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# Hazard Mitigation Action Plan-DRAFT

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**MESQUITE**

T E X A S

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**CHAPTER 1**  
**INTRODUCTION**

## 1.0 Introduction

Prior to the creation of the City of Mesquite local Hazard Mitigation plan, a comprehensive, cohesive, and coordinated hazard mitigation program was needed to ensure that all stakeholders worked together towards a common mitigation strategy. The hazard mitigation plan establishes overarching mitigation goals for the City and addresses emergency response and recovery issues, long and short term planning issues, and economic issues relating to mitigation. The development and implementation of a local mitigation strategy provides a mechanism to address issues that will reduce or eliminate exposure to hazard impacts.

The Federal Emergency Management Agency (FEMA) provides oversight and guidelines for hazard mitigation planning, and provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. Specific planning requirements are published by the FEMA Hazard Mitigation Division that include a “crosswalk” review process that assists jurisdictions on how to develop a plan that meets FEMA requirements. In 2012, FEMA revised the crosswalk review process and developed a local mitigation plan review tool. The improved tool provides constructive recommendations from FEMA regarding subsequent updates that jurisdictions can use to strengthen a community’s mitigations plans with effective and measurable mitigation strategies.

The Texas Division of Emergency Management (TDEM) requires jurisdictions to submit the completed local mitigation plan review tool with the draft plan. The City of Mesquite Hazard Mitigation Plan was prepared using the updated review standard. Additionally, the Local Mitigation Plan Review Tool is provided in Appendix 8.1-A.

### Hazard Mitigation

FEMA defines hazard mitigation as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event. Mitigation planning is defined as a process for systematically identifying policies, activities, and tools that can be used to implement those actions.

A key component in formulating a comprehensive approach to hazard mitigation is to develop, adopt, and update a local hazard mitigation plan. A hazard mitigation plan establishes a broad community vision and guiding principles for reducing hazard risks and further proposes specific mitigation actions to eliminate or reduce identified vulnerabilities.

Mitigation planning and activities provides jurisdictions with a number of benefits such as:

- Identifying cost effective actions for risk reduction that are agreed upon by stakeholders and the public
- Focusing resources on the greatest risks and vulnerabilities
- Building partnerships by involving people, organizations, and businesses
- Increasing education and awareness of hazards and risk
- Communicating priorities to state and federal officials
- Aligning risk reduction with other community objectives

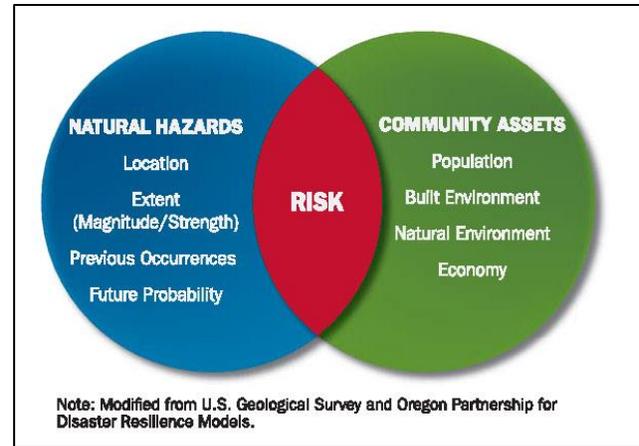


Figure 1-1 - Community Risk from Natural Hazards

Figure 2-1 illustrates the concept of risk as the relationship, or overlap, between hazards and community assets. The smaller the overlap, the lower the risk.

### The Disaster Mitigation Act and the Flood Insurance Reform Act

In an effort to reduce mounting natural disaster losses, U.S. Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) amending the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Section 322 of DMA 2000 emphasizes the need for state and local government entities to closely coordinate mitigation planning activities, making the development of a hazard mitigation plan a specific eligibility requirement for any local government applying for federal mitigation grant funds. These funds include the Hazard Mitigation Grant Program (HMGP) and the Pre-Disaster Mitigation (PDM) program, both administered by the Federal Emergency Management Agency (FEMA) under the Department of Homeland Security.

The Flood Insurance Reform Act of 2004 (P.L. 108-264) created two grant programs, Severe Repetitive Loss (SRL) and Repetitive Flood Claim (RFC), and modified the existing Flood Mitigation Assistance (FMA) program. This act requires completion of a FEMA-approved Hazard Mitigation Plan in order for communities to be eligible for any of the aforementioned programs. Communities with an adopted federally-approved hazard mitigation plan become pre-positioned to receive available mitigation funds before and after a presidentially declared disaster strikes.

### Hazard Mitigation Planning in Mesquite

Starting in 2011, the City of Mesquite aggressively applied for HMGP funds that would assist with the development of a mitigation plan. This was decided after the major disaster declaration of the 2011 Wildland Fires that impacted large areas in the State of Texas, and subsequently provided HMGP funds across the state. The State of Texas received a Presidential Disaster Declaration

and the City received a letter from the Texas Division of Emergency Management requesting that any interested parties could apply for the Hazard Mitigation Grant Program. In the time since then, the City has taken actions to address mitigation when appropriate.

**Purpose of Plan**

The City of Mesquite Hazard Mitigation Plan is a cooperative and collaborative effort between the city and all stakeholders involved in the process. The list of stakeholders is:

| <b>City of Mesquite Hazard Mitigation Stakeholders</b> |  |
|--|--|
| • City of Mesquite Building Inspection                 | • City of Mesquite Police Department         |
| • City of Mesquite City Council                        | • City of Mesquite Streets                   |
| • City of Mesquite City Manager’s Office               | • City of Mesquite Traffic Engineering       |
| • City of Mesquite Code Enforcement                    | • City of Mesquite Utilities                 |
| • City of Mesquite Community Services                  | • Citizens of Mesquite                       |
| • City of Mesquite Economic Development                | • Dallas County                              |
| • City of Mesquite Office of Emergency Management      | • Kaufman County                             |
| • City of Mesquite Engineering                         | • North Texas Municipal Water District       |
| • City of Mesquite Fire Department                     | • City of Garland                            |
| • City of Mesquite Geographic Information Systems      | • North Central Texas Council of Governments |
| • City of Mesquite Housing Division                    | • Texas Division of Emergency Management     |
| • City of Mesquite Public Works                        | • Federal Agencies                           |
| • City of Mesquite Parks and Recreation                | • Private entities                           |
| • City of Mesquite Planning and Zoning                 | • Mesquite Independent School District       |

*Table 1-1 - City of Mesquite Hazard Mitigation Stakeholders*

The Plan goes beyond the minimum DMA 2000 requirements of assessing natural hazards, to further identify and discuss mitigation strategies for various technological and civil hazards posing a threat to the City. Included in the plan are efforts to develop measures to reduce the cost of preparedness, response and recovery time from hazardous events.

The City of Mesquite Hazard Mitigation Plan was developed specifically to achieve the following objectives:

- Protect life and property

- Reduce damage to homes and businesses
- Reduce damage to public facilities and infrastructure such as roads, water, sewer, bridges and public buildings
- Increase public safety
- Avoid/minimize economic disruption and losses
- Reduce human suffering
- Protect the environment
- Reduce tax dollars
- Flood insurance cost reduction
- Maintain the City of Mesquite’s eligibility for the following:
  - National Flood Insurance Program (NFIP)
  - FEMA Planning, Training and Exercise Grants
  - Federal and State Funding for Repetitive Loss Buyout Program
  - Retain eligibility for other Federal and State funding

### Priorities

***Requirement 201.6(d)(3): A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within five years in order to continue to be eligible for mitigation project grant funding.***

Even before developing this plan, the City of Mesquite was aware of their need to set realistic priorities to protect the lives and properties located within its jurisdiction. Through the leadership of the Mayor, City Council and City Management, proactive measures were implemented to communicate preparedness, response and recovery efforts to residents and business owners.

Through the years, City of Mesquite integrated mitigation strategies in plans and regulations/ordinances that promote sustainability. The city actively communicates with the stakeholders to encourage participation in preparedness initiatives and provide information about state and federal programs that will protect property and lives. Reduction of vulnerabilities, articulated throughout this plan, remains a high priority for the city. The hazard identification, risk assessment, mitigation strategies, and plan maintenance chapters provide specific information to identify areas of concern and procedures to implement continued commitment to reduce or eliminate those vulnerabilities.

## Authority and Adoption

***Requirement §201.6(c)(5): [The plan shall include...] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan.***

### ***Authority***

The City of Mesquite Council initiated development of this Hazard Mitigation Plan. The city has used city staff to prepare this plan.

### ***Plan Adoption (Pending)***

A public comment period was held from **March 13, 2014 to April 14, 2014** for citizens to formally review and accept this Plan prior to sending to TDEM and FEMA for state and federal approval. This plan meets the requirements of Section 201.6(c)(5) and was approved by FEMA on **August 19, 2015**. The City Council adopted this Plan on **September 21, 2015** and the **executed Resolution, meeting agenda and FEMA approval letter** are provided in **Appendix 8.1-C**.

## Summary of Contents

Chapter 2: **Community Profile** provides demographic, geographic, and economic characteristics. This information sets the stage for defining the special characteristics useful in understanding the unique vulnerabilities within the City of Mesquite.

Chapter 3: **Planning Process** is a complete account of the planning committees and public meetings held during the planning process including individuals attending

Chapter 4: **Hazard Mitigation and Risk Assessment** contains five areas of study: **Risk Assessment, Hazard Identification, Vulnerability Assessment, Estimating Potential Losses, and Analyzing Development Trends**. Historical data is used to identify and prioritize appropriate mitigation actions to reduce/eliminate losses from potential hazards.

Chapter 5: **Capability Assessment** describes the ability of the city to implement strategies and **incorporate mitigation principles into other planning initiatives**. The capabilities of private/public entities, state, and federal agencies are also provided.

Chapter 6: **Mitigation Strategy** includes the goals and objectives developed to provide a strong foundation for implementing hazard mitigation strategies. Individual **Actions** were identified by goal and objective and include a mitigation group and priority. An **implementation** process is also defined including how **priorities** were established. **Funding Sources** and Hazard Mitigation Assistance eligibility criteria are included.

Chapter 7: **Plan Maintenance** presents the process the Mesquite Hazard Mitigation Committee and other identified departments will follow to ensure the Plan is integrated with all other planning documents, regulations, and ordinances and ensure the public is engaged in any and all updates. Procedures are also defined in evaluating the effectiveness of mitigation actions and the status of pending/in process projects.

## **CHAPTER 2 PLANNING PROCESS**

## 2.0. Planning Process Overview

***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: (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval; (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.***

The City of Mesquite used the following guidance and requirements in the development of the HMAP:

- Robert T Stafford Act
- Title 44 Code of Federal Regulations (CFR) §201.6
- FEMA’s The Local Mitigation Plan Review Guide (dated October 1, 2011)
- FEMA’s Local Mitigation Planning Handbook (March 2013)
- FEMA Local Mitigation Plan Review Tool

According to the Federal Emergency Management Agency (FEMA), any successful planning activity, such as the development of a comprehensive mitigation plan, involves bringing together a cross-section of stakeholders to reach a consensus in achieving a desired outcome or resolve a community problem.

The City of Mesquite supports this initiative through daily interaction with residents, officials and business leaders in local and surrounding communities. The City of Mesquite participates in various planning initiatives, including this HMAP. By fostering these relationships, mitigation planning will move closer to achieving its objective of saving lives and reducing future losses resulting from natural disasters.



**Figure 2-1 - The Hazard Mitigation Planning Process**

**Planning Teams and Committees**

Following the decision to revise the plan internally, a Hazard Mitigation Committee was identified. The Hazard Mitigation Stakeholder Group and Planning Team is identified in Table 2-1. This Team was tasked with the responsibility to guide the decision-making process, assist with the identification and needs for inclusion in the HMAP, provide input into the various sections of the Plan, and approve the draft plan prior to submittal to the Texas Division of Emergency Management (TDEM) and FEMA for state and federal review. This Committee will also present the approved plan to the City Council for formal adoption; and, on behalf of the City, assist with integration of the goals and plan maintenance procedures set forth in this plan with other planning initiatives and actions.

| <b>City of Mesquite Hazard Mitigation Stakeholders Meetings<br/>Participating Representatives</b> |   |
|---|---|
| Agency  | Title   |
| City of Mesquite Building Inspection  | Building Official   |
| City of Mesquite City Council   | Mayor, Councilmember Place 1, Mayor Pro Tem, Councilmember Place 2, Councilmember Place 3, Councilmember Place 4, Deputy Mayor Pro Tem Councilmember Place 5, Councilmember Place 6 |
| City of Mesquite City Manager’s Office  | Assistant City Manager  |
| City of Mesquite Code Enforcement   | Manager   |
| City of Mesquite Community Services   | Director  |
| City of Mesquite Economic Development   | Manager   |
| City of Mesquite Office of Emergency Management   | Emergency Management Coordinator  |
| City of Mesquite Office of Emergency Management   | Senior Emergency Management Specialist  |
| City of Mesquite Fire Department  | Fire Chief  |
| City of Mesquite Geographic Information Systems   | GIS Supervisor  |
| City of Mesquite Housing Division   | Director  |
| City of Mesquite Public Works   | Director, Senior Civil Engineer   |
| City of Mesquite Parks and Recreation   | Director, Manager of Parks and Rec.   |
| City of Mesquite Planning and Zoning  | Plans Examiner  |
| City of Mesquite Police Department  | Assistant Chief   |
| City of Mesquite Streets  | Assistant Director  |
| City of Mesquite Traffic Engineering  | Senior Engineer   |
| City of Mesquite Utilities  | Manager, Assistant Manager  |

|   |   |
|---|---|
| Citizens of Mesquite                        | Citizens  |
| Dallas County                               | Emergency Management Coordinator  |
| Kaufman County                              | Emergency Management Coordinator,<br>Deputy Emergency Management<br>Coordinator |
| North Texas Municipal Water District        | NTMWD   |
| City of Garland                             | Emergency Management Coordinator  |
| North Central Texas Council of Governments, | Mitigation Program Assistant, Senior<br>Emergency Management Specialist         |
| Texas Division of Emergency Management      | District Coordinator  |
| Mesquite Independent School District        | Superintendent, Assistant Superintendent  |

**Table 2-1 – City of Mesquite Hazard Mitigation Committee**

**Plan Development Meetings**

The Hazard Mitigation Committee formally convened three times during the planning process to systematically review data, prioritize and rank hazards and mitigation actions, and identify changes for inclusion in the plan update. Provided below is an agenda of each meetings objective, dates held, times, location, and a brief summary of the results obtained from each meeting. Additional information collected and distributed during the meetings, plus full meeting summaries, is provided in the appendix sections referenced by meeting.

**Meeting 1**

Date: **Monday, August 26, 2013**  
 Time: **1:00 pm – 4:00 pm**  
 Location: **777 N. Galloway Avenue**  
**Mesquite, Texas 75149**

- Agenda Items:
- Introduction
  - Hazard Mitigation Plan Overview
  - Hazard Identification and Risk Assessment
    - Identify Hazards
    - Vulnerability Risk Assessment Methodology
  - Mitigation Goals
  - Next Steps
  - Schedule
  - Questions and Dismissal

Summary:

The main objective accomplished during this initial meeting was to provide an overview of what a

mitigation plan entails according to FEMA Mitigation Planning Guidance.

The Hazard Mitigation Committee was led through an activity of identifying hazards which Mesquite is prone to. Those present used the following criteria to assist with establishing a priority rating for those hazards selected for this HMAP:

- Potential Severity of Impact
- Frequency of Occurrence
- Warning

National Climatic Data Center Information from January 1, 1996 – July 1, 2020 was provided to the stakeholder group as a reference. All results of the findings from this activity can be found in Chapter 4 of this HMAP.

The Hazard Mitigation Committee was also provided information on establishment of mitigation goals, objectives and action items. Some examples of goals were provided from Dallas County the North Central Texas Council of Governments (NCTCOG), and the State of Texas. These were provided in order to give ideas as to what goals, objectives, and action items the City of Mesquite may want to develop for their HMAP. Appendix 8.2–A contains a full meeting summary, agenda, PowerPoint, and sign-in sheet.

### **Meeting 2**

Date: Monday, October 14, 2013

Time: 1:30 pm – 4:00 pm

Location: 777 N. Galloway Avenue  
Mesquite, Texas 75149

Agenda Items: Update on Progress Made  
Public input meeting  
Plan sections in development  
Hazard Identification and Risk Assessment  
Review of hazard ranking  
Review hazard impacts  
Building Ranking  
Mitigation Goals  
Approve goals  
Next Steps  
Plan section to be developed  
Questions and Dismissal

Summary:

During this meeting, the results of the first public meeting were discussed. The first public meeting was held at the National Night Out event (discussed in next section) on October 1, 2013. The Hazard Mitigation Committee was also given an update on the progress on the development of the overall HMAP.

The Committee also reviewed the compiled data from the hazards ranking that occurred in the last Committee meeting. After some discussion on flood risk, the Committee approved the ranking. Additional hazards were identified and ranked based on input from the previous Committee meeting. These were included in the overall ranking. This information is included in Chapter 4 of the HMAP.

The Committee reviewed some preliminary hazard mitigation goals that were provided. After some discussion and changes, the mitigation goals were approved by the Committee. These are included in Chapter 6 of this HMAP.

The stakeholder group reviewed and began ranking City facilities to determine their different levels of criticality for City operations, as well as public health and safety that will be ranked and broken into categories to determine their level of essential use. This risk assessment activity is to assist in providing a scenario of expected losses to buildings and operational functionality of the City should a hazard impact the City of Mesquite. Appendix 8.2–B contains a full meeting summary, agenda, PowerPoint, and sign-in sheet.

### **Meeting 3**

Date: Thursday, January 16, 2014

Time: 9:00 am – 11:00 am

Location: City Council Conference Room,  
757 North Galloway Avenue  
Mesquite, TX 75149

Agenda Items:        Introductions  
                          Recap of Planning Progress  
                          Draft Plan Review  
                          Mitigation Action Ranking Activity  
                          Next Steps  
                          Questions and Dismissal

Summary:

During this meeting, the Committee reviewed the different elements of the Draft Plan, and provided numerous comments for changes before finalizing the Hazard Mitigation Action Plan

(HMAP). The Committee also reviewed each of the mitigation actions in the HMAP and will be providing input as to how those actions are to be ranked according to priority.

Committee members discussed the methodology to be used for Public Input on the draft HMAP. Appendix 8.2-C contains a full meeting summary, agenda, PowerPoint, and sign-in sheet.

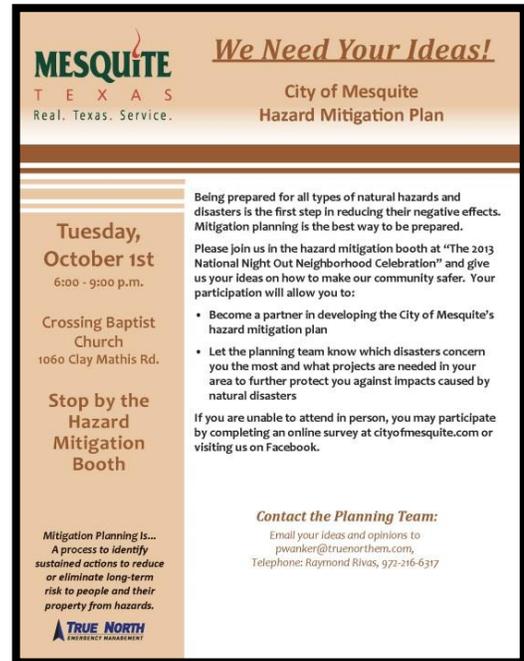
## Public Involvement

The public engagement process provided an opportunity for persons most affected by hazards to voice their opinions, make suggestions about future mitigation actions, and gain a better understanding of the hazard mitigation challenges and actions. An engaged public is often a key component in building support for the use of financial, technical, and human resources dedicated to preparedness and actions. A variety of public meeting formats were provided - from participation during a **National Night Out** and via an online survey tool that was posed in print media and posted to social media sites.

### Online Hazard Mitigation Survey

The City of Mesquite Hazard Mitigation Planning Survey was developed through **Survey Monkey** and linked to the City's web page. The survey provided multi-choice and open-ended questions. The questionnaire consisted of ten questions designed to solicit information about respondent's concerns and experience in dealing with hazards. A copy of the questions and the responses received is provided in Appendix 8.2-D.

The online survey was held open for a period of **three weeks**. During this time, a total of **38 residents completed the survey**. Of that, **37 residents were from Mesquite and one was from an unspecified location**. Charts are provided on the subsequent pages to reflect a sample of the responses received from the survey.



**Figure 2-2 – National Night Out / Hazard Mitigation Booth Poster**

**4. Please indicate the level of threat each hazard presents to your neighborhood, home or business property.**

|  | Very Concerned    | Somewhat Concerned | Neutral           | Not Very Concerned | Not Concerned | Rating Count |
|--|-------------------|--------------------|-------------------|--------------------|---------------|--------------|
| Drought  | 32.4% (11)        | <b>41.2% (14)</b>  | 23.5% (8)         | 2.9% (1)           | 0.0% (0)      | 34           |
| Earthquake   | 2.9% (1)          | 11.4% (4)          | 11.4% (4)         | <b>40.0% (14)</b>  | 34.3% (12)    | 35           |
| Extreme Heat   | 35.1% (13)        | <b>45.9% (17)</b>  | 10.8% (4)         | 8.1% (3)           | 0.0% (0)      | 37           |
| Flood  | 17.6% (6)         | <b>32.4% (11)</b>  | 26.5% (9)         | 17.6% (6)          | 5.9% (2)      | 34           |
| Severe Winter Storm/Extreme Cold/Ice Storms                              | 29.4% (10)        | <b>32.4% (11)</b>  | 17.6% (6)         | 11.8% (4)          | 8.8% (3)      | 34           |
| Severe Weather (Thunderstorm/High Wind/Lightning/Hailstorm)              | <b>51.4% (19)</b> | 35.1% (13)         | 13.5% (5)         | 0.0% (0)           | 0.0% (0)      | 37           |
| Tornado  | <b>70.3% (26)</b> | 16.2% (6)          | 8.1% (3)          | 5.4% (2)           | 0.0% (0)      | 37           |
| Wildfire   | 11.8% (4)         | <b>38.2% (13)</b>  | 26.5% (9)         | 17.6% (6)          | 5.9% (2)      | 34           |
| Technical Hazards (transportation, utilities, hazardous materials, etc.) | 25.7% (9)         | <b>28.6% (10)</b>  | <b>28.6% (10)</b> | 14.3% (5)          | 2.9% (1)      | 35           |
| Health-Related Hazards (west nile virus, pandemic, etc.)                 | 23.5% (8)         | 32.4% (11)         | <b>38.2% (13)</b> | 5.9% (2)           | 0.0% (0)      | 34           |

Figure 2-3 – City of Mesquite Citizen Survey – Hazard Survey Question

**5. Select the hazard(s) that you have experienced that resulted in structural damage or personal displacement due to evacuation orders, loss of utility services or other issues?**

|  | Response Percent | Response Count |
|--|------------------|----------------|
| Flooding   | 11.4%            | 4              |
| Severe Winter Weather  | 14.3%            | 5              |
| Severe Weather (Thunderstorm/High wind/Lightning/Hailstorm)  | 37.1%            | 13             |
| Tornado  | 17.1%            | 6              |
| Wildfire   | 2.9%             | 1              |
| None   | 45.7%            | 16             |
| Other (please add other hazard(s) that are not listed above in which you encountered damages from) |                  | 5              |

Figure 2-4 – City of Mesquite Citizen Survey – Hazard Experience Question

**6. 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 community. Please tell us how important each one is to you.**

|  | Very Important | Somewhat Important | Neutral   | Not Very Important | Not Important | Rating Count |
|--|----------------|--------------------|-----------|--------------------|---------------|--------------|
| Protecting private property  | 75.7% (28)     | 24.3% (9)          | 0.0% (0)  | 0.0% (0)           | 0.0% (0)      | 37           |
| Protecting critical facilities (e.g. transportation networks, hospitals, fire stations)        | 80.6% (29)     | 16.7% (6)          | 2.8% (1)  | 0.0% (0)           | 0.0% (0)      | 36           |
| Preventing development in hazard areas   | 48.6% (18)     | 40.5% (15)         | 8.1% (3)  | 2.7% (1)           | 0.0% (0)      | 37           |
| Enhancing the function of natural features (e.g. streams, wetlands)                            | 35.1% (13)     | 43.2% (16)         | 16.2% (6) | 5.4% (2)           | 0.0% (0)      | 37           |
| Protecting historical and cultural landmarks   | 37.8% (14)     | 40.5% (15)         | 16.2% (6) | 2.7% (1)           | 2.7% (1)      | 37           |
| Protecting and reducing damage to utilities  | 69.4% (25)     | 27.8% (10)         | 2.8% (1)  | 0.0% (0)           | 0.0% (0)      | 36           |
| Strengthening emergency services (e.g. police, fire, ambulance)                                | 70.3% (26)     | 18.9% (7)          | 2.7% (1)  | 8.1% (3)           | 0.0% (0)      | 37           |
| Promoting cooperation among public agencies, citizens, non-profit organizations and businesses | 51.4% (19)     | 45.9% (17)         | 2.7% (1)  | 0.0% (0)           | 0.0% (0)      | 37           |

**Figure 2-5 - City of Mesquite Citizen Survey – Hazard Impact Question**

### First Public Meeting, October 1, 2013

The first public meeting was held at the City's National Night Out Event at Crossing Baptist Church in Mesquite from 6:00 pm to 9:00 pm on Tuesday, October 1, 2013. The event was advertised through a variety of methods including newspaper advertisements, flyers posted in bulletin boards in public buildings, on the City's web page, and on the City's social media accounts (Facebook, Nextdoor, and Twitter) (See Appendix 8.2-E for the event flier, social media notifications, newspaper advertisements, and web site notification).

A Hazard Mitigation table was set up and manned by True North Emergency Management and the City of Mesquite Office of Emergency Management to capture the public's opinion on natural disasters and gather information on mitigation actions that they feel are needed within the City. The event was well attended with over 100 people stopping by the Hazard Mitigation table.

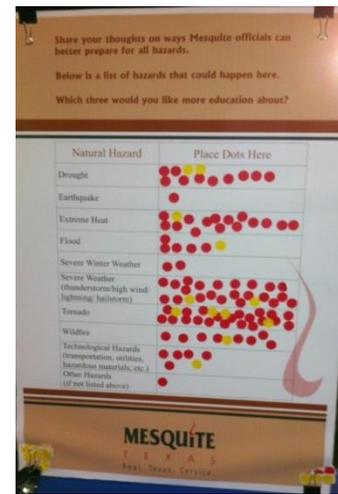


Figure 2-6 - Citizen Hazard Ranking Chart at first City of Mesquite Public Meeting on HMAP Planning.

The Hazard Mitigation table included two activities designed to engage visitors. The first activity identified which hazards they needed more education on, which included how to prepare for, respond to, and recover from identified hazards. The second activity involved True North Emergency Management administering paper versions of the survey that was mentioned above in order to engage residents in expressing their thoughts and concerns on hazards within the City of Mesquite.

Emergency Management preparedness information was made available to all visitors to the Hazard Mitigation table.

In general, the participants all felt that they were adequately educated regarding natural disasters prone to the Dallas / Fort Worth area.

### Public/Stakeholder Draft Plan Review Prior to State/Federal Approval – (April 14 – April 28, 2014)

#### Second Public Meeting / Comment Period

The second public outreach was held from April 14th, 2014 to April 28th, 2014 via the City of Mesquite website. The HMAP was posted on the website so all citizens could review the plan and provide comments via an online survey tool. This gave an opportunity to all citizens to respond to a series of questions regarding the HMAP. Citizens were notified of the availability of the Plan for review and the corresponding survey via posted ads in the Rowlett newspaper and the Mesquite newspaper. Additionally, flyers soliciting public input were posted at the City of Mesquite Fire Administration, the City of Mesquite Municipal building, and both City of Mesquite libraries. The

City of Mesquite also used social media to include Facebook, Twitter and **CNS** to inform citizens about the survey.

The survey was comprised of 6 questions geared towards gathering information from the citizens to incorporate into the HMAP. The survey results were discussed by the planning team and were taken into consideration for hazard risks and impacts presented in this plan as reflected in chapter 6 goals. Please see Appendix 8.2-F for survey results and information on all postings.

