ✓	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News ✓	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?

Yes	No

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?

Yes	No

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

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3	Governance - Ability to maintain order and/or provide public amenities and services

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	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities	✓					
Schools (K-12)	✓					
Hospitals	✓					
Major Bridges	✓					
Fire/Police Stations	✓					
Museums/Historic Bldgs		✓				
Major Employers		✓				
Small Businesses		✓				
College/Universities	✓					
City Hall/Courthouse	✓					
Parks		✓				
Other		✓				

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk	✓					
I support a mix of both regulatory and non-regulatory approaches to reducing risk	✓					
I support policies to prohibit development in areas subject to natural hazards	✓					
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards	✓					

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of local tax dollars to reduce risks and loss from natural disasters.	✓					
I support protecting historical and cultural structures.	✓					
I would be willing to make my home more disaster resilient.	✓					
I support steps to safeguard the local economy following a disaster event.	✓					
I support improving the disaster preparedness of local schools.	✓					
I support a local inventory of at-risk buildings and infrastructure.	✓					
I support disclosure of natural hazard risks during real estate transactions.	✓					

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	✓					
Protecting critical facilities (transportation networks, hospitals, fire stations)	✓					
Preventing development in hazard areas	✓					
Enhancing the function of natural features (i.e., streams)	✓					
Protecting historical and cultural landmarks	✓					
Protecting and reducing damage to utilities	✓					
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	✓					

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	✓			
Talked with members in your household about what to do in case of a natural disaster or emergency?		✓		
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?		✓		
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?			✓	
In the last year, has anyone in your household been trained in First Aid or CPR?	✓			
Prepared your home by having smoke detectors on each level?		✓		
Discussed or created a utility shutoff procedure in the event of a natural disaster?			✓	

General Household Information:
Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	27					
17. Your gender	Male		Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-19,999	$20,000 - $29,000	$30,000 - $39,000 X	$40,000 - $49,000	$50,000 - $59,000
	$60,000-69,999	$70,000 - $79,000	$80,000 - $89,000	$90,000 - $99,000	$100,000 - $149,000	More than $150,000
20. City & Zip Code	Westworth Village (please list if other) Fort Worth				76114	

21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic ✓	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived in Westworth Village? (X the appropriate box)	Less than one year ✓	1-5 Years	5-9 Years	10-19 Years	20 or more years	
23. Do you rent or own your home? (X the appropriate box)	Rent ✓	Own				
24. Do you rent / own a: (X the appropriate box)	Single Family home	Duplex	Apartment (Less than 5 units in structure) ✓	Apartment (5 or more units in structure)	Condominium Or Townhouse	Manufactured or Mobile Home
25. Please feel free to provide any additional comments in the space below and thank you for participating in our survey.						

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Westworth Village Hazardous Mitigation Survey

1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?					
YES	NO (If no, skip to Question 3)				
2. If you answered yes to question 1, please indicate which disaster(s) was experienced.					
Dam Failure	Hail		Drought	High Winds	
Earthquake	Lightning		Expansive Soils	Tornado	
Extreme Heat	Wildfire		Flooding	Winter Storms	
3. How concerned are you about the following natural disasters?					
	Very Concerned	**Somewhat Concerned**	**Neutral**	**Not Very Concerned**	**No Concern**	**Not Applicable**
Dam Failure	✓					
Hail	✓					
Drought	✓					
High Winds	✓					
Earthquake					✓	
Lightning	✓					
Expansive Soils				✓		
Tornado	✓					
Extreme Heat				✓		
Wildfire				✓		
Flooding		✓				
Winter Storms		✓				
4. Have you ever received information about how to make members of your household and your home safer from natural disasters?					
YES	NO (If no, skip to Question 7)				
5. If you answered Yes to question 4, how recently did you receive this information?					
Within last 6 months	6-12 months		1-2 years	2-5 years ✓	
6. What source most recently provided you with the information?					
News Media ✓	Elected Official		Government Agency	Amer. Red Cross	
Insurance Company	Utility Company ✓		Social Media	University/Institution	
Neighbor/Friend	Other:				
7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)					
News Media	Elected Official		✓ Government Agency	Amer. Red Cross	
Insurance Company ✓	✓ Utility Company		Social Media	University/Institution	
Neighbor/Friend	Other:				
8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)					
Newspaper Stories	Online News		Chamber of Commerce	Newspaper Ads	
Social Media	Pamphlet/Brochure		Television News	School	
✓ Public Meetings	Outdoor Ads		Television Ads	Magazines	
Radio News	Books		Universities	✓ Mail	
Radio Ads	Email Newsletters		Fire Dept/Rescue	Other:	
9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?					
Yes	No				
10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?					
Yes	No				

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

11. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, which of the following categories are most susceptible to the impacts caused by natural hazards in your city? The answers will be displayed as Community Asset - Potential Natural Hazard Impact

(Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

1	Human - Loss of life and/or injuries
6	Economic - Business closures and/or job losses
3	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
5	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
2	Environmental - Damage or loss of forests, rangeland, waterways, etc.
4	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities	✓					
Schools (K-12)		✓				
Hospitals		✓	✓		✓	
Major Bridges			✓			
Fire/Police Stations		✓				
Museums/Historic Bldgs			✓			
Major Employers		✓				
Small Businesses			✓			
College/Universities			✓			
City Hall/Courthouse		✓				
Parks		✓				
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk				✓		
I support a mix of both regulatory and non-regulatory approaches to reducing risk				✓		
I support policies to prohibit development in areas subject to natural hazards		✓				
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards				✓		

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of local tax dollars to reduce risks and loss from natural disasters.				✓		
I support protecting historical and cultural structures.				✓		
I would be willing to make my home more disaster resilient.			✓			
I support steps to safeguard the local economy following a disaster event.			✓			
I support improving the disaster preparedness of local schools.			✓			
I support a local inventory of at-risk buildings and infrastructure.			✓			
I support disclosure of natural hazard risks during real estate transactions.	✓					

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property				✓		
Protecting critical facilities (transportation networks, hospitals, fire stations)		✓				
Preventing development in hazard areas		✓				
Enhancing the function of natural features (i.e., streams)		✓				
Protecting historical and cultural landmarks			✓			
Protecting and reducing damage to utilities		✓				
Strengthening emergency services (i.e. police, fire, ems)		✓				
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	✓					

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	✓			
Talked with members in your household about what to do in case of a natural disaster or emergency?	✓			
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?		✓		
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?		✓		
In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?			✓	

General Household Information:
Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	53					
17. Your gender	Male		Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-19,999	$20,000 - $29,000	$30,000 - $39,000	$40,000 - $49,000	$50,000 - $59,000
	$60,000-69,999	$70,000 - $79,000	$80,000 - $89,000	$90,000 - $99,000	$100,000 - $149,000	More than $150,000
20. City & Zip Code	Westworth Village (please list if other)				76114	

21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived in Westworth Village? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years	
23. Do you rent or own your home? (X the appropriate box)	Rent	Own				
24. Do you rent / own a: (X the appropriate box)	Single Family home	Duplex	Apartment (Less than 5 units in structure)	Apartment (5 or more units in structure)	Condominium Or Townhouse	Manufactured or Mobile Home
25. Please feel free to provide any additional comments in the space below and thank you for participating in our survey.						
Glad to know the city is on top of this!						

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Westworth Village Hazardous Mitigation Survey

1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?						
YES	NO (If no, skip to Question 3)					
2. If you answered yes to question 1, please indicate which disaster(s) was experienced.						
Dam Failure	Hail		Drought		High Winds	
Earthquake	Lightning		Expansive Soils		Tornado	
Extreme Heat	Wildfire		Flooding		Winter Storms	
3. How concerned are you about the following natural disasters?						
	Very Concerned	**Somewhat Concerned**	**Neutral**	**Not Very Concerned**	**No Concern**	**Not Applicable**
Dam Failure						
Hail						
Drought						
High Winds						
Earthquake						
Lightning						
Expansive Soils						
Tornado						
Extreme Heat						
Wildfire						
Flooding						
Winter Storms						
4. Have you ever received information about how to make members of your household and your home safer from natural disasters?						
YES	NO (If no, skip to Question 7)					
5. If you answered Yes to question 4, how recently did you receive this information?						
Within last 6 months	6-12 months		1-2 years		2-5 years	
6. What source most recently provided you with the information?						
News Media	Elected Official		Government Agency		Amer. Red Cross	
Insurance Company	Utility Company		Social Media		University/Institution	
Neighbor/Friend	Other:					
7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)						
News Media	Elected Official		Government Agency		Amer. Red Cross	
Insurance Company	Utility Company		Social Media		University/Institution	
Neighbor/Friend	Other:					
8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)						
Newspaper Stories	Online News		Chamber of Commerce		Newspaper Ads	
Social Media	Pamphlet/Brochure		Television News		School	
Public Meetings	Outdoor Ads		Television Ads		Magazines	
Radio News	Books		Universities		Mail	
Radio Ads	Email Newsletters		Fire Dept/Rescue		Other:	
9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?						
Yes	No					
10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?						
Yes	No					

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

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(Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

	Human - Loss of life and/or injuries
	Economic - Business closures and/or job losses
	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
	Environmental - Damage or loss of forests, rangeland, waterways, etc.
	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities						
Schools (K-12)						
Hospitals						
Major Bridges						
Fire/Police Stations						
Museums/Historic Bldgs						
Major Employers						
Small Businesses						
College/Universities						
City Hall/Courthouse						
Parks						
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk						
I support a mix of both regulatory and non-regulatory approaches to reducing risk						
I support policies to prohibit development in areas subject to natural hazards						
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards						

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of local tax dollars to reduce risks and loss from natural disasters.						
I support protecting historical and cultural structures.						
I would be willing to make my home more disaster resilient.						
I support steps to safeguard the local economy following a disaster event.						
I support improving the disaster preparedness of local schools.						
I support a local inventory of at-risk buildings and infrastructure.						
I support disclosure of natural hazard risks during real estate transactions.						

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property						
Protecting critical facilities (transportation networks, hospitals, fire stations)						
Preventing development in hazard areas						
Enhancing the function of natural features (i.e., streams)						
Protecting historical and cultural landmarks						
Protecting and reducing damage to utilities						
Strengthening emergency services (i.e. police, fire, ems)						
Disclosing natural hazard risks during real estate transactions						
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses						

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15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?				
Talked with members in your household about what to do in case of a natural disaster or emergency?				
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?				
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?				
In the last year, has anyone in your household been trained in First Aid or CPR?				
Prepared your home by having smoke detectors on each level?				
Discussed or created a utility shutoff procedure in the event of a natural disaster?				

General Household Information:
Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age						
17. Your gender	Male		Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-19,999	$20,000 - $29,000	$30,000 - $39,000	$40,000 - $49,000	$50,000 - $59,000
	$60,000-69,999	$70,000 - $79,000	$80,000 - $89,000	$90,000 - $99,000	$100,000 - $149,000	More than $150,000
20. City & Zip Code	Westworth Village (please list if other)				76114	

21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived in Westworth Village? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years	
23. Do you rent or own your home? (X the appropriate box)	Rent	Own				
24. Do you rent / own a: (X the appropriate box)	Single Family home	Duplex	Apartment (Less than 5 units in structure)	Apartment (5 or more units in structure)	Condominium Or Townhouse	Manufactured or Mobile Home

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YES	NO (If no, skip to Question 3)				
2. If you answered yes to question 1, please indicate which disaster(s) was experienced.					
Dam Failure	Hail	Drought	High Winds		
Earthquake	Lightning	Expansive Soils	Tornado		
Extreme Heat	Wildfire	Flooding	Winter Storms		

3. How concerned are you about the following natural disasters?	**Very Concerned**	**Somewhat Concerned**	**Neutral**	**Not Very Concerned**	**No Concern**	**Not Applicable**
Dam Failure		✓				
Hail		✓				
Drought		✓				
High Winds		✓				
Earthquake				✓		
Lightning	✓					
Expansive Soils			✓			
Tornado		✓				
Extreme Heat		✓				
Wildfire				✓		
Flooding			✓			
Winter Storms				✓		

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?			
YES	NO (If no, skip to Question 7)		
5. If you answered Yes to question 4, how recently did you receive this information?			
Within last 6 months	6-12 months	1-2 years	2-5 years
6. What source most recently provided you with the information?			
News Media	Elected Official	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbor/Friend	Other:		
7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)			
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Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:
9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?			
Yes	No		
10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?			
Yes	No		

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

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5	Environmental - Damage or loss of forests, rangeland, waterways, etc.
4	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities		✓				
Schools (K-12)	✓					
Hospitals	✓					
Major Bridges	✓					
Fire/Police Stations	✓					
Museums/Historic Bldgs			✓			
Major Employers	✓					
Small Businesses		✓				
College/Universities		✓				
City Hall/Courthouse		✓				
Parks			✓			
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk				✓		
I support a mix of both regulatory and non-regulatory approaches to reducing risk		✓				
I support policies to prohibit development in areas subject to natural hazards		✓				
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards				✓		

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of local tax dollars to reduce risks and loss from natural disasters.			✓			
I support protecting historical and cultural structures.			✓			
I would be willing to make my home more disaster resilient.		✓				
I support steps to safeguard the local economy following a disaster event.		✓				
I support improving the disaster preparedness of local schools.	✓					
I support a local inventory of at-risk buildings and infrastructure.				✓		
I support disclosure of natural hazard risks during real estate transactions.		✓				

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property		✓				
Protecting critical facilities (transportation networks, hospitals, fire stations)	✓					
Preventing development in hazard areas		✓				
Enhancing the function of natural features (i.e., streams)		✓				
Protecting historical and cultural landmarks		✓				
Protecting and reducing damage to utilities	✓					
Strengthening emergency services (i.e. police, fire, ems)		✓				
Disclosing natural hazard risks during real estate transactions		✓				
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	✓					

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	✓			
Talked with members in your household about what to do in case of a natural disaster or emergency?			✓	
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?			✓	
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?			✓	
In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?		✓		

General Household Information:
Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	62					
17. Your gender	Male		Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-19,999	$20,000 - $29,000	$30,000 - $39,000	$40,000 - $49,000	$50,000 - $59,000
	$60,000-69,999	$70,000 - $79,000	$80,000 - $89,000	$90,000 - $99,000	$100,000 - $149,000	More than $150,000
20. City & Zip Code	Westworth Village (please list if other)				76114	

21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived in Westworth Village? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years	
23. Do you rent or own your home? (X the appropriate box)	Rent	Own				
24. Do you rent / own a: (X the appropriate box)	Single Family home X	Duplex	Apartment (Less than 5 units in structure)	Apartment (5 or more units in structure)	Condominium Or Townhouse	Manufactured or Mobile Home
25. Please feel free to provide any additional comments in the space below and thank you for participating in our survey.						

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Westworth Village Hazardous Mitigation Survey

1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?			
YES	NO (If no, skip to Question 3)		
2. If you answered yes to question 1, please indicate which disaster(s) was experienced.			
Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?	**Very Concerned**	**Somewhat Concerned**	**Neutral**	**Not Very Concerned**	**No Concern**	**Not Applicable**
Dam Failure				X		
Hail	✓					
Drought	✓					
High Winds	✓			X		
Earthquake						
Lightning	✓					
Expansive Soils		✓				
Tornado	✓					
Extreme Heat	✓	✓				
Wildfire		✓				
Flooding	✓					
Winter Storms		✓				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?			
YES	NO (If no, skip to Question 7)		
5. If you answered Yes to question 4, how recently did you receive this information?			
Within last 6 months	6-12 months	1-2 years	2-5 years
6. What source most recently provided you with the information?			
News Media	Elected Official	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbor/Friend	Other: Local gov		
7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)			
News Media	Elected Official	✓ Government Agency	✓ Amer. Red Cross
Insurance Company	Utility Company	Social Media	✓ University/Institution
Neighbor/Friend	Other:		
8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)			
Newspaper Stories	✓ Online News	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	✓ Email Newsletters	✓ Fire Dept/Rescue	Other:
9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?			
Yes	No		
10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?			
Yes	No		

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

11. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, which of the following categories are most susceptible to the impacts caused by natural hazards in your city? The answers will be displayed as Community Asset - Potential Natural Hazard Impact

(Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

4	Human - Loss of life and/or injuries
5	Economic - Business closures and/or job losses
3	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
6	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
2	Environmental - Damage or loss of forests, rangeland, waterways, etc.
1	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities		✓				
Schools (K-12)		✓				
Hospitals						✓
Major Bridges	✓					
Fire/Police Stations		✓				
Museums/Historic Bldgs						✓
Major Employers	✓					
Small Businesses		✓				
College/Universities						✓
City Hall/Courthouse		✓				
Parks		✓				
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk		✓				
I support a mix of both regulatory and non-regulatory approaches to reducing risk	✓					
I support policies to prohibit development in areas subject to natural hazards	✓					
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards				✓		

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of local tax dollars to reduce risks and loss from natural disasters.				✓		
I support protecting historical and cultural structures.		✓				
I would be willing to make my home more disaster resilient.	✓					
I support steps to safeguard the local economy following a disaster event.		✓				
I support improving the disaster preparedness of local schools.		✓				
I support a local inventory of at-risk buildings and infrastructure.		✓				
I support disclosure of natural hazard risks during real estate transactions.	✓					

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property		✓				
Protecting critical facilities (transportation networks, hospitals, fire stations)	✓					
Preventing development in hazard areas	✓					
Enhancing the function of natural features (i.e., streams)		✓				
Protecting historical and cultural landmarks		✓				
Protecting and reducing damage to utilities	✓					
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	✓					

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	✓			
Talked with members in your household about what to do in case of a natural disaster or emergency?	✓			
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?		✓		
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?			✓	
In the last year, has anyone in your household been trained in First Aid or CPR?	✓			
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?	✓			

General Household Information:
Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	61					
17. Your gender	Male		Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-19,999	$20,000 - $29,000	$30,000 - $39,000	$40,000 - $49,000	$50,000 - $59,000
	$60,000-69,999	$70,000 - $79,000	$80,000 - $89,000	$90,000 - $99,000	$100,000 - $149,000	More than $150,000
20. City & Zip Code	Westworth Village (please list if other)				76114	

21. Race **(X the appropriate box)**	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived in Westworth Village? **(X the appropriate box)**	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years	
23. Do you rent or own your home? **(X the appropriate box)**	Rent	Own				
24. Do you rent / own a: **(X the appropriate box)**	Single Family home	Duplex	Apartment (Less than 5 units in structure)	Apartment (5 or more units in structure)	Condominium Or Townhouse	Manufactured or Mobile Home
25. Please feel free to provide any additional comments in the space below and thank you for participating in our survey.						

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Westworth Village Hazardous Mitigation Survey

1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

YES	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure		X				
Hail		X				
Drought	X					
High Winds				X		
Earthquake				X		
Lightning		X				
Expansive Soils			X			
Tornado	X					
Extreme Heat		X				
Wildfire				X		
Flooding				X		
Winter Storms		X				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES	NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	6-12 months	1-2 years	2-5 years

6. What source most recently provided you with the information?

News Media	Elected Official	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbor/Friend	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media	Elected Official	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/institution
Neighbor/Friend	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories	X	Online News	Chamber of Commerce		Newspaper Ads
Social Media		Pamphlet/Brochure	Television News	X	School
Public Meetings		Outdoor Ads	Television Ads		Magazines
Radio News		Books	Universities		Mail
Radio Ads	X	Email Newsletters	Fire Dept/Rescue		Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?

Yes	No

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?