**Priorities**

In an effort to engage key stakeholders during the planning process and participation in public meetings, the following agencies and local businesses were identified as stakeholder members and advised through email concerning the public meetings to be held. Additional interviews were conducted with some of these groups, gathering specific information on the capabilities they provide to the City and identification of any mitigation concerns. The City also sent public meeting notifications to their email distribution list.

| <b>City of Mesquite Hazard Mitigation Stakeholders</b>  |   |
|---|---|
| City of Mesquite Building Inspection – Building Official  | City of Mesquite Police Department – Assistant Chief        |
| City of Mesquite City Council – Mayor, Councilmember Place 1, Mayor Pro Tem, Councilmember Place 2, Councilmember Place 3, Councilmember Place 4, Deputy Mayor Pro Tem Councilmember Place 5, Councilmember Place 6 | City of Mesquite Streets – Assistant Director               |
| City of Mesquite City Manager’s Office – Assistant City Manager   | City of Mesquite Traffic Engineering – Senior Engineer      |
| City of Mesquite Code Enforcement - Manager   | City of Mesquite Utilities – Manager, Assistant Manager     |
| City of Mesquite Community Services - Director  | Citizens of Mesquite – Occupations not collected in surveys |
| City of Mesquite Economic Development - Manager   | Dallas County – EM Coordinator                              |
| City of Mesquite Office of Emergency Management – EM Coordinator  | Kaufman County – EM Coordinator, Deputy EM Coordinator      |
| City of Mesquite Engineering -  | North Texas Municipal Water District - NTMWD                |
| City of Mesquite Fire Department – Fire Chief   | City of Garland – EM Coordinator                            |

|   |   |
|---|---|
| City of Mesquite Geographic Information Systems – GIS Supervisor            | North Central Texas Council of Governments – Mitigation Program Assistant, Senior EM Specialist |
| City of Mesquite Housing Division - Director                                | Texas Division of Emergency Management – District Coordinator                                   |
| City of Mesquite Public Works – Director, Senior Civil Engineer             | Mesquite Independent School District – Superintendent, Assistant Superintendent                 |
| City of Mesquite Parks and Recreation – Director, Manager of Parks and Rec. | City of Mesquite Planning and Zoning – Plans Examiner   |

*Table 2-2 City of Mesquite Hazard Mitigation Stakeholders*

## **CHAPTER 3 COMMUNITY PROFILE**

### 3.0 Community Profile for City of Mesquite, Texas

#### 3.1 Description of Study Area

##### Location and Size

Geographically located in east-central Dallas County Texas, the City of Mesquite is one of the municipalities that make up the Dallas/Fort Worth Metroplex. Mesquite’s nearest point is 13 miles from downtown Dallas and accessible to surrounding suburban cities via four freeways. Mesquite is comprised of 47.45 square miles and is bordered by the cities of Dallas, Garland, Sunnyvale, Seagoville and Balch Springs. The study area of Mesquite’s Hazard Mitigation Action Plan includes the incorporated area of the city as shown in Figure 3-1.

Based on the Texas Local Government Code, Mesquite has an extraterritorial jurisdiction (ETJ) which extends five miles from the current city limits and covers a large area in western Kaufman County. The 19 square miles EFJ area, lying primarily to the south of Forney and west of Crandall, is bisected by I-20.

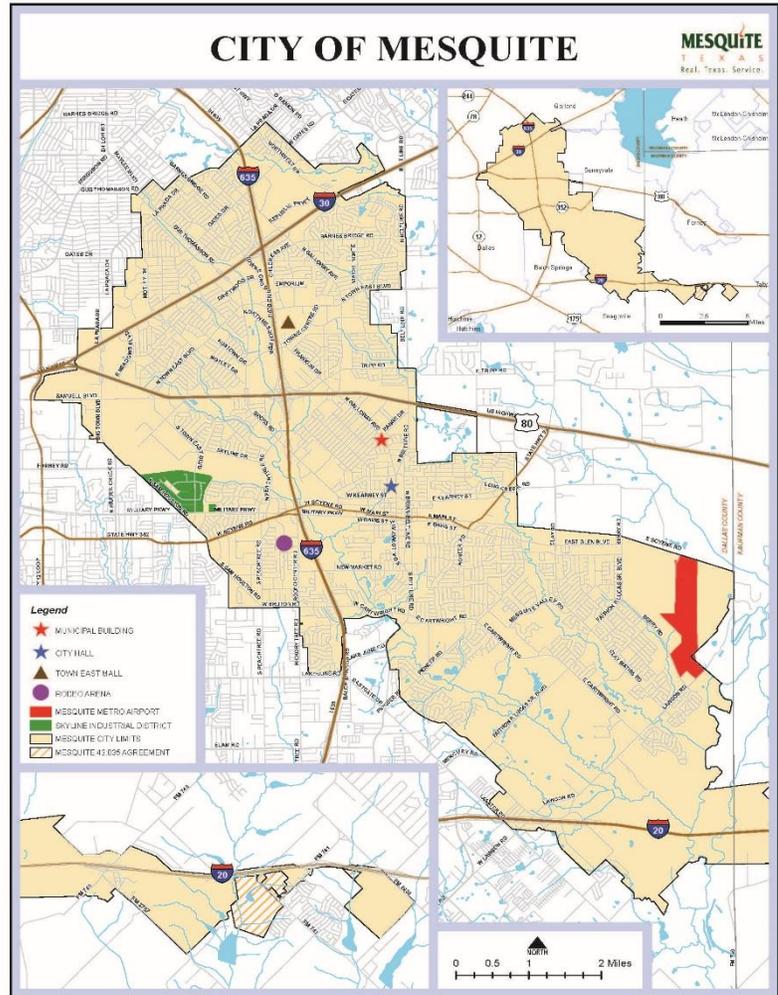


Figure 3-1 – City of Mesquite City Limits and Extra Territorial (ETJ) Boundaries

## History

Mesquite prospered through the late 19th century and early 20th century as a farming community growing cotton, hay, corn and sugar and using the railroad to ship raw goods. The town remained predominantly agrarian until after World War II when the suburban boom also took root in Mesquite.

The City of Mesquite was founded on May 22<sup>nd</sup>, 1873 by Agent A.R. Alcott an engineer for the Texas and Pacific Railroad. On December 3, 1887, the town was the second community to incorporate outside of Dallas proper. The railroad, which ran from Dallas to Shreveport, Louisiana, began stopping at the newly created town shortly thereafter, and the city began to grow around the railroad.

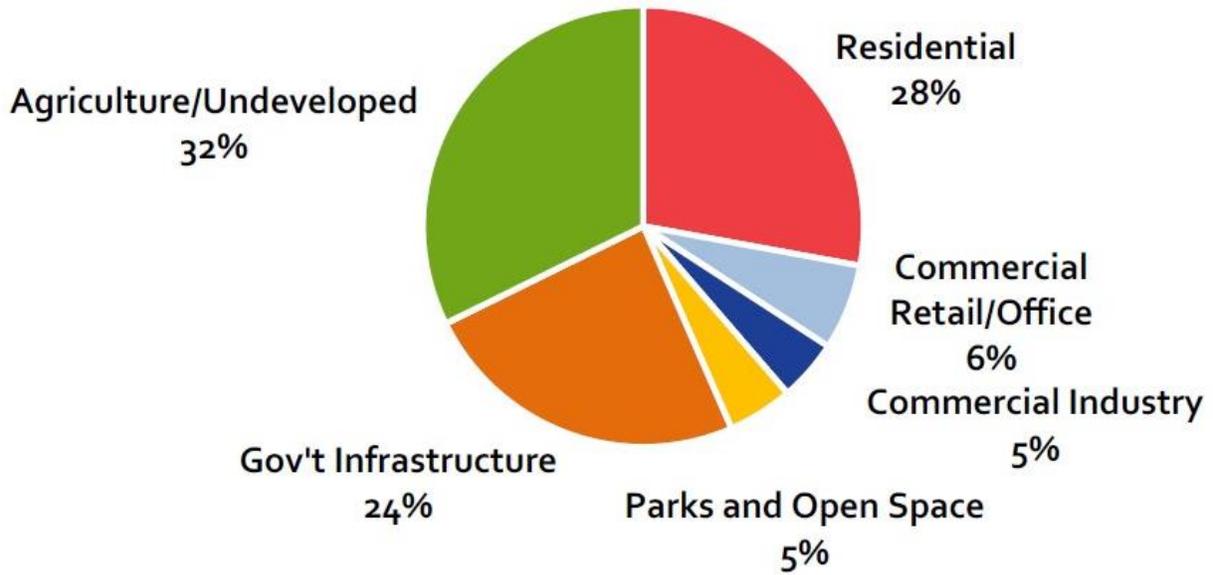
Mesquite saw much growth throughout the years and prospered through the late 19<sup>th</sup> century and early 20<sup>th</sup> century as a farming community. The town was able to use the benefits of the railroads to ship cotton, hay, corn and sugar. During the suburban boom Mesquite saw rapid growth from a population of 1,696 in 1950 to 55,131 in 1970.

In 1970 a freeway called LBJ (1-635) was constructed and connected the city to its neighbors of Garland and Balch Springs.

## 3.2 Geography and Environment

The City of Mesquite corporate limits include 47.45 square miles, mostly in Dallas County, with an Extraterritorial Jurisdiction (ETJ) of another 19 square miles, mostly in Kaufman County. Overall, land use within the city may be considered in one of seven categories: residential, commercial retail, commercial industrial, parks and green spaces, infrastructure, other, and agricultural/undeveloped. A significant part of the city—about 32%—is agricultural/vacant. Most vacant land is in the southeast part of the city and along the East Fork of the Trinity River.

About 28% of the city's land area is residential. Single-family dwellings account for almost 91% of all residential structures, with the remainder split between multi-family residences, primarily apartments (8%), and other residential types—townhouses, duplexes, triplexes, and mobile homes (about 1%). Commercial use accounts for 6% of all land use, primarily along transportation corridors and closer to downtown Mesquite. Industrial use accounts for 5%, most of it located along the central rail corridor. Government and community facilities (public buildings, schools, transportation corridors and facilities, and other infrastructure) occupy 24%. The remaining 5% is used for parks, open spaces, and other uses. The following figure shows the mix of existing land use.



**Climate**

The average annual daily temperate in Mesquite is 76 degrees. On average, the warmest month is July with an average temperature of 96 degrees. The low temperature month is typically January with an average temperature of 34 degrees. The highest recorded temperature was 112°F in 1980. The lowest recorded temperature was 1°F in 1989. Mesquite receives an average of 35 inches of rain annually on 46 rain days. The average relative humidity is 65%. (Source: National Weather Service)

**3.3 Population and Housing**

According to the 2019 Census estimates, Mesquite has a population of 140,937 making it the 24<sup>th</sup> most populous city in the state of Texas. As demonstrated in the table below, Mesquite has seen a steady increase in its population and suggests a continuation of growth; especially in the annexed area of the ETJ.

| Year | Population | Population Change | Housing Units |
|------|------------|-------------------|---------------|
| 1950 | 1,696      | 0.0%              | 812           |
| 1960 | 27,526     | 1523.0%           | 8,004         |
| 1970 | 55,131     | 100.3%            | 15,289        |

| Area                   | Total Population | Land Area in Square Miles | Persons per square mile |
|------------------------|------------------|---------------------------|-------------------------|
| Dallas County (Total)  | 2,635,516        | 871.28                    | 2,718.0                 |
| Kaufman County (Total) | 136,154          | 780.70                    | 132.4                   |
| Mesquite               | 140,937          | 47.45                     | 3,038.3                 |
| 1980                   | 67,053           | 21.6%                     | 22,248                  |
| 1990                   | 101,484          | 51.3%                     | 39251                   |
| 2000                   | 124,523          | 22.7%                     | 46,411                  |
| 2010                   | 139,824          | 12.3%                     | 51,822                  |
| 2020 est.              | 149,262          | 6.7%                      | 56,719                  |
| 2030 est.              | 157,259          | 5.4%                      | 59,543                  |

Table 3-1 – City of Mesquite Population and Housing Unit Trends (Source: 2008 Citywide Data Summary and 2010 Census)

It is important to note that a majority of the population are under the age of 18. The following is a population breakdown for the City of Mesquite.

| Age Composition           |       | Racial Composition |        |
|---------------------------|-------|--------------------|--------|
| Under age of 18           | 29.2% | White              | 28.55% |
| 18-24 years old           | 10.1% | Hispanic or Latino | 34.94% |
| 24-44 years old           | 27.9% | African American   | 25.99% |
| 44-64 years old           | 23.7% | Asian              | 2.93%  |
| 65 years of age and older | 10.0% | Two or more races  | 3.33%  |
|                           |       | Native American    | .77%   |
|                           |       | Pacific Islander   | .06%   |

Table 3-2 – City of Mesquite Population Breakdown (Source: <https://data.census.gov/cedsci/table?tid=ACSST5Y2018.B03002&g=1600000US4847892>)

**Table 3-3 – Land Area and Population Density, 2019 for Dallas / Kaufman County and City of Mesquite (Source: US Census Bureau)**

**3.4 Land Use**

An existing land use study was completed for the 2019 Mesquite Comprehensive Plan. Mesquite has developed within a compact residential land use pattern that has been facilitated by several factors: The relatively flat terrain, disrupted only by the creeks and flood plains that traverse the City.

The existing land use study and map was completed in 2019. Residential land use represented the largest acres in developed land at 8,485 acres followed by retail at 930 acres and industrial at 748 acres. Public / Semi-public had 3,321.2 acres and Transportation 2,680 acres.

**3.5 Housing**

At the time of the 2010 Census, 50,363 housing units were located within the city limits of Mesquite.

Table No. 3-4 provides a breakdown of housing units in the City of Mesquite, Dallas County and Kaufman County as well as the percentage of units that are single-family detached, single-family attached, two units, three or more units, and mobile homes.

| Area           | # Housing Units 2000 | Census 2010          |                      |                      |         |                 |                              | Net Chg. 2000-2010 |
|----------------|----------------------|----------------------|----------------------|----------------------|---------|-----------------|------------------------------|--------------------|
|                |                      | # Housing Units 2010 | Single Unit Detached | Single Unit Attached | 2 Units | 3 or More Units | Mobile Homes, Boat, RV, etc. |                    |
| Dallas County  | 854,119              | 944,055              | 527,212              | 36,559               | 13,333  | 351,426         | 15,525                       | 89,936             |
| Kaufman County | 26,133               | 38,047               | 28,092               | 356                  | 522     | 2,485           | 6,592                        | 11,914             |
| Mesquite       | 46,411               | 51,822               | 37,258               | 986                  | 143     | 13,275          | 160                          | 5,411              |

**Table 3-4 – Occupied Housing Units in Dallas / Kaufman County and the City of Mesquite – 2010 (Source: US Census Bureau, 2010)**

**3.6 Economic Data**

Table 3-5 lists the employers within Mesquite with the highest number of employees.

### Top 10 Employers

Source: City of Mesquite 2008 Comprehensive Annual Financial Report

| Employer                             | No. of Employees | Industry                   |
|--------------------------------------|------------------|----------------------------|
| Mesquite Independent School District | 4,100            | Public                     |
| Town East Mall                       | 3,000            | Retail                     |
| United Parcel Service Inc.           | 2,350            | Transportation / Logistics |
| City of Mesquite                     | 1,100            | Public                     |
| Eastfield College                    | 950              | Education                  |
| HMA Mesquite Hospitals               | 700              | Health Care                |
| Wal-Mart Supercenter                 | 510              | Retail                     |
| Integra Color Group                  | 425              | Manufacturing              |
| Baker Drywall                        | 400              | Manufacturing              |
| Lineage Power                        | 310              | Utility                    |
| Christian Care Center                | 280              | Health Care                |
| Dal-Tile                             | 225              | Manufacturing              |
| Fritz Industries                     | 210              | Manufacturing              |
| Pepsi Bottling of Mesquite           | 200              | Manufacturing              |
| Union Pacific Railroad Intermodal    | 200              | Transportation / Logistics |

Table 3-5 – City of Mesquite Top 15 Employers (Source: City of Mesquite website: <http://www.cityofmesquite.com/econdev/about-us.php>)

### 3.7 Transportation

Mesquite has five major vehicular transportation routes, a municipal general aviation airport and commercial railroad service. Local and regional thoroughfares accessible to Mesquite are described below:

#### Roadways

Five major highways (I-30, I-20, I-635, U.S. Highway 80 and State Highway 352) provide vehicular access to Mesquite. According to the 2008 Citywide Data Summary, future plans include the extension of State Highway 190 and Loop 9 through eastern portions of the city.

#### Rail

Mesquite is home to one of the largest railroad switching facilities in the state of Texas. Freight services are provided by Union Pacific Railroad, which operates an intermodal and auto load facility in the Skyline Industrial Park.

### ***Mesquite Metro Airport***

Mesquite Metro Airport is a reliever airport in the Dallas / Fort Worth Metroplex area providing access for private and corporate air travel. The airport provides a 6,000-foot runway, instrument landing systems, AWOS, a full-length parallel taxiway, terminal building, air traffic control tower and almost 200 individual hangar storage spaces.

### **3.8 Analyzing Development Trends**

***Requirement CFR §201.6(c)(2)(ii)(C) [the plan should describe vulnerability in terms of] providing general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.***

***Requirement 201.6(c)(d)(3): A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within five years in order to continue to be eligible for mitigation project grant funding.***

According to the recent census the City of Mesquite is continuing to grow in population. From 1950 to 2019, the population grew from 1,696 to 140,937 residents. Recent population trends expect the population to continue to grow within the City limits to 157,259 residents in the year 2030.

This population shift is significant in terms of land use and types of development occurring within the City. Whereas in the past mitigation actions for urban type development were focused on Cities and Towns, however now those mitigation actions must also be focused on the rapidly developing rural areas. Fire protection, building codes, land use regulations and other initiatives to address change in development patterns are important to the orderly development over time.

If the future projections hold true then the population will continue to increase for the City of Mesquite. Changes in growth management strategies and an increased focus on accommodating that growth are important.

These development trends call for an increase in intergovernmental cooperation. The City of Mesquite has a planning and zoning, code enforcement, parks & recreation, engineering, traffic engineering, and Utilities departments that are committed to make sure the City of Mesquite development is done with working together towards improving land use planning throughout the City.

A current Land Use Plan for the City of Mesquite was prepared in 2018 providing major transportation routes and generalized expected land uses. This map is shown below (Figure 3-2).

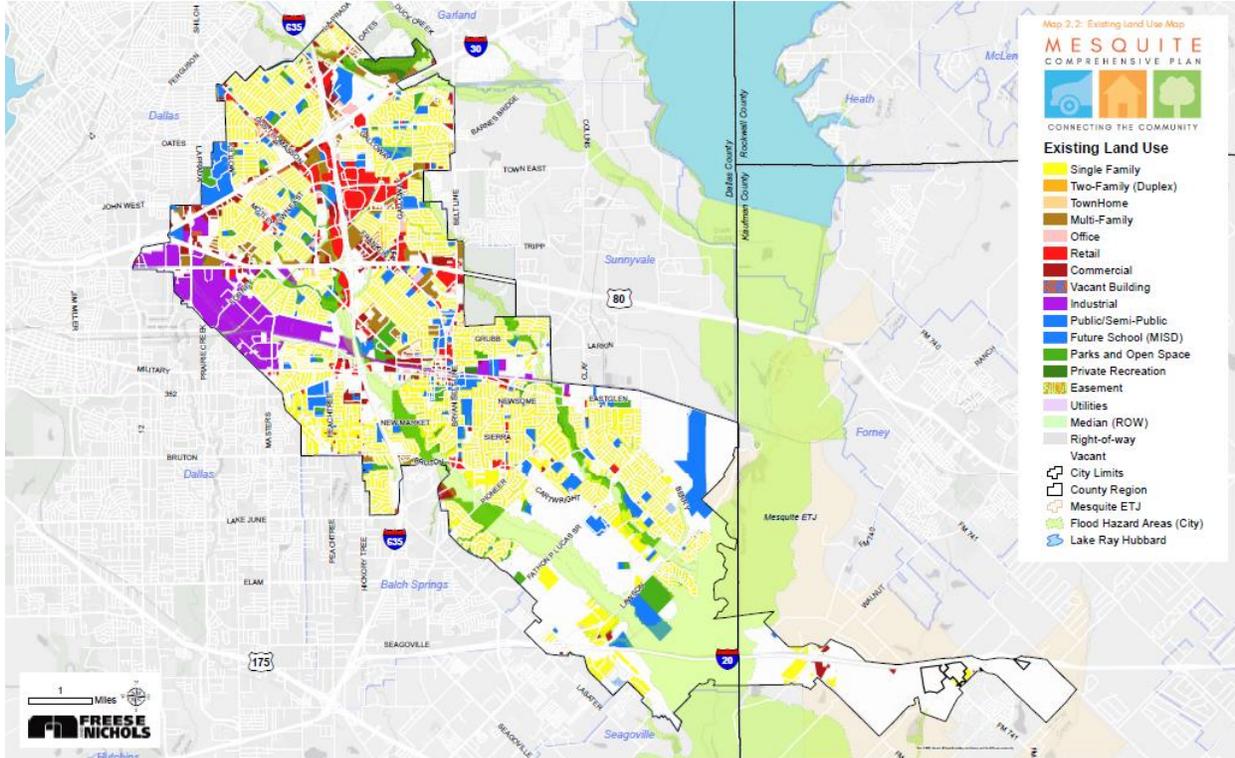


Figure 3-2 – City of Mesquite Land Use Map

## **CHAPTER 4**

# **HAZARD IDENTIFICATION AND RISK ANALYSIS**

### 4.0 Overview of the Risk Assessment Process

***Requirement CFR §201.6(c)(2) A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.***

Risk assessment requires the collection and analysis of hazard-related data enabling participating jurisdictions to identify and prioritize appropriate mitigation actions to reduce/eliminate losses from potential hazards. The information presented in this section is based on best available data available to the Hazard Mitigation Committee. Information presented in the Dallas County 2020 (draft) and State of Texas 2018 plans were incorporated by adding relevant data for Mesquite to update the hazard mitigation plan.

FEMA's Local Mitigation Plan Review Tool (October 2011) provides the following summary of intent for each required element in this section.

- *To understand the potential and chronic hazards affecting the planning area and identify the most significant hazard risks and most adversely affected locations. To understand potential impacts to the community based on past hazard events and the likelihood they will reoccur.*
- *To consider the community as a whole, analyze potential impacts of future hazard events, and the reduction of vulnerabilities through hazard mitigation actions.*
- *To inform hazard mitigation actions for properties suffering repetitive damage due to flooding, particularly problem areas that may not be apparent on the floodplain maps.*

**4.1 Hazard Identification and Risk Assessment**

***Requirement CFR §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.***

**4.1.1 Hazard Identification**

Hazard identification is recognizing risk-related events threatening a community. Events are described as natural or human-caused hazards inflicting harm on people or property, or interfering with commerce or human activities. Such events would include, but are not limited to, floods, severe storms, winter weather, wildfire, drought and other incidents affecting populated or built areas.



Note: Modified from U.S. Geological Survey and Oregon Partnership for Disaster Resilience Models.  
**Figure 4-1 – Disaster Resilience Model (Source: USGS and Oregon Partnership for Disaster Resilience Models)**

The Hazard Mitigation Committee considered all hazards prone to the Mesquite planning area that include the counties of Dallas and Kaufman

in accordance with 44 CFR 201.6 (c) (2) (i). Information from the National Climatic Data Center (NCDC), the United States Geologic Service (USGS) and other sources were reviewed to determine the type, location, and extent of natural hazards that may affect Mesquite.

***Hazards Not Likely to Occur within the City of Mesquite***

FEMA provides a list of known natural hazards that are prone to affect the United States. Many of these hazards are unlikely to occur within Mesquite due to its geographic location. These hazards include avalanche, tropical cyclone, land subsidence, landslide, and volcano. The Hazard Mitigation Committee determined these are not likely to affect the incorporated areas of the city.

***Hazards Prone to the City of Mesquite***

The Hazard Mitigation Committee conducted a review of natural hazards prone to Texas by comparing the hazards identified in the Dallas County 2020 and 2018 State of Texas plans. Table 4-1 reflects the crosswalk of hazards identified in these plans and includes the list of hazards to be presented in the Mesquite Hazard Mitigation Action Plan.

| Natural Hazards      | 2018 State of Texas | 2020 Dallas County | 2020 Mesquite |
|----------------------|---------------------|--------------------|---------------|
| Coastal Erosion      | X                   |                    |               |
| Dam/Levee Failure    | X                   |                    | X             |
| Drought              | X                   | X                  | X             |
| Earthquake           | X                   | X                  | X             |
| Expansive Soils      | X                   |                    | X             |
| Extreme Heat         | X                   | X                  | X             |
| Flood                | X                   | X                  | X             |
| Hailstorm            | X                   | X                  | X             |
| High-Wind/Windstorms | X                   | X                  | X             |
| Hurricane            | X                   |                    |               |
| Land Subsidence      | X                   |                    |               |
| Lightning            | X                   | X                  | X             |
| Severe Winter Storm  | X                   | X                  | X             |
| Tornado              | X                   | X                  | X             |
| Wildfire             | X                   | X                  | X             |

Table 4-1 - Hazard Identification

**National Climatic Data Center**

The next step in the hazard identification process is to gather historical data regarding the number of events and damages to property. The National Climatic Data Center (NCDC) is a reporting tool used by the National Weather Service (NWS) to gather reported events from local officials. Most weather data is tracked on a county level; however, some events are recorded for a specific city. While this data may not capture all events that were experienced in the City of Mesquite, it is considered the “best available” data for planning purposes.

**4.1.2 Hazard Ranking Process**

The Hazard Mitigation Committee reviewed the methodology used by the State of Texas and determined that the City of Mesquite Hazard Mitigation Action Plan should utilize the same ranking methodology to allow a more cohesive process. The six risk characteristics and future occurrence factors defined below were examined to determine the City of Mesquite’s overall vulnerability level, and are presented within each hazards profile.

- *Potential Severity of Impact*
- *Seasonal Patterns*
- *Probable Duration*
- *Existing Warning Systems*
- *Frequency of Occurrence*
- *Source Documents, Studies, Maps, Etc. Researched*
- *Warning Time (Potential Speed of Onset)*

A summary of the hazards selected by ranking level for inclusion in this plan is provided below.

| Substantial   | Major  | Minor   | Limited   |
|---|--|---|---|
| <ul style="list-style-type: none"> <li>• Tornado</li> </ul> | <ul style="list-style-type: none"> <li>• Winter Weather</li> </ul> | <ul style="list-style-type: none"> <li>• Flooding</li> <li>• Hail</li> <li>• High Winds (i.e., microburst, downburst)</li> <li>• Dam</li> <li>• Hazardous Materials release or spill</li> </ul> | <ul style="list-style-type: none"> <li>• Drought</li> <li>• Earthquake</li> <li>• Excessive Heat</li> <li>• Lightning</li> <li>• Wildfire</li> <li>• Expansive Soils</li> </ul> |

Table 4-2 – City of Mesquite Hazard Ranking by Impact Potential

**Technological Hazards**

This plan also includes hazardous materials spills, which are a non-natural hazard. This hazard is addressed in Section 4.3, and recognizes the location and potential for impacts and is presented as information only. These events should be incorporated as appropriate into future planning initiatives to completely address the preparedness, response and recovery procedures.

**4.1.3 Vulnerability Assessment**

**Requirement CFR §201.6(c)(2)(ii) [the risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described and shall include an overall summary of each hazard and its impact on the community.**

Vulnerability is susceptibility to physical injury, harm, damage or economic loss and is dependent on location, construction, content and function of a facility. Understanding vulnerability is essential in mitigation planning for the City of Mesquite because it leads to understanding the types and costs of injury and damages resulting from a future hazard event.

Each hazard identified for inclusion in this plan was categorized into a high, moderate or low classification and is included in Sections 4.2 to 4.4. A profile of each hazard is presented based on best available data obtained throughout the planning process. Each hazard contains the following risk assessment elements:

- Hazard Description
- Location and Extent
- Previous Occurrences

- Probability of Future Occurrences
- \*Vulnerability Assessment

*\*A description of the vulnerabilities identified to population, critical facilities and infrastructure, essential services, transportation systems and lifeline utilities are defined as appropriate with the best available data gathered during the analysis.*

Maps included throughout this chapter further demonstrate the risks associated with population, facilities and infrastructure.

### 4.1.4 Identifying Structures

***Requirement CFR §201.6(c)(2)(ii)(A) The plan should describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas.***

Below is a brief definition of critical facilities and infrastructure categories followed by examples of the identified assets:

- Vulnerable population facilities such as hospitals, nursing homes, schools, day cares and housing likely to contain occupants who may not be sufficiently mobile to avoid death or injury during a disaster. (Table 4-3)
- Public safety facilities such as fire stations, police stations, vehicle and equipment storage facilities, city buildings and emergency operations centers needed for disaster response activities. (Table 4-4)
- Public and private utilities vital to maintaining or restoring normal services. (Table 4-5)
- Transportation systems such as roads and bridges are essential for safe evacuation and egress for emergency personnel and supplies. (Figure 4-2)
- Structures or facilities that produce, use or store highly volatile, flammable, explosive toxic and/or water-reactive materials. (See Section 4.3)

| <b>Vulnerable Populations by Critical Facility Category</b> |  |
|---|--|
| <b>Child Care Centers</b>                                   |  |
| Handprints Academy  | Tomorrows Future                             |
| Children’s Palace Preparatory School                        | Children’s Palace                            |
| Corner Stone Learning Center                                | Town East Learning Center                    |
| Appleseed Academy   | Circle Creek Day Care                        |
| Children’s Safari Private School                            | Jerry R Junkins Head Start Of Greater Dallas |
| Childtime Children’s Centers                                | Children’s Park                              |
| Discovery School  | Calvary Temple Community & Learning Center   |
| Fresh Start-205   | Meadow Oaks Academy                          |
| Gingerbread House Academy                                   | Sherwood Forest                              |
| Kids Discovery Academy                                      | Adventure Time Learning Center               |
| A Bright Beginning  | Kindercare Facilities Management             |
| Learning Time Station                                       | La Petite Academy                            |
| Lil Rascals Learning Center                                 | Mesquite Day School                          |
| Lil Rascals Learning Center                                 | Learning Me - Before & After Learning Center |
| Little Red Schoolhouse                                      | Oates Park Day Care                          |
| A Bright Beginning II                                       | A Mothers Touch                              |
| Children of Light Christian Academy                         | Blessed Little Angels Academy                |
| Children’s Palace Preparatory School                        | Circle Creek Early Care and Education        |
| Durkin Academy  | Family Cathedral of Praise                   |
| Kid’s Green Acre School                                     | King Arthur Castle of Little Tikes           |
| Nexus Child Development Center                              | Noah’s Ark Learning Center                   |
| Pathways to Learning Childcare                              | Pats Little Pecan Ranch                      |
| Small Miracles Academy                                      | St Pius X Early Care and Education Center    |
| Tiny Feet   | Tomorrow’s Future Learning Center            |
| <b>Education</b>  |  |
| A.C. New Middle School                                      | North Mesquite High School                   |
| Achziger Elementary   | Pirrung Elementary                           |
| Agnew Middle School   | Porter Elementary                            |
| Austin Elementary   | Poteet High School                           |
| Beasley Elementary  | Price Elementary                             |
| Berry Middle School   | Range Elementary                             |
| Black Elementary  | Rugel Elementary                             |
| Cannaday Elementary   | Rutherford Elementary                        |

|  |  |
|--|--|
| Florence Elementary  | Seabourn Elementary  |
| Floyd Elementary School  | Shands Elementary  |
| Frazier Middle School  | Shaw Elementary  |
| Galloway Elementary  | Smith Elementary   |
| Gentry Elementary  | Terry Middle School  |
| Gray Elementary  | Thompson Elementary  |
| Hanby Elementary   | Tosch Elementary   |
| Henrie Elementary  | Tisinger Elementary  |
| Hodges Elementary  | Vanston Middle School  |
| Horn High School   | West Mesquite High   |
| Kimball Elementary   | Wilkinson Middle School  |
| Kimbrough Middle School  | Wooley Middle School   |
| Lawrence Elementary  |  |
| Mackey Elementary  |  |
| McDonald Middle School   |  |
| McKenzie Elementary  |  |
| McWhorter Elementary   |  |
| Mesquite Academy   | <b>Private School</b>  |
| Mesquite Learning Center   | Dallas Christian School / Legacy Prep                            |
| Mesquite High School   | <b>Colleges</b>  |
| Moss Elementary  | Eastfield College  |
| Motley Elementary  | Texas A&M Commerce   |
|  | Texas A&M Engineering Extension Service                          |
| <b>Multi-Housing Residential Facilities</b>                            |  |
| Waterford At Mesquite  | Mesquite Village Apartments                                      |
| Evergreen At Mesquite  |  |
| <b>Medical Facilities (current State of Texas licensed facilities)</b> |  |
| <b>Hospitals</b>   |  |
| Dallas Regional Medical Center   | Mesquite Specialty Hospital                                      |
| <b>Nursing Homes</b>   |  |
| Christian Care Center (1000 Wiggins Pkwy)                              |  |
| Heritage Place (825 W. Kerney)   | Edgewood Rehabilitation and Care Center (1101 Windbell Dr.)      |
| Town East Rehabilitation and Healthcare Center (3617 O'Hare Dr)        | Mesquite Tree Nursing Center (434 Paza Dr.)                      |
|  | Willowbend Nursing and Rehabilitation Center (2231 Highway 80 E) |
| <b>Assisted Living Facilities</b>                                      |  |

|  |  |
|--|--|
| Fredisolo Anointed Homes (1400 Parkwood Trail)                       | The Courtyard at Christian Care Center (950 Wiggins Pkwy)                  |
| Christian Care Center Bentley Personal Care Unit (1010 Wiggins Pkwy) | Cambridge Court Assisted Living and Memory Care Community (711 Matador Ln) |
| Masons Personal Care Home (1819 Arapaho Trl)                         | Diann's Place, Inc (1106 Seashell Dr.)                                     |
| Notice Lakeshore Assisted Living (926 Lakeshore Dr.)                 | Notice Residential Care (2724 Daniel Creek)                                |
| Sohpya's Assisted Living (2621 Beeman Dr.)                           | Notice Residential Care (2618 Crosscreek Ln)                               |
| Bradfield Place (3700 Oates Dr.)                                     |  |
| <b>Recreational/Community Centers</b>                                |  |
| Memorial Stadium   | Westlake House   |
| Hanby Stadium  | Rutherford Community Center  |
| Tillery Field  | Creek Crossing Activity Center   |
| Community Services Building  | Lawrence House   |
| Florence Community Center  | Rutherford Senior Center   |
| Evans Community Center   | Goodbar Senior Center  |
| Dunford Community Center   |  |

Table 4-3 – Vulnerable Populations in Mesquite by Critical Facilities Category

| <b>City of Mesquite Public Safety Buildings</b>   |                                |
|---|--------------------------------|
| Fire Stations 1-7   | Municipal Center               |
| Police Administration Building (Including Emergency Operations Center and 911 dispatch) and support buildings | Convention Center/Exhibit Hall |
| City Hall   | Fire Department Support Center |

Table 4-4 – City of Mesquite Public Safety Buildings

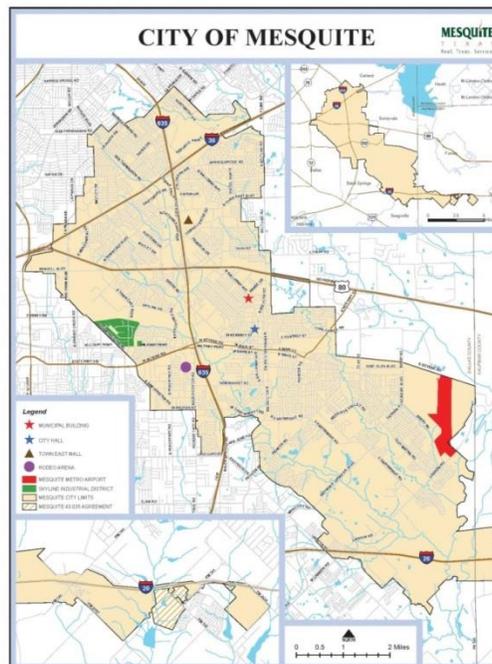
| <b>Public and Private Utilities in the City of Mesquite</b> |   |
|---|---|
| North Texas Municipal Water District (Lawson Road)          | Barnes Bridge Pump Station and Ground Storage   |
| Southeast Pump Station and Ground Storage                   | Hailey Pump Station and Ground Storage          |
| Long Branch Sewer Lift Station                              | Shannon Sewer Lift Station                      |
| McKenzie Sewer Lift Station                                 | Falcons Lair Sewer Lift Station                 |
| LaPrada Sewer Lift Station                                  | Big Town Elevated Water Tank                    |
| Town East Elevated Water Tank                               | Peachtree Elevated Water Tank                   |
| McKenzie Elevated Water Tank                                | ONCOR Power Transmission and Distribution Lines |
| Atmos Gas Transmission and Distribution lines               |   |

Table 4-5 Critical Public and Private Utilities in the City of Mesquite

**Note:** The City of Mesquite has one water source. Drinking water in Mesquite originates at Lavon Reservoir in Wylie, Texas. The water levels in Lavon are supplemented by raw water from Lake Texoma, Lake Jim Chapman, Lake Tawakoni, the Upper Sabine Basin Supply Project, the East Fork Raw Water Supply Project and Lake Bonham. The drinking water in Mesquite is treated by the North Texas Municipal Water District, located in Wylie. If any hazard affects the water supply lines anywhere between Wylie and Mesquite, there could be adverse effects on potable and non-potable water for the City of Mesquite.

## Transportation Systems

The City of Mesquite has an extensive transportation network that includes numerous roadways. All of these roadways are vulnerable to various hazards that could affect the City of Mesquite. The following figure shows the major roadways through the City of Mesquite. These include City, State, and Federal roadways.



**Figure 4-2 – Major Roadways in the City of Mesquite**

## Housing

Certain housing units, such as mobile homes, substandard and older structures not constructed to current building standards, are more susceptible to damage from certain types of hazards.

As shown in Table 4-6, approximately 28 percent of the housing stock was built prior to 1970 and the implementation of building standards. These homes may be at an increased risk from certain hazards.

Persons living in high-density units, such as multi-family developments, are also considered vulnerable due to the concentration of housing units within a relatively small area. According to the 2018 census, approximately 30 percent of housing units contained three or more units.

| Subject                     | City of Mesquite, Texas |                 |         |                   |
|-----------------------------|-------------------------|-----------------|---------|-------------------|
|                             | Estimate                | Margin of Error | Percent | % Margin of Error |
| <b>HOUSING OCCUPANCY</b>    |                         |                 |         |                   |
| Total housing units         | 50,279                  | +/-2,539        | 50,279  | (X)               |
| Occupied housing units      | 47,591                  | +/-2,577        | 94.7%   | +/-1.9            |
| Vacant housing units        | 2,688                   | +/-969          | 5.3%    | +/-1.9            |
| <b>UNITS IN STRUCTURE</b>   |                         |                 |         |                   |
| Total housing units         | 50,279                  | +/-2,539        | 50,279  | (X)               |
| 1-unit, detached            | 33,675                  | +/-2,338        | 67.0%   | +/-3.8            |
| 1-unit, attached            | 1,268                   | +/-641          | 2.5%    | +/-1.3            |
| 2 units                     | 245                     | +/-212          | 0.5%    | +/-0.4            |
| 3 or 4 units                | 617                     | +/-598          | 1.2%    | +/-1.2            |
| 5 to 9 units                | 5,496                   | +/-1,348        | 10.9%   | +/-2.6            |
| 10 to 19 units              | 4,211                   | +/-1,264        | 8.4%    | +/-2.5            |
| 20 or more units            | 4,623                   | +/-1,136        | 9.2%    | +/-2.1            |
| Mobile home                 | 53                      | +/-89           | 0.1%    | +/-0.2            |
| Boat, RV, van, etc.         | 91                      | +/-107          | 0.2%    | +/-0.2            |
| <b>YEAR STRUCTURE BUILT</b> |                         |                 |         |                   |
| Total housing units         | 50,279                  | +/-2,539        | 50,279  | (X)               |
| Built 2014 or later         | 627                     | +/-466          | 1.2%    | (X)               |
| Built 2010 to 2013          | 681                     | +/-680          | 1.4%    | +/-1.4            |
| Built 2000 to 2009          | 5,135                   | +/-1,025        | 10.2%   | +/-2.0            |
| Built 1990 to 1999          | 6,156                   | +/-1,142        | 12.2%   | +/-2.2            |
| Built 1980 to 1989          | 14,186                  | +/-1,587        | 28.2%   | +/-2.8            |
| Built 1970 to 1979          | 9,100                   | +/-1,376        | 18.1%   | +/-2.5            |
| Built 1960 to 1969          | 6,822                   | +/-1,319        | 13.6%   | +/-2.4            |
| Built 1950 to 1959          | 6,336                   | +/-1,240        | 12.6%   | +/-2.5            |
| Built 1940 to 1949          | 789                     | +/-405          | 1.6%    | +/-0.8            |
| Built 1939 or earlier       | 447                     | +/-313          | 0.9%    | +/-0.6            |

<https://data.census.gov/cedsci/table?q=Mesquite%20city,%20Texas%20Housing&tid=ACSDP1Y2018.DP04&vintage=2018&hidePreview=false>

**Table 4-6 - U.S. Census Bureau American Community Survey, 1018 1-year Estimate, City of Mesquite**

**4.2 Identifying and Profiling Hazards**

**4.2.1 Tornado**

***Hazard Description***

Tornadoes are nature’s most violent storms, spawned from powerful thunderstorms, causing fatalities and devastating a neighborhood in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 300 miles per hour. Damage paths can exceed one mile wide and 50 miles long. Every state is at some risk from this hazard. Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. Occasionally, tornadoes develop so rapidly little, if any, advance warning is possible. Before a tornado hits, the wind may die down and the air may become very still. A cloud of debris can mark the location of a tornado even if a funnel is not visible. Tornadoes generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind a tornado.

Prior to February 2007, the Fujita Scale was used to measure tornado severity (Table 4-7).

| F-Scale Number | Intensity Phrase    | Wind Speed  | Type of Damage  |
|----------------|---------------------|-------------|---|
| F0             | Gale tornado        | 40-72 mph   | Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.  |
| F1             | Moderate tornado    | 73-112 mph  | The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.                               |
| F2             | Significant tornado | 113-157 mph | Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.   |
| F3             | Severe tornado      | 158-206 mph | Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted  |
| F4             | Devastating tornado | 207-260 mph | Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.  |
| F5             | Incredible tornado  | 261-318 mph | Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel reinforced concrete structures badly damaged. |

**Source: NOAA**

*Table 4-7 – Pre-2007 Fujita Scale*

The Enhanced Fujita Scale, or EF Scale (Table 4-8), is the current scale for rating the strength of tornadoes in the United States; magnitude is estimated via the damage left behind. Implemented

in February 2007, it replaced the Fujita Scale. The scale has the same basic design as the original Fujita Scale, six categories from zero to five, representing increasing degrees of damage. The new scale takes into account how most structures are designed, and is thought to be a much more accurate representation of the surface wind speeds in the most violent tornadoes.

| Enhanced Fujita Category | Wind Speed (mph) | Potential Damage  |
|--------------------------|------------------|---|
| EF0                      | 65-85            | <b>Light damage.</b> Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.   |
| EF1                      | 86-110           | <b>Moderate damage.</b> Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.  |
| EF2                      | 111-135          | <b>Considerable damage.</b> Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.  |
| EF3                      | 136-165          | <b>Severe damage.</b> 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          | <b>Devastating damage.</b> Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.   |
| EF5                      | 200+             | <b>Incredible damage.</b> Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yd.); high-rise buildings have significant structural deformation; incredible phenomena will occur.                 |

**Source: NOAA**

Table 4-8 – Enhanced Fujita Scale (Source: National Oceanic and Atmospheric Administration)

Figure 4-3 shows wind zones across the United States; note the planning area falls in Zone IV (250 mph).

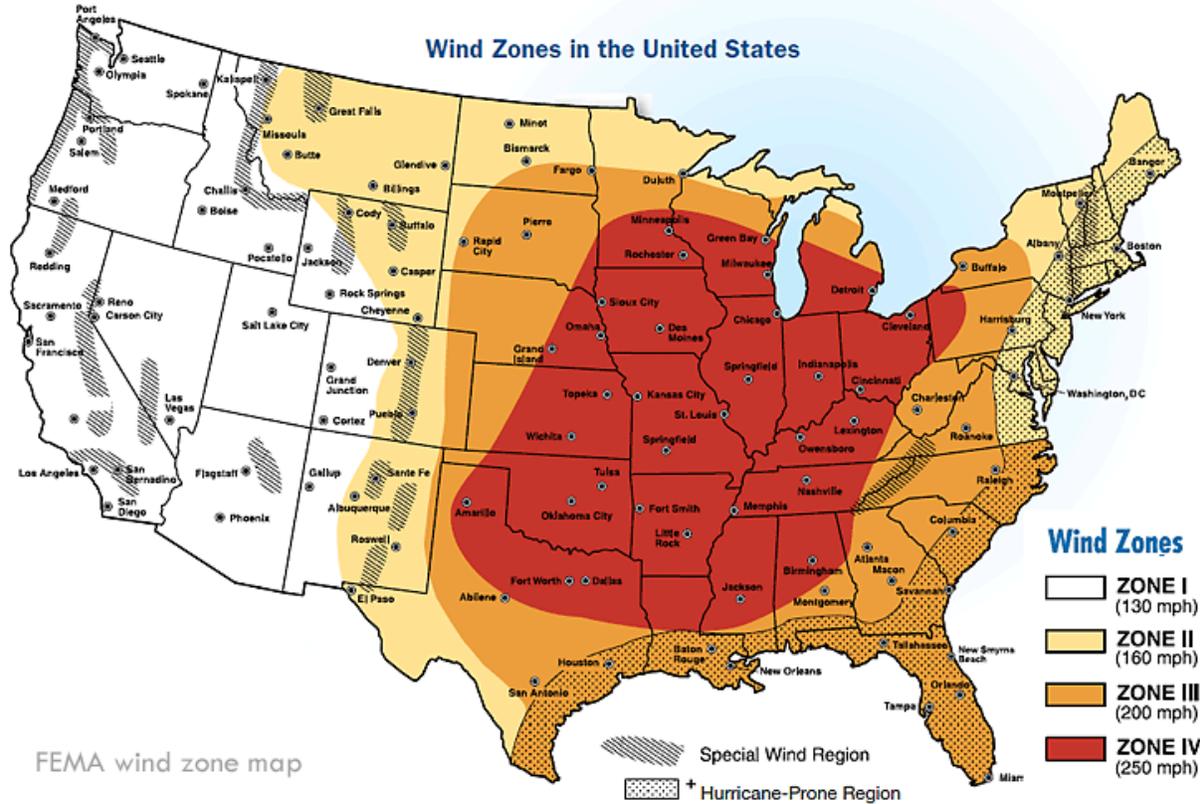


Figure 4-3 - Wind Zones in the United States (Source: FEMA)

**Location and Extent**

The path of a tornado cannot be predicted and damage is not limited by location. Every home, business, industry and utility lifeline within the City of Mesquite has a probability of being impacted by a tornado. Therefore, all locations within the planning area are subject to tornadoes.

Dallas and Kaufman counties experienced tornado activity in all months except February, July, August, and November. Most of the events occurred in the spring and fall.

**Previous Occurrences**

Table 4-9 provides a summary of recorded events in the study area from 1996 to 2020. We see that most of the tornado activity during this timeframe is EF0 and EF1. One specific event was recorded in Mesquite on October 21, 1996 when an F0 tornado crossed through the city inflicting injury on one person and \$120,000 in property damage.

| County         | Category |        |        |        |         | Total No. of Events | Deaths | Injuries | Property Damage | Crop Damage |
|----------------|----------|--------|--------|--------|---------|---------------------|--------|----------|-----------------|-------------|
|                | F0/EF0   | F1/EF1 | F2/EF2 | F3/EF3 | F4/E F4 |                     |        |          |                 |             |
| Dallas County  | 18       | 12     | 5      | 2      | 1       | 38                  | 10     | 490      | \$2,394,950,000 | \$3,000     |
| Kaufman County | 7        | 4      | 1      | 1      | 0       | 13                  | 0      | 8        | \$101,295,000   | 0           |

Table 4-9 – Countywide Tornado Event Summary - January 1996 – July 2020 (Source: National Climatic Data Center)

Although the intensity of tornado activity has been relatively low in the Mesquite planning area, we can see stronger tornadoes have been recorded in neighboring communities. Figure 4-4 below provides a graphic image of historic tornado tracks based on regional data obtained from NCDC from 1950 to 2020.

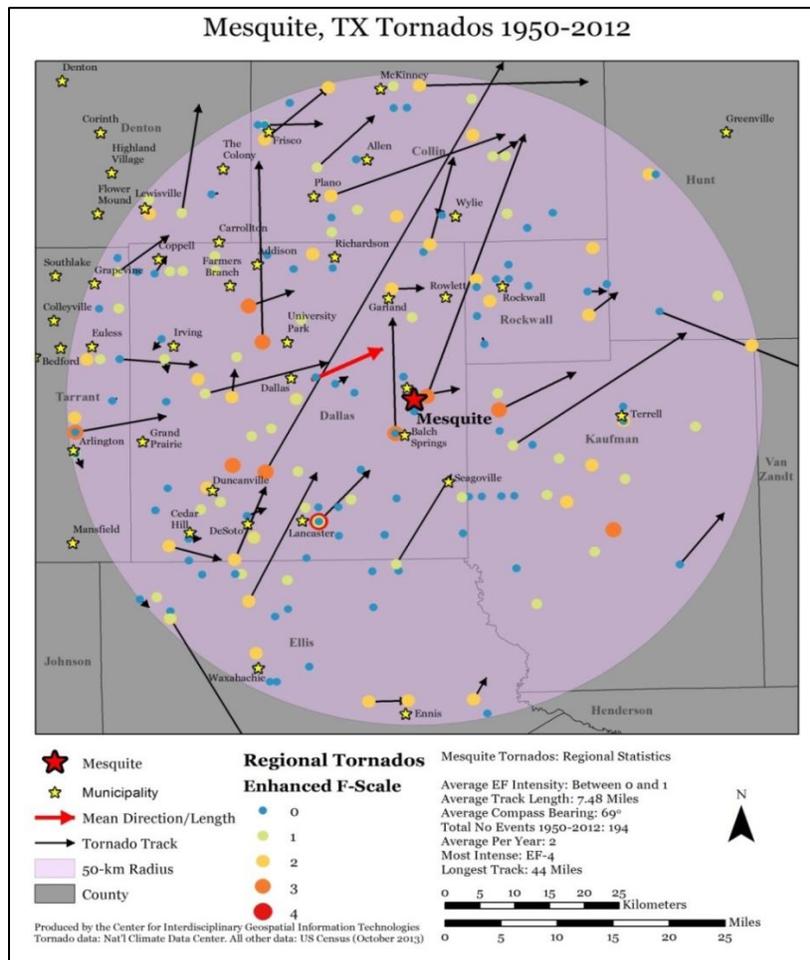


Figure 4-4 – Tornadoes in and Around Mesquite, TX – 1950-2012 (Source: National Climatic and Data Center)

### Probability of Future Occurrences

As reported in the 2018 State of Texas Hazard Mitigation Plan, the state has had 16 Presidential declarations due to tornado events. Texas averages 123 tornadoes annually, 88% are EF0 or EF-1, 3% are EF-3 or EF-4, and 9% are EF5.

Dallas and Kaufman County experienced 51 tornadoes in the past 24 years, which equates to an annual occurrence rate of 3 percent producing a low probability of occurrence. The Hazard Mitigation Committee deemed that tornadoes are probable in the next 3 years, and due to the violent nature of tornadoes, the severity of impact was deemed to be “Substantial”.

### ***Vulnerability Assessment***

All locations within the planning area are subject to tornadoes.

Population: The entire population is vulnerable to tornadoes.

Critical Facilities: All above ground facilities are vulnerable to tornadoes.

Essential Services: Since the location of possible tornado damage is not predictable, there is no way of knowing which essential services may be affected. Damage to municipal buildings would hinder services and response capabilities.

Transportation Systems: Roadways and rail lines are subject to closure before, during, and after a tornado event due to the likelihood of debris that may impede transportation routes.

Lifeline Utility Systems: Above-ground critical facilities may be impacted by tornadoes. Among these systems are electric utilities, water tanks, and communication towers

|                                      |   |
|--------------------------------------|---|
| <b>Hazard:</b>                       | <b>Tornado</b>  |
| <b>Potential Severity of Impact:</b> |   |
| <b>Substantial</b>                   |   |
| <b>X</b>                             | Multiple deaths   |
|                                      | Complete shutdown of facilities for 30 days or more             |
|                                      | More than 50% of property destroyed or with major damage        |
| <b>Major</b>                         |   |
|                                      | Injuries and/or illnesses result in permanent disability        |
|                                      | Complete shutdown of critical facilities for at least 2 weeks   |
|                                      | More than 25% of property destroyed or with major damage        |
| <b>Minor</b>                         |   |
|                                      | Injuries and/or illnesses do not result in permanent disability |
|                                      | Complete shutdown of critical facilities for at least 1 week    |
|                                      | More than 10% of property destroyed or with major damage        |
| <b>Limited</b>                       |   |
|                                      | Injuries and/or illnesses are treatable with first aid          |

|  |   |                                 |
|--|---|---------------------------------|
|  | Minor quality of life lost  |                                 |
|  | Shutdown of critical facilities and services for 24 hours or less |                                 |
|  | Less than 10% of property destroyed or with major damage          |                                 |
| <b>Frequency of Occurrence:</b>  |   | <b>Seasonal Pattern:</b>        |
|  | Highly Likely:  | Event probable in next year     |
| X  | Likely:   | Event probable in next 3 years  |
|  | Occasional:   | Event possible in next 5 years  |
|  | Unlikely:   | Event possible in next 10 years |
| Spring and Fall Months   |   |                                 |
| <b>Source Documents, Studies, Maps, Etc. Researched:</b>   |   |                                 |
| NCDC   |   |                                 |
| <b>Probable Duration:</b>  |   |                                 |
| From an hour to several days of various tornadoes, depending on severity of storm system.          |   |                                 |
| <b>Warning Time (Potential Speed of Onset):</b>  |   |                                 |
| X  | Minimal (or no) warning   |                                 |
|  | 3 to 6 hours warning  |                                 |
|  | 6 to 12 hours warning   |                                 |
|  | More than 12 hours warning  |                                 |
| <b>Cascading Potential:</b>  |   |                                 |
| Power Failures, Sheltering, Hazardous Materials  |   |                                 |
| <b>Existing Warning Systems:</b>   |   |                                 |
| Outdoor Warning System, TV and radio stations, Emergency Alert System (EAS), Wireless Alert System |   |                                 |

Table 4-10 – City of Mesquite Hazard Mitigation Committee Tornado Hazard Ranking

#### 4.2.2 Severe Winter Weather

##### **Hazard Description**

The National Weather Service defines a winter storm as having three factors: cold air, moisture and lift. These three factors acting together create conditions suitable for a winter storm. Below is a listing of definitions for winter weather events that could affect the Mesquite planning area.

Snow Flurries: Light snow falling for short durations. No accumulation or light dusting is all that is expected.

Snow Showers: Snow falling at varying intensities for brief periods. Some accumulation is possible.

Sleet: Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects. However, it can accumulate like snow and cause a hazard to motorists.

*Freezing Rain:* Rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces, such as trees, cars, and roads, forming a coating or glaze of ice. Even small accumulations of ice can cause a significant hazard.

*Wind Chill:* The combination of wind and temperature that serves as an estimate of how cold it actually feels to exposed human skin. Wind chill values below -19 degrees are considered dangerous

The National Weather Service issues the following watches and warnings when impacts are suspected.

*Winter Storm Warning:* Issued when hazardous winter weather in the form of heavy snow, heavy freezing rain, or heavy sleet is imminent or occurring. Winter Storm Warnings are usually issued 12 to 24 hours before the event is expected to begin.

*Winter Storm Watch:* Alerts the public to the possibility of a blizzard, heavy snow, heavy freezing rain, or heavy sleet. Winter Storm Watches are usually issued 12 to 48 hours before the beginning of a Winter Storm.

*Winter Storm Outlook:* Issued prior to a Winter Storm Watch. The Outlook is given when forecasters believe winter storm conditions are possible and are usually issued 3 to 5 days in advance of a winter storm.

*Wind Chill Warning:* Issued when wind chill temperatures are expected to be hazardous to life within several minutes of exposure.

*Wind Chill Advisory:* Issued when wind chill temperatures are expected to be a significant inconvenience to life with prolonged exposure and, if caution is not exercised, could lead to hazardous exposure.

*Winter Weather Advisories:* Issued for accumulations of snow, freezing rain, freezing drizzle, and sleet, which will cause significant inconveniences and, if caution is not exercised, could lead to life-threatening situations.