Yes	No	

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

11. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, which of the following categories are most susceptible to the impacts caused by natural hazards in your city? The answers will be displayed as Community Asset - Potential Natural Hazard Impact

(Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

2	Human - Loss of life and/or injuries
5	Economic - Business closures and/or job losses
1	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
3	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
4	Environmental - Damage or loss of forests, rangeland, waterways, etc.
6	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities		X				
Schools (K-12)			X			
Hospitals				X		
Major Bridges		X				
Fire/Police Stations		X				
Museums/Historic Bldgs	X					
Major Employers				X		
Small Businesses		X				
College/Universities				X		
City Hall/Courthouse			X			
Parks		X				
Other		X				

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk			X			
I support a mix of both regulatory and non-regulatory approaches to reducing risk	X					
I support policies to prohibit development in areas subject to natural hazards			X			
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards				X		

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of local tax dollars to reduce risks and loss from natural disasters.			X			
I support protecting historical and cultural structures.	X					
I would be willing to make my home more disaster resilient.		X				
I support steps to safeguard the local economy following a disaster event.		X				
I support improving the disaster preparedness of local schools.	X					
I support a local inventory of at-risk buildings and infrastructure.		X				
I support disclosure of natural hazard risks during real estate transactions.	X					

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	X					
Protecting critical facilities (transportation networks, hospitals, fire stations)	X					
Preventing development in hazard areas		X				
Enhancing the function of natural features (i.e., streams)	X					
Protecting historical and cultural landmarks	X					
Protecting and reducing damage to utilities	X					
Strengthening emergency services (i.e. police, fire, ems)		X				
Disclosing natural hazard risks during real estate transactions	X					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	X					

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	X			
Talked with members in your household about what to do in case of a natural disaster or emergency?		X		
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?		X		
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?		X		
In the last year, has anyone in your household been trained in First Aid or CPR?	X			
Prepared your home by having smoke detectors on each level?	X			
Discussed or created a utility shutoff procedure in the event of a natural disaster?	X			

General Household Information:
Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	33					
17. Your gender	Male		Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-19,999	$20,000 - $29,000	$30,000 - $39,000	$40,000 - $49,000	$50,000 - $59,000
	$60,000-69,999	$70,000 - $79,000	$80,000 - $89,000	$90,000 - $99,000	$100,000 - $149,000	More than $150,000
20. City & Zip Code	Westworth Village (please list if other)				76114	

21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic X	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived in Westworth Village? (X the appropriate box)	Less than one year X	1-5 Years	5-9 Years	10-19 Years	20 or more years	
23. Do you rent or own your home? (X the appropriate box)	Rent X	Own				
24. Do you rent / own a: (X the appropriate box)	Single Family home	Duplex	Apartment (Less than 5 units in structure) X	Apartment (5 or more units in structure)	Condominium Or Townhouse	Manufactured or Mobile Home
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Mitigation Survey

1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

YES | NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure				✓		
Hail		✓				
Drought			✓			
High Winds			✓			
Earthquake				✓		
Lightning				✓		
Expansive Soils		✓				
Tornado	✓					
Extreme Heat			✓			
Wildfire				✓		
Flooding		✓				
Winter Storms		✓				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES | NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months | 6-12 months | 1-2 years | 2-5 years

6. What source most recently provided you with the information?

News Media	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media	Elected Officials	Government Agency	Amer. Red Cross
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8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories	Online News	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's

Yes	No

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?

Yes	No

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Major Employers		✓				
Small Businesses		✓				
College/Universities		✓				
City Hall/Courthouse			✓			
Parks				✓		
Other						

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I support a mix of both regulatory and nonregulatory approaches to reducing risk		✓				
I support policies to prohibit development in areas subject to natural hazards	✓					

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards			✓			
I support the use of local tax dollars to reduce risks and loss from natural disasters			✓			
I support protecting historical and cultural structures			✓			
I would be willing to make my home more disaster resilient			✓			
I support steps to safeguard the local economy following a disaster event			✓			
I support improving the disaster preparedness of local schools	✓					
I support a local inventory of at-risk buildings and infrastructure		✓				
I support disclosure of natural hazard risks during real estate transactions	✓					

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Enhancing the function of natural features (i.e., streams)	✓					
Protecting historical and cultural landmarks			✓			
Protecting and reducing damage to utilities		✓				
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	✓					

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	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	✓			
Talked with members in your household about what to do in case of a natural disaster or emergency?		✓		
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?			✓	
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?			✓	
In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?		✓		

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	38	**17. Gender (circle one)**		Male / (Female)		
18. Education Level: (X the appropriate box)	High School	Some College Trade School	(College Degree)	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000 -$19,999	$20,000 -$29,000	$30,000 -$39,000	$40,000 -$49,000	$50,000 - $59,000
	$60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	Westworth Village, TX 76114					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	(Hispanic / Latino)	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)		Less than one year	1-5 Years	5-9 Years	(10-19 Years)	20 or more years
23. Do you rent or own?	Rent	(Own)				
24. Do you rent / own a:	(Single Family)	Duplex	Apartment	Townhouse	Mobile Home	

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1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

YES	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure						✓
Hail		✓				
Drought		✓				
High Winds		✓				
Earthquake				✓		
Lightning		✓				
Expansive Soils		I HAVE MOLES OR GOPHERS				
Tornado		✓				
Extreme Heat		✓				
Wildfire		✓				
Flooding		✓				
Winter Storms		✓				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES	NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	6-12 months	1-2 years	2-5 years

6. What source most recently provided you with the information?

News Media	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media ✓	Elected Officials ✓	Government Agency ✓	Amer. Red Cross ✓
Insurance Company ✓	Utility Company ✓	Social Media	University/Institution ✓
Neighbors/ Friends ✓	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories	Online News	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure ✓	Television News	School
Public Meetings ✓	Outdoor Ads	Television Ads	Magazines
Radio News	Books ✓	Universities ✓	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue ✓	Other:

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BY:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	(No)

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	(No)

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

11. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, which of the following categories are most susceptible to the impacts caused by natural hazards in your city? The answers will be displayed as Community Asset - Potential Natural Hazard Impact. (Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

1	Human - Loss of life and/or injuries
5	Economic - Business closures and/or job losses
2	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
3	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
4	Environmental - Damage or loss of forests, rangeland, waterways, etc.
6	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities		✓				
Schools (K-12)		✓				
Hospitals		✓				
Major Bridges		✓				
Fire/Police Stations		✓				
Museums/Historic Bldgs			✓			✓
Major Employers			✓			
Small Businesses			✓			
College/Universities			✓			✓
City Hall/Courthouse		✓				
Parks			✓			
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk	✓					
I support a mix of both regulatory and nonregulatory approaches to reducing risk						
I support policies to prohibit development in areas subject to natural hazards	✓					

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards				✓		
I support the use of local tax dollars to reduce risks and loss from natural disasters		✓				
I support protecting historical and cultural structures		✓				
I would be willing to make my home more disaster resilient						✓
I support steps to safeguard the local economy following a disaster event						
I support improving the disaster preparedness of local schools		✓				
I support a local inventory of at-risk buildings and infrastructure		✓				
I support disclosure of natural hazard risks during real estate transactions	✓					

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property		✓				
Protecting critical facilities (transportation networks, hospitals, fire stations)	✓					
Preventing development in hazard areas	✓					
Enhancing the function of natural features (i.e., streams)	✓					
Protecting historical and cultural landmarks		✓				
Protecting and reducing damage to utilities		✓				
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	✓					

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?		✓	✓	
Talked with members in your household about what to do in case of a natural disaster or emergency?		✓	✓	
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?		✓	✓	
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?		✓	✓	
In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?			✓	

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	77	**17. Gender (circle one)**	Male ✓	Female		
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree ✓	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000	$40,000 -$49,000	$50,000 - $59,000
	X $60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	Westworth Village			76114		
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic ✓	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)		Less than one year	1-5 Years	5-9 Years	10-19 Years ✓	20 or more years
23. Do you rent or own?	Rent ✓	Own ✓				
24. Do you rent / own a:	Single Family ✓	Duplex	Apartment	Townhouse	Mobile Home	

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1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

YES	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure			✓			
Hail		✓				
Drought		✓				
High Winds		✓				
Earthquake			✓			
Lightning		✓				
Expansive Soils		✓				
Tornado		✓				
Extreme Heat		✓				
Wildfire				✓		
Flooding			✓			
Winter Storms		✓				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES	NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	6-12 months	1-2 years	2-5 years

6. What source most recently provided you with the information?

News Media	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

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Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories	Online News	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	No

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	No

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

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4	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities		✓				
Schools (K-12)		✓				
Hospitals						✓
Major Bridges		✓	✓			
Fire/Police Stations		✓				
Museums/Historic Bldgs						✓
Major Employers			✓			
Small Businesses		✓				
College/Universities						✓
City Hall/Courthouse		✓				
Parks		✓				
Other Power		✓				

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk		✓				
I support a mix of both regulatory and nonregulatory approaches to reducing risk		✓				
I support policies to prohibit development in areas subject to natural hazards	✓					

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards				✓		
I support the use of local tax dollars to reduce risks and loss from natural disasters		✓				
I support protecting historical and cultural structures		✓				
I would be willing to make my home more disaster resilient			✓			
I support steps to safeguard the local economy following a disaster event			✓			
I support improving the disaster preparedness of local schools	✓					
I support a local inventory of at-risk buildings and infrastructure		✓				
I support disclosure of natural hazard risks during real estate transactions	✓					

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

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Preventing development in hazard areas	✓					
Enhancing the function of natural features (i.e., streams)		✓				
Protecting historical and cultural landmarks		✓				
Protecting and reducing damage to utilities	✓					
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	✓					

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	Have Done	Plan to Do	Not Done	Unable to Do
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Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	✓			
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?		✓		
In the last year, has anyone in your household been trained in First Aid or CPR?	✓			
Prepared your home by having smoke detectors on each level?				✓
Discussed or created a utility shutoff procedure in the event of a natural disaster?			✓	

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	78	**17. Gender (circle one)**	Male / Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000	$40,000 -$49,000	$50,000 - $59,000
	$60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000 X	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	WESTWORTH VILLAGE 76114					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic X	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years X	
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24. Do you rent / own a:	Single Family	Duplex	Apartment	Townhouse	Mobile Home	

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YES	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure				✓		
Hail		✓				
Drought	✓					
High Winds		✓				
Earthquake		✓				
Lightning		✓				
Expansive Soils				✓		
Tornado		✓				
Extreme Heat		✓				
Wildfire				✓		
Flooding				✓		
Winter Storms				✓		

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YES	(NO) (if no, skip to Question 7)

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Social Media	Pamphlet/Brochure	Television News ✓	School
Public Meetings ✓	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue ✓	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	No ✓

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	No ✓

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Major Employers		✓				
Small Businesses		✓				
College/Universities			✓			
City Hall/Courthouse		✓				
Parks		✓				
Other						

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In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?			✓	

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18. Education Level: (X the appropriate box)	High School	(Some College) Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000	$40,000 -$49,000	$50,000 - $59,000 X
	$60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	WESTWORTH VILLAGE 76114					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic X	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years X	20 or more years	
23. Do you rent or own?	Rent	X Own				
24. Do you rent / own a:	X Single Family	Duplex	Apartment	Townhouse	Mobile Home	

Westworth Village Hazardous Mitigation Survey

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1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

YES	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure					✓	
Hail	✓					
Drought		✓				
High Winds	✓					
Earthquake				✓		
Lightning	✓					
Expansive Soils			✓			
Tornado	✓					
Extreme Heat		✓				
Wildfire		✓				
Flooding		✓				
Winter Storms		✓				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

(YES)	NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	6-12 months	1-2 years	✓ 2-5 years

6. What source most recently provided you with the information?

News Media ✓	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company ✓	Utility Company	Social Media ✓	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media ✓	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company ✓	Utility Company	Social Media ✓	University/Institution
Neighbors/ Friends	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories	Online News ✓	Chamber of Commerce	Newspaper Ads
Social Media ✓	Pamphlet/Brochure	Television News ✓	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	No ✓

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
(Yes)	No

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

11. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, which of the following categories are most susceptible to the impacts caused by natural hazards in your city? The answers will be displayed as Community Asset - Potential Natural Hazard Impact. (Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

1	Human - Loss of life and/or injuries
2	Economic - Business closures and/or job losses
6	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
4	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
3	Environmental - Damage or loss of forests, rangeland, waterways, etc.
5	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities	✓					
Schools (K-12)			✓			
Hospitals		✓	✓			
Major Bridges			✓			
Fire/Police Stations			✓			
Museums/Historic Bldgs			✓			
Major Employers		✓				
Small Businesses		✓				
College/Universities				✓		
City Hall/Courthouse			✓			
Parks			✓			
Other			✓			

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk			✓			
I support a mix of both regulatory and nonregulatory approaches to reducing risk			✓			
I support policies to prohibit development in areas subject to natural hazards			✓			

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards					✓	
I support the use of local tax dollars to reduce risks and loss from natural disasters			✓			
I support protecting historical and cultural structures			✓			
I would be willing to make my home more disaster resilient			✓			
I support steps to safeguard the local economy following a disaster event			✓			
I support improving the disaster preparedness of local schools		✓				
I support a local inventory of at-risk buildings and infrastructure			✓			
I support disclosure of natural hazard risks during real estate transactions			✓			

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	✓					
Protecting critical facilities (transportation networks, hospitals, fire stations)			✓			
Preventing development in hazard areas			✓			
Enhancing the function of natural features (i.e., streams)		✓				
Protecting historical and cultural landmarks	✓					
Protecting and reducing damage to utilities	✓					
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions		✓				
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses			✓			

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?			✓	
Talked with members in your household about what to do in case of a natural disaster or emergency?	✓			
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	✓			
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?		✓		
In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?			✓	
Discussed or created a utility shutoff procedure in the event of a natural disaster?		✓		

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	70	**17. Gender (circle one)**	Male / (Female)			
18. Education Level: (X the appropriate box)	High School ✓	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000 ✓	$40,000 -$49,000	$50,000 - $59,000
	$60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	76014					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic ✓	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years 43 yrs ✓	
23. Do you rent or own?	Rent	(Own)				
24. Do you rent / own a:	✓ Single Family	Duplex	Apartment	Townhouse	Mobile Home	

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1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

YES	X NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure				X		
Hail		X				
Drought		X				
High Winds			X			
Earthquake					X	
Lightning			X			
Expansive Soils			X			
Tornado		X				
Extreme Heat				X		
Wildfire			X			
Flooding			X			
Winter Storms		X				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES X	NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	6-12 months	X 1-2 years	2-5 years

6. What source most recently provided you with the information?

News Media X	Elected Officials	Government Agency X	Amer. Red Cross
Insurance Company X	Utility Company X	Social Media X	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media	Elected Officials	Government Agency X	Amer. Red Cross X
Insurance Company X	Utility Company X	Social Media	University/Institution
Neighbors/ Friends	Other: Police & Fire Department		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories X	Online News	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure X	Television News X	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail X
Radio Ads	Email Newsletters	Fire Dept/Rescue X	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	No X

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	No X

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

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3	Human - Loss of life and/or injuries
5	Economic - Business closures and/or job losses
6	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
4	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
1	Environmental - Damage or loss of forests, rangeland, waterways, etc.
2	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities		X				
Schools (K-12)		X				
Hospitals		X				
Major Bridges			X			
Fire/Police Stations		X				
Museums/Historic Bldgs		X				
Major Employers		X				
Small Businesses		X	X			
College/Universities			X			
City Hall/Courthouse			X			
Parks		X				
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk						X
I support a mix of both regulatory and nonregulatory approaches to reducing risk		X				
I support policies to prohibit development in areas subject to natural hazards	X					

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards		X				
I support the use of local tax dollars to reduce risks and loss from natural disasters			X			
I support protecting historical and cultural structures	X					
I would be willing to make my home more disaster resilient	X					
I support steps to safeguard the local economy following a disaster event		X				
I support improving the disaster preparedness of local schools			X			
I support a local inventory of at-risk buildings and infrastructure			X			
I support disclosure of natural hazard risks during real estate transactions			X			

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	X					
Protecting critical facilities (transportation networks, hospitals, fire stations)	X					
Preventing development in hazard areas	X					
Enhancing the function of natural features (i.e., streams)	X					
Protecting historical and cultural landmarks	X					
Protecting and reducing damage to utilities	X					
Strengthening emergency services (i.e. police, fire, ems)	X					
Disclosing natural hazard risks during real estate transactions		X				
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	X					

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	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	X			
Talked with members in your household about what to do in case of a natural disaster or emergency?		X		
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?		X		
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?		X		
In the last year, has anyone in your household been trained in First Aid or CPR?			X	
Prepared your home by having smoke detectors on each level?	X			
Discussed or created a utility shutoff procedure in the event of a natural disaster?			X	

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	42	**17. Gender (circle one)**	Male / (Female)			
18. Education Level: (X the appropriate box)	High School X	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000 X	$40,000 -$49,000	$50,000 - $59,000
	$60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	Westworth Village 76114					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic X	Hispanic / Latino	Native Hawaiian or Pacific Islander

22. How long have you lived here? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years X	20 or more years	
23. Do you rent or own?	Rent	X Own				
24. Do you rent / own a:	X Single Family	Duplex	Apartment	Townhouse	Mobile Home	

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YES	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure				X		
Hail		X				
Drought		X				
High Winds		X				
Earthquake						
Lightning			X			
Expansive Soils			X			
Tornado		X				
Extreme Heat		X				
Wildfire				X		
Flooding		X				
Winter Storms		X				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES	NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	6-12 months	1-2 years	2-5 years

6. What source most recently provided you with the information?

News Media	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

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Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

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Social Media	Pamphlet/Brochure	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	(No)

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	(No)

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

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2	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
6	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
1	Environmental - Damage or loss of forests, rangeland, waterways, etc.
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	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities			X			
Schools (K-12)		X				
Hospitals		X				
Major Bridges			X			
Fire/Police Stations		X				
Museums/Historic Bldgs				X		
Major Employers				X		
Small Businesses	X					
College/Universities			X			
City Hall/Courthouse			X			
Parks	X					
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk		X				
I support a mix of both regulatory and nonregulatory approaches to reducing risk	X					
I support policies to prohibit development in areas subject to natural hazards	X					

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards	X					
I support the use of local tax dollars to reduce risks and loss from natural disasters		X				
I support protecting historical and cultural structures			X			
I would be willing to make my home more disaster resilient			X			
I support steps to safeguard the local economy following a disaster event		X				
I support improving the disaster preparedness of local schools		X				
I support a local inventory of at-risk buildings and infrastructure			X			
I support disclosure of natural hazard risks during real estate transactions			X			

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

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Protecting Private Property	X					
Protecting critical facilities (transportation networks, hospitals, fire stations)	X					
Preventing development in hazard areas	X					
Enhancing the function of natural features (i.e., streams)	X					
Protecting historical and cultural landmarks			X			
Protecting and reducing damage to utilities						
Strengthening emergency services (i.e. police, fire, ems)		X				
Disclosing natural hazard risks during real estate transactions		X				
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses		X				

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	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	X			
Talked with members in your household about what to do in case of a natural disaster or emergency?	X			
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	X			
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?	X			
In the last year, has anyone in your household been trained in First Aid or CPR?			X	
Prepared your home by having smoke detectors on each level?	X			
Discussed or created a utility shutoff procedure in the event of a natural disaster?		X		

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	36	**17. Gender (circle one)**	Male	(Female)		
18. Education Level: (X the appropriate box)	High School	Some College Trade School	(College Degree)	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000	$40,000 -$49,000	$50,000 - $59,000
	$60,000-$69,999	($70,000 -$79,000)	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	76114					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)	Less than one year	1-5 Years	(5-9 Years)	10-19 Years	20 or more years	
23. Do you rent or own?	Rent	(Own)				
24. Do you rent / own a:	(Single Family)	Duplex	Apartment	Townhouse	Mobile Home	

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1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

(YES)	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	(Hail)	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure			✓			
Hail		✓				
Drought		✓				
High Winds		✓				
Earthquake		✓				
Lightning		✓				
Expansive Soils			✓			
Tornado		✓				
Extreme Heat		✓				
Wildfire		✓				
Flooding		✓				
Winter Storms		✓				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES	(NO) (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	6-12 months	1-2 years	2-5 years

6. What source most recently provided you with the information?

News Media	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

(News Media)	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	(Utility Company)	Social Media	(University/Institution)
Neighbors/ Friends	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories	Online News	Chamber of Commerce	Newspaper Ads
(Social Media)	(Pamphlet/Brochure)	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	(Mail)
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	No

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	No

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

11. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, which of the following categories are most susceptible to the impacts caused by natural hazards in your city? The answers will be displayed as Community Asset - Potential Natural Hazard Impact. (Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

1.	Human - Loss of life and/or injuries
6.	Economic - Business closures and/or job losses
3.	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
5.	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
4.	Environmental - Damage or loss of forests, rangeland, waterways, etc.
2.	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities		✓				
Schools (K-12)		✓				
Hospitals	✓					
Major Bridges	✓					
Fire/Police Stations	✓					
Museums/Historic Bldgs				✓		
Major Employers			✓			
Small Businesses		✓				
College/Universities			✓			
City Hall/Courthouse		✓		✓		
Parks				✓		
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk			✓			
I support a mix of both regulatory and nonregulatory approaches to reducing risk			✓			
I support policies to prohibit development in areas subject to natural hazards			✓			

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards						✓
I support the use of local tax dollars to reduce risks and loss from natural disasters						✓
I support protecting historical and cultural structures				✓		
I would be willing to make my home more disaster resilient						✓
I support steps to safeguard the local economy following a disaster event						✓
I support improving the disaster preparedness of local schools			✓			
I support a local inventory of at-risk buildings and infrastructure			✓			
I support disclosure of natural hazard risks during real estate transactions						

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	✓					
Protecting critical facilities (transportation networks, hospitals, fire stations)	✓					
Preventing development in hazard areas			✓			
Enhancing the function of natural features (i.e., streams)			✓			
Protecting historical and cultural landmarks			✓			
Protecting and reducing damage to utilities	✓					
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses			✓			

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	✓			
Talked with members in your household about what to do in case of a natural disaster or emergency?	✓			
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	✓			
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?	✓			
In the last year, has anyone in your household been trained in First Aid or CPR?	✓			
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?	✓			

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	72	**17. Gender (circle one)**	Male / Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree X	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000	$40,000 -$49,000	$50,000 - $59,000 X
	$60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	WESTWORTH VILLAGE, TX 76114					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic X	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years X	
23. Do you rent or own?	Rent	X Own				
24. Do you rent / own a:	X Single Family	Duplex	Apartment	Townhouse	Mobile Home	

Westworth Village Hazardous Mitigation Survey

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1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

YES	(NO) (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure				✓		
Hail	✓					
Drought		✓				
High Winds	✓					
Earthquake				✓		
Lightning			✓			
Expansive Soils				✓		
Tornado	✓					
Extreme Heat	✓					
Wildfire				✓		
Flooding				✓		
Winter Storms		✓				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES	(NO) (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	6-12 months	1-2 years	2-5 years

6. What source most recently provided you with the information?

News Media	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media	Elected Officials	Government Agency	(Amer. Red Cross)
(Insurance Company)	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other: WESTWORTH Village		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories	Online News	Chamber of Commerce	Newspaper Ads
Social Media	(Pamphlet/Brochure)	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	(Mail)
Radio Ads	Email Newsletters	(Fire Dept/Rescue)	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	(No)

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	(No)

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

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6	Environmental - Damage or loss of forests, rangeland, waterways, etc.
2	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities		✓				
Schools (K-12)			✓			
Hospitals	✓					
Major Bridges		✓				
Fire/Police Stations	✓					
Museums/Historic Bldgs			✓			
Major Employers			✓			
Small Businesses			✓			
College/Universities			✓			
City Hall/Courthouse			✓			
Parks			✓			
Other			✓			

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk		✓				
I support a mix of both regulatory and nonregulatory approaches to reducing risk	✓					
I support policies to prohibit development in areas subject to natural hazards	✓					

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards					✓	
I support the use of local tax dollars to reduce risks and loss from natural disasters			✓			
I support protecting historical and cultural structures		✓				
I would be willing to make my home more disaster resilient	✓					
I support steps to safeguard the local economy following a disaster event			✓			
I support improving the disaster preparedness of local schools	✓					
I support a local inventory of at-risk buildings and infrastructure			✓			
I support disclosure of natural hazard risks during real estate transactions	✓					

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	✓					
Protecting critical facilities (transportation networks, hospitals, fire stations)	✓					
Preventing development in hazard areas	✓					
Enhancing the function of natural features (i.e., streams)		✓				
Protecting historical and cultural landmarks		✓				
Protecting and reducing damage to utilities	✓					
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	✓					

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?			✓	
Talked with members in your household about what to do in case of a natural disaster or emergency?			✓	
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?			✓	
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?			✓	
In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?	✓			

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age		**17. Gender (circle one)**		Male / Female		
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000	$40,000 -$49,000	$50,000 - $59,000
	$60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code		76114				
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)		Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years
23. Do you rent or own?	Rent	Own				
24. Do you rent / own a:	Single Family	Duplex	Apartment	Townhouse	Mobile Home	

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1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

YES	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure			X			
Hail		X				
Drought		X				
High Winds		X				
Earthquake			X			
Lightning		X				
Expansive Soils			X			
Tornado	X					
Extreme Heat		X				
Wildfire			X			
Flooding		X				
Winter Storms		X				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES	NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	6-12 months	1-2 years	2-5 years

6. What source most recently provided you with the information?

News Media	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media	Elected Officials	Government Agency ✓	Amer. Red Cross
Insurance Company ✓	Utility Company ✓	Social Media	University/Institution
Neighbors/ Friends	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories	Online News ✓	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure ✓	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail ✓
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	No

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	No

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

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2	Economic - Business closures and/or job losses
1	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
4	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
5	Environmental - Damage or loss of forests, rangeland, waterways, etc.
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12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities				✓		
Schools (K-12)						✓
Hospitals	✓					
Major Bridges	✓					
Fire/Police Stations	✓					
Museums/Historic Bldgs		✓				
Major Employers		✓				
Small Businesses		✓				
College/Universities		✓				
City Hall/Courthouse	✓					
Parks	✓					
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk		✓				
I support a mix of both regulatory and nonregulatory approaches to reducing risk	✓					
I support policies to prohibit development in areas subject to natural hazards	✓					

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards		✓				
I support the use of local tax dollars to reduce risks and loss from natural disasters	✓					
I support protecting historical and cultural structures	✓					
I would be willing to make my home more disaster resilient	✓					
I support steps to safeguard the local economy following a disaster event	✓					
I support improving the disaster preparedness of local schools	✓					
I support a local inventory of at-risk buildings and infrastructure	✓					
I support disclosure of natural hazard risks during real estate transactions	✓					

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

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Preventing development in hazard areas		✓				
Enhancing the function of natural features (i.e., streams)	✓					
Protecting historical and cultural landmarks		✓				
Protecting and reducing damage to utilities	✓					
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	✓					

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	Have Done	Plan to Do	Not Done	Unable to Do
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Talked with members in your household about what to do in case of a natural disaster or emergency?	✓			
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?		✓		
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?	✓			
In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?			✓	

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	42	**17. Gender (circle one)**	Male / (Female)			
18. Education Level: (X the appropriate box)	High School	Some College Trade School X	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000	$40,000 -$49,000	$50,000 - $59,000
	$60,000-$69,999	$70,000 -$79,000 X	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	Westworth Village 76114					
21. Race (X the appropriate box)	X American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)		Less than one year	1-5 Years	5-9 Years	X 10-19 Years	20 or more years
23. Do you rent or own?	Rent	X Own				
24. Do you rent / own a:	X Single Family	Duplex	Apartment	Townhouse	Mobile Home	

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YES ✓	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	✓ Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure						✓
Hail			✓			
Drought			✓			
High Winds			✓			
Earthquake					✓	
Lightning			✓			
Expansive Soils		✓				
Tornado			✓			
Extreme Heat			✓			
Wildfire					✓	
Flooding					✓	
Winter Storms			✓			

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES	NO (If no, skip to Question 7) ✓

5. If you answered Yes to question 4, how recently did you receive this information?

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Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media	Elected Officials	Government Agency	✓ Amer. Red Cross
✓ Insurance Company	Utility Company	Social Media	University/Institution
✓ Neighbors/ Friends	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

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Social Media	Pamphlet/Brochure	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
✓ Radio News	Books	Universities	✓ Mail
Radio Ads	Email Newsletters	✓ Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	No ✓

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	No ✓

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1	Human - Loss of life and/or injuries
4	Economic - Business closures and/or job losses
3	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
6	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
5	Environmental - Damage or loss of forests, rangeland, waterways, etc.
2	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities			✓			
Schools (K-12)			✓			
Hospitals		✓				
Major Bridges			✓			
Fire/Police Stations	✓					
Museums/Historic Bldgs				✓		
Major Employers			✓			
Small Businesses		✓				
College/Universities				✓		
City Hall/Courthouse			✓			
Parks				✓		
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk			✓			
I support a mix of both regulatory and nonregulatory approaches to reducing risk		✓				
I support policies to prohibit development in areas subject to natural hazards	✓					

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards					✓	
I support the use of local tax dollars to reduce risks and loss from natural disasters			✓			
I support protecting historical and cultural structures				✓		
I would be willing to make my home more disaster resilient		✓				
I support steps to safeguard the local economy following a disaster event	✓					
I support improving the disaster preparedness of local schools	✓					
I support a local inventory of at-risk buildings and infrastructure	✓					
I support disclosure of natural hazard risks during real estate transactions	✓					

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	✓					
Protecting critical facilities (transportation networks, hospitals, fire stations)	✓					
Preventing development in hazard areas		✓				
Enhancing the function of natural features (i.e., streams)		✓				
Protecting historical and cultural landmarks			✓			
Protecting and reducing damage to utilities	✓					
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses			✓			

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?			✓	
Talked with members in your household about what to do in case of a natural disaster or emergency?			✓	
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?		✓		
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?			✓	
In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?			✓	
Discussed or created a utility shutoff procedure in the event of a natural disaster?			✓	

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	79	**17. Gender (circle one)**	Male / Female ✓			
18. Education Level: (X the appropriate box)	High School ✓	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	✓ $10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000	$40,000 -$49,000	$50,000 - $59,000
	$60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	Westworth Village 76114					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino ✓	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years ✓	20 or more years	
23. Do you rent or own?	Rent	✓ Own				
24. Do you rent / own a:	✓ Single Family	Duplex	Apartment	Townhouse	Mobile Home	

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1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

YES	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure					X	
Hail		X				
Drought	X					
High Winds		X				
Earthquake				X		
Lightning		X				
Expansive Soils			X			
Tornado	X					
Extreme Heat		X				
Wildfire			X			
Flooding			X			
Winter Storms		X				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES	NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	6-12 months	1-2 years	2-5 years

6. What source most recently provided you with the information?

News Media	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories	Online News	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	No

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	No

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

11. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, which of the following categories are most susceptible to the impacts caused by natural hazards in your city? The answers will be displayed as Community Asset - Potential Natural Hazard Impact. (Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

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3	Economic - Business closures and/or job losses
6	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
5	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
2	Environmental - Damage or loss of forests, rangeland, waterways, etc.
1	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities		X				
Schools (K-12)		X				
Hospitals		X				
Major Bridges		X				
Fire/Police Stations	X					
Museums/Historic Bldgs			X			
Major Employers		X				
Small Businesses		X				
College/Universities		X				
City Hall/Courthouse		X				
Parks		X				
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk			X			
I support a mix of both regulatory and nonregulatory approaches to reducing risk	X					
I support policies to prohibit development in areas subject to natural hazards			X			

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards				X		
I support the use of local tax dollars to reduce risks and loss from natural disasters			X			
I support protecting historical and cultural structures				X		
I would be willing to make my home more disaster resilient			X			
I support steps to safeguard the local economy following a disaster event			X			
I support improving the disaster preparedness of local schools	X					
I support a local inventory of at-risk buildings and infrastructure		X				
I support disclosure of natural hazard risks during real estate transactions			X			

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	X					
Protecting critical facilities (transportation networks, hospitals, fire stations)	X					
Preventing development in hazard areas			X			
Enhancing the function of natural features (i.e., streams)		X				
Protecting historical and cultural landmarks			X			
Protecting and reducing damage to utilities	X					
Strengthening emergency services (i.e. police, fire, ems)	X					
Disclosing natural hazard risks during real estate transactions			X			
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses		X				

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?			X	
Talked with members in your household about what to do in case of a natural disaster or emergency?			X	
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?			X	
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?	X			
In the last year, has anyone in your household been trained in First Aid or CPR?	X		X	
Prepared your home by having smoke detectors on each level?				
Discussed or created a utility shutoff procedure in the event of a natural disaster?			X	

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	63	**17. Gender (circle one)**	Male / Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000	$40,000 -$49,000	$50,000 - $59,000
	$60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	WESTWORTH VILLAGE 76114					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years	
23. Do you rent or own?	Rent	Own				
24. Do you rent / own a:	Single Family	Duplex	Apartment	Townhouse	Mobile Home	

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1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

YES	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure			✓			
Hail		✓				
Drought		✓				
High Winds		✓				
Earthquake			✓			
Lightning		✓				
Expansive Soils			✓			
Tornado	✓					
Extreme Heat	✓					
Wildfire		✓				
Flooding		✓				
Winter Storms		✓				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES	NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	6-12 months	1-2 years	2-5 years

6. What source most recently provided you with the information?

News Media	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories	Online News	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	No

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	No

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

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2	Human - Loss of life and/or injuries
6	Economic - Business closures and/or job losses
4	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
3	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
5	Environmental - Damage or loss of forests, rangeland, waterways, etc.
1	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities		✓				
Schools (K-12)		✓				
Hospitals			✓			
Major Bridges			✓			
Fire/Police Stations		✓				
Museums/Historic Bldgs			✓			
Major Employers			✓			
Small Businesses			✓			
College/Universities			✓			
City Hall/Courthouse		✓				
Parks				✓		
Other			✓			

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk				✓		
I support a mix of both regulatory and nonregulatory approaches to reducing risk			✓			
I support policies to prohibit development in areas subject to natural hazards			✓			

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards				✓		
I support the use of local tax dollars to reduce risks and loss from natural disasters			✓			
I support protecting historical and cultural structures				✓		
I would be willing to make my home more disaster resilient						
I support steps to safeguard the local economy following a disaster event		✓				
I support improving the disaster preparedness of local schools			✓			
I support a local inventory of at-risk buildings and infrastructure						✓
I support disclosure of natural hazard risks during real estate transactions		✓				

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	✓					
Protecting critical facilities (transportation networks, hospitals, fire stations)	✓					
Preventing development in hazard areas			✓			
Enhancing the function of natural features (i.e., streams)		✓				
Protecting historical and cultural landmarks			✓			
Protecting and reducing damage to utilities		✓				
Strengthening emergency services (i.e. police, fire, ems)				✓		
Disclosing natural hazard risks during real estate transactions			✓			
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses				✓		

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15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	✓			
Talked with members in your household about what to do in case of a natural disaster or emergency?	✓			
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?			✓	
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?			✓	
In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?			✓	

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	57	**17. Gender (circle one)**	Male / Female			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000	$40,000 -$49,000	$50,000 - $59,000
	$60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	Westworth Village 76114					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years	
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24. Do you rent / own a:	Single Family	Duplex	Apartment	Townhouse	Mobile Home	

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YES	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
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Drought						
High Winds						
Earthquake						
Lightning						
Expansive Soils						
Tornado						
Extreme Heat						
Wildfire						
Flooding		✓				
Winter Storms						

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

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Public Meetings ✓	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	No ✓

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	No ✓

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Schools (K-12)						
Hospitals						
Major Bridges						
Fire/Police Stations	✓					
Museums/Historic Bldgs						
Major Employers						
Small Businesses						
College/Universities						
City Hall/Courthouse						
Parks						
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
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I support a mix of both regulatory and nonregulatory approaches to reducing risk						
I support policies to prohibit development in areas subject to natural hazards						

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards			✓			
I support the use of local tax dollars to reduce risks and loss from natural disasters			✓			
I support protecting historical and cultural structures			✓			
I would be willing to make my home more disaster resilient						
I support steps to safeguard the local economy following a disaster event						
I support improving the disaster preparedness of local schools						
I support a local inventory of at-risk buildings and infrastructure						
I support disclosure of natural hazard risks during real estate transactions						

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property			✓			
Protecting critical facilities (transportation networks, hospitals, fire stations)						
Preventing development in hazard areas						
Enhancing the function of natural features (i.e., streams)						
Protecting historical and cultural landmarks						
Protecting and reducing damage to utilities						
Strengthening emergency services (i.e. police, fire, ems)						
Disclosing natural hazard risks during real estate transactions						
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses						

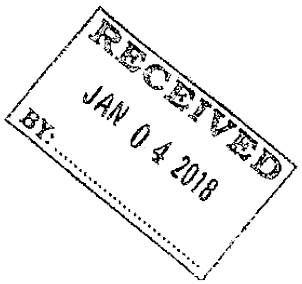
Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?				
Talked with members in your household about what to do in case of a natural disaster or emergency?				
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?				
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?				
In the last year, has anyone in your household been trained in First Aid or CPR?				✓
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?				

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age		**17. Gender (circle one)**	Male / Female			
18. Education Level: (X the appropriate box)	High School X	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000	$30,000 -$39,000 X	$40,000 -$49,000	$50,000 - $59,000
	$60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	WESTWORTH VILLAGE 76114					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic	Hispanic / Latino X	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years X	
23. Do you rent or own?	Rent	X Own				
24. Do you rent / own a:	Single Family X	Duplex	Apartment	Townhouse	Mobile Home	



Westworth Village Hazardous Mitigation Survey

Please return all surveys to City of Westworth Village, 311 Burton Hill Road, Westworth Village, TX 76114
Attn: Brandy Barrett or scan and email to bbarrett@cityofwestworth.com

1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

YES	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	High Winds
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure					X	
Hail		X				
Drought				X		
High Winds		X				
Earthquake			X			
Lightning		X				
Expansive Soils				X		
Tornado	X					
Extreme Heat		X				
Wildfire				X		
Flooding		X				
Winter Storms		X				

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES	NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	6-12 months	1-2 years	2-5 years

6. What source most recently provided you with the information?

News Media	Elected Officials	Government Agency	Amer. Red Cross
Insurance Company	Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media	Elected Officials	Government Agency ✓	Amer. Red Cross
Insurance Company ✓	Utility Company	Social Media	University/Institution
Neighbors/ Friends ✓	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories	Online News	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure ✓	Television News ✓	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	Mail ✓
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
Yes	(No)

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	(No)

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g. populations with functional needs, economic components, environmental resources, etc.). The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

11. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, which of the following categories are most susceptible to the impacts caused by natural hazards in your city? The answers will be displayed as Community Asset - Potential Natural Hazard Impact. (Please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

3	Human - Loss of life and/or injuries
4	Economic - Business closures and/or job losses
1	Infrastructure - Damage or loss of bridges, utilities, schools, etc.
6	Cultural/Historic - Damage or loss of libraries, museums, fairgrounds, etc.
5	Environmental - Damage or loss of forests, rangeland, waterways, etc.
2	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities	✓					
Schools (K-12)		✓				
Hospitals	✓					
Major Bridges	✓					
Fire/Police Stations	✓					
Museums/Historic Bldgs		✓				
Major Employers	✓					
Small Businesses		✓				
College/Universities	✓					
City Hall/Courthouse	✓					
Parks		✓				
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk		✓				
I support a mix of both regulatory and nonregulatory approaches to reducing risk		✓				
I support policies to prohibit development in areas subject to natural hazards			✓			

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards				✓		
I support the use of local tax dollars to reduce risks and loss from natural disasters		✓				
I support protecting historical and cultural structures		✓				
I would be willing to make my home more disaster resilient		✓				
I support steps to safeguard the local economy following a disaster event		✓				
I support improving the disaster preparedness of local schools	✓					
I support a local inventory of at-risk buildings and infrastructure		✓				
I support disclosure of natural hazard risks during real estate transactions		✓				

14. Natural Hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your city. Please tell us how important each one is to you.

	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property	✓					
Protecting critical facilities (transportation networks, hospitals, fire stations)	✓					
Preventing development in hazard areas	✓					
Enhancing the function of natural features (i.e., streams)		✓				
Protecting historical and cultural landmarks		✓				
Protecting and reducing damage to utilities	✓					
Strengthening emergency services (i.e. police, fire, ems)	✓					
Disclosing natural hazard risks during real estate transactions	✓					
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	✓					

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

15. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?		✓		
Talked with members in your household about what to do in case of a natural disaster or emergency?			✓	
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?			✓	
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?			✓	
In the last year, has anyone in your household been trained in First Aid or CPR?			✓	
Prepared your home by having smoke detectors on each level?	✓			
Discussed or created a utility shutoff procedure in the event of a natural disaster?			✓	

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	71	**17. Gender (circle one)**	Male	(Female)		
18. Education Level: (X the appropriate box)	High School X	Some College Trade School	College Degree	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000 -$29,000 X	$30,000 -$39,000	$40,000 -$49,000	$50,000 - $59,000
	$60,000-$69,999	$70,000 -$79,000	$80,000 -$89,000	$90,000 -$99,000	$100,000 -$149,000	More than $150,000
20. City & Zip Code	Westworth Village 76114					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	White, Non-Hispanic X	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)		Less than one year	1-5 Years	5-9 Years	10-19 Years	20 or more years X
23. Do you rent or own?	Rent	X Own				
24. Do you rent / own a:	X Single Family	Duplex	Apartment	Townhouse	Mobile Home	

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1. During the past five years in the city you currently reside in, have you or someone in your household directly experienced a natural disaster such as a tornado, flooding, wildfire, hail, or other natural disaster?