### ***Location and Extent***

Winter storms could have the potential to impact structures and infrastructure throughout the entire city. The city's electrical utility lines are located above ground, and, therefore, subject to falling limbs and are particularly susceptible to damage. Bridges are the most likely to become hazardous. Heat from the ground and the road melt the snow on roadways until accumulations become significant. Bridges do not have this heat source to keep the snow from accumulating.

### ***Past Occurrences***

The City of Mesquite planning area has seen an increase in winter weather activity over the past few years. Over the past 24 years, a total of thirteen deaths and \$20,575,000 in property damages have been recorded for Dallas and Kaufman counties.

The NCDC documents winter weather events by county/zone into the following seven winter weather categories:

- Cold/Wind Chill
- Extreme Cold/Wind Chill
- Frost/Freeze
- Heavy Snow
- Ice Storm
- Winter Storm
- Winter Weather

Table 4-11 provides data obtained by NCDC for Dallas County from January 1996 to July 2020.

| Cold/Wind Chill         |            |          |          |                 |             |
|-------------------------|------------|----------|----------|-----------------|-------------|
| County                  | Date       | Death    | Injury   | Property Damage | Crop Damage |
| Dallas County           | 1/22/1996  | 4        | 0        | 0               | 0           |
|                         | 4/12/1997  | 0        | 0        | 0               | 0           |
|                         | 12/26/2012 | 2        | 0        | 0               | 0           |
|                         | 12/19/2016 | 1        | 0        | 0               | 0           |
|                         | 10/31/2019 | 0        | 0        | 0               | 0           |
| <b>Dallas Total</b>     |            | <b>7</b> | <b>0</b> | <b>0</b>        | <b>0</b>    |
| Extreme Cold/Wind Chill |            |          |          |                 |             |
| County                  | Date       | Death    | Injury   | Property Damage | Crop Damage |
| Dallas County           | 3/2/2002   | 2        | 0        | 0               | 0           |
|                         | 3/3/2002   | 0        | 0        | 0               | 0           |
|                         | 1/16/2018  | 2        | 0        | 0               | 0           |
| <b>Dallas Total</b>     |            | <b>4</b> | <b>0</b> | <b>0</b>        | <b>0</b>    |
| Frost/Freeze            |            |          |          |                 |             |
| County                  | Date       | Death    | Injury   | Property Damage | Crop Damage |
| Dallas County           | 1/4/2010   | 0        | 0        | 40,000          | 0           |

| Heavy Snow          |            |          |          |                   |             |
|---------------------|------------|----------|----------|-------------------|-------------|
| County              | Date       | Death    | Injury   | Property Damage   | Crop Damage |
| Dallas County       | 2/1/1996   | 0        | 0        | 0                 | 0           |
|                     | 1/6/1997   | 0        | 0        | 0                 | 0           |
|                     | 1/1/2001   | 0        | 0        | 0                 | 0           |
|                     | 2/14/2004  | 0        | 0        | 0                 | 0           |
|                     | 2/11/2010  | 0        | 0        | 16,000,000        | 0           |
|                     | 2/3/2011   | 0        | 0        | 150,000           | 0           |
|                     | 3/5/2015   | 0        | 0        | 0                 | 0           |
| <b>Dallas Total</b> |            | <b>0</b> | <b>0</b> | <b>16,150,000</b> | <b>0</b>    |
| Ice Storm           |            |          |          |                   |             |
| County              | Date       | Death    | Injury   | Property Damage   | Crop Damage |
| Dallas County       | 12/22/1998 | 0        | 0        | 0                 | 0           |
|                     | 11/28/2001 | 0        | 0        | 0                 | 0           |
|                     | 1/13/2007  | 0        | 0        | 50,000            | 0           |
|                     | 1/27/2009  | 1        | 0        | 300,000           | 0           |
|                     | 2/1/2011   | 0        | 0        | 500,000           | 0           |
| <b>Dallas Total</b> |            | <b>1</b> | <b>0</b> | <b>850,000</b>    | <b>0</b>    |
| Winter Storm        |            |          |          |                   |             |
| County              | Date       | Death    | Injury   | Property Damage   | Crop Damage |
| Dallas County       | 11/24/1996 | 0        | 0        | 0                 | 0           |
|                     | 1/25/2000  | 1        | 0        | 0                 | 0           |
|                     | 12/12/2000 | 0        | 0        | 0                 | 0           |
|                     | 12/25/2000 | 0        | 0        | 0                 | 0           |
|                     | 12/31/2000 | 0        | 0        | 0                 | 0           |
|                     | 2/5/2002   | 0        | 0        | 0                 | 0           |
|                     | 3/2/2002   | 0        | 0        | 0                 | 0           |
|                     | 2/24/2003  | 0        | 0        | 0                 | 0           |
|                     | 12/7/2005  | 0        | 0        | 0                 | 0           |
|                     | 11/30/2006 | 0        | 0        | 20,000            | 0           |
|                     | 12/5/2013  | 0        | 0        | 2,000,000         | 0           |
|                     | 2/22/2015  | 0        | 0        | 25,000            | 0           |
| <b>Dallas Total</b> |            | <b>1</b> | <b>0</b> | <b>2,450,000</b>  | <b>0</b>    |
| Winter Weather      |            |          |          |                   |             |

| County              | Date       | Death    | Injury   | Property Damage  | Crop Damage |
|---------------------|------------|----------|----------|------------------|-------------|
| Dallas County       | 1/12/1997  | 0        | 0        | 0                | 0           |
|                     | 1/14/1997  | 0        | 0        | 0                | 0           |
|                     | 1/17/2007  | 0        | 0        | 20,000           | 0           |
|                     | 2/1/2007   | 0        | 0        | 0                | 0           |
|                     | 12/15/2008 | 0        | 0        | 0                | 0           |
|                     | 12/23/2008 | 0        | 0        | 0                | 0           |
|                     | 1/5/2009   | 0        | 0        | 35,000           | 0           |
|                     | 12/24/2009 | 0        | 0        | 250,000          | 0           |
|                     | 1/7/2010   | 0        | 0        | 700,000          | 0           |
|                     | 3/20/2010  | 0        | 0        | 100,000          | 0           |
|                     | 2/10/2014  | 0        | 0        | 0                | 0           |
|                     | 3/4/2015   | 0        | 0        | 0                | 0           |
|                     | 3/5/2015   | 0        | 0        | 0                | 0           |
|                     | 12/7/2017  | 0        | 0        | 0                | 0           |
|                     | 12/31/2017 | 0        | 0        | 10000            | 0           |
|                     | 1/16/2018  | 0        | 0        | 0                | 0           |
|                     | 2/11/2018  | 0        | 0        | 0                | 0           |
| 2/28/2019           | 0          | 0        | 10000    | 0                |             |
| <b>Dallas Total</b> |            | <b>0</b> | <b>0</b> | <b>1,125,000</b> | <b>0</b>    |

Table 4-11 - Winter Weather Events in Dallas County – January 1996 – July 2020 (National Climatic and Data Center)

**Probability of Future Occurrences**

Based upon historical winter events for the Mesquite planning area, there is a good probability each year that a winter storm might impact the city. This is based upon the documentation of 51 winter storm events since 1996 (51 events/24 years) to determine a percentage chance of probability.

**Vulnerability Assessment**

Population: According to the Centers for Disease Control and Prevention, populations most at risk to extreme cold and heat events include the following: 1) the elderly, who are less able to withstand temperature extremes due to their age, health conditions and limited mobility to access shelters; 2) infants and children under 4 years of age; 3) individuals who are physically ill (e.g. heart disease or high blood pressure); 4) low-income persons that cannot afford proper heating and cooling; and 5) the general public who may experience hypothermia during extreme cold events.

**Critical Facilities:** Damage to larger buildings is not likely to occur; however, frozen pipes and fallen limbs could cause temporary cessation of services.

**Essential Service:** Essential services are not likely to be significantly impacted by winter storms; however, police and fire services may be compromised if freezing occurs on overpasses. Availability of alternative power sources such as generators, which the city has purchased for most of their critical facilities, will help ensure continuity of emergency services.

**Transportation System:** Temporary icing of roadways, bridges, and overpasses may occur.

**Lifeline Utility Systems:** Icing on trees can cause limb breakage that could fall on above ground electrical lines resulting in power outages.

|                                      |   |                             |
|--------------------------------------|---|-----------------------------|
| <b>Hazard:</b>                       | <b>Winter Weather (Cold/wind chill, Extreme Cold/wind chill, Frost/Freeze, Heavy Snow, Ice Storm, Winter Storm, Winter Weather)</b> |                             |
| <b>Potential Severity of Impact:</b> |   |                             |
| <b>Substantial</b>                   |   |                             |
|                                      | Multiple deaths   |                             |
|                                      | Complete shutdown of facilities for 30 days or more   |                             |
|                                      | More than 50% of property destroyed or with major damage  |                             |
| <b>Major</b>                         |   |                             |
| <b>X</b>                             | Injuries and/or illnesses result in permanent disability  |                             |
|                                      | Complete shutdown of critical facilities for at least 2 weeks   |                             |
|                                      | More than 25% of property destroyed or with major damage  |                             |
| <b>Minor</b>                         |   |                             |
|                                      | Injuries and/or illnesses do not result in permanent disability   |                             |
|                                      | Complete shutdown of critical facilities for at least 1 week  |                             |
|                                      | More than 10% of property destroyed or with major damage  |                             |
| <b>Limited</b>                       |   |                             |
|                                      | Injuries and/or illnesses are treatable with first aid  |                             |
|                                      | Minor quality of life lost  |                             |
|                                      | Shutdown of critical facilities and services for 24 hours or less   |                             |
|                                      | Less than 10% of property destroyed or with major damage  |                             |
| <b>Frequency of Occurrence:</b>      |   | <b>Seasonal Pattern:</b>    |
|                                      | Highly Likely: Event probable in next year  | Winter Months, Early Spring |
| <b>X</b>                             | Likely: Event probable in next 3 years  |                             |
|                                      | Occasional: Event possible in next 5 years  |                             |

|  |                            |                                 |  |  |
|--|----------------------------|---------------------------------|--|--|
|  | Unlikely:                  | Event possible in next 10 years |  |  |
| <b>Source Documents, Studies, Maps, Etc. Researched:</b> |                            |                                 |  |  |
| NCDC, NOAA   |                            |                                 |  |  |
| <b>Probable Duration:</b>                                |                            |                                 |  |  |
| From a few days to a few weeks.                          |                            |                                 |  |  |
| <b>Warning Time (Potential Speed of Onset):</b>          |                            |                                 |  |  |
|  | Minimal (or no) warning    |                                 |  |  |
|  | 3 to 6 hours warning       |                                 |  |  |
| X  | 6 to 12 hours warning      |                                 |  |  |
|  | More than 12 hours warning |                                 |  |  |
| <b>Cascading Potential:</b>                              |                            |                                 |  |  |
| Slippery roads can decrease response time to citizens    |                            |                                 |  |  |
| <b>Existing Warning Systems:</b>                         |                            |                                 |  |  |
| National Weather Service, NOAA                           |                            |                                 |  |  |

Table 4-12 City of Mesquite Hazard Mitigation Committee Winter Weather Hazard Ranking

### 4.2.3 Flood

#### **Hazard Description**

Flooding is natural and inevitable, occurring seasonally with general or torrential rains associated with tropical storms. These rains later drain into river basins and fill them with an abundance of water. Rivers, lakes, and other water bodies have always overflowed their normal beds to inundate nearby land. The land adjacent to these bodies of water is called a floodplain. Mesquite is generally susceptible to three leading causes/types of flooding as defined below – river, flash, and drainage.

River (Riverine or Stream) Flooding: Riverine floods occur along rivers, streams, or channels primarily during heavy or prolonged rainfall. Other contributing factors include: (1) elimination of ground cover on drainage slopes resulting from tree cutting, wildfires, land development, or overgrazing; (2) the simultaneous arrival of flood crests from major tributaries; and (3) blocked drainage by items, such as debris, dams, or inadequately sized drainage structures. Floods from these sources can be “flash” or rapid, but are usually more gradual and have longer duration than flash floods.

Flash Flooding (Rapid): Flash floods are a result of heavy, localized rainfall - possibly from a slow-moving intense thunderstorm causing small creeks, streams, branches, and rivers to overflow. They are most common when rain falls on areas with steep slopes or built-up areas where impervious surfaces, gutters, and storm sewers speed up the flow of run-off. The torrential nature of flash floods makes this hazard particularly lethal, especially in or near the river, streambeds, city streets, coastal areas, and narrow valleys, which contribute to the development of rapid water movement.

**Drainage:** Drainage flooding occurs primarily in urban or developed areas when the volume of run-off exceeds the capacity of the drainage system. Flooding of this nature can be the result of increased development, inadequate drainage, riverine flooding, flash flooding, or a combination of all.

The City of Mesquite regulates the development of areas subject to periodic or occasional inundation from stream overflows. Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the Flood Hazard Factor (FHF), respectively. A unique zone number is associated with each possible FHF and varies from a one for an FHF of 005 to a maximum of 30 for an FHF of 200 or greater. Table 4-13 provides a listing of the zones applicable to Mesquite and their definitions.

| <b>Moderate to Low Risk Areas</b> |  |
|-----------------------------------|--|
| Zone B and X (shaded)             | Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. Also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than one square mile.                         |
| Zone C and X (unshaded)           | Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level  |
| <b>High Risk Areas</b>            |  |
| Zone A                            | Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.   |
| Zone AE                           | The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.   |
| Zone AO                           | River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from one to three feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones. |
| <b>Undetermined Risk Areas</b>    |  |
| Zone D                            | Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.  |

Table 4-13 – National Flood Insurance Program Zone Designations

**Location and Extent**

Historical documentation indicates flooding may occur during any season of the year. For the planning area, the most damaging floods occur in April, June, and July. Based on historical

analysis, floods are most likely to occur between March and September. Floods are least likely to occur in autumn and winter months.

Flooding is a relatively frequent hazard with the level of severity ranging from localized to citywide and regional events. Flood events can last from a few hours to a few days, leaving roads and bridges impassible. In addition to river and creek flooding, areas can be generally impacted with flooding caused by inadequate provisions for drainage and lowlands that naturally collect runoff. With increased development and paved parking areas, there is a decrease in the amount of forested land able to absorb rainfall and runoff. One does not need to live next to a river or creek to experience flooding. The City of Mesquite is continuing to urbanize rapidly and as a result, extra pressure is placed on the existing drainage systems due to faster water surface runoff.

Beyond using standardized DFIRM zones, it is difficult to predict the extent of flood depth without performing detailed land surveys because depth is variable based on topography and the amount of water entering the floodplains and planning area. The City of Mesquite has a total of 24 identified city-owned assets / buildings within the SFHA. These buildings are primary related to parks and recreation facilities. Table 4-14 provides a summary of City of Mesquite facilities (not necessarily City-owned) located in the Floodplain.

| Building Type   | No. of Buildings Zone X | No. of Buildings Zone AE | No. of Buildings Zone C |
|---|-------------------------|--------------------------|-------------------------|
| City-Owned Facilities   | 238                     | 24                       | 0                       |
| Education Facilities (Child Care Center, K-12, Private and College) | 79                      | 1                        | 2                       |
| Multi-Housing Facilities  | 8                       | 0                        | 0                       |
| Hospitals/Nursing Homes   | 6                       | 0                        | 0                       |
| <b>Source: City of Mesquite</b>                                     |                         |                          |                         |

Table 4-14 – Asset Inventory located in Flood Zones in the City of Mesquite

## Addressing Repetitive Loss Properties

***Requirement CFR §201.6(2)(ii) the risk assessment in all plans approved after October 1, 2008 must also address National Flood Insurance Program (NFIP) insured structures that have been repetitive damaged by floods.***

The National Flood Insurance Program (NFIP) is a Federal program created by Congress to mitigate future flood losses nationwide through sound, community-enforced building and zoning ordinances and to provide access to affordable, federally backed flood insurance protection for property owners. The NFIP is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

The Community Rating System (CRS) recognizes and encourages community floodplain management activities that exceed the minimum NFIP standards. Depending upon the level of participation, flood insurance premium rates for policyholders can be reduced up to 45%. Besides the benefit of reduced insurance rates, CRS floodplain management activities enhance public safety, reduce damages to property and public infrastructure, avoid economic disruption and losses, reduce human suffering, and protect the environment. Technical assistance on designing and implementing some activities is available at no charge. Currently Mesquite does not participate in the CRS. A mitigation action has been added to work towards expanding the city’s flood program.

### **Repetitive Loss Areas**

By definition, a Repetitive Loss property is “any insurable building” with two or more National Flood Insurance Program (NFIP) losses of at least \$1,000 each and paid within any ten year period since 1978. A Severe Repetitive Loss is defined as a “single family property” with four or more separate claims exceeding \$5,000 and with cumulative amounts of such claim payments exceeding \$20,000; or at least two separate claim payments made and the cumulative amount of these claims exceeding the reported value of the property.

The following is a list of repetitive loss properties in the City of Mesquite (Table 4-15). A graphic representation of the general locations of the properties within the planning area can be found in Figure 4-5.

| Structure      | City     | Total Building Payment | Total Contents Payment | Loss # | Total Paid   | Average Pay  |
|----------------|----------|------------------------|------------------------|--------|--------------|--------------|
| RESIDENTIAL 1  | MESQUITE | \$ 22,804.24           | \$ 2,724.60            | 2      | \$ 25,528.84 | \$ 12,764.42 |
| RESIDENTIAL 2  | MESQUITE | \$ 39,099.44           | \$ 50,758.38           | 6      | \$ 89,857.82 | \$ 14,976.30 |
| RESIDENTIAL 3  | MESQUITE | \$ 19,685.55           | \$ -                   | 2      | \$ 19,685.55 | \$ 9,842.78  |
| RESIDENTIAL 4  | MESQUITE | \$ 14,147.99           | \$ -                   | 2      | \$ 14,147.99 | \$ 7,074.00  |
| RESIDENTIAL 5  | MESQUITE | \$ 18,888.47           | \$ 23,727.75           | 4      | \$ 42,616.22 | \$ 10,654.06 |
| RESIDENTIAL 6  | MESQUITE | \$ 19,000.00           | \$ 3,675.00            | 2      | \$ 22,675.00 | \$ 11,337.50 |
| RESIDENTIAL 7  | MESQUITE | \$ 9,208.27            | \$ 943.80              | 2      | \$ 10,152.07 | \$ 5,076.04  |
| RESIDENTIAL 8  | MESQUITE | \$ 63,684.35           | \$ 18,543.73           | 3      | \$ 82,228.08 | \$ 27,409.36 |
| RESIDENTIAL 9  | MESQUITE | \$ 20,619.23           | \$ 10,150.38           | 2      | \$ 30,769.61 | \$ 15,384.81 |
| RESIDENTIAL 10 | MESQUITE | \$ 22,309.87           | \$ 7,915.75            | 3      | \$ 30,225.62 | \$ 10,075.21 |

|                |          |               |               |    |               |               |
|----------------|----------|---------------|---------------|----|---------------|---------------|
| RESIDENTIAL 11 | MESQUITE | \$ 24,458.75  | \$ 20,823.76  | 2  | \$ 45,282.51  | \$ 22,641.26  |
| RESIDENTIAL 12 | MESQUITE | \$ 33,683.72  | \$ 10,737.69  | 2  | \$ 44,421.41  | \$ 22,210.71  |
|                |          | \$ 307,589.88 | \$ 150,000.84 | 32 | \$ 457,590.72 | \$ 169,446.45 |

Table 4-15 – City of Mesquite Repetitive Loss Properties

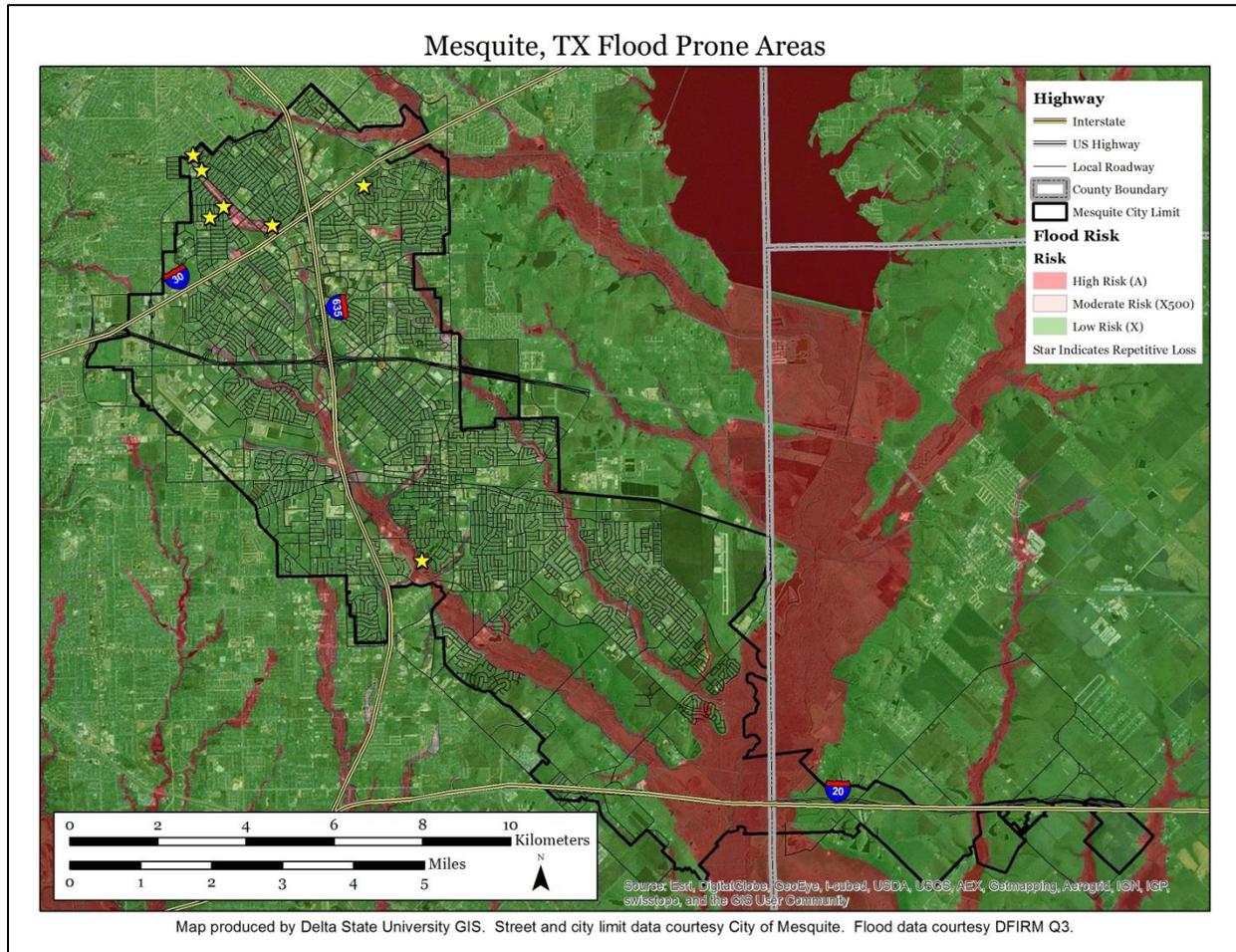


Figure 4-5 – City of Mesquite Repetitive Loss Property Locations

**Historical Summary of Insured Flood Losses**

According to the FEMA Loss Statistics Report from January 1, 1978 to December 4, 2019, there were 71 total losses filed on properties located within Mesquite with a total of \$1,131,303.42 paid to date (source: <https://www.fema.gov/media-library/assets/documents/180374>). This includes single losses, as well as the repetitive losses mentioned above. Detailed information on the repetitive loss properties is maintained by the Engineering Division Stormwater section.

**Probability of Future Occurrences**

The planning area is subject to flash, drainage and riverine flooding. Based on flooding history in the City of Mesquite, the Hazard Mitigation Committee ranked the probability of flooding as “likely”, or probable in the next three years.

### ***Vulnerability Assessment***

**Population:** Persons with property located within the high-risk flood areas are most vulnerable to periodic flooding of property. Flash flooding events can affect other areas, dependent upon the efficiency of drainage facilities.

**Critical Facilities:** There are 24 identified city-owned properties within the SFHA. However, these properties are not considered critical in nature in that they are associated with parks and storage sheds.

**Essential Services:** While most of the city-owned buildings are located outside the flood zones, several are vulnerable due to their proximity to major bodies of water. There are no critical facilities that provide essential services located within the SHFA.

**Transportation Systems:** Major roadways, such as SH 352, I-635, I-20, I-30 and US 80 are subject to surface flooding from heavy rainfall. Other City-owned roadways are subject to the same. Poor drainage from highway construction occasionally exacerbates the surface flooding.

**Lifeline Utility Systems:** Critical facilities could be impacted by flooding that could damage these lifeline utility systems. Among these systems are electric utilities, natural gas lines, water and sewer systems, and communications.

|                                      |   |
|--------------------------------------|---|
| <b>Hazard:</b>                       | <b>Flooding (Flash flood and flood)</b>                         |
| <b>Potential Severity of Impact:</b> |   |
| <b>Substantial</b>                   |   |
|                                      | Multiple deaths   |
|                                      | Complete shutdown of facilities for 30 days or more             |
|                                      | More than 50% of property destroyed or with major damage        |
| <b>Major</b>                         |   |
|                                      | Injuries and/or illnesses result in permanent disability        |
|                                      | Complete shutdown of critical facilities for at least 2 weeks   |
|                                      | More than 25% of property destroyed or with major damage        |
| <b>Minor</b>                         |   |
| <b>X</b>                             | Injuries and/or illnesses do not result in permanent disability |
|                                      | Complete shutdown of critical facilities for at least 1 week    |
|                                      | More than 10% of property destroyed or with major damage        |
| <b>Limited</b>                       |   |
|                                      | Injuries and/or illnesses are treatable with first aid          |

|   |   |                                 |
|---|---|---------------------------------|
|   | Minor quality of life lost  |                                 |
|   | Shutdown of critical facilities and services for 24 hours or less |                                 |
|   | Less than 10% of property destroyed or with major damage          |                                 |
| <b>Frequency of Occurrence:</b>   |   | <b>Seasonal Pattern:</b>        |
|   | Highly Likely:  | Event probable in next year     |
| X   | Likely:   | Event probable in next 3 years  |
|   | Occasional:   | Event possible in next 5 years  |
|   | Unlikely:   | Event possible in next 10 years |
| Mostly spring and fall  |   |                                 |
| <b>Source Documents, Studies, Maps, Etc. Researched:</b>  |   |                                 |
| NCDC, State of Texas HMP (2018), Dallas County HMP (2020), Flood Insurance Rate Maps (FIRM)   |   |                                 |
| <b>Probable Duration:</b>   |   |                                 |
| Flood events can last from a few hours of one day, to several days or even months if certain weather conditions combine to allow precipitation to continue to fall. |   |                                 |
| <b>Warning Time (Potential Speed of Onset):</b>   |   |                                 |
|   | Minimal (or no) warning   |                                 |
| X   | 3 to 6 hours warning  |                                 |
|   | 6 to 12 hours warning   |                                 |
|   | More than 12 hours warning  |                                 |
| <b>Cascading Potential:</b>   |   |                                 |
| Power outages, sheltering, evacuations, water rescues.  |   |                                 |
| <b>Existing Warning Systems:</b>  |   |                                 |
| NOAA weather radios (Emergency Alert System (EAS)), Television and radio stations.  |   |                                 |

Table 4-16 City of Mesquite Hazard Mitigation Committee Flooding Hazard Ranking

#### 4.2.4 Severe Storms (Thunderstorm/High Wind/Lightning/Hail)

##### **Hazard Descriptions**

Severe storms can occur at most any time in the Mesquite planning area. Cold fronts and daytime heating of the atmosphere cause these events. Severe storms can produce tornadoes, strong, gusty winds, lightning, hail and heavy rain. This hazard section focuses on the high wind, hail and lightning hazards associated with thunderstorms.

*Thunderstorms* are defined by the National Weather Service (NWS) as “a local storm produced by a cumulonimbus cloud and accompanied by lightning and thunder”. The storms alone do not cause losses to life or property, but the components of a thunderstorm can be devastating. Thunderstorms can include high winds, lightning, tornadoes, heavy rain (flash flood) and hail. The NWS further defines a thunderstorm that produces a tornado has winds of at least 58 mph (50

knots), and/or hail at least 1" in diameter as a “severe thunderstorm”. Structural wind damage may imply the occurrence of a severe thunderstorm.

*High winds* are a general term associated with sustained or gusting winds of significant strength to cause risk or damage to crops, vegetation, buildings, infrastructure, or transportation. High winds are typically associated with weather frontal systems often bringing other severe weather products, such as hail and lightning.