(YES)	NO (If no, skip to Question 3)

2. If you answered yes to question 1, please indicate which disaster(s) was experienced.

Dam Failure	Hail	Drought	(High Winds)
Earthquake	Lightning	Expansive Soils	Tornado
Extreme Heat	Wildfire	Flooding	Winter Storms

3. How concerned are you about the following natural disasters?

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Dam Failure					X	
Hail		X				
Drought		X				
High Winds				X		
Earthquake				X		
Lightning			X			
Expansive Soils			X			
Tornado		X				
Extreme Heat					X	
Wildfire						X
Flooding					X	
Winter Storms					X	

4. Have you ever received information about how to make members of your household and your home safer from natural disasters?

YES X	NO (If no, skip to Question 7)

5. If you answered Yes to question 4, how recently did you receive this information?

Within last 6 months	X 6-12 months	1-2 years	2-5 years

6. What source most recently provided you with the information?

X News Media	Elected Officials	Government Agency	Amer. Red Cross
X Insurance Company	X Utility Company	X Social Media	University/Institution
Neighbors/ Friends	Other:		

7. Which source(s) would you most trust to provide you with information about how to make your household and home safe from natural disasters? (Check up to three)

News Media	Elected Officials	Government Agency	Amer. Red Cross
X Insurance Company	X Utility Company	Social Media	University/Institution
Neighbors/ Friends	Other:		

8. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Check up to three)

Newspaper Stories	Online News	Chamber of Commerce	Newspaper Ads
Social Media	Pamphlet/Brochure	Television News	School
Public Meetings	Outdoor Ads	Television Ads	Magazines
Radio News	Books	Universities	X Mail
Radio Ads	Email Newsletters	Fire Dept/Rescue	Other:

9. Prior to this survey, were you aware of your city's Hazard Mitigation Plan (HazMAP)?	
X Yes	No

10. Prior to this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your city to update the HazMAP every five years in order for your city to be eligible for federal pre- and post-disaster hazard mitigation funds?	
Yes	X No

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3	Environmental - Damage or loss of forests, rangeland, waterways, etc.
6	Governance - Ability to maintain order and/or provide public amenities and services

12. Next we would like to know what specific types of community assets are most important to you. (Check the corresponding box for each asset)

	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	No Concern	Not Applicable
Elder Care Facilities				X		
Schools (K-12)				X		
Hospitals						X
Major Bridges						X
Fire/Police Stations		X				
Museums/Historic Bldgs			X			
Major Employers		X				
Small Businesses				X		
College/Universities						X
City Hall/Courthouse			X			
Parks			X			
Other						

13. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk					X	
I support a mix of both regulatory and nonregulatory approaches to reducing risk				X		
I support policies to prohibit development in areas subject to natural hazards				X		

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree	Not Sure
I support the use of tax dollars (federal/state/local) to compensate land owners for not developing in areas subject to natural hazards						X
I support the use of local tax dollars to reduce risks and loss from natural disasters					X	
I support protecting historical and cultural structures			X			
I would be willing to make my home more disaster resilient						X
I support steps to safeguard the local economy following a disaster event			X			
I support improving the disaster preparedness of local schools			X			
I support a local inventory of at-risk buildings and infrastructure			X			
I support disclosure of natural hazard risks during real estate transactions			X			

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	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Not Applicable
Protecting Private Property		X				
Protecting critical facilities (transportation networks, hospitals, fire stations)	X					
Preventing development in hazard areas					X	
Enhancing the function of natural features (i.e., streams)			X			
Protecting historical and cultural landmarks		X				
Protecting and reducing damage to utilities		X				
Strengthening emergency services (i.e. police, fire, ems)	X					
Disclosing natural hazard risks during real estate transactions		X				
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses		X				

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	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural or emergency preparedness?	X			
Talked with members in your household about what to do in case of a natural disaster or emergency?	X			
Developed a "Household / Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?			X	
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies?			X	
In the last year, has anyone in your household been trained in First Aid or CPR?			X	
Prepared your home by having smoke detectors on each level?	X			
Discussed or created a utility shutoff procedure in the event of a natural disaster?	X			

General Household Information: Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only. Please answer the following questions:

16. Your age	63	**17. Gender (circle one)**	Male / (Female)			
18. Education Level: (X the appropriate box)	High School	Some College Trade School	College Degree X	Postgraduate Degree	Other (please specify):	
19. Total Household Income (X the appropriate box)	Less than $10,000	$10,000-$19,999	$20,000-$29,000	$30,000-$39,000	$40,000-$49,000	$50,000-$59,000
	$60,000-$69,999	$70,000-$79,000	$80,000-$89,000	$90,000-$99,000	$100,000-$149,000 X	More than $150,000
20. City & Zip Code	Westworth Village 76114					
21. Race (X the appropriate box)	American Indian or Alaska Native	Asian	Black or African American	X White, Non-Hispanic	Hispanic / Latino	Native Hawaiian or Pacific Islander
22. How long have you lived here? (X the appropriate box)	Less than one year	1-5 Years	5-9 Years	X 10-19 Years	20 or more years	
23. Do you rent or own?	Rent	X Own				
24. Do you rent / own a:	X Single Family	Duplex	Apartment	Townhouse	Mobile Home	

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Attendance Records

The following pages are the various attendance sheets from a majority of the meetings conducted during the planning process of this Tarrant County Hazard Mitigation Action Plan.

Meeting Sign-In Sheet

Meeting:	PDM16 Tarrant County HazMAP Kickoff	**Meeting Date:**	August 17, 2017
Facilitator:	Alayna Payne and Jessica Mason	**Place/Room:**	Tarrant County Northeast Courthouse

Planning Team Member

Initial	Jurisdiction	Name	Title	Email
	Arlington	Irish Hancock	Emergency Management Administrator	irish.hancock@arlingtontx.gov
	Azle	Thomas Will Scott	EMC	tscott@ci.azle.tx.us
	Bedford	Sean Fay	Fire Chief/EMC	sean.fay@bedfordtx.gov
	Bedford	Bobby Sewell		bobby.sewell@bedfordtx.gov
	Colleyville	Kenny Phillips	EMC	kphillips@colleyville.com
	Crowley	Luke Thompson	EMC	lthompson@ci.crowley.tx.us
	Dalworthington Gardens	Aaron Ausmus	EMC	aausmus@cityofdwg.net
	DFW Airport	Phillip Mongeau	EMC	pmongeau@dfwairport.com
JB	Edgecliff Village	Jeff Ballew	Fire Chief/EMC	jballewevfd@aol.com
	Euless	Suzanne Hendrickson	EMC	shendrickson@eulesstx.gov
	Everman	C. Spencer ~~Randy Sanders~~	EMC Police Chief	~~s00@evermantx.net~~ cspencer@evermantx.net
	Forest Hill	Randy Chapman	~~Assistant~~ Fire Chief/EMC	randychapman@foresthilltx.org
	Fort Worth	Maribel Martinez	EMC	Maribel.Martinez@fortworthtexas.gov
	Grapevine	Matt Feryan	EMC	mferyan@grapevinetexas.gov
	Haltom City	Perry Bynum	EMC	pbynum@haltomcitytx.com
	Haslet	Kirt Mays	EMC	kmays@haslet.org
	Hurst	David Palla	Assistant Fire Chief/EMC	dpalla@hursttx.gov
	Keller	David Jones	Fire Chief/EMC	djones@cityofkeller.com
mike mcmurray	Kennedale	~~Tommy Williams~~	Police Chief/EMC Fire Chief	~~twilliams@cityofkennedale.com~~
	Lake Worth	Michael Voorhies	Fire Marshal/EMC	mvoorhies@lakeworthtx.org
	Lakeside	Sean Hughes	EMC	hughs0119@sbcglobal.net
	Mansfield	Greg Cutler	EMC	greg.cutler@mansfieldtexas.gov

Meeting Sign-In

Meeting:	PDM16 Tarrant County HazMAP Kickoff	**Meeting Date:**	August 17, 2017
Facilitator:	Alayna Payne and Jessica Mason	**Place/Room:**	Tarrant County Northeast Courthouse

Planning Team Member

Initial	Jurisdiction	Name	Title	Email
	NCTCOG	Alayna Payne	Program Assistant	apayne@nctcog.org
	NCTCOG	Jessica Mason	EM Specialist	jmason@nctcog.org
	North Richland Hills	Billy Owens	EMC	bowens@nrhtx.com
	Pantego	Thomas Griffith	EMC	tgriffith@townofpantego.com
	Richland Hills	Russell Shelley	Fire Chief/EMC	rshelley@richlandhills.com
	River Oaks	James Myrick	EMC	j.m.myrick@sbcglobal.net
	Saginaw	Doug Spears	Fire Chief/EMC	dougspears@saginawfire.us
	Southlake	Eric Hutmacher	EMC	ehutmacher@ci.southlake.tx.us
	Tarrant County	David McCurdy	EMC	dmmccurdy@tarrantcounty.com
	TDEM	Raymond Mejia	Hazard Mitigation Plans Team Lead	Raymond.Mejia@dps.texas.gov
	UNTHSC	Brandi Lara	Associate Director, Emergency Management and Business Continuity	Brandi.Lara@unthsc.edu
	Watauga	Randy Barkley	EMC	rbarkley@cowtx.org
	Westlake	Richard Whitten	Fire Chief/EMC	rwhitten@westlake-tx.org
	Westworth Village	~~Michael Coleman~~ Gina Dubey	Mayor/EMC Project Manager	mcoleman@cityofwestworth.com
	White Settlement	~~Brian Thompson~~ Russell Shelley	Fire Chief/EMC	bthompson@wstx.us

Meeting Sign-In Sheet

Meeting:	PDM16 Tarrant County HazMAP Kickoff	**Meeting Date:**	August 17, 2017
Facilitator:	Alayna Payne and Jessica Mason	**Place/Room:**	Tarrant County Northeast Courthouse

Additional/ Alternate Member

Initial	Jurisdiction	Name	Title	Email
	Westworth Village	Brandy Barrett	City Secretary	bbarrett@cityofwestworth.com
	Kennedale	Mike McMurray	Fire Chief	
MD	**NCTCOG**	Molly McFadden	EP Director	mmcfadden@nctcog.org
MD	**NCTCOG**	Melanie Devine	EP Manager	MDevine@nctcog.org
MB	**NCTCOG**	Mia Brown	E&D Planner 1	MBBrown@nctcog.org
	NCTCOG	Tamara Cook	E&D Manager	tcook@nctcog.org
	NCTCOG	Edith Marvin	E&D Director	EMarvin@nctcog.org
MB	LAKESIDE	LEE PITTS		LPITTS@LAKESIDETEXAS.US
ok	BEDFORD	JAMES RICHARDSON ops S.		JAMES.RICHARDSON@BEDFORDTX.GOV
KR	WESTWORTH VILLAGE	KB CAL REAGAN CHIEF		REAGAN@CITYOFWESTWORTH.COM
HR	City of Mansfield	Howard Relfsnyder Environmental Mgr		howard.relfsnyder@mansfieldtexas.gov

MEETING SIGN-IN SHEET

Meeting:	Program Directors Meeting	**Meeting Date:**	September 18, 2017
Facilitator:	Alayna Payne	**Place/Room:**	NCTCOG, Fred Keithley Conference Room

Name	Title	Company	Phone	E-Mail
Dori Green	Aging director	NCTCOG		
Edith Marvin	Dir. of Env. + Dev.	NCTCOG	817-695-9211	emarvin@nctcog.org
Monte Mercer	Deputy Exec Director	NCTCOG	(817)695-9121	MMercer@nctcog.org
Ken Kirkpatrick	Counsel		817695-9278	KKirkpatrick@nctcog.org
MICHAEL MORRIS	DIR OF TRANS.	NCTCOG	817-695-9241	MMORRIS@NCTCOG.ORG
James Powell	Deputy Counsel	NCTCOG	(817)695.9283	jpowell@nctcog.org
Tim Barbee	Director of RTS	NCTCOG	817-695-9158	tbarbee@nctcog.org
David Setzer	Dir. of Workforce Dev.	NCTCOG	817-695-9187	dsetzer@dfwjobs.com
Lucille Johnson	Asst. to Executive Director	NCTCOG	817-695-9103	ljohnson@nctcog.org
MIKE EASTLAND	EXEC. DIR	NCTCOG	817-695-9101	meastland@nctcog.org
Christy Williams	Director of 911	NCTCOG	817-692-9204	cwilliams@nctcog.org
MOLLY McFADDEN	NCTCOG EP	NCTCOG	8/608-2322	mmcfadden@nctcog.org

MEETING SIGN-IN SHEET

Meeting:	Capabilities Assessment for Tarrant County HazMAP Jurisdictional Annex	**Meeting Date:**	October 26, 2017
Facilitator:	Jessica Mason and Alayna Payne	**Place/Room:**	3201 Diana Dr. Richland Hills, TX 76118

Name	Title	Company	Phone	E-Mail
Alayna Payne	Program Ast.	NCTCOG		
Jessica Mason	Acting Supervisor	NCTCOG		
Russell Shelley	Fire Chief	Richland Hills		

MEETING SIGN-IN SHEET

Meeting:	Capabilities Assessment for Tarrant County HazMAP Jurisdictional Annex	**Meeting Date:**	November 1, 2017
Facilitator:	Jessica Mason and Alayna Payne	**Place/Room:**	NCTCOG Pecan

Name	Title	Company	Phone	E-Mail
Randy Chapman	Fire Chief	Forest Hill	817-531-5715	randychapman@foresthillstx.org
Alayna Payne	Program Asst.	NCTCOG		
Mike McMurray	Fire Chief	Kennedale	817-985-2157	mmcmurray@cityofkennedale.com

MEETING SIGN-IN SHEET

Meeting:	Capabilities Assessment for Tarrant County HazMAP Jurisdictional Annex	**Meeting Date:**	November 1, 2017
Facilitator:	Jessica Mason and Alayna Payne	**Place/Room:**	NCTCOG Mustang

Name	Title	Company	Phone	E-Mail
Alayna Payne	Program Asst.	NCTCOG		
THOMAS GRIFFITH	CHIEF PUBLIC SAFETY	PANTEGO	817-832-9590	TGRIFFITH@TOWNOFPANTEGO.COM
Jessica Mason	~~Acting Supervisor~~ NCTCOG	NCTCOG	817.608.2352	JMason@nctcg.org
Greg Cutter	EM	Mansfield	817 454 7650	greg.cutter@mansfieldtexas.gov
SCOTT WILLIAMS	PUBLIC WORKS DIRECTOR	TOWN OF PANTEGO	817-617-3720	swilliams@townofpantego.com
Matt Fielder	City Manager	Town of Pantego	(817)617-5700	mfielder@townofpantego.com

SOUTHLAKE EMERGENCY MANAGEMENT SIGN-IN SHEET – NOVEMBER 3, 2017 – HAZMAP MEETING	
NAME	DEPARTMENT OR AGENCY
PATRICK WITTMANN	CITY OF SOUTHLAKE, GIS
Brendan Wiltshire	City of Southlake, GIS
John Ard	Town of Westlake
Richard Whitten	" "
Alayna Payne	NCTCOG
ERIC HUTMACHER	SOUTHLAKE OEM

MEETING SIGN-IN SHEET

Meeting:	Capabilities Assessment for Tarrant County HazMAP Jurisdictional Annex	**Meeting Date:**	November 7, 2017
Facilitator:	Alayna Payne	**Place/Room:**	3801 Firehall Dr. Lake Worth, TX

Name	Title	Company	Phone	E-Mail
Alayna Payne	Program Ast.	NCTCOG		
Mike Voorhies	EMC	Lake Worth	817 237-7461	MVOORHIES@LAKEWORTHTX.ORG
NORMAN CRAVEN	CM	LAKESIDE	817-237-1234	
LEE PITTS	POLICE CHIEF	LAKESIDE	"	LPITTS@LAKESIDETEXAS.US
Bobby Davenport	Div. Chief/Fire Marshal	Saginaw	817-230-0404	BOBBY.DAVENPORT@SAGINAWFIRE.US
Lee Godbold	Battalion Chief	Azle	817-304-0942	lgodbold@cityofazle.org
Thomas Scott	Fire Chief	Azle	817 233-8998	TSCOTT@cityofazle.org

MEETING SIGN-IN SHEET

Meeting:	Capabilities Assessment for Tarrant County HazMAP Jurisdictional Annex	**Meeting Date:**	November 7, 2017
Facilitator:	Alayna Payne	**Place/Room:**	NCTCOG/ Pecan

Name	Title	Company	Phone	E-Mail
Alayna Payne	Program Ast	NCTCOG		
Billy Anderson	[redacted] PSO	DWG DPS		

MEETING SIGN-IN SHEET

Meeting:	Capabilities Assessment for Tarrant County HazMAP Jurisdictional Annex	**Meeting Date:**	November 8, 2017
Facilitator:	Alayna Payne	**Place/Room:**	River Oaks

Name	Title	Company	Phone	E-Mail
JAMES Myrick	EMC	City of River Oaks	817-929-6267	EMC@riveroaksTX.com
MARVIN Gregory	CITY Admin	CITY of River Oaks	817-223-4974	Mgregory@riveroaksTX.com

MEETING SIGN-IN SHEET

Meeting:	Capabilities Assessment for Tarrant County HazMAP Jurisdictional Annex	**Meeting Date:**	November 9, 2017
Facilitator:	Alayna Payne	**Place/Room:**	Bedford

Name	Title	Company	Phone	E-Mail
JAMES RICHARDSON	DEP CHIEF	BEDFORD FIRE		
Mark Williams	Battalion Chief	Bedford FD	8179522500	mark.williams@bedfordtx.gov
SEAN FAY	FIRE CHIEF	BEDFORD FD	"	SEAN.FAY@BEDFORDTX.GOV

MEETING SIGN-IN SHEET

Meeting:	Capabilities Assessment for Tarrant County HazMAP Jurisdictional Annex	**Meeting Date:**	November 9, 2017
Facilitator:	Alayna Payne	**Place/Room:**	Watauga Fire Station

Name	Title	Company	Phone	E-Mail
Alayna Payne	Program Ast.	NCTCOG		
Shawn Fannan	Fire Chief	Blue Mound	817-925-9525	shawnfannan@yahoo.com
Kirt Mays	F.C.	Haslet	817 988-0861	KMAYS@Haslet.org
Randy Barkley	Bat Chief	Watauga	8175145791	rbarkley@cawtx.org

MEETING SIGN-IN SHEET

Meeting:	Mitigation Workshop	**Meeting Date:**	January 31, 2018
Facilitator:	Jessica Mason	**Place/Room:**	NCTCOG, Regional Forum Room

Name	Title	Company	Phone	E-Mail
Alayna Payre	Program Asst.	NCTCOG		apayre@nctcog.org
Greg Cutler	EM	Mansfield	8174547650	greg.cutler@mansfieldtexas.gov
Craig Spencer	Dir of Emerg. Svcs.	Everman	817-293-2923	cspencer@evermantx.net
Ricardo Valenzuela	Intern	Tarrant county office of Emergency	940-465-9123	rickyv50@gmail.com
Donnalyn Lixie Gray	EP Spec			

MEETING SIGN-IN SHEET

Meeting:	Public Meeting and Workshop for the 2018 Tarrant County HazMAP	**Meeting Date:**	February 6, 2018
Facilitator:	Alayna Payne and Jessica Mason from NCTCOG	**Place/Room:**	NE Tarrant County Courthouse

Name	City/Town	Phone	E-Mail
Richard Whitten	Westlake	817-490-5785	rwhitten@westlake-tx.org
James Myrick	River Oaks	817.832.2843	J.M.Myrick@SBCGlobal.NET
Jason Rossarell	North Richland Hills	817-948-7825	jason.rossarell:@yahoo.com
JEFF BALLEW	EDGECLIFF VILLAGE	817-293-4317	FIRECHIEF@EVGOV.ORG
Greg Cutter	Mansfield	817-276-4790	greg.cutter@mansfieldtexas.gov
Billy Downs	NRH	817-421-6935	bdowns@nrhtx.com
Luke Thompson	Crowley	817 781 0050	lthompson@ci.crowley.tx.us
BILL PETERSON	HURST	817 9880280	W.KPETERSON47@ATT.NET
DAVID McCurdy	Tarrant County	817-884-1804	dmccurdy@tarrantcounty.com
GARY HARSLEY	DWG	682-333-4753	gharsle@cityofdwg.net
Brandy Barrett	Westworth Village	817 710 2526	bbarrett@cityofwestworth.com
Kevin Reaves	Westworth Village	817-710-2530	Kreaves@cityofwestworth.com
Bobby Davenport	Saginaw	817-219-4243	BobbyDavenport@saginawfire.us
JAMES RICHARDSON	BEDFORD	8177130520	JAMES.RICHARDSON@BEDFORDTX.GOV
Donna Insixiengmay	NCTCOG	8177045615	donsixiengmay@nctcog.org