High winds can damage property by carrying projectile debris or by breaking building envelopes as wind buffets weak points around doors, windows, and roof structures. Winds can increase speed as they pass between closely situated buildings through a Venturi effect that may increase the potential for damage. Metal buildings, tall structures, open fields, and swimming pools are at greater risk of lightning strikes.

The National Weather Service recognizes and defines three levels of wind events:

- *Wind Advisory* – Sustained winds of 30mph or more or gusts of 45mph or greater for a duration for one hour or longer.
- *High Winds* – Sustained winds of 40mph or greater for at least one hour, or frequent gusts of wind to 58mph or greater.
- *Extreme Wind Warnings* – Sustained winds of 115mph or greater during a land-falling hurricane.

Winds and related damages can also be defined through the Beaufort Wind Scale as shown in Table 4.17.

| Force | Wind (Knots) | WMO Classification | Appearance of Wind Effects  |  |
|-------|--------------|--------------------|---|--|
|       |              |                    | On the Water  | On Land  |
| 0     | Less than 1  | Calm               | Sea surface smooth and mirror-like                                    | Calm, smoke rises vertically                                   |
| 1     | 1-3          | Light Air          | Scaly ripples, no foam crests   | Smoke drift indicates wind direction, still wind vanes         |
| 2     | 4-6          | Light Breeze       | Small wavelets, crests glassy, no breaking                            | Wind felt on face, leaves rustle, vanes begin to move          |
| 3     | 7-10         | Gentle Breeze      | Large wavelets, crests begin to break, scattered whitecaps            | Leaves and small twigs constantly moving, light flags extended |
| 4     | 11-16        | Moderate Breeze    | Small waves 1-4 ft. becoming longer, numerous whitecaps               | Dust, leaves, and loose paper lifted, small tree branches move |
| 5     | 17-21        | Fresh Breeze       | Moderate waves 4-8 ft. taking longer form, many whitecaps, some spray | Small trees in leaf begin to sway                              |

| Force | Wind (Knots) | WMO Classification | Appearance of Wind Effects  |  |
|-------|--------------|--------------------|---|--|
|       |              |                    | On the Water  | On Land  |
| 6     | 22-27        | Strong Breeze      | Larger waves 8-13 ft., whitecaps common, more spray   | Larger tree branches moving, whistling in wires  |
| 7     | 28-33        | Near Gale          | Sea heaps up, waves 13-20 ft., white foam streaks off breakers  | Whole trees moving, resistance felt walking against wind                               |
| 8     | 34-40        | Gale               | Moderately high (13-20 ft.) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks | Whole trees in motion, resistance felt walking against wind                            |
| 9     | 41-47        | Strong Gale        | High waves (20 ft.), sea begins to roll, dense streaks of foam, spray may reduce visibility                               | Slight structural damage occurs, slate blows off roofs                                 |
| 10    | 48-55        | Storm              | Very high waves (20-30 ft.) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility | Seldom experienced on land, trees broken or uprooted, "considerable structural damage" |
| 11    | 56-63        | Violent Storm      | Exceptionally high (30-45 ft.) waves, foam patches cover sea, visibility more reduced                                     |  |
| 12    | 64+          | Hurricane          | Air filled with foam, waves over 45 ft., sea completely white with driving spray, visibility greatly reduced              |  |

Table 4-17 - Beaufort Wind Scale (Source: NOAA Storm Prediction Center)

Lightning is a visible electrical discharge produced by a thunderstorm. Lightning may occur within or between clouds, between the cloud and air, between a cloud and the ground or between the ground and a cloud. Lightning is created by static electrical energy, and can generate enough electricity to set buildings on fire and electrocute people.

Lightning can strike anywhere and anytime thunderstorms are in the area. Almost all lightning occurs within 10 miles of the parent thunderstorm, but in rare cases, it can strike as much as 50 miles away. There are two major categories of lightning:

- *Cloud Flashes* – Cloud flashes sometimes have visible channels that extend out into the air around the storm but do not strike the ground. This is often further defined as cloud-to-air, cloud-to-cloud, or intra-cloud lightning.
- *Ground Flashes* – Lightning channels that travel from cloud-to-ground or ground-to-cloud. There are two categories of ground flashes: natural and artificially initiated/triggered. Artificially initiated lightning includes strikes to tall structures,

airplanes, rockets, and towers on mountains. Artificially initiated lightning travels from ground to cloud while natural lightning travels from cloud to ground.

*Hail* is defined by the National Weather Service (NWS) as a showery precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter, falling from a cumulonimbus cloud. Studies of thunderstorms provided through the NWS indicate two conditions are required for hail to develop, sufficiently strong and persistent up-draft velocities and an accumulation of liquid water in a super-cooled state in the upper parts of the storm. Hailstones are formed as water vapor in the warm surface layer rises quickly into the cold upper atmosphere. The water vapor freezes and begins to fall, as the water falls it accumulates more water vapor. This cycle continues until there is too much weight for the updraft to support and the frozen water falls too quickly to the ground to melt along the way.

The size of hailstones is best determined by measuring their diameter with a ruler. In the absence of a ruler, hailstone size is often visually estimated by comparing its size to that of known objects. Table 4.18 provides a reference of commonly used objects for this purpose.

| Hail Diameter Size | Description             | Hail Diameter Size | Description          |
|--------------------|-------------------------|--------------------|----------------------|
| 1/4"               | Pea                     | 2"                 | Hen Egg / Lime       |
| 1/2"               | Small Marble            | 2 1/2"             | Tennis Ball          |
| 3/4"               | Penny                   | 2 3/4"             | Baseball             |
| 7/8"               | Nickel                  | 3"                 | Teacup / Large Apple |
| 1" (severe)        | Quarter                 | 4"                 | Grapefruit           |
| 1 1/4"             | Half Dollar             | 4 1/2"             | Softball             |
| 1 1/2"             | Ping Pong Ball / Walnut | 4 3/4"- 5"         | DVD                  |
| 1 3/4"             | Golf Ball               |                    |                      |

Table 4- 18 Hail Size Chart (Source, NOAA, National Weather Service)

**Location and Extent**

Severe storms are likely to affect an entire region. Therefore, every location within Mesquite can be subject to the probability of damage from lightning, hail and winds associated with thunderstorms.

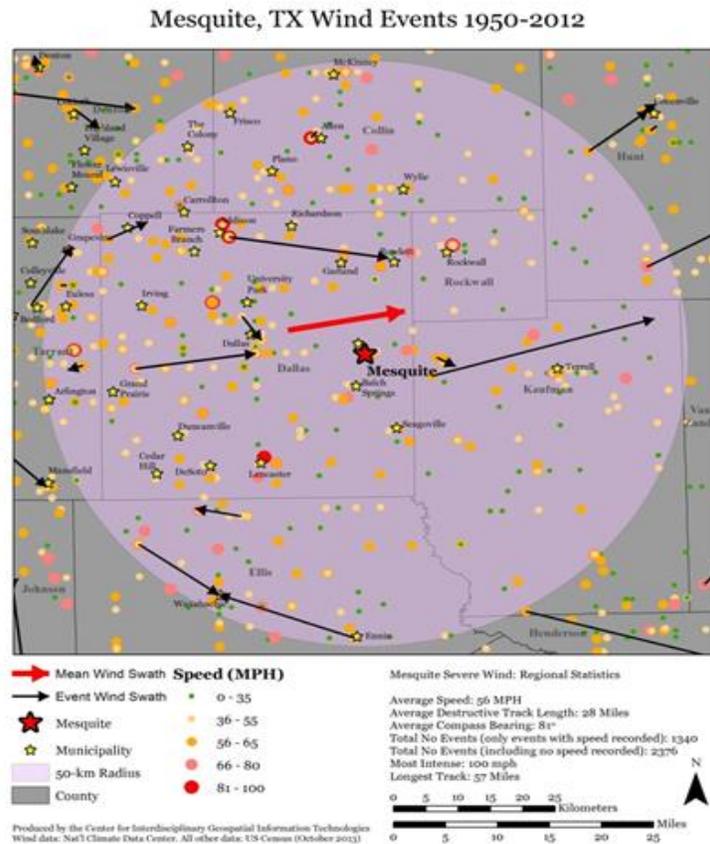
People, buildings, and property are at risk from the effects of high wind and lightning. Buildings, automobiles, and infrastructural components (such as electrical feed lines) can suffer damage from high wind and lightning; outdoor populations are vulnerable to injury or death from lightning. High winds can cause debris to strike people, animals, buildings and property, which in turn can cause significant injuries, fatalities, and property damage.

Critical infrastructure associated with power transmission, telecommunications and road signage are vulnerable to hail. Manufactured homes are particularly susceptible to hail events due to construction types (vinyl siding, lesser gauge metal roofs). People and animals can also be impacted by hail if they are caught outdoors with no protection.

Tables 4-19 and 4.20 present data obtained from the NCDC database. The data was separated into thunderstorm/strong wind, lightning and hail to facilitate ease in reviewing the data and understanding the impacts caused to the planning area. This information is based on reported information only, and may not be all-inclusive.

| Event Type           | Total Events             | Deaths | Injuries | Property Damage |
|----------------------|--------------------------|--------|----------|-----------------|
| <b>Mesquite</b>      |                          |        |          |                 |
| Thunderstorm<br>Wind | 13                       | 0      | 0        | \$23,000        |
| Strong Wind          | No data recorded by NCDC |        |          | \$84,000        |
| Hail                 | 17                       | 0      | 0        | \$24,000        |

**Table 4-19 – Thunderstorm, Strong Wind, and Hail Event Summary, City of Mesquite – January 1, 1996 – July 1, 2020 (Source: National Climatic Data Center)**



**Figure 4-6 – Mesquite Texas Wind Events 1950-2012**

The results for lightning strikes are based on best available data obtained through the NCDC. Not all lightning strikes are accounted for – especially if there are no associated or reported damages.

| Event Type       | Total Events | Deaths   | Injuries | Property Damage |
|------------------|--------------|----------|----------|-----------------|
| <b>Mesquite</b>  |              |          |          |                 |
| <b>Lightning</b> | <b>1</b>     | <b>0</b> | <b>0</b> | <b>\$3,000</b>  |

Table 4-20 – Lightning Summary, City of Mesquite - January 1, 1996-July 1, 2020 (Source: National Climatic Data Center)

To demonstrate lightning impacts, Figure 4.7 shows a lightning flash density map for 2019, based upon data provided by Vaisala’s U.S. National Lightning Detection Network. Dallas County (circled in red) has an average of 4-8 flash density per square km annually.

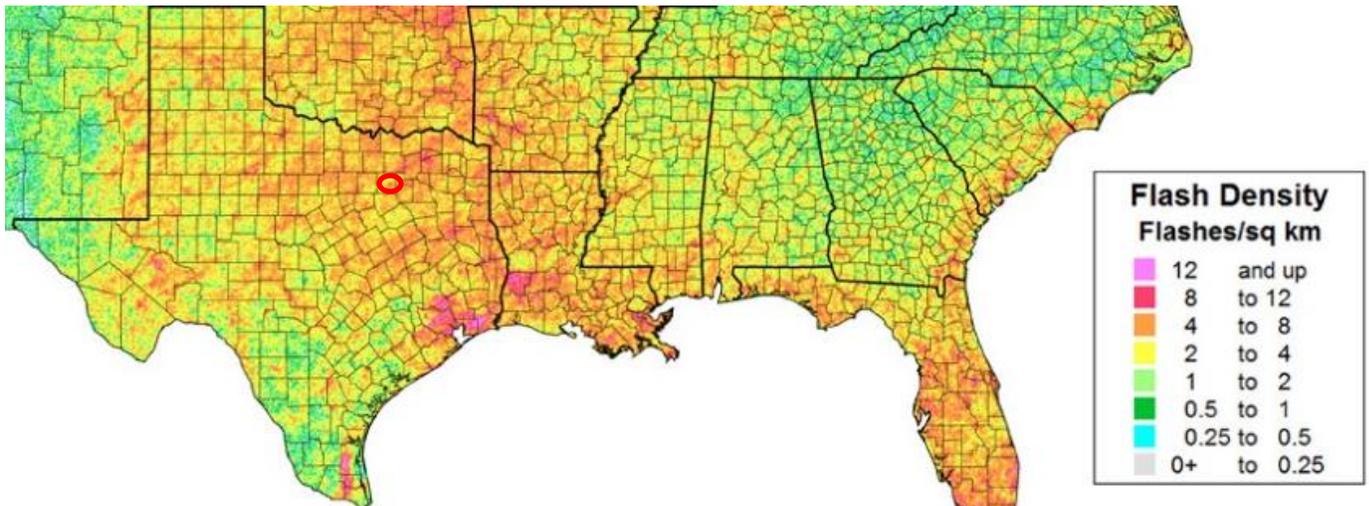
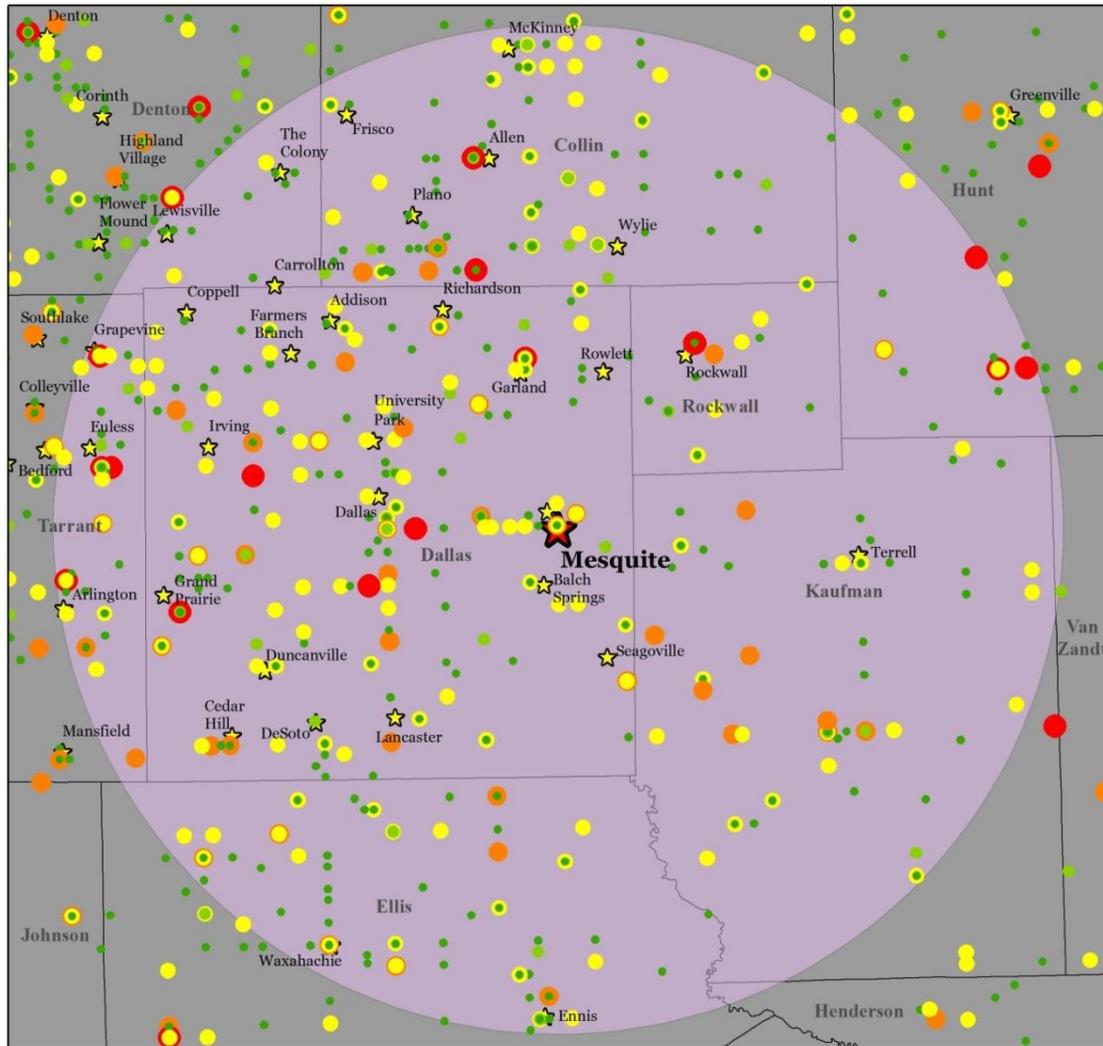


Figure 4-7 - Valasia’s National Lightning Detection Network Lightning Flash Density Map (2019)

The NCDC recorded 17 hail events in the incorporated areas of Mesquite with a range in size from 1.75 inches to .75 inches. Of the reported events \$24,000 in property damage losses were reported. The following map provides a summary of the events.

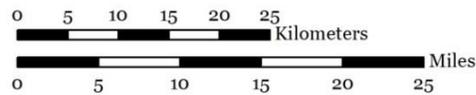
### Mesquite, TX Hail Events 1950-2012



|  |              |                          |
|--|--------------|--------------------------|
|  | Mesquite     | <b>Diameter (Inches)</b> |
|  | Municipality | 0.75 - 1.00              |
|  | 50-km Radius | 1.01 - 1.50              |
|  | County       | 1.51 - 2.25              |
|  |              | 2.26 - 3.00              |
|  |              | 3.01 - 5.00              |

Mesquite Severe Hail: Regional Statistics

Event near Ft. Worth Injured 109 on 5 May 1995  
 Average Hail Size: 1.29"  
 Largest Hail Stone: 3.5"  
 Number of Hail Events: 2351



Produced by the Center for Interdisciplinary Geospatial Information Technologies  
 Hail data: Nat'l Climate Data Center. All other data: US Census (October 2013)

**Figure 4-8 – Hail Events in Mesquite, Texas (1950-2012)**

### ***Probability of Future Occurrences***

Based upon data for the City of Mesquite, an estimation of future occurrences of damaging winds, lightning-causing damage, and hailstorms was made by the City of Mesquite Hazard Mitigation Committee. It was determined the probability of severe thunderstorms was “highly likely” within the next year.

Potential impacts to life are determined to be “minor”, as high wind and lightning are primarily a threat to property especially mobile homes. Persons who are outdoors for activities and sporting events may be at risk. The City of Mesquite does have outdoor warning systems in place to warn those that are outdoors to seek shelter from these impending events.

### ***Vulnerability Assessment***

Population: People are vulnerable to injury or death from lightning, hail and from being struck by falling limbs and structural components. The likelihood of fatal incidents is relatively low due to public awareness as well as policies established by organizers of outdoor activities, such as football games and similar events.

High wind and hail from severe storms are most likely to impact the outside envelope of structures and cause property damage to items located outside and unprotected. Hail can cause significant cosmetic damage to cars, as well as to the roof and siding of structures. Over time, these cosmetic damages can rust or weaken, putting the outside envelope of the car or the structure at risk.

Critical Facilities: Severe thunderstorms, high wind, lightning, and hail are not location-specific hazards since the entire planning area is vulnerable to these hazards. People, buildings, and property are at risk from the effects of high wind, lightning, and hail.

Essential Service: Power outages, because of downed power lines, are the most common results of severe storm activity. Dispatch, communications, and emergency service provisions must continue during a power outage.

Among essential medical services, Dallas Regional Medical Center, Mesquite Specialty Hospital, as well as city police and fire facilities, are equipped with generators and operate under an emergency operation plan during hazard events.

Transportation System: Roadways are most affected by flooding and debris from severe storm and wind damage.

Lifeline Utility Systems: Electric power lines within the City of Mesquite are located above ground, subjecting electric utility systems to lightning and high winds. Lift stations and water pumps can be struck by lightning. The city is in the process of installing surge protection devices to reduce future impacts.

|   |                            |   |                          |
|---|----------------------------|---|--------------------------|
| <b>Hazard:</b>  |                            | <b>High Wind/Thunderstorm/Strong Wind</b>                         |                          |
| <b>Potential Severity of Impact:</b>  |                            |   |                          |
| <b>Substantial</b>  |                            |   |                          |
|   |                            | Multiple deaths   |                          |
|   |                            | Complete shutdown of facilities for 30 days or more               |                          |
|   |                            | More than 50% of property destroyed or with major damage          |                          |
| <b>Major</b>  |                            |   |                          |
|   |                            | Injuries and/or illnesses result in permanent disability          |                          |
|   |                            | Complete shutdown of critical facilities for at least 2 weeks     |                          |
|   |                            | More than 25% of property destroyed or with major damage          |                          |
| <b>Minor</b>  |                            |   |                          |
|   | <b>X</b>                   | Injuries and/or illnesses do not result in permanent disability   |                          |
|   |                            | Complete shutdown of critical facilities for at least 1 week      |                          |
|   |                            | More than 10% of property destroyed or with major damage          |                          |
| <b>Limited</b>  |                            |   |                          |
|   |                            | Injuries and/or illnesses are treatable with first aid            |                          |
|   |                            | Minor quality of life lost  |                          |
|   |                            | Shutdown of critical facilities and services for 24 hours or less |                          |
|   |                            | Less than 10% of property destroyed or with major damage          |                          |
| <b>Frequency of Occurrence:</b>   |                            |   | <b>Seasonal Pattern:</b> |
| X   | Highly Likely:             | Event probable in next year                                       |                          |
|   | Likely:                    | Event probable in next 3 years                                    |                          |
|   | Occasional:                | Event possible in next 5 years                                    |                          |
|   | Unlikely:                  | Event possible in next 10 years                                   |                          |
| <b>Source Documents, Studies, Maps, Etc. Researched:</b>                        |                            |   |                          |
| NCDC  |                            |   |                          |
| <b>Probable Duration:</b>   |                            |   |                          |
| Few Hours   |                            |   |                          |
| <b>Warning Time (Potential Speed of Onset):</b>                                 |                            |   |                          |
|   | Minimal (or no) warning    |   |                          |
| X   | 3 to 6 hours warning       |   |                          |
|   | 6 to 12 hours warning      |   |                          |
|   | More than 12 hours warning |   |                          |
| <b>Cascading Potential:</b>   |                            |   |                          |
| Flooding, Lightning, Hail   |                            |   |                          |
| <b>Existing Warning Systems:</b>  |                            |   |                          |
| National Weather Service (Emergency Alert System (EAS)), Outdoor Warning System |                            |   |                          |

Table 4-21 - City of Mesquite Hazard Mitigation Committee High Wind / Thunderstorm / Strong Wind Hazard Ranking

|  |   |                                      |
|--|---|--------------------------------------|
| <b>Hazard:</b>   | <b>Hail</b>   |                                      |
| <b>Potential Severity of Impact:</b>   |   |                                      |
| <b>Substantial</b>   |   |                                      |
|  | Multiple deaths   |                                      |
|  | Complete shutdown of facilities for 30 days or more               |                                      |
|  | More than 50% of property destroyed or with major damage          |                                      |
| <b>Major</b>   |   |                                      |
|  | Injuries and/or illnesses result in permanent disability          |                                      |
|  | Complete shutdown of critical facilities for at least 2 weeks     |                                      |
|  | More than 25% of property destroyed or with major damage          |                                      |
| <b>Minor</b>   |   |                                      |
| <b>X</b>   | Injuries and/or illnesses do not result in permanent disability   |                                      |
|  | Complete shutdown of critical facilities for at least 1 week      |                                      |
|  | More than 10% of property destroyed or with major damage          |                                      |
| <b>Limited</b>   |   |                                      |
|  | Injuries and/or illnesses are treatable with first aid            |                                      |
|  | Minor quality of life lost  |                                      |
|  | Shutdown of critical facilities and services for 24 hours or less |                                      |
|  | Less than 10% of property destroyed or with major damage          |                                      |
| <b>Frequency of Occurrence:</b>  |   | <b>Seasonal Pattern:</b>             |
| <input checked="" type="checkbox"/>  | Highly Likely: Event probable in next year                        | Spring Thunderstorms or Early Winter |
| <input type="checkbox"/>   | Likely: Event probable in next 3 years                            |                                      |
| <input type="checkbox"/>   | Occasional: Event possible in next 5 years                        |                                      |
| <input type="checkbox"/>   | Unlikely: Event possible in next 10 years                         |                                      |
| <b>Source Documents, Studies, Maps, Etc. Researched:</b>                       |   |                                      |
| NCDC   |   |                                      |
| <b>Probable Duration:</b>  |   |                                      |
| One to a few hours   |   |                                      |
| <b>Warning Time (Potential Speed of Onset):</b>                                |   |                                      |
| <input checked="" type="checkbox"/>  | Minimal (or no) warning   |                                      |
| <input type="checkbox"/>   | 3 to 6 hours warning  |                                      |
| <input type="checkbox"/>   | 6 to 12 hours warning   |                                      |
| <input type="checkbox"/>   | More than 12 hours warning  |                                      |
| <b>Cascading Potential:</b>  |   |                                      |
| Power Failure, property damage   |   |                                      |
| <b>Existing Warning Systems:</b>   |   |                                      |
| National Weather Service (Emergency Alert System (EAS), Outdoor Warning System |   |                                      |

**Table 4-22 - City of Mesquite Hazard Mitigation Committee Hail Hazard Ranking**

|   |   |                                 |                          |
|---|---|---------------------------------|--------------------------|
| <b>Hazard:</b>  | Lightning   |                                 |                          |
| <b>Potential Severity of Impact:</b>  |   |                                 |                          |
| <b>Substantial</b>  |   |                                 |                          |
|   | Multiple deaths   |                                 |                          |
|   | Complete shutdown of facilities for 30 days or more               |                                 |                          |
|   | More than 50% of property destroyed or with major damage          |                                 |                          |
| <b>Major</b>  |   |                                 |                          |
|   | Injuries and/or illnesses result in permanent disability          |                                 |                          |
|   | Complete shutdown of critical facilities for at least 2 weeks     |                                 |                          |
|   | More than 25% of property destroyed or with major damage          |                                 |                          |
| <b>Minor</b>  |   |                                 |                          |
|   | Injuries and/or illnesses do not result in permanent disability   |                                 |                          |
|   | Complete shutdown of critical facilities for at least 1 week      |                                 |                          |
|   | More than 10% of property destroyed or with major damage          |                                 |                          |
| <b>Limited</b>  |   |                                 |                          |
| X   | Injuries and/or illnesses are treatable with first aid            |                                 |                          |
|   | Minor quality of life lost  |                                 |                          |
|   | Shutdown of critical facilities and services for 24 hours or less |                                 |                          |
|   | Less than 10% of property destroyed or with major damage          |                                 |                          |
| <b>Frequency of Occurrence:</b>   |   |                                 | <b>Seasonal Pattern:</b> |
| X   | Highly Likely:  | Event probable in next year     | Spring or Early Winter   |
|   | Likely:   | Event probable in next 3 years  |                          |
|   | Occasional:   | Event possible in next 5 years  |                          |
|   | Unlikely:   | Event possible in next 10 years |                          |
| <b>Source Documents, Studies, Maps, Etc. Researched:</b>                            |   |                                 |                          |
| NCDC  |   |                                 |                          |
| <b>Probable Duration:</b>   |   |                                 |                          |
| Lightning Strike (seconds) to multiple strikes for duration of thunderstorm (hours) |   |                                 |                          |
| <b>Warning Time (Potential Speed of Onset):</b>                                     |   |                                 |                          |
|   | Minimal (or no) warning   |                                 |                          |
| X   | 3 to 6 hours warning  |                                 |                          |
|   | 6 to 12 hours warning   |                                 |                          |
|   | More than 12 hours warning  |                                 |                          |
| <b>Cascading Potential:</b>   |   |                                 |                          |
| Power Outages   |   |                                 |                          |
| <b>Existing Warning Systems:</b>  |   |                                 |                          |
| National Weather Service  |   |                                 |                          |

Table 4-23 - City of Mesquite Hazard Mitigation Committee Lightning Hazard Ranking

**4.2.5 Dam Failure**

***Hazard Description***

A dam is any artificial barrier, including appurtenant works, constructed to impound or divert water, wastewater, liquid borne materials or solids that may flow if saturated. All structures necessary to maintain the water level in an impoundment or to divert a stream from its course will be considered one dam.

A levee is an artificial embankment alongside a river. The main purpose of an artificial levee is to prevent flooding of the adjoining countryside; however, they also confine the flow of the river resulting in higher and faster water flow.

In terms of loss of life and property to residents located close to dams, the area downstream at a lower elevation is most affected. This is referred to in mitigation planning as the inundation or impacted area. It is assumed that dam breaks happen at the time of maximum capacity and that the location of the released water would inundate a downstream area proportional to the maximum capacity of the dam.

An acre-foot is 325,851 gallons and would cover one acre of land with a foot of water. A 1,000 acre-foot body of water could cover 40 acres with an average depth of 25 feet, and the volume of 1,000 acre-feet is approximately 326 million gallons of water.

***Dam Categories***

The Dam Safety Program of the Texas Commission on Environmental Quality (TCEQ) monitors and regulates both private and public dams in Texas. The program periodically inspects dams that pose a high or significant hazard and makes recommendations and reports to dam owners to help them maintain safe facilities. Dams are classified by size and hazard potential.

| Size Category | Storage (ac-ft.) | Height (ft.) |
|---------------|------------------|--------------|
| Small         | Less than 1,000  | Less than 40 |
| Intermediate  | 1,000 – 49,999   | 40-99        |
| Large         | 50,000 +         | 100+         |

*Table 4-24 – Size Categories of Dams, State of Texas*

| Hazard Category | Loss of Life               | Economic Loss |
|-----------------|----------------------------|---------------|
| Low             | None Expected              | Minimal       |
| Significant     | Possible, but not expected | Appreciable   |
| High            | Expected                   | Excessive     |

*Table 4-25 – Hazard Categories for Dams, State of Texas*

### **Hazard Profile**

#### **Location and Extent**

##### **City Lake Dam**

City Lake Dam is located in Dallas County, Texas, within the city limits of Mesquite, and southwest of the intersection of West Davis Street and South Galloway Avenue. The dam is situated in the Trinity River Basin and impounds water from an unnamed tributary of South Mesquite Creek. The coordinates of the dam are Latitude 32.761499° and Longitude 96.601687°.

City Lake Dam consists of an earthfill embankment, an 18-inch diameter reinforced concrete pipe (RCP) drop inlet, and a rectangular drop inlet measuring 11.5 feet by 3 feet by 6 feet deep. The RCP inlet slopes gradually from elevation 467.59 to 468.43 feet msl, and an approximate average value of 468 feet msl was assumed to be the normal pool elevation. The RCP serves as the service spillway and discharges into the bottom of the rectangular drop inlet, which serves as the auxiliary spillway. The crest elevation of the auxiliary spillway inlet is approximately 469.3 feet msl. Both inlets are covered with grates. The combined discharge flows into three 36-inch RCPs which extend for approximately 475 feet under the parking lot at the toe of the dam, ultimately discharging into a small tributary of South Mesquite Creek. The dam does not have an emergency spillway.

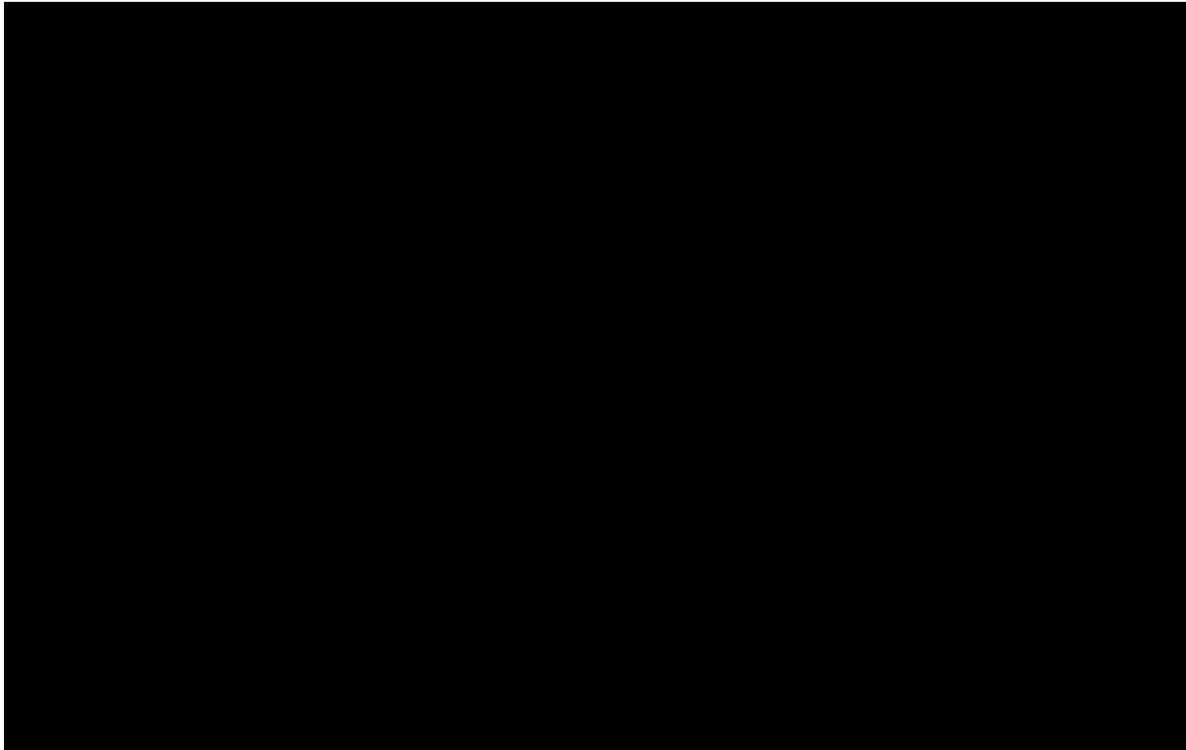
A survey of City Lake Dam was completed in **January 2011**. Prior to this survey, exact elevations for the dam crest and other dam appurtenances were unknown because no construction plans are available for the dam. Based on the results of this survey, the elevation of the crest of the dam varies along its length from approximately 471.18 to 472.98 feet-msl. The crest is approximately 410 feet long, has a 6-foot sidewalk along its length and varies in width from approximately 10 to 15 feet. There are several large trees present on the crest of the dam. The reservoir has a surface area of 4.4 acres and a capacity of 15.9 acre-feet at the normal pool elevation of 468 feet-msl. The elevation at the downstream toe of the dam is 460 feet-msl resulting in a maximum dam height of 11.2 feet.

The upstream slope of the dam was estimated to be approximately 3 horizontal to 1 vertical down to elevation 469.3 feet-msl, below which the face is nearly vertical and is protected by a concrete bag-wall. Above the wall, a significant amount of the slope is bare soil with no erosion protection. The downstream slope is approximately 3 horizontal to 1 vertical and is protected with grass cover. A cemetery is located along the western edge of the reservoir, and approximately 100 feet of the upstream slope adjacent to the cemetery is protected with the concrete bags similar to the protection along the water's edge.

The potential for a failure of the dam does exist. A simplified breach analysis of the dam was completed assuming an embankment failure occurring when the water level in the reservoir was at the top of dam elevation of 471.18 feet msl. According to the results of the simplified breach analyses reported in the City Lake Dam Breach Analysis, a breach of the embankment would

have a height of 11.2 feet, a width of 33.6 feet, and a peak discharge of 4,056 cubic feet per second (cfs). The flood wave resulting from such a breach would travel downstream through the floodplain of an unnamed tributary of South Mesquite Creek, attenuating just before the confluence with South Mesquite Creek. A breach of City Lake Dam has the potential to result in loss of human life and property.

The City Lake Dam Inundation Map is included in Figure 4.9 below.



*Figure 4-9 – Inundation Map for City Lake Dam*

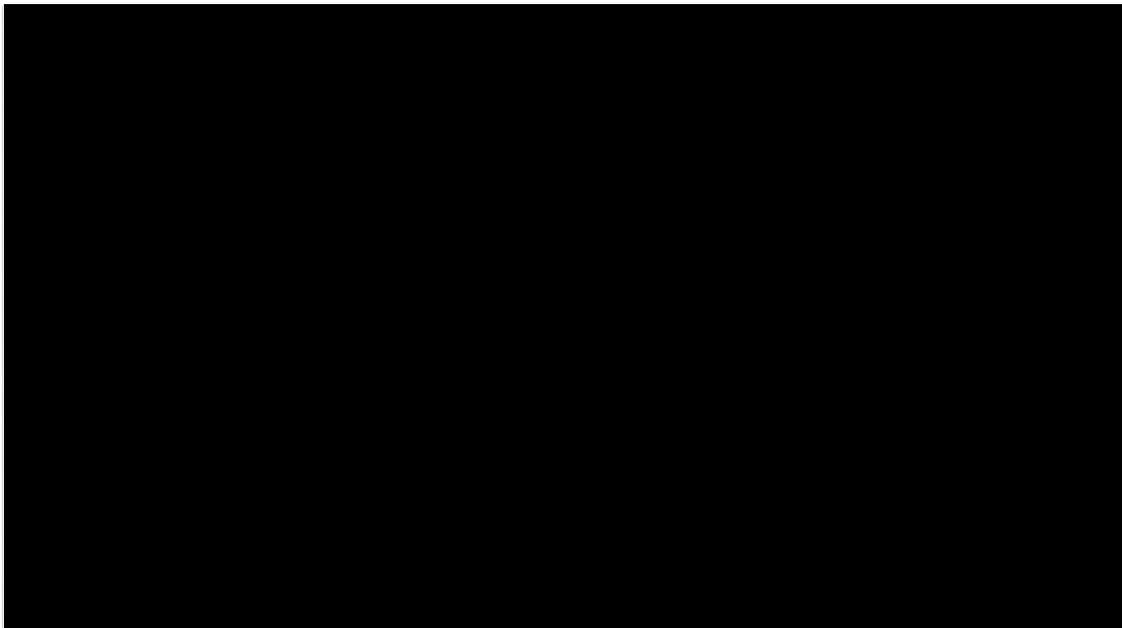
### **Palos Verdes Dam**

Palos Verdes Dam is located in Dallas County, Texas, within the city limits of Mesquite (City). The dam is situated in the Trinity River Basin and impounds water from an unnamed tributary of South Mesquite Creek. The dam was originally constructed by a private landowner to provide water for livestock. The City took ownership of the dam in 1981 when a developer deeded the lake and surrounding property to the City, and a park was developed in the area surrounding the lake. Palos Verdes Dam is a small size dam with a maximum storage of 46 acre-feet and a maximum height of 21 feet. Palos Verdes Dam is considered a high hazard structure because there are more than three habitable structures within the potential breach inundation area. According to Texas Administrative Code §299.15, a small size, high hazard structure is required to pass 75 percent of the Probable Maximum Flood (PMF).

According to the updated data, the capacity of the reservoir at the normal pool and top of dam are approximately 17.8 acre-feet and 46 acre-feet, respectively. The dam has a drainage area of approximately 0.114 square miles (73 acres). The PMF analysis was updated to reflect the new area-capacity data, and it was determined that Palos Verdes Dam is capable of passing 57 percent of the PMF in its current condition.

Palos Verdes Dam consists of an earthfill embankment, a corrugated metal pipe (CMP) drop inlet, and a low spot on the left end of the dam that serves as an emergency spillway. Based on the results of the survey, the normal pool elevation is 492.3 feet-msl, the elevation of the emergency spillway crest is 496 feet-msl, and the effective elevation of the crest of the dam is 498 feet-msl. There is a low spot in the dam where the crest elevation is 497.85 feet-msl. The elevation of the streambed at the toe of the dam is 477 feet-msl, resulting in a maximum embankment height of 21 feet.

The upstream slope is approximately 4 horizontal to 1 vertical, and the downstream slope is approximately 3 horizontal to 1 vertical, with a few areas measuring about 2 horizontal to 1 vertical. Both slopes are protected with grass, and the upstream slope has a wall at the water line for erosion protection. The service spillway is a seven-foot diameter CMP drop inlet that transitions to a four-foot diameter CMP that goes through the embankment and discharges at the downstream toe of the dam. The inlet also has two sluice gates to allow for low-flow releases. The gates were most likely originally installed to allow lowering of the lake level and they should be maintained for that purpose. Water from the riser is discharged into a natural channel for approximately 450 feet, and then flows into a double barrel culvert that extends under Northwest Drive and the adjacent neighborhood. The discharge from Palos Verdes Lake ultimately flows into Duck Creek, a tributary to the East Fork of the Trinity River.



*Figure 4-10 – Inundation Map for Palos Verde Dam*

## Previous Occurrences

The City Lake Dam and Palos Verdes dams have no recorded failures.

## Emergency Action Plans

In accordance with Title 30 Texas Administrative Code (TAC) Chapter 299, Dams and Reservoirs, §299.61(b), owners of significant and high hazard dams were required to submit an Emergency Action Plan, which may be a draft version, to the executive director (of TCEQ) for review by January 1, 2011.

|  |   |                          |
|--|---|--------------------------|
| <b>Hazard:</b>   | <b>Dam Failure</b>  |                          |
| <b>Potential Severity of Impact:</b>                                   |   |                          |
| <b>Substantial</b>   |   |                          |
|  | Multiple deaths   |                          |
|  | Complete shutdown of facilities for 30 days or more               |                          |
|  | More than 50% of property destroyed or with major damage          |                          |
| <b>Major</b>   |   |                          |
|  | Injuries and/or illnesses result in permanent disability          |                          |
|  | Complete shutdown of critical facilities for at least 2 weeks     |                          |
|  | More than 25% of property destroyed or with major damage          |                          |
| <b>Minor</b>   |   |                          |
| <b>X</b>   | Injuries and/or illnesses do not result in permanent disability   |                          |
|  | Complete shutdown of critical facilities for at least 1 week      |                          |
|  | More than 10% of property destroyed or with major damage          |                          |
| <b>Limited</b>   |   |                          |
|  | Injuries and/or illnesses are treatable with first aid            |                          |
|  | Minor quality of life lost  |                          |
|  | Shutdown of critical facilities and services for 24 hours or less |                          |
|  | Less than 10% of property destroyed or with major damage          |                          |
| <b>Frequency of Occurrence:</b>  |   | <b>Seasonal Pattern:</b> |
|  | Highly Likely: Event probable in next year                        | Not applicable.          |
|  | Likely: Event probable in next 3 years                            |                          |
|  | Occasional: Event possible in next 5 years                        |                          |
| <b>X</b>   | Unlikely: Event possible in next 10 years                         |                          |
| <b>Source Documents, Studies, Maps, Etc. Researched:</b>               |   |                          |
| City Lake Dam Emergency Action Plan, Palos Verde Emergency Action Plan |   |                          |
| <b>Probable Duration:</b>  |   |                          |
| Extended period of time is possible.                                   |   |                          |
| <b>Warning Time (Potential Speed of Onset):</b>                        |   |                          |
|  | Minimal (or no) warning   |                          |

|   |                            |
|---|----------------------------|
|   | 3 to 6 hours warning       |
| X   | 6 to 12 hours warning      |
|   | More than 12 hours warning |
| <b>Cascading Potential:</b>                                   |                            |
| Flooding of cities and destruction of property, loss of life. |                            |
| <b>Existing Warning Systems:</b>                              |                            |
| Television and Radio  |                            |

Table 4-26 - City of Mesquite Hazard Mitigation Committee Dam Failure Hazard Ranking

### 4.2.6 Drought

#### **Hazard Description**

According to NOAA, a drought is defined as a period of unusually dry weather persisting long enough to cause serious problems, such as crop damage and/or water supply shortages. The severity of the drought depends upon the degree of moisture deficiency and the duration of the drought.

Drought occurs under differing conditions, based on the reference points:

Meteorological drought is defined by a period of substantially diminished precipitation duration and/or intensity. The commonly used definition of meteorological drought is an interval of time, generally on the order of months or years, during which the actual moisture supply at a given place consistently falls below the average moisture supply.

Agricultural drought occurs when there is inadequate soil moisture to meet the needs of a particular crop at a given time. Agricultural drought usually occurs after or during meteorological drought, but before hydrological drought and can affect livestock and other dry-land agricultural operations.

Hydrological drought refers to deficiencies in surface and subsurface water supplies from deficiencies in precipitation. It is measured as stream flow, snow pack, and as lake, reservoir, and groundwater levels. There is usually a delay between lack of rain or snow and less measurable water in streams, lakes, and reservoirs. Therefore, hydrological measurements tend to lag behind other drought indicators.

Socio-economic drought occurs when physical water shortages start to affect the health, well-being, and quality of life of people, or when drought starts to affect the supply and demand of an economic product.

A drought’s severity depends on numerous factors, including duration, intensity, and geographic extent, as well as regional water demands by humans, livestock, crops, and vegetation. The severity of drought can be aggravated by other climatic factors, such as prolonged high winds

and low relative humidity. Due to its multi-dimensional nature, drought is difficult to define in exact terms and poses difficulties in terms of comprehensive risk assessments.

In 1965, Wayne Palmer developed an index to “measure the departure of the moisture supply.” This index was based on the supply-and-demand concept of the water balance equation, taking into account more than merely the precipitation deficit at specific locations. The objective of the Palmer Drought Severity Index (PDSI) was to provide a measurement of moisture conditions that were “standardized” so comparisons using the index could be made between locations and between time periods. While Palmer’s indices are water balance indices that consider water supply (precipitation), demand (evapotranspiration) and loss (runoff), another commonly used drought index, the Standardized Precipitation Index (SPI), is a probability index that considers only precipitation. Therefore and for the purposes of this plan, drought will be analyzed using the PDSI.

The PDSI varies between -4.0 and +4.0. Weekly Palmer Index values are calculated for the Climate Divisions during every growing season and are available from the Climate Prediction Center. Mesquite could expect to experience the entire range of drought severity and classification. Table 4-27 lists the Palmer Drought Severity Index.

| Index Value   | Classification      | Index Value    | Classification      |
|---------------|---------------------|----------------|---------------------|
| 4.00 or more  | Extremely wet       | -0.50 to -0.99 | Incipient dry spell |
| 3.00 to 3.99  | Very wet            | -1.00 to -1.99 | Mild drought        |
| 2.00 to 2.99  | Moderately wet      | -2.00 to -2.99 | Moderate drought    |
| 1.00 to 1.99  | Slightly wet        | -3.00 to -3.99 | Severe drought      |
| 0.50 to 0.99  | Incipient wet spell | -4.00 or less  | Extreme drought     |
| 0.49 to -0.49 | Near normal         |                |                     |

**Table 4-27 Palmer Drought Severity Index** (Source: <http://www.futura-sciences.us/dico/d/climatology-palmer-drought-severity-index-50000924/>)

Another means of analyzing drought is the Keetch-Byram Drought Index (KBDI) The KBDI drought index system is the most widely used by fire managers in the south. It is also one of the only drought index systems specifically developed to equate the effects of drought with potential fire activities.

The result of this system is a drought index number ranging from 0 to 800 accurately describing the amount of moisture missing. A rating of zero defines the point of no moisture deficiency and 800 is the maximum drought possible.

These numbers correlate with potential fire behavior as follows:

- 0 - 200: Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. Typical of spring dormant season following winter precipitation.

- 200 - 400: Typical of late spring, early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.
- 400 - 600: Typical of late summer, early fall. Lower litter and duff layers actively contribute to fire intensity and will burn actively.
- 600 - 800: Often associated with more severe drought with increased wildfire occurrence. Intense, deep burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

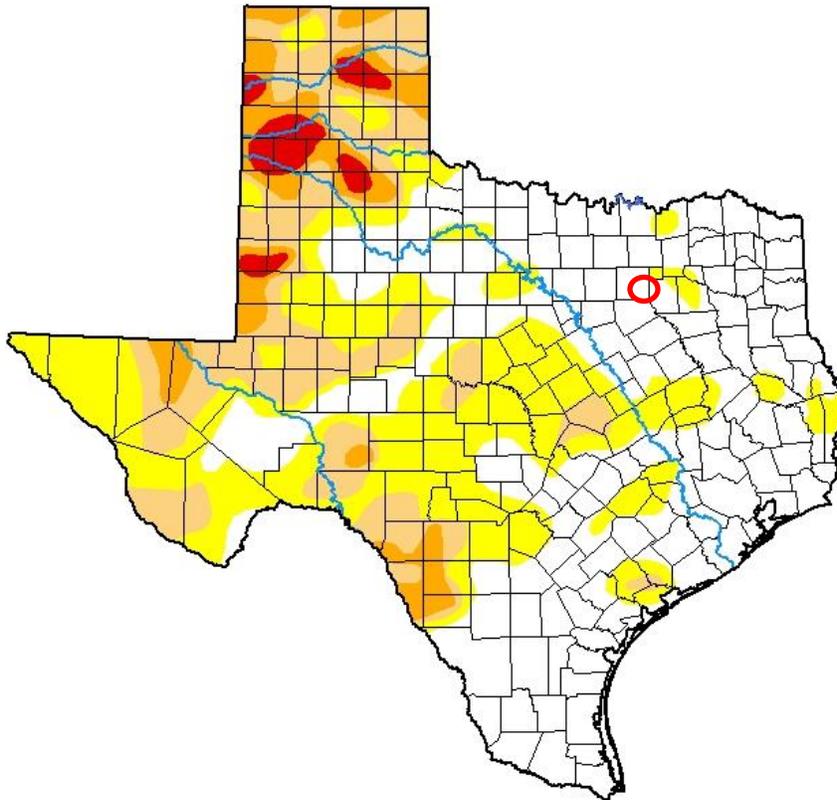
### ***Location and Extent***

Drought is not a location-specific hazard. All areas of Mesquite are equally vulnerable to drought.

A severe, prolonged drought could have negative and lasting impacts on residents, agriculture, industry and infrastructure in Mesquite. When available water tables decline and potable water becomes harder to obtain, the residents, commuting population, and visitors are exposed to greater health risks. Any water-dependent functions in the city are exposed to potential loss of or failure to function. Figure 4-11 provides a view of drought impacts on Texas with Mesquite identified by a red circle.

**U.S. Drought Monitor  
Texas**

**July 7, 2020**  
(Released Thursday, Jul. 9, 2020)  
Valid 8 a.m. EDT



**Intensity:**

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>*

**Author:**

David Miskus  
NOAA/NWS/NCEP/CPC



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

*Figure 4-11 Drought Monitor July 7, 2020-Mesquite circled in red*

**Previous Occurrences**

The NCDC captures drought data by zone for conditions D2 and higher. Tables 4-28 and 4-29 show previous occurrences of drought in Dallas and Kaufman County (City of Mesquite is located in both counties).

| Date      | Property Damage | Crop Damage |  | Date         | Property Damage  | Crop Damage        |
|-----------|-----------------|-------------|--|--------------|------------------|--------------------|
| 5/1/1996  | 0               | 0           |  | 4/1/2013     | 0                | 2,000              |
| 8/1/1996  | 0               | 0           |  | 6/25/2013    | 0                | 2,000              |
| 7/1/1998  | 0               | 0           |  | 7/1/2013     | 0                | 2,000              |
| 8/1/2000  | 0               | 0           |  | 8/1/2013     | 5,000            | 5,000              |
| 9/1/2000  | 0               | 0           |  | 9/1/2013     | 0                | 4,000              |
| 6/1/2005  | 0               | 0           |  | 2/25/14      | 0                | 1,000              |
| 7/1/2005  | 0               | 0           |  | 3/1/2014     | 0                | 4,000              |
| 8/1/2005  | 0               | 0           |  | 4/1/2014     | 0                | 3,000              |
| 9/1/2005  | 0               | 0           |  | 5/1/2014     | 0                | 3,000              |
| 10/1/2005 | 0               | 0           |  | 6/1/2014     | 0                | 2,000              |
| 11/1/2005 | 0               | 0           |  | 7/1/2014     | 0                | 3,000              |
| 12/1/2005 | 0               | 0           |  | 8/1/2014     | 0                | 1,000              |
| 1/1/2006  | 0               | 0           |  | 9/1/2014     | 5,000            | 0                  |
| 2/1/2006  | 0               | 0           |  | 10/1/2014    | 0                | 5,000              |
| 3/1/2006  | 0               | 0           |  | 11/1/2014    | 0                | 2,000              |
| 4/1/2006  | 0               | 0           |  | 12/1/2014    | 0                | 6,000              |
| 5/1/2006  | 0               | 0           |  | 1/1/2015     | 0                | 2,000              |
| 6/6/2006  | 0               | 0           |  | 2/1/2015     | 0                | 2,000              |
| 7/1/2006  | 0               | 0           |  | 3/1/2015     | 0                | 3,000              |
| 8/1/2006  | 0               | 0           |  | 4/1/2015     | 0                | 1,000              |
| 9/1/2006  | 0               | 0           |  | 8/25/2015    | 0                | 0                  |
| 10/1/2006 | 500,000         | 500,000     |  | 9/1/2015     | 0                | 1,000              |
| 11/1/2006 | 0               | 800,000     |  | 10/1/2015    | 2,000            | 0                  |
| 4/1/2011  | 0               | 5,000       |  | 12/1/2017    | 0                | 1,000              |
| 8/1/2011  | 0               | 10,000      |  | 7/1/2018     | 0                | 0                  |
| 9/1/2011  | 0               | 25,000      |  | 8/1/2018     | 0                | 1,000              |
| 10/1/2011 | 0               | 5,000       |  | 9/24/2019    | 0                | 1,000              |
| 8/7/2012  | 0               | 0           |  | 10/1/2019    | 0                | 0                  |
| 12/1/2012 | 0               | 2,000       |  |              |                  |                    |
| 1/1/2013  | 0               | 1,000       |  | <b>Total</b> | <b>\$512,000</b> | <b>\$1,405,000</b> |

Table 4- 28 Dallas County Drought Data – January 1996 – July 2020 (Source: National Climatic and Data Center)

| Date      | Property Damage | Crop Damage |  | Date         | Property Damage  | Crop Damage        |
|-----------|-----------------|-------------|--|--------------|------------------|--------------------|
| 8/1/1996  | 0               | 0           |  | 10/1/2011    | 0                | 10,000             |
| 7/1/1998  | 0               | 0           |  | 11/1/2011    | 0                | 7,000              |
| 8/1/2000  | 0               | 0           |  | 12/1/2011    | 0                | 3,000              |
| 9/1/2000  | 0               | 0           |  | 12/1/2012    | 0                | 1,000              |
| 7/1/2005  | 0               | 0           |  | 1/1/2013     | 0                | 1,000              |
| 8/1/2005  | 0               | 0           |  | 3/19/2013    | 0                | 1,000              |
| 9/1/2005  | 0               | 0           |  | 4/1/2013     | 0                | 2,000              |
| 10/1/2005 | 0               | 0           |  | 5/14/2013    | 0                | 3,000              |
| 11/1/2005 | 0               | 0           |  | 7/1/2013     | 0                | 4,000              |
| 12/1/2005 | 0               | 0           |  | 8/1/2013     | 0                | 1,000              |
| 1/1/2006  | 0               | 0           |  | 9/1/2013     | 0                | 500                |
| 2/1/2006  | 0               | 0           |  | 5/1/2014     | 0                | 0                  |
| 3/1/2006  | 0               | 0           |  | 6/1/2014     | 0                | 2,000              |
| 6/6/2006  | 0               | 0           |  | 9/28/2014    | 0                | 500                |
| 7/1/2006  | 0               | 0           |  | 2/5/2015     | 0                | 1,000              |
| 8/1/2006  | 0               | 0           |  | 4/1/2015     | 0                | 500                |
| 9/1/2006  | 0               | 0           |  | 9/1/2015     | 0                | 0                  |
| 10/1/2006 | 500,000         | 500,000     |  | 10/1/2015    | 2,000            | 1,000              |
| 11/1/2006 | 0               | 800,000     |  | 12/1/2017    | 0                | 0                  |
| 3/14/2011 | 0               | 5,000       |  | 7/1/2018     | 0                | 1,000              |
| 4/1/2011  | 0               | 30,000      |  | 8/1/2018     | 0                | 0                  |
| 5/1/2011  | 0               | 7,000       |  | 10/1/2019    | 0                | 0                  |
| 6/7/2011  | 4,000           | 0           |  | 1/1/2020     | 0                | 0                  |
| 7/1/2011  | 0               | 10,000      |  | 2/1/2020     | 0                | 0                  |
| 8/1/2011  | 0               | 20,000      |  |              |                  |                    |
| 9/1/2011  | 0               | 25,000      |  | <b>Total</b> | <b>\$506,000</b> | <b>\$1,440,000</b> |

Table 4- 29 – Kaufman County Drought Data – January 1996 – July 2020 (Source: National Climatic and Data Center)

**Probability of Future Occurrences**

A lack of recorded historical drought data and forecasting limitations makes estimating probability of drought unrealistic within the context of this plan. Given statewide drought indices, the probability of future drought conditions is considered low as determined by the U.S. seasonal drought outlook. However, it is important to note the seasonal drought outlook is a forecast through September 2020 (Figures 4-11 and 4-12) and a much shorter timeframe than the five-

year planning horizon of this plan. Continuous monitoring of drought indices and forecasts are recommended.