MEETING SIGN-IN SHEET

Meeting:	Public Meeting and Workshop for the 2018 Tarrant County HazMAP	**Meeting Date:**	February 6, 2018
Facilitator:	Alayna Payne and Jessica Mason from NCTCOG	**Place/Room:**	NE Tarrant County Courthouse

Name	City/Town	Phone	E-Mail
Mark Williams	Bedford	817 952 2500	mark.williams@bedfordtx.gov
Thomas Griffith	Pantego	817-8329590	TGriffith@townofpantego.com
Connor Flahive	Arlington	817 781 4707	connormu77@gmail.com
Sandy Rhone	Southlake	817 481-2227	shrhone@verizon.net
TJ. Manor	Arlington	817 459 6942	tj.manor@arlingtontx.gov
Vaughan Minnefonge	Mansfield	817-405-9681	VAUGHANWJ@GMAIL.COM
Kim Bouse	Hurst	(817) 807-7186	kim.bouse@yahoo.com
Shirley Richardson	Hurst		
D. Fleenor	Crowley		docdeb@sbcglobal.net
C. Spencer	Everman	817-293-2923	cspencer@evermantx.net
Susan A	Tarrant Co.	817-850-7940	sau@tarrantcounty.com
Katie Elwess	Arlington	817-792-2030	Katie_elwess@Classichomecare.us
Cynthia Martinez	Arlington	817-792-2030	Cynthia_martinez@classichomecare.us
Will Scott	Azle	817 444 7108	tscott@cityofazle.org
Jessica Mason	NCTCOG	8176082352	jmason@nctcog.org

MEETING SIGN-IN SHEET

Meeting:	Public Meeting and Workshop for the 2018 Tarrant County HazMAP	**Meeting Date:**	February 6, 2018
Facilitator:	Alayna Payne and Jessica Mason from NCTCOG	**Place/Room:**	NE Tarrant County Courthouse

Name	City/Town	Phone	E-Mail
Rusty Chapman	Forest Hill	817-531-5715	Rusty.Chapman@foresthilltx.org
Mike Voorhies	Lake Worth	817 312-3177	MVoorhies@lakeworthtx.org
DAVID JONES	Keller	817-743-4401	DJONES@CITYOFKELLER.com
Cheryl Glaze	Arlington	817-323-0044	chivaglaze@hotmail.com
MATT FERYAN	GRAPEVINE	817-410-4470	Mferyan@grapevinetexas.gov
JAN JOPLIN	KENNEDALE	8176903821	JAN.JOPLIN@SBCGLOBAL.NET
PERRY BYNUM	HALTOM CITY	8177598660	PBynum@HALTOMCITYTX.com
Kirt Mays	Haslet	817 840-3949	KMays@haslet.org
Suzanne Hendrickson	Euless	817-685-3144	shendrickson@eulesstx.gov
Shawn Fannin	Blue Mound	817 925-9[illegible]	shawnfannin@yahoo.com
John Robertson	Grapevine	817-410-3136	jrobertson@grapevinetexas.gov
RANDY BARKLEY	Watauga	817 6815[illegible]	RBarkley@[illegible]ty.org
ERIC HUMACHER	SOUTHLAKE	817 748 8624	EHUMACHER@CI.SOUTHLAKE.TX.US
Amanda Meneses	Southlake	817 748-8903	ameneses@ci.southlake.tx.us
Kenny Phillips	Colleyville	817-988-2271	kphillips@colleyville.com

MEETING SIGN-IN SHEET

Meeting:	Public Meeting and Workshop for the 2018 Tarrant County HazMAP	**Meeting Date:**	February 6, 2018
Facilitator:	Alayna Payne and Jessica Mason from NCTCOG	**Place/Room:**	NE Tarrant County Courthouse

Name	City/Town	Phone	E-Mail
Jamy Roe	Arlington	937-422-1016	roemm@aty.net
Doug Rhoad	Southlake	817 481-2227	RDRR@VERIZON.NET
Terry Maughan	Hurst	1-682-7043384	—
Randy Bouse	Hurst	8179375693	bouse.randy@yahoo.com
Iris H Hancock	Arlington	817-459-6941	
DAVID PALKA	Hurst	817-788-7238	dpalka@hurst tx.gov
CEE PITTS	LAKESIDE	8172371234	LPITTS@LAKESIDETEXAS.US
CINDY SHEPARD	HURST	817-319-5634	hurst@cindyshepard.com
Dalton Wood	Denton	864-436-2859	daltonwood@my.unt.edu
MARISOL MARTINEZ	FW	8176201182	mar.bel.martinez@fortworthtexas.gov

MEETING SIGN-IN SHEET

Meeting:	Public Meeting and Workshop for the 2018 Tarrant County HazMAP	**Meeting Date:**	February 6, 2018
Facilitator:	Alayna Payne and Jessica Mason from NCTCOG	**Place/Room:**	NE Tarrant County Courthouse

Name	City/Town	Phone	E-Mail
Mike McMurray	Kennedale	817-985-2150	mmcmurray@cityofkennedale.com
Charles Napp	Haltom City	817 822-7914	Fnapp@haltomcityTX.com
Raymond Mejia	Austin, TX	512 438-6519	raymond.mejia@DPS.TEXAS.GOV
Samantha Aburto	Austin, TX	512-424-2565	Samantha.aburto@dps.texas.gov
Natalie Johnson	Austin, TX	512-377-0005	Natalie.Johnson@dps.texas.gov

MEETING SIGN-IN SHEET

Meeting:	Tarrant County HazMAP Mitigation Workshop	**Meeting Date:**	April 5, 2018
Facilitator:	Alayna Payne	**Place/Room:**	Crowley Recreation Center

Name	Title	Organization	Phone	E-Mail
Luke Thompson	FM/EMC	Crowley	817 781 0030	lthompson@ci.crowley.tx.us
JEFF BALLEW	FC/EMC	EDGECLIFF VILLAGE	817-293-4317	FIRECHIEF@EV60V.ORG
James Myrick	EMC	River Oaks	817-832-2843	J. M. Myrick@SBCGlobal.net
Will Scott	EM/Fire	Azle	817 444-7093	wscott@cityofazle.org
Donna Insixiengmay	EP Specialist	NCTCOG		
Brandy Barrett	EMC/City Sec	Westworth Village	817-710 2526	bbarrett@cityofwestworth.com
Elisa Greubel	Proj. Manager	Westworth Village	817-710-2502	egreubel@cityofwestworth.com
Jessica Mason	Acting Super.	NCTCOG	817-608 2352	jmason@nctcog.org
Randy Chapman	FC/EMC	Forest Hill	817-531-5715	RandyChapman@ForestHillTX.org
Maribel Mathews	EMC	CFW	806 420 1882	maribel.mathews@fortworthtexas.gov
Greg Sutter	EMC	Mansfield	817-276-4762	greg.sutter@mansfieldtexas.com
JAMES RICHARDSON	DEPCH	BEDFORD	8177130520	JAMES.RICHARDSON@BEDFORDTX.GOV

MEETING SIGN-IN SHEET

Meeting:	Tarrant County HazMAP Mitigation Workshop	**Meeting Date:**	April 5, 2018
Facilitator:	Alayna Payne	**Place/Room:**	Crowley Recreation Center

Name	Title	Organization	Phone	E-Mail
Sean Hughes	EMC	LAKESIDE	817-475-9303	SOhughes76@Gmail.Com

MEETING SIGN-IN SHEET

Meeting:	Tarrant County HazMAP Workshop	**Meeting Date:**	April 11, 2018
Facilitator:	Alayna Payne	**Place/Room:**	6750 Baker Blvd., Richland Hills

Name	Title	Organization	Phone	E-Mail
Shaun Fannon	Fire Chief	Blue Mound/Watauga		sfannan@wataugatx.org
DAVID JONES	FIRECHIEF	KELLER	817-743-4420	DJones@cityofkeller.com
Russell Shelley	" "	Richland Hills	817 616 3757	rshelley@richlandhills.com
Jessica Mason	Action Officer	NCTCOG	817.608.2352	jmason@nctcog.org
Richard Whitten	Fire Chief	Westlake	817 929 5526	rwhitten@westlake-tx.org
TJ Manor	EMC	Arlington	817-459-6942	tj.manor@arlingtontx.gov
Ricardo Valenzuela	Intern	Tarrant County Office of Emergency Management	940-465-9123	rickyv50@gmail.com
Suzanne Hendrickson	EMC	City of Euless	817-685-3144	shendrickson@eulesstx.gov
Kenny Phillips	EMC	Colleyville	817-980-7271	kphillips@colleyville.com
RANDY BARKLEY	EMC	Watauga	817 6895614	rbarkley@cityofwatauga.org
Bobby Davenport	Div. Chief	Saginaw	817-230-0404	BobbyDAVENport@saginawfire.us
DAVID PALLA	Fire Chief	Hurst	817-788-7246	dpalla@hursttx.gov
Jackie Hancock	Office Manager	Bedford	817-952-2246	jackie.hancock@bedfordtx.gov
SCOTT TEDFORD	ASST. P/W DIRECTOR	BEDFORD	817-952-2200	SCOTT.TEDFORD@BEDFORDTX.GOV
Kenny Overstreet	P.W. Director	Bedford	817 952-2246	Kenneth.Overstreet@bedfordtx.gov
Alayna Payne	PA	NCTCOG	817.608.2352	apayne@nctcog.org

MEETING SIGN-IN SHEET

Meeting:	Mitigation Actions	**Meeting Date:**	April 18, 2018
Facilitator:	Alayna Payne	**Place/Room:**	Kennedale

Name	Title	Company	Phone	E-Mail
Alayna Payne	Program Ast.	NCTCOG		
Montae Lane	Fire Admin. Assist.	KFD	(817) 985-2150	klane@cityofkennedale.com
Sandra Johnson	Building Official	KFD	817-985-2133	sjohnson@cityofkennedale.com
Mike McMurray	Fire Chief-EMC	KFD	817-985-2150	mmcmurray@cityofkennedale.com michaelwmcmurray@cityofkennedale

MEETING SIGN-IN SHEET

Meeting:	HazMAP Meeting- Fort Worth	**Meeting Date:**	May 4, 2018
Facilitator:	Alayna Payne	**Place/Room:**	JEOC

Name	Title	Company	Phone	E-Mail
Alayna Payne	Program Ast.	NCTCOG		
Melanie Devine	Spvr-EP	NCTCOG	817-695-9138	mdevine@nctcog.org
Maribel Martinez-Mejia	EMC	FWOEM	817-392-6173	mar.bd.martinez@fortworthtexas.gov

MEETING SIGN-IN SHEET

Meeting:	Program Directors Meeting	**Meeting Date:**	September 18, 2017
Facilitator:	Alayna Payne	**Place/Room:**	NCTCOG, Fred Keithley Conference Room

Name	Title	Company	Phone	E-Mail
Dori Green	Aging director	NCTCOG		
Edith Marvin	Dir. of Env. + Dev.	NCTCOG	817-695-9211	emarvin@nctcog.org
Monte Mercer	Deputy Exec Director	NCTCOG	(817)695-9121	MMercer@nctcog.org
Ken Kirkpatrick	Counsel	"	817695-9278	KKirkpatrick@nctcog.org
MICHAEL MORRIS	DIR OF TRANS.	NCTCOG	817-695-9241	MMORRIS@NCTCOG.ORG
James Powell	Deputy Counsel	NCTCOG	(817)695.9283	jpowell@nctcog.org
Tim Barbee	Director of RES	NCTCOG	817-695-9178	tbarbee@nctcog.org
David Setzer	Dir. of Workforce Dev.	NCTCOG	817-695-9187	dsetzer@dfwjobs.com
Lucille Johnson	Asst. to Executive Director	NCTCOG	817-695-9103	ljohnson@nctcog.org
MIKE EASTLAND	EXEC. DIR	NCTCOG	817-695-9101	meastland@nctcog.org
Christy Williams	Director of 911	NCTCOG	817-692-9204	cwilliams@nctcog.org
MOLLY McFADDEN	NCTCOG EP	NCTCOG	8/608-2322	mmcfadden@nctcog.org

Appendix B: Supporting Documents

Appendix B provides various information that support the mitigation actions and risk assessment identified in this hazard mitigation action plan.

Information includes:

- Annotated list of rare species in Tarrant County.
- Historic sites in Tarrant County.
- Natural Cooperative Soil Survey for dwellings on concrete slabs in Tarrant County.

Annotated List of Rare Species in Tarrant County

Under Section 12.0011 of the Texas Parks and Wildlife Code, the Texas Parks and Wildlife Department (TPWD) is charged with "providing recommendations that will protect fish and wildlife resources to local, state, and federal agencies that approve, permit, license, or construct developmental projects" and "providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources." Project types reviewed by TPWD include reservoirs, highway projects, pipelines, urban infrastructure, utility construction, renewable energy, and residential and commercial construction, as well as many others.

During project planning, and prior to construction, project areas should be surveyed for potential habitat for rare species as described on the following list. If potential habitat for a rare species is found, construction impacts to these areas should be avoided to the greatest extent practicable. If a rare species is found on a project, TPWD recommends contacting the Wildlife Habitat Assessment Program (WHAB) for additional guidance.

Rare species are those native Texas species considered to be imperiled throughout a significant part of their range. Rare species are not protected by state or federal law. However, TPWD actively promotes their conservation in an effort to prevent future endangerment and need to propose for listing. Identifying the potential for adverse impacts to rare species and taking steps to avoid or minimize them on projects helps to further this goal.

Below is the TPWD Annotated County Lists of Rare Species in Tarrant County.

TARRANT COUNTY **Last Updated: 12/30/2016**			
	BIRDS	**Federal Status**	**State Status**
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T
Year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.			
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL	
Migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.			
	BIRDS	**Federal Status**	**State Status**
Bald Eagle	*Haliaeetus leucocephalus*	DL	T
Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds.			

	BIRDS	Federal Status	State Status
Henslow's Sparrow	*Ammodramus henslowii*		
Wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking.			
Interior Least Tern	*Sterna antillarum athalassos*	LE	E
Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony.			
Peregrine Falcon	*Falco peregrinus*	DL	T
Both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.			
Red Knot	*Calidris canutus rufa*	T	
Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.			
Sprague's Pipit	*Anthus spragueii*		
Only in Texas during migration and winter, mid-September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.			
Western Burrowing Owl	*Athene cunicularia hypugaea*		
Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows.			
Whooping Crane	*Grus americana*	LE	E
Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.			

	FISHES	Federal Status	State Status
Shovelnose sturgeon	*Scaphirhynchus platorynchus*		T
Open, flowing channels with bottoms of sand or gravel; spawns over gravel or rocks in an area with a fast current; Red River below reservoir and rare occurrence in Rio Grande.			
	MAMMALS	**Federal Status**	**State Status**
Gray wolf	*Canis lupus*	LE	E
Extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands.			
Plains spotted skunk	*Spilogale putorius interrupta*		
Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie.			
Red wolf	*Canis rufus*	LE	E
Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies.			
	MOLLUSKS	**Federal Status**	**State Status**
Louisiana pigtoe	*Pleurobema riddellii*		T
Streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins.			
Sandbank pocketbook	*Lampsilis satura*		T
Small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms; east Texas, Sulfur south through San Jacinto River basins; Neches River.			
Texas heelsplitter	*Potamilus amphichaenus*		T
Quiet waters in mud or sand and also in reservoirs. Sabine, Neches, and Trinity River basins.			
Texas pigtoe	*Fusconaia askewi*		T
Rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures; east Texas River basins, Sulphur River, Cypress Creek, Sabine through Trinity rivers as well as San Jacinto River.			
	REPTILES	**Federal Status**	**State Status**
Texas garter snake	*Thamnophis sirtalis annectens*		
Wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August.			
Texas horned lizard	*Phrynosoma cornutum*		T
Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September.			

	REPTILES	Federal Status	State Status
Timber rattlesnake	*Crotalus horridus*		T
Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto.			
	PLANTS	**Federal Status**	**State Status**
Auriculate false foxglove	*Agalinis auriculata*		
Known in Texas from one late nineteenth century specimen record labeled -Benbrook-; in Oklahoma, degraded prairies, floodplains, fallow fields, and borders of upland sterile woods; in Arkansas, blackland prairie; annual; flowering August – October.			
Glen Rose yucca	*Yucca necopina*		
Texas endemic; grasslands on sandy soils and limestone outcrops; flowering April-June.			
Hall's prairie clover	*Dalea hallii*		
Global Rank: G3; In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; perennial; flowering May-September; fruiting June-September.			
Osage Plains false foxglove	*Agalinis densiflora*		
Global Rank: G3; Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; prairies, dry limestone soils; annual; flowering August-October.			
Reverchon's curfpea	*Pediomelum reverchonii*		
Global Rank: G3; Mostly in prairies on shallow rocky calcareous substrates and limestone outcrops; perennial; flowering June-September; fruiting June-July.			
Texas milk vetch	*Astragalus reflexus*		
Global Rank: G3; In grasslands, prairies, and roadsides on calcareous and clay substrates; annual; flowering February-June; fruiting April-June.			
Topeka purple-coneflower	*Echinacea atrorubens*		
Global Rank: G3; Occurring mostly in tallgrass prairie of the southern Great Plains, in blackland prairies but also in a variety of other sites like limestone hillsides; perennial; flowering January-June; fruiting January-May.			

*Globe Rank: NatureServe global conservation status ranks (G-ranks) reflect an assessment of the condition of the species or ecological community across its entire range. G3 is vulnerable: at moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

Definitions for The Terms Used Above	
Federal Status and State Status	**Description**
LE or LT	Federally listed endangered or threatened
DL or PDL	Federally delisted or proposed for delisting
E or T	State listed endangered or threatened
“blank”	Species of greatest conservation need (SGCN) but with no regulatory listing status

Historic Sites in Tarrant County

The importance of integrating historic property and cultural resource considerations into mitigation planning has been made all too apparent in losses that have occurred in recent disasters. Whether a disaster impacts a major community museum, a historic "main street," or collections of family photographs, the sudden loss of historic properties and cultural resources can negatively impact a community's character and economy, and can affect the overall ability of the community to recover from a disaster.

According to the Texas Historic Sites Atlas, Tarrant County has 124 cemeteries, 32 museums, and 392 historical markers. There are also 6 state antiquities landmarks, 115 national register properties, and 6 courthouses.

The following sites, from the National Register of Historic Places, are located within Tarrant County, are exposed to the identified hazards, and could potentially experience severe damage if directly impacted. These sites keep the history of the community alive. They are reminders of a jurisdiction's culture and complexity. Once a piece of history is destroyed, it is lost forever.

- **Allen Chapel AME Church (added 1984 - - #84000169)**

116 Elm Street, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Reed, William & Sons, Pittman, William Sidney
Architectural Style:	Other, Late Gothic Revival
Area of Significance:	Architecture
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Religion
Historic Sub-function:	Religious Structure
Current Function:	Religion
Current Sub-function:	Religious Structure

- **American Airways Hanger and Administration Building (added 2008 - - #08000317)**

201 Aviation Way, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Epstein, A., Byrne, Thomas S. Inc.
Architectural Style:	Moderne
Area of Significance:	Transportation, Architecture
Period of Significance:	1950-1974, 1925-1949
Owner:	Local
Historic Function:	Transportation
Historic Sub-function:	Air-Related
Current Function:	Transportation
Current Sub-function:	Air-Related

- **Anderson, Neil P., Building (added 1978 - - #78002981)**

411 West 7th Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Hedrick, W.C., Construction, Sanguinett & Staats
Architectural Style:	Chicago
Area of Significance:	Architecture, Commerce
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Business
Current Function:	Commerce/Trade

- **Arlington Post Office (added 2000 - - #00000188); also known as Old Post Office**

200 West Main Street, Arlington

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Public Building Administration, Federal Works Agency
Architectural Style:	Colonial Revival
Area of Significance:	Art, Architecture
Period of Significance:	1950-1974
Owner:	Local
Historic Function:	Government
Historic Sub-function:	Post Office
Current Function:	Government
Current Sub-function:	Government Office

- **Atelier Building (added 1984 - - #84003976); also known as Edrington Bank; Cameron Alread Architect, Inc.**

209 West 8th Street, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Smith & Schenk
Architectural Style:	Other, Late 19th and Early 20th Century American Movements
Area of Significance:	Architecture
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Commerce/Trade
Current Function:	Commerce/Trade

- **Austin, Stephen F., Elementary School (added 1983 - - #83003160)**

319 Lipscomb Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Sanguinet & Staats, Messer, Sanguinet & Messer
Architectural Style:	Romanesque
Area of Significance:	Education, Architecture
Period of Significance:	1950-1974, 1925-1949, 1900-1924, 1875-1899
Owner:	Private
Historic Function:	Education
Historic Sub-function:	School
Current Function:	Commerce/Trade
Current Sub-function:	Business

- **Bedford School (added 1997 - - #97000851)**

2400 School Lane, Bedford

Historic Significance:	Event
Area of Significance:	Community Planning and Development, Education
Period of Significance:	1925-1949, 1900-1924
Owner:	Local
Historic Function:	Education
Historic Sub-function:	School
Current Function:	Recreation and Culture
Current Sub-function:	Museum

- **Benton, M. A., House (added 1978 - - #78002982)**

1730 6th Avenue, Fort Worth

Historic Significance:	Person, Architecture/Engineering
Architect, builder, or engineer:	Unknown
Architectural Style:	Late Victorian
Historic Person:	Benton, Ella Belle
Significant Year:	1898
Area of Significance:	Education, Architecture, Landscape Architecture, Religion
Period of Significance:	1875-1899
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Blackstone Hotel (added 1984 - - #84001961)**

601 Main Street, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Mauran, Russell & Crowell
Architectural Style:	Modern Movement
Area of Significance:	Architecture, Commerce
Period of Significance:	1925-1949
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Hotel
Current Function:	Vacant/Not In Use

- **Botts--Fowler House (added 1999 - - #99000723)**

115 North Fourth Avenue, Mansfield

Historic Significance:	Event
Area of Significance:	Community Planning and Development
Period of Significance:	1925-1949, 1900-1924, 1875-1899
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Bratton, Andrew "Cap" and Emma Doughty, House (added 2003 - - #03000432)**

310 East Broad Street, Mansfield

Historic Significance:	Event
Area of Significance:	Community Planning and Development, Architecture
Period of Significance:	1950-1974, 1925-1949, 1900-1924, 1875-1899
Owner:	Private
Historic Function:	Commerce/Trade, Domestic
Historic Sub-function:	Single Dwelling, Specialty Store
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Bryce Building (added 1984 - - #84001963)**

909 Throckmorton Street, Fort Worth

Historic Significance:	Person, Architecture/Engineering
Architect, builder, or engineer:	Bryce, William J.
Architectural Style:	Renaissance
Historic Person:	Bryce, William J.
Significant Year:	1910
Area of Significance:	Architecture, Commerce
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Business
Current Function:	Vacant/Not In Use

- **Bryce, William J., House (added 1984 - - #84001965); also known as Fairview**

4900 Bryce Avenue, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Bryce, William J., Sanguinet, Marshall
Architectural Style:	Other, Renaissance
Area of Significance:	Architecture
Period of Significance:	1875-1899
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Buchanan-Hayter-Witherspoon House (added 2003 - - #03000433)**

306 E. Broad Street, Mansfield

Historic Significance:	Event
Area of Significance:	Architecture, Community Planning and Development
Period of Significance:	1950-1974, 1925-1949, 1900-1924, 1875-1899, 1850-1874
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Buck Oaks Farm (added 2004 - - #87000995); also known as Raymond and Katherine Buck House**

6312 White Settlement Road, Westworth

Historic Significance:	Person, Event, Architecture/Engineering
Architect, builder, or engineer:	Glasgow, Earl T.
Architectural Style:	Colonial Revival
Historic Person:	Buck, Raymond E.
Significant Year:	1933, 1932
Area of Significance:	Commerce, Architecture
Period of Significance:	1925-1949
Owner:	Federal
Historic Function:	Domestic
Historic Sub-function:	Secondary Structure, Single Dwelling
Current Function:	Defense, Domestic
Current Sub-function:	Secondary Structure, Single Dwelling

- **Burnett, Burk, Building (added 1980 - - #80004151)**

500--502 Main Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Buchanan & Gilder, Sanguinet & Staats
Architectural Style:	Other, Classical Revival
Area of Significance:	Architecture, Commerce
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Financial Institution
Current Function:	Commerce/Trade

- **Central Handley Historic District (added 2002 - - #01001472)**

Roughly bounded by East Lancaster Avenue, Forest Avenue, Kerr Street, and Handley Drive, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	et.al., Adams, B.B.
Architectural Style:	Late Victorian, Early Commercial
Area of Significance:	Commerce, Community Planning and Development, Architecture
Period of Significance:	1950-1974, 1925-1949, 1900-1924
Owner:	Private
Historic Function:	Commerce/Trade, Domestic, Government
Historic Sub-function:	Business, Post Office, Professional, Restaurant, Single Dwelling, Specialty Store
Current Function:	Commerce/Trade, Vacant/Not In Use
Current Sub-function:	Business, Restaurant, Specialty Store

- **Chorn, Lester H. and Mabel Bryant, House (added 2003 - - #03000434)**

303 East Broad Street, Mansfield

Historic Significance:	Event
Area of Significance:	Community Planning and Development
Period of Significance:	1950-1974, 1925-1949, 1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Cotton Belt Railroad Industrial Historic District (added 1997 - - #97001109)**

Along railroad tracks, roughly bounded by Hudgins, Dooley, and Dallas Streets, Grapevine

Historic Significance:	Architecture/Engineering, Event
Architectural Style:	No Style Listed
Area of Significance:	Industry, Transportation, Architecture
Period of Significance:	1950-1974, 1925-1949, 1900-1924, 1875-1899
Owner:	Private
Historic Function:	Industry/Processing/Extraction, Transportation
Historic Sub-function:	Manufacturing Facility, Rail-Related
Current Function:	Industry/Processing/Extraction, Recreation and Culture, Vacant/Not In Use
Current Sub-function:	Manufacturing Facility, Museum

- **Eddleman-McFarland House (added 1979 - - #79003009) ; also known as McFarland Home**

1110 Penn Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Messer, Howard
Architectural Style:	Other, Late Victorian
Area of Significance:	Architecture, Commerce
Period of Significance:	1875-1899
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Social
Current Sub-function:	Civic

- **Eighth Avenue Historic District (added 2006 - - #06001065)**

Bounded by 8th Avenue, Pennsylvania Avenue, 9th Avenue, and Pruitt Street, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Koeppe, Paul, Sanguinet & Staats
Architectural Style:	Late 19th and Early 20th Century American Movements, Late 19th and 20th Century Revivals
Area of Significance:	Architecture
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Commerce/Trade
Current Sub-function:	Professional

- **Electric Building (added 1995 - - #95000048); also known as Fort Worth Power and Light Building; Texas Electric Service C**

410 West 7th Street, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	et al., Hedrick, Wyatt C.
Architectural Style:	Other, Art Deco
Area of Significance:	Commerce, Architecture
Period of Significance:	1925-1949
Owner:	Private
Historic Function:	Commerce/Trade, Recreation and Culture
Historic Sub-function:	Business, Theater
Current Function:	Vacant/Not In Use

- **Elizabeth Boulevard Historic District (added 1979 - - #79003010)**

1001--1616 Elizabeth Boulevard, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Ryan, John C.
Architectural Style:	Mission/Spanish Revival, Colonial Revival, Prairie School
Area of Significance:	Architecture, Landscape Architecture, Commerce
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Fairmount--Southside Historic District (added 1990 - - #90000490); also known as See Also: South Side Masonic Lodge; Benton, Meredith, House; J**

Roughly bounded by Magnolia, Hemphill, Eighth, and Jessamine, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Unknown
Architectural Style:	Late 19th and Early 20th Century American Movements, Late 19th and 20th Century Revivals, Late Victorian
Area of Significance:	Architecture, Community Planning and Development
Period of Significance:	1925-1949, 1900-1924, 1875-1899
Owner:	Private
Historic Function:	Commerce/Trade, Domestic, Social
Historic Sub-function:	Business, Multiple Dwelling, Single Dwelling
Current Function:	Commerce/Trade, Domestic, Social
Current Sub-function:	Business, Multiple Dwelling, Single Dwelling

- **Fairmount--Southside Historic District (Boundary Increase) (added 1998 - - #98001375); also known as See Also: Fairmount--Southside Historic District**

Roughly bounded by Magnolia, Hemphill, Allen, Travis and Murphy, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Davies, J.B.
Architectural Style:	Other, Classical Revival
Area of Significance:	Architecture, Community Planning and Development
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Commerce/Trade, Education
Historic Sub-function:	School, Specialty Store
Current Function:	Commerce/Trade, Education
Current Sub-function:	School, Specialty Store

- **Fairmount--Southside Historic District (Boundary Increase) (added 1999 - - #99000565)**

Roughly bounded by Magnolia, Hemphill, Allen, Travis and Morphy Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Davies, J.B.
Architectural Style:	Other, Classical Revival
Area of Significance:	Community Planning and Development, Architecture
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Commerce/Trade, Education
Historic Sub-function:	School, Specialty Store
Current Function:	Commerce/Trade, Education
Current Sub-function:	School, Specialty Store

- **First Christian Church (added 1983 - - #83003812)**

612 Throckorton Street, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Van Slyke & Woodruff
Architectural Style:	Beaux Arts, Renaissance
Area of Significance:	Architecture, Religion
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Religion
Historic Sub-function:	Religious Structure
Current Function:	Religion, Social
Current Sub-function:	Civic, Religious Structure

- **First National Bank Building (added 2009 - - #09000981); also known as Baker Building**

711 Houston Street, Fort Worth

Historic Significance:	Event, Person, Architecture/Engineering
Architect, builder, or engineer:	Hedrick, Wyatt C., Sanguinet & Staats
Architectural Style:	Skyscraper
Historic Person:	Loyd, Cpt. Martin B.
Area of Significance:	Architecture, Commerce
Period of Significance:	1950-1974, 1925-1949, 1900-1924
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Business
Current Function:	Commerce/Trade
Current Sub-function:	Business

- **Flatiron Building (added 1971 - - #71000964)**

1000 Houston Street, Fort Worth

Historic Significance:	Person, Architecture/Engineering
Architect, builder, or engineer:	Sanguinet & Staats
Architectural Style:	Chicago
Historic Person:	Saunders, Bacon
Significant Year:	1907
Area of Significance:	Architecture, Health/Medicine
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Commerce/Trade, Health Care
Historic Sub-function:	Medical Business/Office
Current Function:	Commerce/Trade

- **Fort Worth Botanic Garden (added 2009 - - #08001400); also known as Harry J. Adams Memorial Garden**

3220 Botanic Garden Boulevard, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Hare and Hare, et al.
Architectural Style:	Renaissance
Area of Significance:	Landscape Architecture, Entertainment/Recreation
Period of Significance:	1950-1974, 1925-1949
Owner:	Local
Historic Function:	Agriculture/Subsistence, Education, Landscape, Recreation and Culture, Social
Historic Sub-function:	Clubhouse, Horticulture Facility, Outdoor Recreation, Park, Research Facility
Current Function:	Agriculture/Subsistence, Education, Landscape, Recreation and Culture, Social
Current Sub-function:	Clubhouse, Horticulture Facility, Outdoor Recreation, Park, Research Facility

- **Fort Worth Club Building--1916 (added 1998 - - #98000102); also known as Holmes Building; Winfree Building; Midcontinent Building; Ken**

608-610 Main Street, Fort Worth

Historic Significance:	Event
Area of Significance:	Commerce, Social History
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Commerce/Trade, Social
Historic Sub-function:	Business, Clubhouse, Organizational, Professional
Current Function:	Vacant/Not In Use

- **Fort Worth Elks Lodge 124 (added 1984 - - #84001969); also known as Benevolent and Protective Order of Elks; YWCA of Fort Worth a**

512 West 4th Street, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Burne, Thomas C., Inc., Hedrick, Wyatt C.
Architectural Style:	Other, Colonial Revival
Area of Significance:	Architecture
Period of Significance:	1925-1949
Owner:	Private
Historic Function:	Social
Historic Sub-function:	Clubhouse
Current Function:	Social
Current Sub-function:	Civic

- **Fort Worth High School (added 2002 - - #02001515); also known as Central No.19, Junior High; Jennings Avenue No. 40;**

1015 South Jennings Avenue, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Waller and Field, Innis--Graham builder
Architectural Style:	Classical Revival
Area of Significance:	Education, Architecture
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Education
Historic Sub-function:	School
Current Function:	Domestic
Current Sub-function:	Multiple Dwelling

- **Fort Worth Public Market (added 1984 - - #84001981); also known as Cadillac Plastics**

1400 Henderson Street, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Quisle & Andrews, Noftsger, B. Gaylord
Architectural Style:	Mission/Spanish Revival, Other
Area of Significance:	Architecture, Commerce
Period of Significance:	1925-1949
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Specialty Store
Current Function:	Commerce/Trade
Current Sub-function:	Specialty Store

- **Fort Worth Stockyards Historic District (added 1976 - - #76002067)**

Roughly bounded by 23rd, Houston, and 28th Streets, and railroad, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Unknown
Architectural Style:	Mission/Spanish Revival
Area of Significance:	Agriculture, Architecture, Commerce, Industry
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Agriculture/Subsistence, Commerce/Trade, Industry/Processing/Extraction, Recreation and Culture
Historic Sub-function:	Animal Facility, Manufacturing Facility, Processing, Sport Facility
Current Function:	Agriculture/Subsistence, Commerce/Trade, Industry/Processing/Extraction, Recreation and Culture
Current Sub-function:	Animal Facility, Manufacturing Facility, Processing, Sport Facility

- **Fort Worth United States Courthouse (added 2001 - - #01000437)**

501 West 10th Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Cret, Paul Phillippe, Clarkson, Wiley G., et al.
Architectural Style:	Moderne, Modern Movement
Area of Significance:	Art, Politics/Government, Architecture
Period of Significance:	1950-1974, 1925-1949
Owner:	Federal
Historic Function:	Government
Historic Sub-function:	Courthouse, Government Office
Current Function:	Government
Current Sub-function:	Courthouse, Government Office

- **Grand Avenue Historic District (added 1990 - - #90000337)**

Roughly Grand Avenue from Northside to Park, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Unknown
Architectural Style:	Prairie School, Bungalow/Craftsman, Tudor Revival
Area of Significance:	Architecture, Community Planning and Development
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Multiple Dwelling, Secondary Structure, Single Dwelling
Current Function:	Domestic
Current Sub-function:	Multiple Dwelling, Secondary Structure, Single Dwelling

- **Grapevine Commercial Historic District (added 1992 - - #92000097)**

404--432 South Main Street, Grapevine

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Unknown
Architectural Style:	Other
Area of Significance:	Commerce, Architecture
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Commerce/Trade, Government
Historic Sub-function:	Business, Department Store, Financial Institution, Post Office
Current Function:	Commerce/Trade
Current Sub-function:	Business, Restaurant, Specialty Store

- **Grapevine Commercial Historic District (Boundary Increase II) (added 2002 - - #02001569)**

500-530 South Main Street, Grapevine

Historic Significance:	Event, Architecture/Engineering
Architectural Style:	Early Commercial
Area of Significance:	Architecture, Commerce
Period of Significance:	1950-1974, 1925-1949, 1900-1924, 1875-1899
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Specialty Store
Current Function:	Commerce/Trade
Current Sub-function:	Specialty Store

- **Grapevine Commercial Historic District (Boundary Increase) (added 1997 - - #97000444)**

300 and 400 blocks of South Main Street, Grapevine

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Unknown
Architectural Style:	No Style Listed
Area of Significance:	Architecture, Commerce
Period of Significance:	1925-1949, 1900-1924, 1875-1899
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Specialty Store
Current Function:	Commerce/Trade
Current Sub-function:	Specialty Store

- **Guinn, James E., School (added 1998 - - #98000429)**

1200 South Freeway, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Multiple
Architectural Style:	Classical Revival
Area of Significance:	Architecture, Education
Period of Significance:	1950-1974, 1925-1949
Owner:	Local
Historic Function:	Education
Historic Sub-function:	School
Current Function:	Vacant/Not In Use

- **Gulf, Colorado, and Santa Fe Railroad Passenger Station (added 1970 - - #70000760)**

1601 Jones Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Unknown
Architectural Style:	Beaux Arts
Area of Significance:	Transportation, Architecture
Period of Significance:	1875-1899
Owner:	Private
Historic Function:	Transportation
Historic Sub-function:	Rail-Related
Current Function:	Transportation
Current Sub-function:	Rail-Related

- **Heritage Park Plaza (added 2010 - - #10000253); also known as Upper Heritage Park**

West Bluff Street at Main Street, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Halprin, Lawrence
Area of Significance:	Landscape Architecture
Period of Significance:	1975-2000
Owner:	Local
Historic Function:	Landscape
Historic Sub-function:	Park
Current Function:	Landscape
Current Sub-function:	Park

- **Hogg, Alexander, School (added 2002 - - #02001512); also known as District 11 School No. 11; Homes of Parker Commons**

900 Saint Louis Avenue, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Innis--Graham Construction Company, Waller, M.L.
Architectural Style:	Beaux Arts
Area of Significance:	Education, Architecture
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Education
Historic Sub-function:	School
Current Function:	Domestic
Current Sub-function:	Multiple Dwelling

- **Hotel Texas (added 1979 - - #79003011); also known as Fort Worth-Sheraton**

815 Main Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Marvan, Russell & Clowell, Sanguinet & Staats
Architectural Style:	Other, Chicago, Renaissance
Area of Significance:	Architecture, Commerce, Industry
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Hotel
Current Function:	Domestic
Current Sub-function:	Hotel

- **Hutcheson-Smith House (added 1984 - - #84001993)**

312 North Oak Street, Arlington

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Unknown
Architectural Style:	Queen Anne, Stick/Eastlake
Area of Significance:	Architecture
Period of Significance:	1875-1899
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Johnson-Elliott House (added 1984 - - #84001996); also known as Dr. Clay Johnson House**

3 Chase Court, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Waller & Field
Architectural Style:	Prairie School, Beaux Arts
Area of Significance:	Architecture
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Secondary Structure, Single Dwelling
Current Function:	Domestic
Current Sub-function:	Secondary Structure, Single Dwelling

- **Knights of Pythias Building (added 1970 - - #70000761); also known as Knights of Pythias Castle Hall**

315 Main Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Sanguinet & Staats
Architectural Style:	Other
Area of Significance:	Architecture, Social History
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Social
Historic Sub-function:	Clubhouse
Current Function:	Social
Current Sub-function:	Clubhouse

- **Kress Building (added 2007 - - #07000266); also known as Kress, S.H. and Co. Building**

604 Main Street, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Sibbert, Edward F.
Architectural Style:	Moderne
Area of Significance:	Commerce, Architecture
Period of Significance:	1950-1974, 1925-1949
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Department Store
Current Function:	Commerce/Trade, Work In Progress
Current Sub-function:	Restaurant

- **Leuda--May Historic District (added 2005 - - #05000240)**

301-311 West Leuda and 805-807 May Streets, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architectural Style:	Prairie School, Colonial Revival
Area of Significance:	Community Planning and Development, Architecture
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Multiple Dwelling, Single Dwelling
Current Function:	Domestic
Current Sub-function:	Multiple Dwelling, Single Dwelling

- **M. G. Ellis School (1914) (added 1986 - - #83003161); also known as North Fort Worth Public School (1905)**

213 Northeast 14th Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Waller, Marion L.
Architectural Style:	Colonial, Renaissance
Area of Significance:	Education, Architecture
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Education
Historic Sub-function:	School
Current Function:	Vacant/Not In Use

- **Man, Ralph Sandiford and Julia Boisseau, House (added 2003 - - #03000435); also known as Ralph Sandiford Mann Homestead**

604 West Broad Street, Mansfield

Historic Significance:	Person, Event
Historic Person:	Man, Ralph Sandiford
Significant Year:	1865, 1868, 1880
Area of Significance:	Community Planning and Development
Period of Significance:	1900-1924, 1875-1899, 1850-1874
Owner:	Private
Historic Function:	Agriculture/Subsistence, Domestic
Historic Sub-function:	Animal Facility, Secondary Structure, Single Dwelling
Current Function:	Agriculture/Subsistence, Domestic
Current Sub-function:	Animal Facility, Secondary Structure, Single Dwelling