## U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

Valid for June 18 - September 30, 2020  
Released June 18

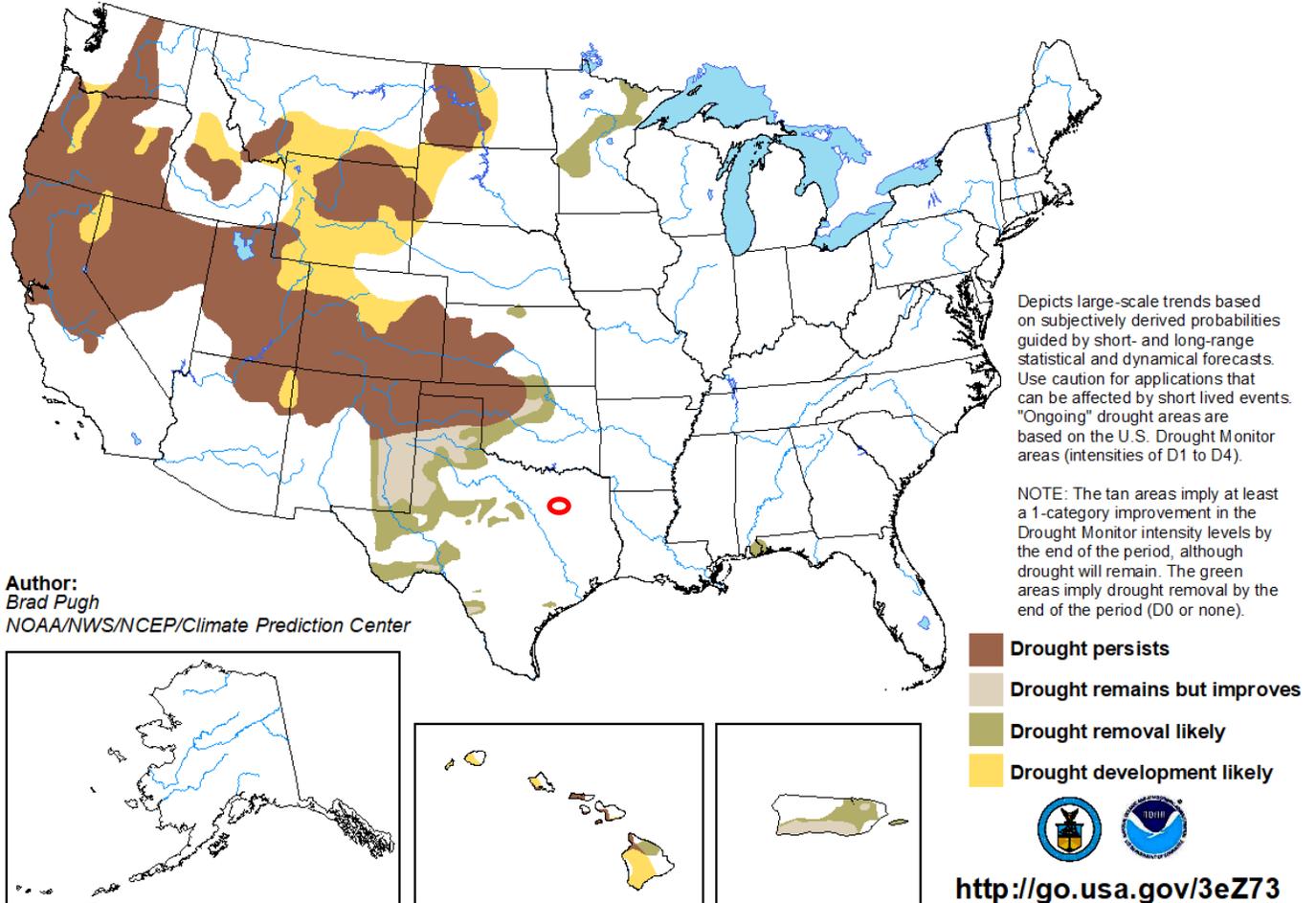


Figure 4-12 – US Seasonal Drought Outlook-Mesquite circled in red (June 18-September 30, 2020)  
(Source: NWS Climate Prediction Center)

## ***Vulnerability Assessment***

**Population:** Drought is not a location-specific hazard. All areas of Mesquite are equally vulnerable to drought. Drought can have a widespread impact on the environment and the economy, depending upon its severity, although it typically does not result in loss of life or damage to property, as do other natural disasters. A drought does affect companies offering recreational services, such as river rafting and landscape and nursery businesses. People will not invest in new plants if water is not available to sustain them. Rationing of water can affect property owners who are not able to water lawns.

**Critical Facilities:** Critical facilities are not likely to be affected by drought.

**Essential Service:** Drought threatens supplies of water for irrigated crops and communities. Prolonged drought increases the threat of wildfires from dry conditions in forest and rangelands.

**Transportation System:** Transportation and Utility systems on/in expansive soils are affected by drought. Drought accelerates pavement deterioration and shifting soils cause water and sewer lines to break.

**Lifeline Utility Systems:** Drought has the potential of affecting the supply of electricity. When supplies of locally generated hydropower shrink because of drought, utilities seek other sources of electricity and energy for power generation, driving up prices and reducing supply.

|                                      |   |
|--------------------------------------|---|
| <b>Hazard:</b>                       | <b>Drought</b>  |
| <b>Potential Severity of Impact:</b> |   |
| <b>Substantial</b>                   |   |
|                                      | Multiple deaths   |
|                                      | Complete shutdown of facilities for 30 days or more               |
|                                      | More than 50% of property destroyed or with major damage          |
| <b>Major</b>                         |   |
|                                      | Injuries and/or illnesses result in permanent disability          |
|                                      | Complete shutdown of critical facilities for at least 2 weeks     |
|                                      | More than 25% of property destroyed or with major damage          |
| <b>Minor</b>                         |   |
|                                      | Injuries and/or illnesses do not result in permanent disability   |
|                                      | Complete shutdown of critical facilities for at least 1 week      |
|                                      | More than 10% of property destroyed or with major damage          |
| <b>Limited</b>                       |   |
| <b>X</b>                             | Injuries and/or illnesses are treatable with first aid            |
|                                      | Minor quality of life lost  |
|                                      | Shutdown of critical facilities and services for 24 hours or less |
|                                      | Less than 10% of property destroyed or with major damage          |

| Frequency of Occurrence:                                   |                            |                                 | Seasonal Pattern:               |  |
|--|----------------------------|---------------------------------|---------------------------------|--|
| X  | Highly Likely:             | Event probable in next year     | Can happen throughout the year. |  |
|  | Likely:                    | Event probable in next 3 years  |                                 |  |
|  | Occasional:                | Event possible in next 5 years  |                                 |  |
|  | Unlikely:                  | Event possible in next 10 years |                                 |  |
| Source Documents, Studies, Maps, Etc. Researched:          |                            |                                 |                                 |  |
| NCDC, USDA   |                            |                                 |                                 |  |
| Probable Duration:   |                            |                                 |                                 |  |
| Extended period of time (several weeks of months).         |                            |                                 |                                 |  |
| Warning Time (Potential Speed of Onset):                   |                            |                                 |                                 |  |
|  | Minimal (or no) warning    |                                 |                                 |  |
|  | 3 to 6 hours warning       |                                 |                                 |  |
|  | 6 to 12 hours warning      |                                 |                                 |  |
| X  | More than 12 hours warning |                                 |                                 |  |
| Cascading Potential:                                       |                            |                                 |                                 |  |
| Strains on water supply, damage to agricultural interests. |                            |                                 |                                 |  |
| Existing Warning Systems:                                  |                            |                                 |                                 |  |
| National Weather Service                                   |                            |                                 |                                 |  |

Table 4-30 - City of Mesquite Hazard Mitigation Committee Drought Hazard Ranking

### 4.2.7 Earthquake

#### Hazard Description

The United States Geologic Survey (USGS) defines an earthquake as a sudden motion or trembling of the earth caused by an abrupt release of stored energy beneath the earth’s surface.

In 1935, Charles Richter developed the local magnitude, ML scale for moderate-size (3<ML<7) earthquakes in southern California. The ML scale is often called the “Richter scale” by the press and the public. All current methodologies for measuring earthquake magnitude (ML, duration magnitude mD, surface-wave magnitude MS, teleseismic body-wave magnitude mb, moment magnitude M, etc.) yield results consistent with ML. In fact, most modern methods for measuring magnitude were designed to be consistent with the Richter scale, which is shown in Table 4-31 (below).

| Magnitude     | Earthquake Effects   |
|---------------|--|
| Less than 3.5 | Generally not felt, but recorded.  |
| 3.5-5.4       | Often felt, but rarely causes damage.  |
| Under 6.0     | At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions. |

|              |  |
|--------------|--|
| 6.1-6.9      | Can be destructive in areas up to about 100 kilometers across where people live.       |
| 7.0-7.9      | Major earthquake. Can cause serious damage over larger areas.                          |
| 8 or greater | Great earthquake. Can cause serious damage in areas several hundred kilometers across. |

**Table 4-31 – Richter Scale (Source: United States Geological Survey (USGS))**

The Mercalli intensity scale is a seismic scale used for measuring the intensity of an earthquake. It measures the *effects* of an earthquake, and is distinct from the moment magnitude  $M_w$  usually reported for an earthquake (sometimes described as the obsolete Richter magnitude), which is a measure of the *energy* released. The intensity of an earthquake is not totally determined by its magnitude.

The scale quantifies the effects of an earthquake on the earth’s surface, humans, objects of nature, and man-made structures on a scale from I (not felt) to XII (total destruction) as shown in Table 4-33. Values depend upon the distance to the earthquake, with the highest intensities being around the epicentral area. Data gathered from people who have experienced the quake is used to determine an intensity value for their location. The Mercalli (Intensity) scale originated with the widely used simple ten-degree Rossi-Forel scale that was revised by Italian volcanologist, Giuseppe Mercalli in 1884 and 1906.

In 1902, the ten-degree Mercalli scale was expanded to twelve degrees by Italian physicist Adolfo Cancani. It was later completely re-written by the German geophysicist August Heinrich Sieberg and became known as the Mercalli-Cancani-Sieberg (MCS) scale.

The MCS scale was modified and published in 1931 in English by Harry O. Wood and Frank Neumann as the Mercalli-Wood-Neumann (MWN) scale. It was later improved by Charles Richter, the father of the Richter magnitude scale.

The scale is known today as the Modified Mercalli scale or Modified Mercalli Intensity scale (Tables 4-32 and 4-33).

| Magnitude      | Modified Mercalli Intensity |
|----------------|-----------------------------|
| 1.0 – 3.0      | I                           |
| 3.0 – 3.9      | II - III                    |
| 4.0 – 4.9      | IV - V                      |
| 5.0 – 5.9      | VI - VII                    |
| 6.0 – 6.9      | VII - IX                    |
| 7.0 and Higher | VIII or Higher              |

**Source: USGS Earthquake Hazards Program**

**Table 4-32 – Modified Mercalli Intensity Scale (Source: USGS Earthquake Hazards Program)**

| Mercalli magnitude | Effects observed  |
|--------------------|---|
| I                  | Not felt except by a very few under especially favorable conditions.  |
| II                 | Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.  |
| III                | Felt quite noticeably by persons indoors, especially on the upper floors of buildings. Many do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to the passing of a truck. Duration estimated.   |
| IV                 | Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.  |
| V                  | Felt by nearly everyone; many awakened. Some dishes and windows broken. Unstable objects overturned. Pendulum clocks may stop.  |
| VI                 | Felt by all; many frightened and run outdoors, walk unsteadily. Windows, dishes, glassware broken, books off shelves, some heavy furniture moved or overturned; a few instances of fallen plaster. Damage slight.   |
| VII                | Difficult to stand. Furniture broken. Damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars. |
| VIII               | Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture moved.  |
| IX                 | General panic. Damage considerable in specially designed structures, well-designed frame structures thrown out of plumb. Damage great even in substantial buildings, with partial collapse. Buildings shifted off foundations.  |
| X                  | Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.  |
| XI                 | Few, if any masonry structures remain standing. Bridges destroyed. Rails bent greatly.  |
| XII                | Damage total. Lines of sight and level distorted. Objects thrown into the air.  |

Table 4-33 – Earthquake effects by Mercalli Magnitude Category

**Man-Made Earthquakes**

Source: [https://archive.usgs.gov/archive/sites/www.usgs.gov/blogs/features/usgs\\_top\\_story/man-made-earthquakes/index.html](https://archive.usgs.gov/archive/sites/www.usgs.gov/blogs/features/usgs_top_story/man-made-earthquakes/index.html)

### ***Wastewater Disposal***

Water that is salty or polluted by chemicals needs to be disposed of in a manner that prevents it from contaminating freshwater sources. Often, it is most economical to geologically sequester such wastewaters by injecting them underground, deep below any aquifers that provide drinking water.

Wastewater can result from a variety of processes related to energy production. For example, water is usually present in rock formations containing oil and gas and therefore will be co-produced during oil and gas production. Wastewater can also occur as flow back from hydraulic fracturing operations that involve injecting water under high pressure into a rock formation to stimulate the movement of oil and gas to a well for production.

Research showed when wastewater disposal takes place near faults, and underground conditions are right, earthquakes may be more likely to occur. Specifically, an earthquake can be triggered by the well-understood mechanism of raising the water pressure inside a fault. If the pressure increases enough, the fault may fail, releasing stored tectonic stress in the form of an earthquake. Even faults that have not moved in millions of years can be made to slip and cause an earthquake if conditions underground are right.

While the disposal process has the potential to trigger earthquakes, not every wastewater disposal well produces earthquakes. In fact, very few of the more than 30,000 wells designed for this purpose appear to cause earthquakes.

### ***Hydraulic Fracturing***

Many questions have been raised about whether hydraulic fracturing — commonly known as “fracking”— is responsible for the recent increase of earthquakes. USGS’s studies suggest that the actual hydraulic fracturing process is only very rarely the direct cause of felt earthquakes. While hydraulic fracturing works by making thousands of extremely small “micro earthquakes,” they are rarely felt and are too small to cause structural damage. As noted previously, wastewater associated with hydraulic fracturing has been linked to some, but not all, of the induced earthquakes.

As the use of injection for disposal of wastewater increases, the importance of knowing the associated risks also grows. To meet these challenges, the USGS hopes to increase research efforts to understand the cause and effect of injection-induced earthquakes.

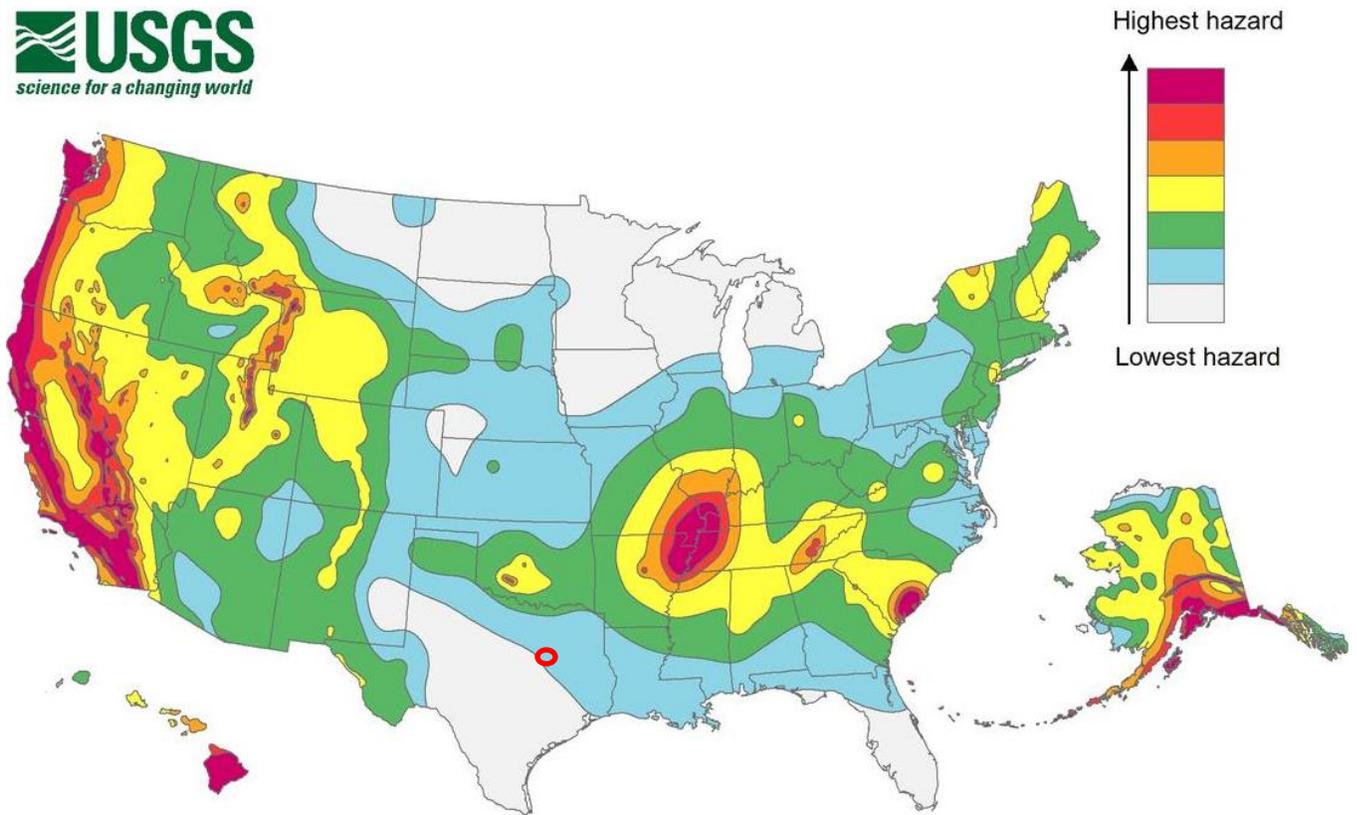


Figure 4-13 –2018 Long term National Seismic Hazard-Mesquite circled in red . (Source: USGS)

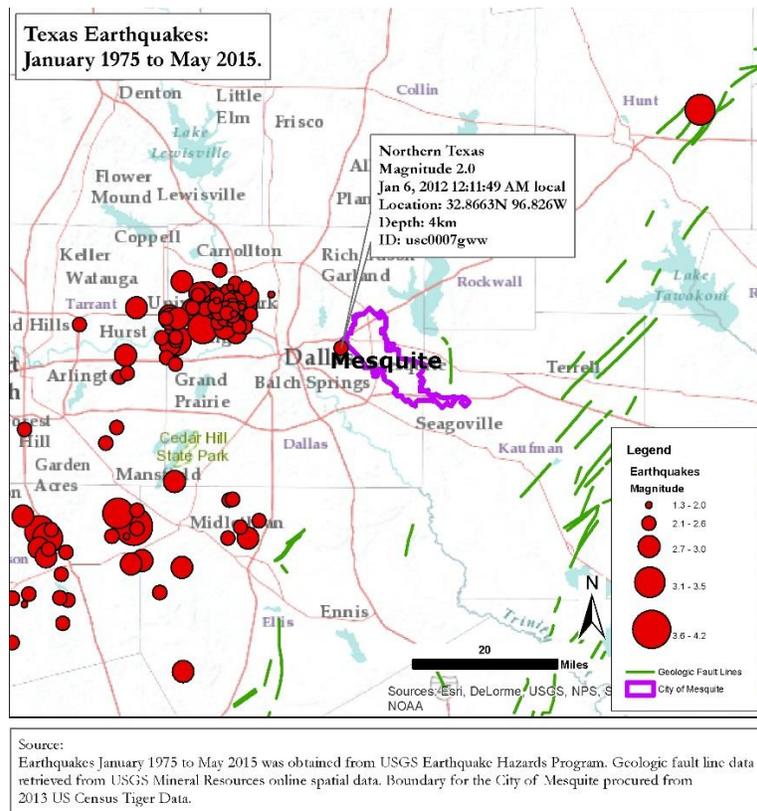


Figure 4-14 – Texas Earthquakes (Source: USGS)

### ***Vulnerability Assessment***

**Population**—The types and numbers of existing and future buildings that may be impacted by earthquakes within the City of Mesquite is not dictated by location, as much as it is by soundness and age of the structure. Earthquakes could have widespread impact across a community and any structure could be at risk. The most likely type of damage anticipated from such an event would be to foundations, walls, and ceilings.

**Critical Facilities and Essential Services**—Most critical facilities within the City of Mesquite were built to the International Building Code and therefore, not likely to be susceptible to damages from the type of earthquake anticipated on the in the Dallas / Fort Worth region.

**Transportation System and Lifeline Utility Systems**—Infrastructure may be impacted by earthquake damage. Bridges, including interstate overpasses, may be subject to damage from an earthquake. All bridges would have to be inspected for damages.

Sewer, water and gas lines are underground and might be susceptible to breaks. The City has mitigated much of the potential damaging breaks by installing shut off valves along major infrastructure lines.

Oncor Electric Delivery Company maintains many overhead and underground lines, as transmission and switching stations. Seismic activity can potentially damage this electrical infrastructure and / or cause equipment failure.

### Location and Extent

The USGS rates areas of the U.S. for susceptibility to earthquakes based on a 10% probability of a given peak being exceeded in a 50-year period. The City of Mesquite lies in an area of low seismic risk, with a peak acceleration of 1%, which according to the USGS is equivalent to the potential for light shaking with no damage. Figure 4.16 provides an overview of the entire United States and peak ground acceleration. As FEMA guidelines suggest, areas located within a region of 2% peak acceleration or less are at nominal risk; therefore, the Hazard Mitigation Committee considered earthquakes a low ranking hazard.

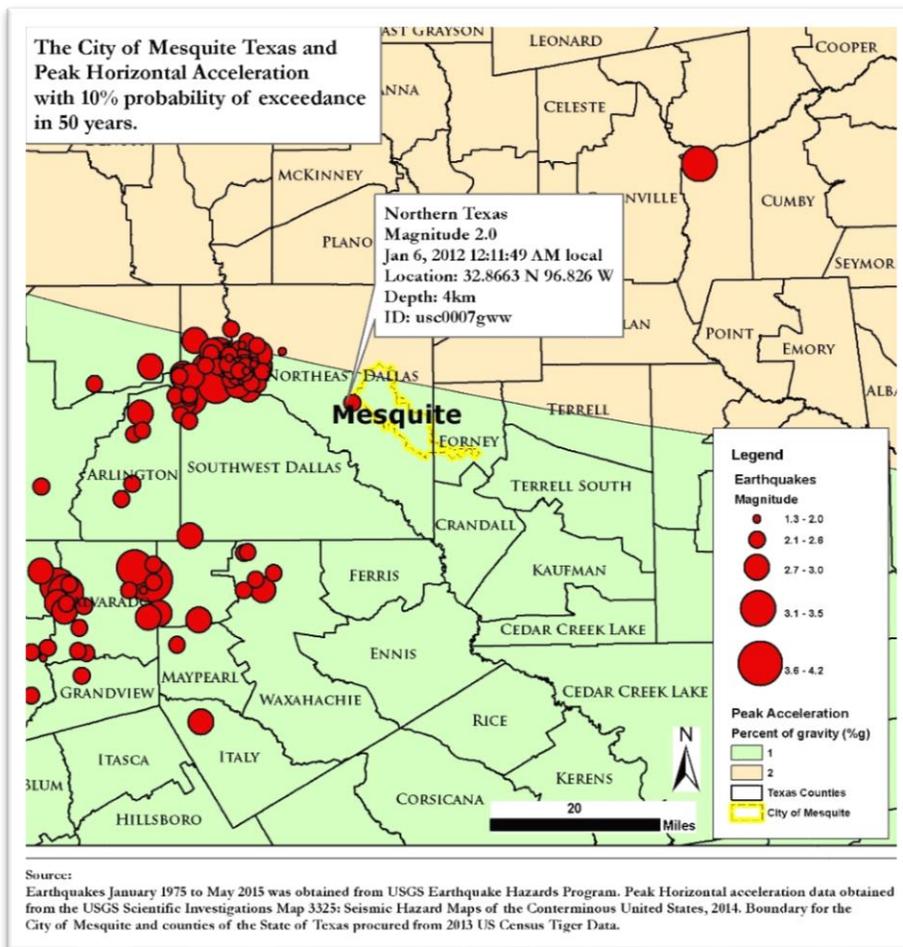


Figure 4-15 – Areas with 10% Probability of PE in 50 years (Source: USGS)

## Previous Occurrences

While earthquakes are not believed to pose a great threat to Mesquite, there is some history involving earthquakes within the Dallas / Fort Worth area. Although the number of earthquakes known to have centered within the State of Texas’ boundaries is small, the State was affected by numerous events located in neighboring states. The nearest occurrence to Mesquite was a 2.0 magnitude in January 2012 with no effected structures in the City.

In terms of magnitude and damage, the largest earthquake known to have occurred in Texas occurred in 1931, a magnitude 5.8. It is known as the Valentine earthquake because most of the severe damage was reported at Valentine. Most buildings except wood-frame houses were damaged severely and all brick chimneys toppled or were damaged there. Some walls collapsed in adobe buildings, and ceilings and damage to property was reported from widely scattered points in Brewster, Jeff Davis, Culberson, and Presidio Counties. According to the records of the USGS, Mesquite, being 553 miles northeast of Valentine, would have felt Mercalli magnitude 2.0-3.0 effects which would not have effected structures in the City.

## Probability of Future Occurrences

With the limited history of occurrences of earthquakes in the Dallas / Fort Worth area, over a two hundred year period, the occurrence rate is <1%, making the probability low.

|                                      |   |                          |
|--------------------------------------|---|--------------------------|
| <b>Hazard:</b>                       | <b>Earthquake</b>   |                          |
| <b>Potential Severity of Impact:</b> |   |                          |
| <b>Substantial</b>                   |   |                          |
|                                      | Multiple deaths   |                          |
|                                      | Complete shutdown of facilities for 30 days or more               |                          |
|                                      | More than 50% of property destroyed or with major damage          |                          |
| <b>Major</b>                         |   |                          |
|                                      | Injuries and/or illnesses result in permanent disability          |                          |
|                                      | Complete shutdown of critical facilities for at least 2 weeks     |                          |
|                                      | More than 25% of property destroyed or with major damage          |                          |
| <b>Minor</b>                         |   |                          |
|                                      | Injuries and/or illnesses do not result in permanent disability   |                          |
|                                      | Complete shutdown of critical facilities for at least 1 week      |                          |
|                                      | More than 10% of property destroyed or with major damage          |                          |
| <b>Limited</b>                       |   |                          |
| <b>X</b>                             | Injuries and/or illnesses are treatable with first aid            |                          |
|                                      | Minor quality of life lost  |                          |
|                                      | Shutdown of critical facilities and services for 24 hours or less |                          |
|                                      | Less than 10% of property destroyed or with major damage          |                          |
| <b>Frequency of Occurrence:</b>      |   | <b>Seasonal Pattern:</b> |
| Highly Likely:                       | Event probable in next year                                       | Not applicable           |
| Likely:                              | Event probable in next 3 years                                    |                          |

|   |                            |                                 |  |
|---|----------------------------|---------------------------------|--|
|   | Occasional:                | Event possible in next 5 years  |  |
| X   | Unlikely:                  | Event possible in next 10 years |  |
| <b>Source Documents, Studies, Maps, Etc. Researched:</b>                    |                            |                                 |  |
| United States Geological Service (USGS)                                     |                            |                                 |  |
| <b>Probable Duration:</b>   |                            |                                 |  |
| Seconds with potential aftershocks.   |                            |                                 |  |
| <b>Warning Time (Potential Speed of Onset):</b>                             |                            |                                 |  |
| X   | Minimal (or no) warning    |                                 |  |
|   | 3 to 6 hours warning       |                                 |  |
|   | 6 to 12 hours warning      |                                 |  |
|   | More than 12 hours warning |                                 |  |
| <b>Cascading Potential:</b>   |                            |                                 |  |
| Infrastructure damage, damage to property, injuries, disruption of services |                            |                                 |  |
| <b>Existing Warning Systems:</b>  |                            |                                 |  |
| None. Rapid onset.  |                            |                                 |  |

Table 4-34 - City of Mesquite Hazard Mitigation Committee Earthquake Hazard Ranking

#### 4.2.8 Wildfire

##### **Hazard Description**

A wildfire is any fire that burns uncontrollably in a natural setting (such as grasslands, forest, and brush land). Prescribed burnings are the only exception to a wildfire, which can be either man-made or natural.

Prescribed burning, also known as a controlled burning, is the deliberate use of fire under specified and controlled conditions. Prescribed burning is used by forest management professionals and individual landowners to accomplish one or more of the following tasks:

**Fuel Reduction** – The reduction of accumulated grass, weeds, pine needles, and hardwood leaves. This type of vegetation can encourage wildfires in young stands and hinder regeneration of older stands.