- **Marine Commercial Historic District (added 2001 - - #01000102); also known as The Mercado**

Roughly defined by North Main Street, between North Side Drive and North 14th Street, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Singleton, Frank J., et.al.
Architectural Style:	Early Commercial, Mission/Spanish Revival
Area of Significance:	Architecture, Commerce, Community Planning and Development
Period of Significance:	1950-1974, 1925-1949, 1900-1924
Owner:	Private, Local
Historic Function:	Commerce/Trade, Domestic, Health Care, Industry/Processing/Extraction, Recreation and Culture, Social
Historic Sub-function:	Clubhouse, Department Store, Medical Business/Office, Processing Site, Single Dwelling, Specialty Store, Theater
Current Function:	Commerce/Trade, Industry/Processing/Extraction, Vacant/Not In Use, Work In Progress
Current Sub-function:	Organizational, Processing Site, Restaurant, Specialty Store, Warehouse, Water Works

- **Markeen Apartments (added 2001 - - #01000470)**

210--14 Saint Louis Avenue and 406--10 West Daggett Avenue, Fort Worth

Historic Significance:	Architecture/Engineering
Architectural Style:	Prairie School
Area of Significance:	Architecture
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Multiple Dwelling
Current Function:	Work In Progress

- **Marrow Bone Spring Archeological Site (added 1978 - - #78002980)**

Address Restricted, Arlington

Historic Significance:	Information Potential
Area of Significance:	Historic - Non-Aboriginal, Prehistoric
Cultural Affiliation:	NATIVE AMERICAN, AMERICAN
Period of Significance:	5000-6999 BC, 1850-1874, 1000-2999 BC, 1000 AD-999 BC
Owner:	Local
Historic Function:	Domestic, Industry/Processing/Extraction
Historic Sub-function:	Manufacturing Facility, Village Site
Current Function:	Landscape
Current Sub-function:	Park

- **Masonic Widows and Orphans Home Historic District (added 1992 - - #91002022); also known as Masonic Home and School of Texas**

Roughly bounded by East Berry Street, Mitchell Boulevard, Vaughn Street, Wichita Street and Glen Garden Drive, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Greene, Herbert M., Clarkson, Wiley G.
Architectural Style:	Late Gothic Revival
Area of Significance:	Architecture, Social History
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Institutional Housing
Current Function:	Domestic, Education
Current Sub-function:	Institutional Housing, School

- **Montgomery Ward and Company Building (added 1998 - - #98001415); also known as Tindall Storage Warehouse**

801 Grove Street, Fort Worth

Historic Significance:	Event
Area of Significance:	Commerce
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Warehouse
Current Function:	Commerce/Trade
Current Sub-function:	Warehouse

- **Morning Chapel Colored Methodist Episcopal Church (added 1999 - - #99001049); also known as Morning Chapel Christian Methodist Episcopal Church**

901 East 3rd Street, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Meador, W.C.
Architectural Style:	Late Gothic Revival
Area of Significance:	Architecture
Period of Significance:	1925-1949
Owner:	Private
Historic Function:	Religion
Historic Sub-function:	Religious Structure
Current Function:	Religion
Current Sub-function:	Religious Structure

- **Near Southeast Historic District (added 2002 - - #02000405)**

Roughly bounded by New York Avenue, East Terrell Avenue, former I&GN Railway, Verbena Street, and north side of East Terrell Avenue, Fort Worth

Historic Significance:	Event
Area of Significance:	Black, Commerce
Period of Significance:	1950-1974, 1925-1949, 1900-1924
Owner:	Local, Private
Historic Function:	Commerce/Trade, Domestic, Religion
Historic Sub-function:	Multiple Dwelling, Religious Structure, Restaurant, Single Dwelling, Specialty Store
Current Function:	Commerce/Trade, Domestic, Religion, Vacant/Not In Use
Current Sub-function:	Multiple Dwelling, Religious Structure, Restaurant, Single Dwelling, Specialty Store

- **North Fort Worth High School (added 1995 - - #94001627); also known as North Side High School; Fort Worth Technical High School**

600 Park Street, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Buchanan, J.C., Sanguinet & Staats
Architectural Style:	Prairie School
Area of Significance:	Education, Architecture
Period of Significance:	1925-1949, 1900-1924
Owner:	Local
Historic Function:	Education
Historic Sub-function:	School
Current Function:	Vacant/Not In Use

- **Oakhurst Historic District (added 2010 - - #10000051)**

Roughly bounded by Yucca Avenue, Sylvania Avenue, Watauga Avenue, and Oakhurst Scenic Drive, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Oakhurst Land Co., Hare & Hare
Architectural Style:	Bungalow/Craftsman, Late 19th and 20th Century Revivals
Area of Significance:	Landscape Architecture, Architecture, Community Planning and Development
Period of Significance:	1950-1974, 1925-1949, 1900-1924
Owner:	Private, Local
Historic Function:	Domestic
Historic Sub-function:	Multiple Dwelling, Single Dwelling
Current Function:	Domestic
Current Sub-function:	Multiple Dwelling, Single Dwelling

- **Old Town Historic District (added 2000 - - #00000247)**

Roughly bounded by Sanford, Elm, North, Prairie and Oak Streets, Arlington

Historic Significance:	Event, Architecture/Engineering
Architectural Style:	Queen Anne, Colonial Revival
Area of Significance:	Community Planning and Development, Architecture
Period of Significance:	1950-1974, 1925-1949, 1900-1924, 1875-1899
Owner:	Local, Private
Historic Function:	Domestic, Education, Landscape
Historic Sub-function:	Multiple Dwelling, School, Secondary Structure, Single Dwelling, Street Furniture/Object
Current Function:	Domestic, Education, Landscape
Current Sub-function:	Multiple Dwelling, School, Secondary Structure, Single Dwelling, Street Furniture/Object

- **Original Town Residential Historic District (added 1998 - - #98000736); also known as College Heights Neighborhood**

Roughly bounded by Texas, Austin, Hudgins and Jenkins Streets, Grapevine

Historic Significance:	Event, Architecture/Engineering
Architectural Style:	Colonial Revival, Queen Anne, Other
Area of Significance:	Architecture, Community Planning and Development
Period of Significance:	1925-1949, 1900-1924, 1875-1899
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Multiple Dwelling, Secondary Structure, Single Dwelling
Current Function:	Domestic
Current Sub-function:	Multiple Dwelling, Secondary Structure, Single Dwelling

- **Our Lady of Victory Academy (added 2004 - - #04000886); also known as Victory Arts Center**

801 West Shaw Street, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Sanguinet & Staats, et.al.
Architectural Style:	Late Gothic Revival
Area of Significance:	Education, Architecture
Period of Significance:	1950-1974, 1925-1949, 1900-1924
Owner:	Private
Historic Function:	Religion
Historic Sub-function:	Church Related Residence, Church School
Current Function:	Commerce/Trade, Domestic
Current Sub-function:	Business, Multiple Dwelling, Professional

- **Our Mother of Mercy Catholic Church and Parsonage (added 1999 - - #99000882); also known as Sunshine Cumberland Presbyterian Church and Manse**

1100 and 1104 Evans Avenue, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Denis, N.P.
Architectural Style:	Tudor Revival, Queen Anne
Area of Significance:	Architecture, Social History, Black
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Domestic, Religion
Historic Sub-function:	Religious Structure, Single Dwelling
Current Function:	Religion
Current Sub-function:	Religious Structure

- **Our Mother of Mercy School (added 2006 - - #06000510); also known as Our Lady of Mercy School**

801 Verbena Street, Fort Worth

Historic Significance:	Event
Area of Significance:	Education, Black
Period of Significance:	1950-1974, 1925-1949
Owner:	Local
Historic Function:	Religion
Historic Sub-function:	Church School
Current Function:	Vacant/Not In Use

- **Paddock Viaduct (added 1976 - - #76002068); also known as Main Street Bridge**

Main Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Hannan-Heckley Bros., Brennke & Fay
Architectural Style:	No Style Listed
Area of Significance:	Transportation, Commerce, Engineering
Period of Significance:	1900-1924
Owner:	Local
Historic Function:	Transportation
Historic Sub-function:	Road-Related
Current Function:	Transportation
Current Sub-function:	Road-Related

- **Petroleum Building (added 2009 - - #09000982); also known as Life of America Building; Schick Building**

210 West 6th Street, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Hedrick, Wyatt C.
Architectural Style:	Skyscraper
Area of Significance:	Commerce, Architecture
Period of Significance:	1950-1974, 1925-1949
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Business
Current Function:	Commerce/Trade
Current Sub-function:	Business

- **Pollock-Capps House (added 1972 - - #72001372)**

1120 Penn Street, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Messer, Howard
Architectural Style:	Queen Anne
Area of Significance:	Architecture
Period of Significance:	1875-1899
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Commerce/Trade
Current Sub-function:	Professional

- **Ponton, Dr. Arvel and Faye, House (added 2006 - - #06001085)**

1208 Mistletoe Drive, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Hull Historical Restoration, Pelich, Joseph R.
Architectural Style:	Mission/Spanish Revival
Area of Significance:	Architecture
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Riverside Public School (added 1999 - - #99001624); also known as Corinth Baptist Youth Center**

2629 LaSalle Street, Fort Worth

Historic Significance:	Event
Area of Significance:	Black, Education
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Education
Historic Sub-function:	School
Current Function:	Religion
Current Sub-function:	Religious Structure

- **Rogers-O'Daniel House (added 1985 - - #85001484); also known as Pappy O'Daniel House**

2230 Warner Road, Fort Worth

Historic Significance:	Person
Historic Person:	O'Daniel, Wilburt L.
Area of Significance:	Politics/Government
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Saint James Second Street Baptist Church (added 1999 - - #99000883); also known as Greater Saint James Missionary Baptist Church**

210 Harding Street, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Singleton, Frank J., Powell, George R., et al.
Architectural Style:	Late Victorian
Area of Significance:	Architecture
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Religion
Historic Sub-function:	Religious Structure
Current Function:	Religion
Current Sub-function:	Religious Structure

- **Sanger Brothers Building (added 1994 - - #94000542); also known as Sanger Brothers; J.C. Penney Building**

410--412 Houston Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Wohlfield and Witt, Hedrick, Wyatt C.
Architectural Style:	No Style Listed
Area of Significance:	Architecture, Commerce
Period of Significance:	1925-1949
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Department Store
Current Function:	Commerce/Trade
Current Sub-function:	Department Store

- **Sanguinet, Marshall R., House (added 1983 - - #83003162)**

4729 Collinwood Avenue, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Sanguinet, Marshall R.
Architectural Style:	Bungalow/Craftsman
Area of Significance:	Architecture
Period of Significance:	1900-1924, 1875-1899
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Shaw, Thomas and Marjorie, House (added 1995 - - #95001029); also known as Site No. W-26, Fort Worth Southside**

2404 Medford Court East, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Adams, Bert B.
Architectural Style:	Other
Area of Significance:	Architecture
Period of Significance:	1925-1949
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Sinclair Building (added 1992 - - #91001913)**

512 Main Street, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Friedman, Harry B., Clarkson, Wiley Gulick
Architectural Style:	Art Deco, Modern Movement
Area of Significance:	Architecture
Period of Significance:	1925-1949
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Business
Current Function:	Commerce/Trade
Current Sub-function:	Business

- **South Center Street Historic District (added 2003 - - #03000334)**

500-600 blocks of South Center Street, Arlington

Historic Significance:	Event, Architecture/Engineering
Architectural Style:	Bungalow/Craftsman
Area of Significance:	Architecture, Community Planning and Development
Period of Significance:	1950-1974, 1925-1949, 1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **South Main Street Historic District (added 2009 - - #09000984)**

104, 108, 126 & 200 blocks South Main Street, Fort Worth

Historic Significance:	Architecture/Engineering
Architectural Style:	Other, Early Commercial
Area of Significance:	Architecture
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Commerce/Trade, Domestic, Industry/Processing/Extraction, Landscape
Historic Sub-function:	Hotel, Manufacturing Facility, Multiple Dwelling, Restaurant, Specialty Store, Street Furniture/Object
Current Function:	Commerce/Trade, Domestic, Industry/Processing/Extraction, Landscape, Vacant/Not In Use, Work In Progress
Current Sub-function:	Business, Manufacturing Facility, Multiple Dwelling, Professional, Street Furniture/Object

- **South Side Masonic Lodge No. 1114 (added 1985 - - #85000048)**

1301 West Magnolia, Fort Worth

Historic Significance:	Architecture/Engineering
Architectural Style:	Classical Revival
Area of Significance:	Architecture
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Commerce/Trade, Social
Historic Sub-function:	Clubhouse, Specialty Store
Current Function:	Recreation and Culture
Current Sub-function:	Music Facility

- **Saint Mary of the Assumption Church (added 1984 - - #84001998)**

501 West Magnolia Avenue, Fort Worth

Historic Significance:	Architecture/Engineering, Event
Architect, builder, or engineer:	Sanguinet, Staats & Hedrick
Architectural Style:	Romanesque, Other
Area of Significance:	Architecture, Religion
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Religion
Historic Sub-function:	Religious Structure
Current Function:	Religion
Current Sub-function:	Religious Structure

- **Saint Patrick Cathedral Complex (added 1985 - - #85000074); also known as Saint Patrick Church, Saint Ignatius Academy, and Saint Patrick Chur**

1206 Throckmorton, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Kane, James J.
Architectural Style:	Gothic Revival, Other, Second Empire
Area of Significance:	Education, Architecture
Period of Significance:	1900-1924, 1875-1899
Owner:	Private
Historic Function:	Religion
Historic Sub-function:	Church Related Residence, Church School, Religious Structure
Current Function:	Religion
Current Sub-function:	Church Related Residence, Religious Structure

- **Tabernacle Baptist Church (added 1999 - - #99001451); also known as Mount Pisgah Baptist Church**

1801 Evans Avenue, Fort Worth

Historic Significance:	Architecture/Engineering
Architectural Style:	Classical Revival
Area of Significance:	Architecture
Period of Significance:	1925-1949, 1900-1924
Owner:	Private
Historic Function:	Religion
Historic Sub-function:	Religious Structure
Current Function:	Religion
Current Sub-function:	Religious Structure

- **Tarrant County Courthouse (added 1970 - - #70000762)**

Bounded by Houston, Belknap, Weatherford, and Commerce Streets, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Gunn & Curtis
Architectural Style:	Late 19th and 20th Century Revivals, Renaissance
Area of Significance:	Politics/Government, Architecture
Period of Significance:	1875-1899
Owner:	Local
Historic Function:	Government
Historic Sub-function:	Courthouse
Current Function:	Government
Current Sub-function:	Courthouse

- **Texas & Pacific Steam Locomotive No. 610 (added 1977 - - #77001477)**

Felix and Hemphill Streets, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Lima Locomotive Works
Architectural Style:	Other
Area of Significance:	Engineering, Transportation, Invention
Period of Significance:	1925-1949
Owner:	Private
Historic Function:	Transportation
Historic Sub-function:	Rail-Related
Current Function:	Transportation
Current Sub-function:	Rail-Related

- **Texas and Pacific Terminal Complex (added 1978 - - #78002983)**

Lancaster and Throckmorton Streets, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Hedrick, Wyatt C.
Architectural Style:	Art Deco, Skyscraper
Area of Significance:	Art, Transportation, Architecture
Period of Significance:	1925-1949
Owner:	Private
Historic Function:	Commerce/Trade, Transportation
Historic Sub-function:	Rail-Related
Current Function:	Commerce/Trade, Transportation
Current Sub-function:	Rail-Related

- **US Post Office (added 1985 - - #85000855); also known as Fort Worth Main Post Office**

Lancaster and Jennings Avenue, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Hedrick, Wyatt C.
Architectural Style:	Classical Revival, Beaux Arts
Area of Significance:	Architecture
Period of Significance:	1925-1949
Owner:	Federal
Historic Function:	Government
Historic Sub-function:	Post Office
Current Function:	Government
Current Sub-function:	Post Office

- **Vandergriff Building (added 2010 - - #10000500); also known as Thannisch Chevrolet Building**

100 East Division Street, Arlington

Historic Significance:	Event
Area of Significance:	Commerce
Period of Significance:	1950-1974, 1925-1949
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Specialty Store
Current Function:	Commerce/Trade
Current Sub-function:	Business

- **Vaught House (added 2005 - - #05000864)**

718 West Abram Street, Arlington

Historic Significance:	Event
Area of Significance:	Community Planning and Development
Period of Significance:	1950-1974, 1925-1949, 1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Commerce/Trade
Current Sub-function:	Specialty Store

- **Waggoner, W. T. Building (added 1979 - - #79003012)**

810 Houston Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Sanguinet & Staats
Architectural Style:	Chicago, Skyscraper
Area of Significance:	Architecture, Commerce, Industry
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Commerce/Trade
Current Function:	Commerce/Trade

- **Wallace--Hall House (added 2003 - - #03000436)**

210 South Main Street, Mansfield

Historic Significance:	Event
Area of Significance:	Community Planning and Development
Period of Significance:	1950-1974, 1925-1949, 1900-1924, 1875-1899
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Secondary Structure, Single Dwelling
Current Function:	Domestic
Current Sub-function:	Secondary Structure, Single Dwelling

- **Westbrook, Roy A. and Gladys, House (added 2009 - - #08001300)**

2232 Winton Terrace West, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Pelich, Joseph R.
Architectural Style:	Tudor Revival
Area of Significance:	Architecture
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Domestic, Landscape, Recreation and Culture
Historic Sub-function:	Garden, Secondary Structure, Single Dwelling, Sport Facility
Current Function:	Domestic, Landscape, Recreation and Culture
Current Sub-function:	Garden, Secondary Structure, Single Dwelling, Sport Facility

- **Westover Manor (added 1988 - - #88002709); also known as Fort Worth Star Telegram 1930 Home Beautiful**

8 Westover Road, Westover Hills

Historic Significance:	Event, Person, Architecture/Engineering
Architect, builder, or engineer:	Et al., Curtis, Victor Marr
Architectural Style:	Other, Tudor Revival
Historic Person:	Farrell, John E.
Significant Year:	1930, 1936, 1929
Area of Significance:	Architecture, Community Planning and Development, Industry
Period of Significance:	1925-1949
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Secondary Structure, Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling

- **Wharton-Scott House (added 1975 - - #75002003)**

1509 Pennsylvania Avenue, Fort Worth

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Sanguinet & Staats
Architectural Style:	Other, Colonial Revival, Beaux Arts
Area of Significance:	Architecture, Landscape Architecture
Period of Significance:	1900-1924
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Vacant/Not In Use

- **Woolworth, F. W., Building (added 1994 - - #94001359)**

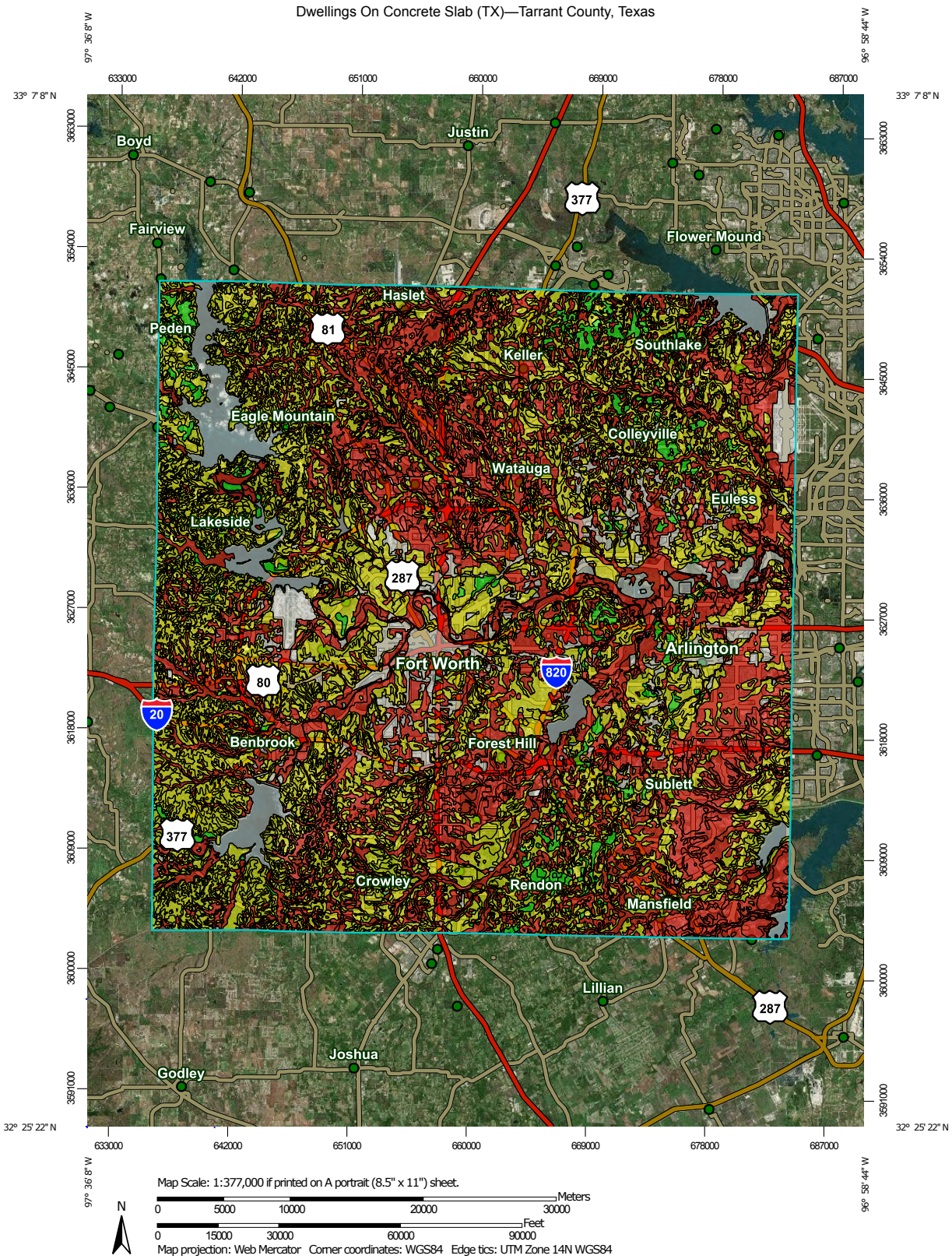
501 Houston Street, Fort Worth

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Taylor, James T., Clarkson, Wiley G.
Architectural Style:	Classical Revival
Area of Significance:	Commerce, Architecture
Period of Significance:	1925-1949
Owner:	Private
Historic Function:	Commerce/Trade
Historic Sub-function:	Department Store
Current Function:	Commerce/Trade
Current Sub-function:	Specialty Store

Natural Cooperative Soil Survey

The following soil survey identifies the dwellings on concrete slabs in Tarrant County. These dwellings have the potential to be impacted by the identified hazards; particularly, expansive soils.