**Hardwood Control** – Prevents hardwood trees from competing with pines for nutrients and moisture; impeding visibility and access through the stands; and interfering with natural regeneration in areas better suited for growing pines.

Wildfires are very common in many places around the world. Fires are particularly prevalent in summer, autumn and during droughts when fallen branches, leaves, grasses and scrub can dry out and become highly flammable. Some experts believe global warming is increasing the intensity and frequency of droughts in many areas, thus creating more intense and frequent wildfires.

Wildfires tend to be most common and severe during years of drought and occur on days of strong winds. With extensive urbanization of wildlands, these fires often involve destruction of suburban homes located in the wildland urban interface, a zone of transition between developed areas and undeveloped wildland.

On occasion, wildfires have caused large-scale damage to private or public property, destroying many homes and causing deaths, particularly when they have reached urban fringe communities. Wildfires are extremely dangerous, and have been deliberately lit in some instances.

It is important to note what constitutes an urban fire and how that affects mitigation planning for the City of Mesquite. Urban fires may be created by electrically related structural and vehicle fires, incendiary arson, unattended cooking fires, smoking materials, heating devices, fuel systems, sparks, hazardous material spills, and spontaneous combustion.

Table 4-35 demonstrates the Fire Danger Rating System, from the U.S. Forest Service’s Wildland Fire Assessment System.

| Fire Danger Rating and Color Code |                     | Description   |
|-----------------------------------|---------------------|---|
| Low (L)                           | Dark Green          | Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires in duff or punky wood. Fires in open cured grasslands may burn freely a few hours after rain, but woods fires spread slowly by creeping or smoldering, and burn in irregular fingers. There is little danger of spotting.   |
| Moderate (M)                      | Light Green or Blue | Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot. Short-distance spotting may occur, but is not persistent. Fires are not likely to become serious and control is relatively easy. |
| High (H)                          | Yellow              | All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High-intensity burning may develop on slopes or in concentrations of fine fuels. Fires may become serious and their control difficult unless attacked successfully while small.  |

|                |        |   |
|----------------|--------|---|
| Very High (VH) | Orange | Fires start easily from all causes and, immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high intensity characteristics, such as long-distance spotting and fire whirlwinds when they burn into heavier fuels.  |
| Extreme (E)    | Red    | Fires start quickly, spread furiously, and burn intensely. All fires are potentially serious. Development into high intensity burning will usually be faster and occur from smaller fires than in the very high fire danger class. Direct attack is rarely possible and may be dangerous except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions, the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens. |

*Table 4-35 – Fire Danger Rating System (Source: US Forest Service, Wildfire Assessment Service)*

Fire managers in the south also use the Keetch-Byram Drought Index (KBDI) a mathematical system for relating current and recent weather conditions to potential or expected fire behavior. This system, originally developed for the southeastern United States, is based primarily on recent rainfall patterns and was specifically developed to equate the effects of drought with potential fire activities.

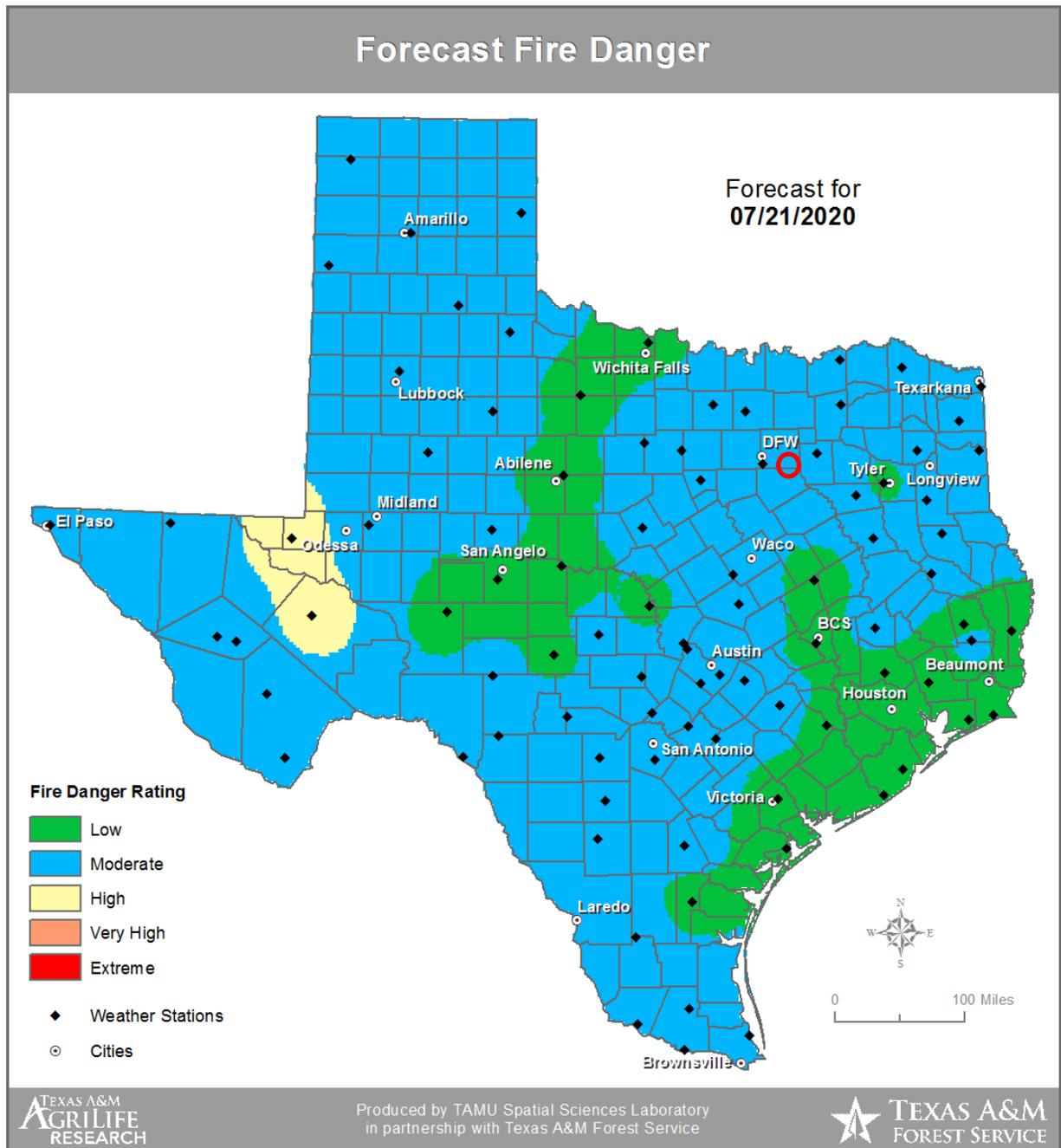
The KBDI attempts to measure the amount of precipitation needed to bring the top eight inches of soil back to saturation. A value of zero represents complete soil saturation or no moisture deficiency. A value of 800 means it would take eight inches of precipitation to fully saturate the soil. Eight hundred is the maximum drought that is possible. At any point along the scale, the KBDI number indicates the amount of precipitation it would take to bring the moisture level back to zero.

High KBDI values indicate that conditions are favorable for the occurrence and spread of wildfires. The following shows how KBDI and expected fire potential relate.

- **KBDI = 0 – 200:** Soil and fuel moisture is high. Most fuels will not contribute much to wildfire intensity. This is often seen in spring after winter precipitation.
- **KBDI = 200 – 400:** Fuels are beginning to dry and contribute to wildfire intensity. Heavier fuels will still not readily ignite and burn. This is often seen in late spring.
- **KBDI = 400 – 600:** Wildfire intensity begins to increase significantly. Wildfires will readily burn and larger fuels could burn or smolder for several days. This is often seen in late summer and early fall.

- **KBDI = 600 – 800:** Wildfires will show extreme intensity. Deep-burning, intense wildfires with significant spotting can be expected. This is often associated with severe drought.

Figure 4.18, with Mesquite circled in red, provides data on observed fire dangers as reported through various weather stations. For the time period reflected in the Figure, a majority of Texas is in a moderate danger class that includes the City of Mesquite planning area.



**Figure 4-18 – Keetch-Byram Forecasted Fire Danger Class, State of Texas, July 21, 2020-Mesquite identified with red circle (Source: Texas Engineering Extension Service)**

### Location and Extent

While there are no large open spaces or preserves within the City of Mesquite that could contribute to wildfire threat within the city, there are smaller localized agricultural and undeveloped lands on the city’s outskirts where wildfires could become established, threatening structures and infrastructure within the city.

The eastern part of Mesquite backs up to the Trinity River Basin which, if it gets dry enough, could pose a serious wildfire risk with the Falcons Lair and Hillside at Falcons Lair Subdivisions being the most vulnerable. There are also some grassy expanses that could pose problems, but none are more than 1,000 acres in size and appear to be maintained to prevent overgrowth that could produce wildfires.

The City of Mesquite supports a fully paid professional firefighting staff, with seven fire stations strategically located throughout the city providing services.

### Previous Occurrences

Data provided in Table 4-36 was obtained from the NCDL for Dallas and Kaufman Counties (Mesquite is located in both counties).

| Dallas County |       |        |                 |   |
|---------------|-------|--------|-----------------|---|
| Date          | Death | Injury | Property Damage | Event Narrative   |
| 6/18/2011     | 0     | 0      | 0               | A 230-acre blaze burned from approximately Waxahachie in Ellis County to DeSoto in Dallas County. In Ellis County, a home and 5 vehicles were destroyed and 12 other homes were damaged.  |
| 8/16/2011     | 0     | 0      | \$300,000       | A grass fire damaged a group of vacant manufactured homes off Jimmy Lane in Combine. One home was destroyed and five others were badly damaged. Only one of the homes was occupied at the time. A few vehicles and some sheds were also burned in the fire.     |
| 2/08/2016     | 0     | 0      | \$65,000        | A fire began in the 15000 block of Budeudy, in unincorporated Dallas County. The fire began at the location of two mobile homes, and quickly spread to consume approximately ten acres. In addition to two mobile homes, one storage shed was impacted as well. |

| Kaufman County |       |        |                 |  |
|----------------|-------|--------|-----------------|--|
| Date           | Death | Injury | Property Damage | Event Narrative  |
| 8/5/2011       | 0     | 0      | \$150,000       | A small 5-acre fire in the 7800 block of Silverado Loop in Kaufman burned a home.  |
| 9/4/2011       | 0     | 0      | \$75,000        | A 440-acre fire at FM 148 and CR 2613 near Lively destroyed one home.  |
| 9/6/2011       | 1     | 2      | \$100,000       | A small grass fire on the 1300 block of Travis Lane in the city of Kaufman killed an elderly man. The grass fire spread to a nearby mobile home, engulfing the home in flames. Two other family members at the residence were injured. |

*Table 4-36 – Wildfires for Dallas and Kaufman County, Texas – January 1996 – July 2020 (Source, National Climatic Data Center)*

Figure 4-19 depicts where humans and their structures meet or intermix with wildland fuels in the City of Mesquite planning area.

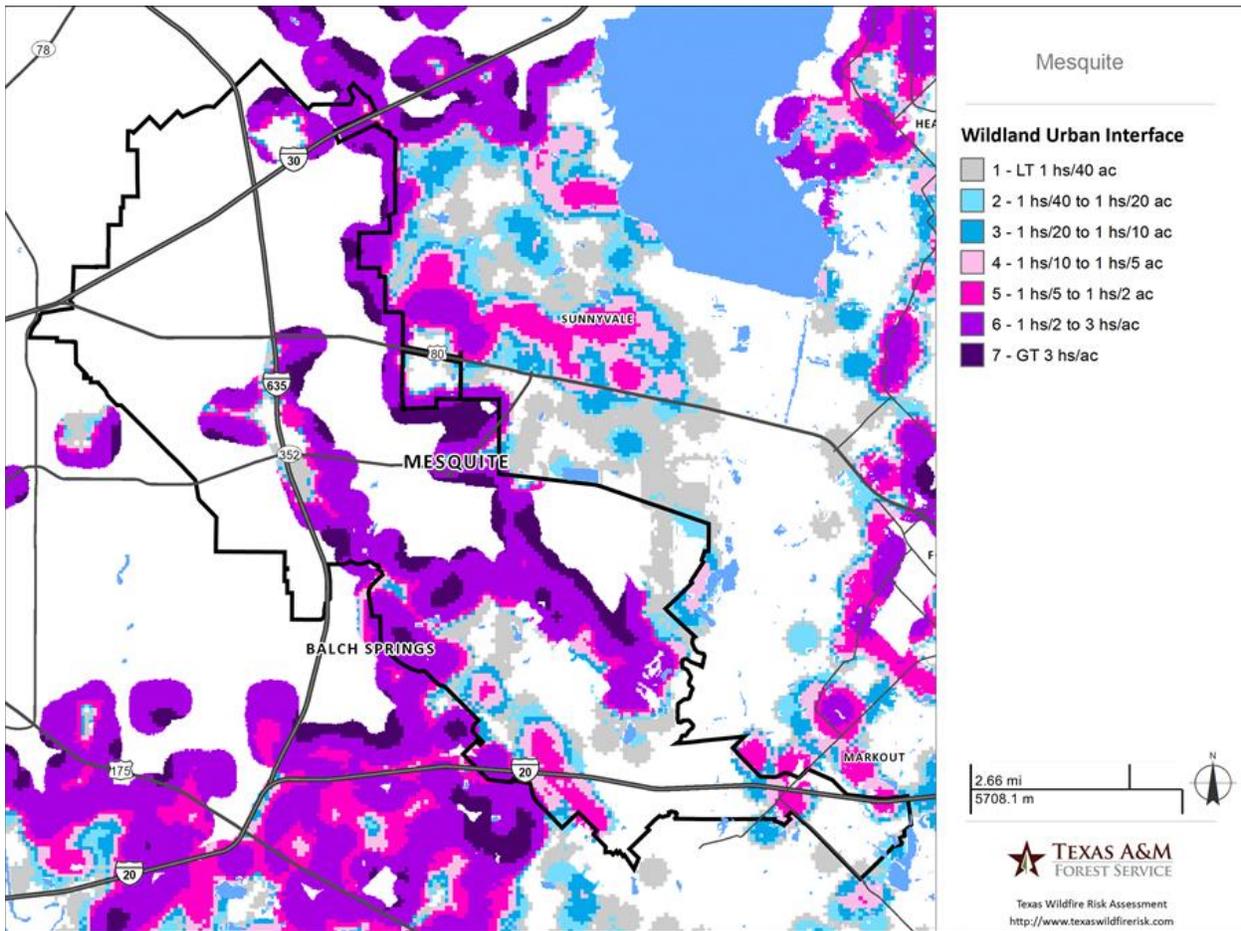


Figure 4-19 – Wildland Urban Interface for City of Mesquite, Texas, Texas Wildfire Risk Assessment 2020 (Source: Texas A&M Forest Service)

**Probability of Future Occurrences**

Based on the best available data provided by the NCDC, the probability of man-made fires remains high due to undeveloped areas and a transportation system that can be impacted by unforeseen fires. Natural events, such as tornado and high-wind events will continue to generate debris but the impacts can vary from light to heavy depending on the size of the storm.

The Mesquite Fire Department enforces a burn ban, thereby reducing the potential of wildfire within the city.

**Vulnerability Assessment**

Population: Areas on the perimeter of the city located close to forested areas are most vulnerable for wildfires. Should wildfires become established in forested areas, they could threaten structures and infrastructure within the city.

**Critical Facilities:** One fire station is located within this area, but not located within an area immediately adjacent to the city/county corporate limit and, therefore, not likely to be subject to damages from wildfire.

**Essential Services:** Interruption of essential services, such as power, phones and public roadways, can disrupt dispatch and other emergency services. Electric power facilities, communication facilities, and municipal buildings, including fire stations, have the potential of being damaged or affected by wildfires. No major treatment facilities for sewer or water are located within this area.

**Transportation Systems:** Wildfires may affect major transportation routes. Smoke from wildfires can cause unsafe driving conditions and may damage roadways if the fire crosses it.

**Lifeline Utility Systems:** The most likely lifeline utility system to be impacted by a wildfire would be the electric power utility system.

|                                      |   |                                 |  |
|--------------------------------------|---|---------------------------------|--|
| <b>Hazard:</b>                       | <b>Wildfire</b>   |                                 |  |
| <b>Potential Severity of Impact:</b> |   |                                 |  |
| <b>Substantial</b>                   |   |                                 |  |
|                                      | Multiple deaths   |                                 |  |
|                                      | Complete shutdown of facilities for 30 days or more               |                                 |  |
|                                      | More than 50% of property destroyed or with major damage          |                                 |  |
| <b>Major</b>                         |   |                                 |  |
|                                      | Injuries and/or illnesses result in permanent disability          |                                 |  |
|                                      | Complete shutdown of critical facilities for at least 2 weeks     |                                 |  |
|                                      | More than 25% of property destroyed or with major damage          |                                 |  |
| <b>Minor</b>                         |   |                                 |  |
|                                      | Injuries and/or illnesses do not result in permanent disability   |                                 |  |
|                                      | Complete shutdown of critical facilities for at least 1 week      |                                 |  |
|                                      | More than 10% of property destroyed or with major damage          |                                 |  |
| <b>Limited</b>                       |   |                                 |  |
| <b>X</b>                             | Injuries and/or illnesses are treatable with first aid            |                                 |  |
|                                      | Minor quality of life lost  |                                 |  |
|                                      | Shutdown of critical facilities and services for 24 hours or less |                                 |  |
|                                      | Less than 10% of property destroyed or with major damage          |                                 |  |
| <b>Frequency of Occurrence:</b>      |   | <b>Seasonal Pattern:</b>        |  |
| X                                    | Highly Likely:  | Event probable in next year     | Not applicable. Can occur throughout the year. |
|                                      | Likely:   | Event probable in next 3 years  |  |
|                                      | Occasional:   | Event possible in next 5 years  |  |
|                                      | Unlikely:   | Event possible in next 10 years |  |

|   |                            |
|---|----------------------------|
| <b>Source Documents, Studies, Maps, Etc. Researched:</b>                              |                            |
| NCDC, Texas A&M Fire Service, US Fire Service, Texas Division of Emergency Management |                            |
| <b>Probable Duration:</b>   |                            |
| Typically an hour or more   |                            |
| <b>Warning Time (Potential Speed of Onset):</b>                                       |                            |
| X   | Minimal (or no) warning    |
|   | 3 to 6 hours warning       |
|   | 6 to 12 hours warning      |
|   | More than 12 hours warning |
| <b>Cascading Potential:</b>   |                            |
| Property destruction, injuries, possible fatalities                                   |                            |
| <b>Existing Warning Systems:</b>  |                            |
| Television and Radio outlets, Social Media  |                            |

Table 4-37 - City of Mesquite Hazard Mitigation Committee Wildfire Hazard Ranking

#### 4.2.9 Technological Hazards

##### ***Transportation-Related Hazardous Material Incidents***

##### **Hazard Description**

The location of the transportation hazard is best described as proximity to transportation corridors, be it railways or highways. For this plan, the proximity used for analysis purposes was a half-mile buffer zone around major transportation corridors. An analysis of all modes of transportation revealed rail and roadway transportation modes pose risks to the health, safety and welfare of citizens, as well as visitors or those traveling to and through the City of Mesquite. The level of risk and impact of hazards vary depending on conditions, such as location, time and size of the incident, direction of wind, and other factors. Hazardous materials related events seem to be more of a human-life issue than a property-damage issue, although some incidents could result in significant property damage.

Due to the large number and wide variety of hazardous material transportation corridors in the community, it is difficult to identify areas and populations vulnerable to the hazard. There are simply too many determinant factors of vulnerability. Major corridors with vehicles transporting hazardous materials include Interstate 635, Interstate 20, Interstate 30, and US Highway 80.

Union Pacific Railroad has one main rail line that runs through the City of Mesquite. The intermodal and auto load facility is located at 4100 Forney Rd, and runs from east to west through the City of Mesquite. Union Pacific Railroad transports, among other things, large volumes of toxic chemicals and hazardous materials.

### ***Assessing Vulnerabilities***

Location, magnitude, type of problem, wind velocity and direction, and weather conditions vary with each incident, thus making an assessment of vulnerability difficult at best. For identification purposes, the rail line and roadway impacts are discussed in general terms.

In the case of an accident on the Union Pacific Railroad, population and areas within a half mile on either side of the railroad are most vulnerable to hazardous materials. The number of cars involved in the accident, volume and type of materials carried, wind direction and velocity, and atmospheric conditions will dictate with more specificity vulnerable areas and the resultant need for evacuation or other actions.

Heavy trucks carrying hazardous chemicals on Interstate 635, Interstate 20, Interstate 30, and US Highway 80 pose the greatest risk to areas and populations within a half mile of the highway system. Variables, such as atmospheric conditions, wind direction and velocity, and type of chemical, will dictate with more specificity, vulnerable areas and populations

### ***Previous Occurrences***

According to the National Transportation Safety Board, there were no major reported hazardous materials incidents along the transportation corridors in the City of Mesquite. There have been many smaller incidents (i.e., fuels spill resulting from traffic accident, etc.).

### ***Probability of Future Occurrences***

Despite the lack of previous occurrences of major hazardous materials incidents along major transportation corridors within the City of Mesquite, the probability of an event is occasional due to the high volume of traffic along these corridors.

### ***Fixed-Site Hazardous Material Spill Incidents***

#### ***Hazard Description***

The City of Mesquite has a number of businesses that involve hazardous materials. For planning purposes, a general identification (not a comprehensive list) of these facilities is provided in Tables 4-38 to 4-40. Figure 4.21, below, provides a general location of the facilities that are deemed to have hazardous materials and extremely hazardous substances (EHS).

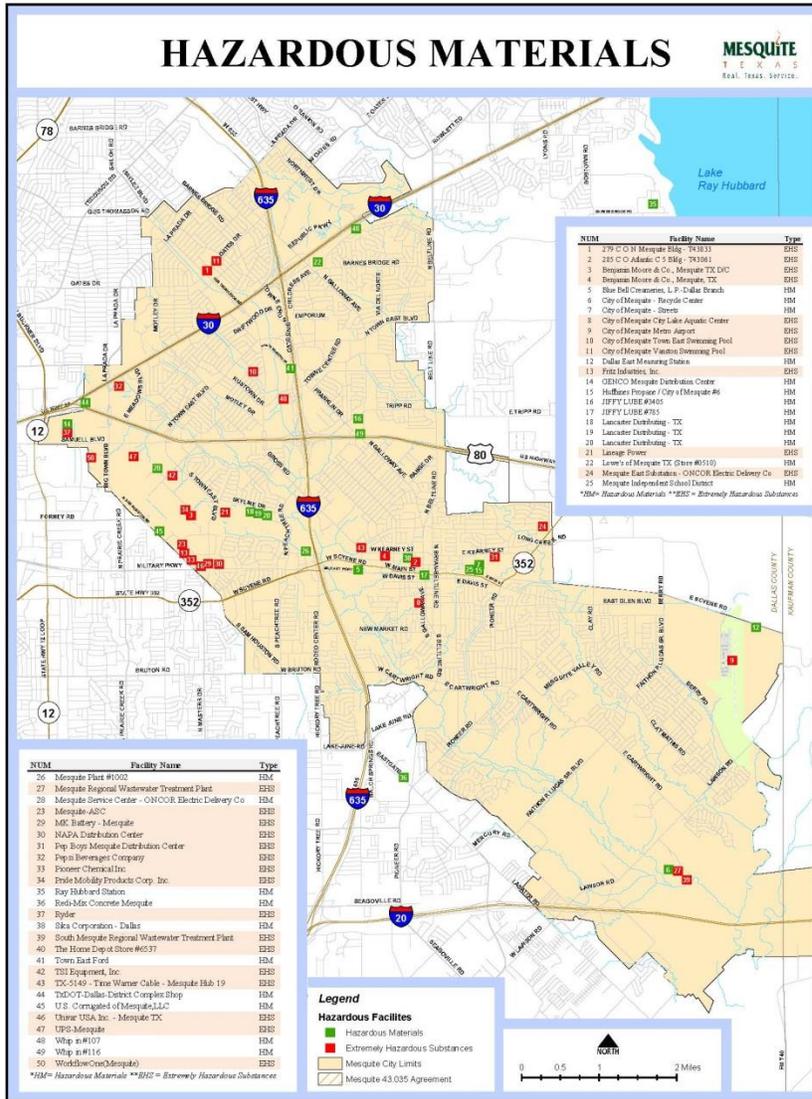


Figure 4-21 – City of Mesquite Hazardous Materials Facilities

| City of Mesquite Tier II Facilities |                        |                              |
|-------------------------------------|------------------------|------------------------------|
| Facility Name                       | Address                | # of Employees (if provided) |
| 279 CON Mesquite Bldg – T43033      | 2943 Oates Dr          | 7                            |
| 285 CO Atlantic                     | 321 West Kimbrough St. | 6                            |

## Chapter 4 – Hazard Identification and Risk Analysis

|   |                            |     |
|---|----------------------------|-----|
| Benjamin Moore & Co., Mesquite TX D/C                         | 1100 Chase Road Suite 300  |     |
| Benjamin Moore & Co., Mesquite, TX                            | 700 West Kearney           |     |
| Blue Bell Creameries, L.P.-Dallas Branch                      | 1123 Military Parkway      |     |
| City of Mesquite - Recycle Center                             | 3500 E Lawson Rd           |     |
| City of Mesquite - Street                                     | 1101 E Main St             |     |
| City of Mesquite City Lake Aquatic Center                     | 200 Parkview               | 12  |
| City of Mesquite Metro Airport                                | 1340 Airport Blvd          | 9   |
| City of Mesquite Town East Swimming Pool                      | 2525 John Glenn            | 12  |
| City of Mesquite Vanston Swimming Pool                        | 2913 Oates Dr              | 12  |
| Dallas East Measuring Station                                 | 4700 Scyene Road           |     |
| Fritz Industries, Inc.  | 500 N. Sam Houston Rd.     |     |
| Huffhines Propane / City of Mesquite #6                       | 1101 E. Main Street        |     |
| JiffyLube #785  | 110 S Galloway Ave         | 7   |
| KapStone Container Corporation                                | 700 North Sam Houston Road | 130 |
| Lawson Road Substation – Oncor Electric Delivery Co.          | 4595 Lawson Rd             |     |
| Lowe's of Mesquite TX (#510)                                  | 4444 N. Galloway Ave       |     |
| Mesquite East Substation – Oncor Electric Delivery Co.        | 801 HWY 352                |     |
| Mesquite Independent School District                          | 801 E. Main St.            | 95  |
| Mesquite Plant #1002  | 1719 Scyene Rd.            |     |
| Mesquite Regional Wastewater Treatment Plant                  | 3500 Lawson Road           |     |
| Mesquite Service Center – Oncor Electric Delivery Service Co. | 1545 High Point Drive      |     |
| Mesquite - ASC  | 3500 Executive Blvd        | 24  |
| MK Battery - Mesquite (closed)                                | 3201 Military Pkwy #A100   | 2   |
| MK Battery - Mesquite (current)                               | 2200 Big Town Blvd #170    | 2   |
| Pep Boys Mesquite Distribution Center                         | 1130 East Kearney Street   | 64  |
| Pepsi Beverages Company                                       | 4532 IH 30E                | 510 |
| Pride Mobility Products                                       | 100 Chase Rd Ste#400       | 11  |
| Ray Hubbard Station   | 555 Barnes Bridge Road     |     |

|   |                            |     |
|---|----------------------------|-----|
| Redi-Mix Concrete Mesquite                    | 12909 Eastgate Drive       | 15  |
| Ryder   | 5151 Samuell               | 32  |
| Sika Corporation - Dallas                     | 315 North Ebrite St        | 12  |
| The Home Depot Store #6537                    | 18855 I-635                |     |
| Town East Ford                                | 18411 LBJ Freeway          |     |
| TSI Equipment Inc.                            | 3900 Forney Road           | 85  |
| TX-5149 - Time Warner Cable - Mesquite Hub 19 | 300 Gross Road             |     |
| TxDOT-Dallas-District Complex Shop            | 4777 East Hwy 80           |     |
| Unifirst corporation                          | 200 North Sam Houston Road | 150 |
| Union Pacific Railroad - Mesquite Intermodal  | 9211 Forney Road           | 15  |
| Univar USA Inc. - Mesquite TX                 | 100 North Sam Houston      | 31  |
| UPS-Mesquite                                  | 4200 Samuell Blvd          |     |
| Whip in #107                                  | 1140 IH 