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 to 3 feet.


Dwellings On Concrete Slab (TX)—Tarrant County, Texas
97° 36' 8" W
96° 58' 44" W
33° 7' 8" N
32° 25' 22" N
633000
642000
651000
660000
669000
678000
687000
3663000
3654000
3645000
3636000
3627000
3618000
3609000
3600000
3591000
Boyd
Justin
Fairview
Flower Mound
Haslet
Peden
Keller
Southlake
Eagle Mountain
Colleyville
Watauga
Euless
Lakeside
Arlington
Fort Worth
Benbrook
Forest Hill
Sublett
Crowley
Rendon
Mansfield
Lillian
Joshua
Godley
81
377
287
80
20
820
Map Scale: 1:377,000 if printed on A portrait (8.5" x 11") sheet.
Meters
0
5000
10000
20000
30000
Feet
0
15000
30000
60000
90000
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

Dwellings On Concrete Slab (TX)—Tarrant County, Texas

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Soil Rating Lines
- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Soil Rating Points
- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Tarrant County, Texas
Survey Area Data: Version 15, Nov 8, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Dwellings On Concrete Slab (TX)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
1	Aledo gravelly clay loam, 1 to 8 percent slopes	Somewhat limited	Aledo (85%)	Depth to hard bedrock (0.01)	22,471.8	3.9%
2	Bolar-Aledo complex, 3 to 20 percent slopes	Somewhat limited	Bolar (45%)	Depth to hard bedrock (0.97)	21,475.3	3.7%
			Aledo (40%)	Slopes, sprinkler irrigation (0.78)		
				Depth to hard bedrock (0.09)		
3	Aledo-Bolar-Urban land complex, 3 to 20 percent slopes	Somewhat limited	Aledo (35%)	Slopes, sprinkler irrigation (0.78)	14,300.0	2.5%
				High shrink-swell (0.13)		
				Depth to hard bedrock (0.12)		
			Bolar (20%)	Depth to hard bedrock (0.80)		
				High shrink-swell (0.13)		
				Slopes, sprinkler irrigation (0.10)		
4	Aledo-Urban land complex, 1 to 8 percent slopes	Somewhat limited	Aledo (50%)	High shrink-swell (0.13)	9,538.5	1.7%
				Depth to hard bedrock (0.12)		
5	Altoga silty clay loam, 5 to 12 percent slopes	Somewhat limited	Altoga (100%)	Slopes, sprinkler irrigation (0.22)	697.1	0.1%
				High shrink-swell (0.13)		
6	Aquilla loamy fine sand, 1 to 5 percent slopes	Not limited	Aquilla (100%)		601.0	0.1%
7	Arents, frequently flooded	Not rated	Arents (98%)		5,286.9	0.9%
			Unnamed, hydric (2%)			
8	Arents, loamy	Somewhat limited	Arents (100%)	High shrink-swell (0.13)	3,940.1	0.7%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
9	Bastsil fine sandy loam, 0 to 3 percent slopes	Somewhat limited	Bastsil (100%)	High shrink-swell (0.13)	6,027.6	1.0%
10	Bastsil-Urban land complex, 0 to 5 percent slopes	Somewhat limited	Bastsil (50%)	High shrink-swell (0.13)	8,770.2	1.5%
11	Birome fine sandy loam, 1 to 5 percent slopes	Very limited	Birome (100%)	Too acid (1.00)	2,505.5	0.4%
				High shrink-swell (0.13)		
12	Birome-Aubrey-Rayex complex, 5 to 15 percent slopes	Very limited	Birome (35%)	Too acid (1.00)	6,337.0	1.1%
				Slopes, sprinkler irrigation (0.40)		
				High shrink-swell (0.13)		
			Aubrey (30%)	Too acid (1.00)		
				Slopes, sprinkler irrigation (0.40)		
				High shrink-swell (0.13)		
13	Birome-Aubrey-Urban land complex, 5 to 15 percent slopes	Very limited	Birome (28%)	Too acid (1.00)	5,448.8	0.9%
				Slopes, sprinkler irrigation (0.40)		
				High shrink-swell (0.13)		
			Aubrey (25%)	Too acid (1.00)		
				Slopes, sprinkler irrigation (0.40)		
				High shrink-swell (0.13)		
14	Bolar clay loam, 1 to 3 percent slopes	Somewhat limited	Bolar (90%)	Depth to hard bedrock (0.80)	2,200.3	0.4%
15	Bolar clay loam, 3 to 5 percent slopes	Somewhat limited	Bolar (90%)	Depth to hard bedrock (0.97)	3,831.9	0.7%
16	Bolar-Urban land complex, 1 to 5 percent slopes	Not rated	Urban land (40%)		2,124.8	0.4%
			Unnamed (25%)			
17	Brackett clay loam, 3 to 8 percent slopes	Somewhat limited	Brackett (100%)	Depth to soft bedrock (0.17)	1,432.7	0.2%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
18	Branyon clay, 0 to 1 percent slopes	Very limited	Branyon (85%)	High shrink-swell (1.00)	3,572.0	0.6%
19	Burleson clay, 0 to 1 percent slopes	Somewhat limited	Burleson (90%)	High shrink-swell (0.94)	1,231.9	0.2%
20	Chatt silty clay, 1 to 3 percent slopes	Somewhat limited	Chatt (100%)	High shrink-swell (0.88)	1,471.1	0.3%
21	Crosstell fine sandy loam, 1 to 3 percent slopes	Very limited	Crosstell (85%)	High shrink-swell (1.00) Too acid (0.08)	10,630.1	1.8%
22	Crosstell fine sandy loam, 3 to 8 percent slopes	Very limited	Crosstell (85%)	High shrink-swell (1.00) Too acid (0.08)	14,586.1	2.5%
23	Crosstell-Urban land complex, 1 to 5 percent slopes	Very limited	Crosstell (55%)	High shrink-swell (1.00) Too acid (0.82)	17,470.5	3.0%
24	Ferris clay, 5 to 12 percent slopes, eroded	Very limited	Ferris, moderately eroded (75%)	High shrink-swell (1.00) Slopes, sprinkler irrigation (0.22)	1,353.1	0.2%
25	Ferris-Heiden complex, 2 to 5 percent slopes	Very limited	Ferris (50%) Heiden (40%)	High shrink-swell (1.00) High shrink-swell (1.00)	2,781.3	0.5%
26	Frio silty clay, 0 to 1 percent slopes, occasionally flooded	Very limited	Frio (85%)	Flooding (1.00) High shrink-swell (0.93)	11,177.7	1.9%
27	Frio silty clay, frequently flooded	Very limited	Frio (100%)	Flooding (1.00) High shrink-swell (0.13)	7,738.3	1.3%
28	Frio-Urban land complex, occasionally flooded	Very limited	Frio (55%)	Flooding (1.00) High shrink-swell (0.13)	6,701.8	1.2%
29	Gasil fine sandy loam, 1 to 3 percent slopes	Somewhat limited	Gasil (85%)	Too acid (0.08)	11,246.5	2.0%
30	Gasil fine sandy loam, 3 to 8 percent slopes	Somewhat limited	Gasil (85%)	Too acid (0.08)	8,358.9	1.5%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
31	Gasil sandy clay loam, graded, 1 to 5 percent slopes	Somewhat limited	Gasil (100%)	Too acid (0.08)	1,595.2	0.3%
32	Gasil-Urban land complex, 1 to 8 percent slopes	Somewhat limited	Gasil (55%)	Too acid (0.08)	13,150.4	2.3%
33	Heiden clay, 1 to 3 percent slopes	Very limited	Heiden (85%)	High shrink-swell (1.00)	10,682.6	1.9%
34	Houston Black clay, 1 to 3 percent slopes	Very limited	Houston Black (80%)	High shrink-swell (1.00)	7,402.9	1.3%
35	Houston Black-Urban land complex, 1 to 4 percent slopes	Very limited	Houston Black (50%)	High shrink-swell (1.00)	10,754.5	1.9%
36	Justin loam, 1 to 3 percent slopes	Somewhat limited	Justin (100%)	High shrink-swell (0.13)	674.8	0.1%
37	Konsil fine sandy loam, 1 to 5 percent slopes	Somewhat limited	Konsil (100%)	High shrink-swell (0.13) Too acid (0.08)	3,017.7	0.5%
38	Leson clay, 1 to 3 percent slopes	Very limited	Leson (85%)	High shrink-swell (1.00)	2,555.5	0.4%
39	Lindale clay loam, 1 to 3 percent slopes	Somewhat limited	Lindale (100%)	High shrink-swell (0.13)	3,197.8	0.6%
40	Lindale-Urban land complex, 1 to 3 percent slopes	Somewhat limited	Lindale (50%)	High shrink-swell (0.13)	1,382.1	0.2%
41	Lott silty clay, 1 to 3 percent slopes	Somewhat limited	Lott (100%)	High shrink-swell (0.88)	3,926.8	0.7%
42	Lott-Urban land complex, 1 to 5 percent slopes	Somewhat limited	Lott (50%)	High shrink-swell (0.88)	1,674.5	0.3%
43	Luckenbach clay loam, moist, 1 to 3 percent slopes	Somewhat limited	Luckenbach, moist (90%)	High shrink-swell (0.96)	1,407.5	0.2%
44	Luckenbach-Urban land complex, 1 to 3 percent slopes	Somewhat limited	Luckenbach (50%)	High shrink-swell (0.13)	1,026.0	0.2%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
45	Mabank fine sandy loam, 0 to 1 percent slopes	Somewhat limited	Mabank (100%)	High shrink-swell (0.88)	691.9	0.1%
46	Maloterre, Aledo, and Brackett soils, 3 to 20 percent sl opes	Somewhat limited	Maloterre (35%)	Slopes, sprinkler irrigation (0.78)	8,395.6	1.5%
			Aledo (30%)	Slopes, sprinkler irrigation (0.98)		
				High shrink-swell (0.13)		
				Depth to hard bedrock (0.09)		
			Brackett (20%)	Slopes, sprinkler irrigation (0.90)		
				Depth to soft bedrock (0.12)		
47	Medlin clay, 5 to 15 percent slopes	Somewhat limited	Medlin (100%)	High shrink-swell (0.88)	2,448.8	0.4%
				Slopes, sprinkler irrigation (0.40)		
48	Mingo clay loam, 1 to 3 percent slopes	Somewhat limited	Mingo (100%)	High shrink-swell (0.88)	2,062.7	0.4%
				Depth to hard bedrock (0.84)		
49	Mingo-Urban land complex, 1 to 3 percent slopes	Somewhat limited	Mingo (50%)	High shrink-swell (0.88)	1,351.8	0.2%
				Depth to hard bedrock (0.84)		
50	Navo clay loam, 1 to 3 percent slopes	Somewhat limited	Navo (100%)	High shrink-swell (0.88)	10,134.1	1.8%
51	Navo-Urban land complex, 1 to 3 percent slopes	Somewhat limited	Navo (60%)	High shrink-swell (0.88)	5,087.8	0.9%
52	Nimrod fine sand, 1 to 5 percent slopes	Not limited	Nimrod (100%)		1,784.7	0.3%
53	Ovan clay, occasionally flooded	Very limited	Ovan (100%)	Flooding (1.00)	1,653.6	0.3%
				High shrink-swell (0.88)		
54	Ovan clay, frequently flooded	Very limited	Ovan (100%)	Flooding (1.00)	1,749.0	0.3%
				High shrink-swell (0.88)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
55	Ovan-Urban land complex, occasionally flooded	Very limited	Ovan (62%)	Flooding (1.00) High shrink-swell (0.88)	1,130.8	0.2%
56	Pits, quarries	Not rated	Pits (100%)		833.2	0.1%
57	Ponder clay loam, 1 to 3 percent slopes	Somewhat limited	Ponder (100%)	High shrink-swell (0.88)	10,426.2	1.8%
58	Ponder-Urban land complex, 0 to 3 percent slopes	Somewhat limited	Ponder (52%)	High shrink-swell (0.88)	6,378.4	1.1%
59	Pulexas fine sandy loam, frequently flooded	Very limited	Pulexas (100%)	Flooding (1.00)	5,901.1	1.0%
60	Pulexas-Urban land complex, occasionally flooded	Very limited	Pulexas (55%)	Flooding (1.00)	1,262.1	0.2%
61	Purves clay, 1 to 3 percent slopes	Somewhat limited	Purves (89%)	High shrink-swell (0.98) Depth to hard bedrock (0.04)	16,727.9	2.9%
62	Purves-Urban land complex, 0 to 5 percent slopes	Somewhat limited	Purves (60%)	High shrink-swell (0.98) Depth to hard bedrock (0.06)	5,314.7	0.9%
63	Rader fine sandy loam, 0 to 3 percent slopes	Somewhat limited	Rader (100%)	High shrink-swell (0.88) Too acid (0.82)	14,182.0	2.5%
64	Rader-Urban land complex, 0 to 3 percent slopes	Not rated	Urban land (30%) Unnamed (25%)		7,143.9	1.2%
65	Sanger clay, 1 to 3 percent slopes	Very limited	Sanger (90%)	High shrink-swell (1.00)	32,510.1	5.7%
66	Sanger clay, 3 to 5 percent slopes	Very limited	Sanger (90%)	High shrink-swell (1.00)	12,582.6	2.2%
67	Sanger-Urban land complex, 1 to 5 percent slopes	Very limited	Sanger (55%)	High shrink-swell (1.00)	24,521.2	4.3%
68	San Saba clay, 0 to 2 percent slopes	Very limited	San Saba (90%)	High shrink-swell (1.00) Depth to hard bedrock (0.96)	3,050.5	0.5%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
69	Selden loamy fine sand, 1 to 3 percent slopes	Somewhat limited	Selden (100%)	Too acid (0.08)	1,060.3	0.2%
70	Silawa fine sandy loam, 3 to 8 percent slopes	Somewhat limited	Silawa (100%)	Too acid (0.82)	6,499.0	1.1%
71	Silstid loamy fine sand, 1 to 5 percent slopes	Not limited	Silstid (100%)		7,188.7	1.2%
72	Silstid-Urban land complex, 1 to 5 percent slopes	Not limited	Silstid (50%)		4,087.7	0.7%
73	Slidell clay, 0 to 1 percent slopes	Very limited	Slidell (85%)	High shrink-swell (1.00)	3,445.3	0.6%
74	Slidell clay, 1 to 3 percent slopes	Very limited	Slidell (85%)	High shrink-swell (1.00)	17,846.1	3.1%
75	Speck clay loam, 0 to 3 percent slopes	Somewhat limited	Speck (100%)	High shrink-swell (0.88) Depth to hard bedrock (0.06)	1,882.2	0.3%
76	Stephenville fine sandy loam, 8 to 15 percent slopes	Somewhat limited	Stephenville (100%)	Too acid (0.82) Slopes, sprinkler irrigation (0.78)	677.6	0.1%
77	Sunev clay loam, cool, 1 to 3 percent slopes	Not limited	Sunev, cool (90%)		1,432.5	0.2%
78	Sunev clay loam, 3 to 8 percent slopes	Somewhat limited	Sunev (100%)	High shrink-swell (0.13)	7,279.1	1.3%
79	Sunev-Urban land complex, 2 to 8 percent slopes	Somewhat limited	Sunev (50%)	High shrink-swell (0.13)	2,797.0	0.5%
80	Trinity clay, 0 to 1 percent slopes, frequently flooded	Very limited	Trinity (85%)	Flooding (1.00) High shrink-swell (1.00)	3,781.8	0.7%
81	Urban land	Not rated	Urban land (100%)		18,498.2	3.2%
82	Duffau-Weatherford complex, 3 to 8 percent slopes	Somewhat limited	Duffau (48%) Weatherford (29%)	High shrink-swell (0.01) Too acid (0.32)	2,570.6	0.4%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Slopes, sprinkler irrigation (0.03)		
				High shrink-swell (0.01)		
			Wise (9%)	Slopes, sprinkler irrigation (0.03)		
			Windthorst (7%)	High shrink-swell (0.22)		
			Keeter (4%)	High shrink-swell (0.25)		
				Too acid (0.02)		
83	Whitesboro loam, frequently flooded	Very limited	Whitesboro (100%)	Flooding (1.00)	3,155.8	0.5%
				High shrink-swell (0.13)		
84	Wilson clay loam, 0 to 2 percent slopes	Somewhat limited	Wilson (85%)	High shrink-swell (0.88)	6,497.3	1.1%
85	Wilson-Urban land complex, 0 to 2 percent slopes	Somewhat limited	Wilson (60%)	High shrink-swell (0.88)	2,373.2	0.4%
86	Windthorst very fine sandy loam, 1 to 3 percent slopes	Somewhat limited	Windthorst (90%)	High shrink-swell (0.09)	1,248.7	0.2%
87	Windthorst fine sandy loam, 5 to 8 percent slopes	Somewhat limited	Windthorst (85%)	High shrink-swell (0.14)	2,328.9	0.4%
88	Windthorst fine sandy loam, 3 to 8 percent slopes, eroded	Somewhat limited	Windthorst, eroded (85%)	High shrink-swell (0.09)	1,059.5	0.2%
89	Duffau-Windthorst complex, 1 to 5 percent slopes, moderately eroded	Somewhat limited	Duffau, moderately eroded (52%)	High shrink-swell (0.04)	633.1	0.1%
			Windthorst, moderately eroded (28%)	High shrink-swell (0.44)		
			Chaney (10%)	High shrink-swell (0.50)		
			Weatherford, moderately eroded (6%)	Too acid (0.32)		
				High shrink-swell (0.01)		
DAM	Dams	Not rated	Dams (100%)		259.3	0.0%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
M-W	Miscellaneous water	Not rated	Water, miscellaneous (100%)		379.9	0.1%
W	Water	Not rated	Water (100%)		23,077.1	4.0%
Totals for Area of Interest					**575,140.7**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Somewhat limited	268,155.2	46.6%
Very limited	234,287.6	40.7%
Not limited	15,094.6	2.6%
Null or Not Rated	57,603.3	10.0%
Totals for Area of Interest	**575,140.7**	**100.0%**

Description

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 to 3 feet.

The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification of the soil. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments in the soil.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher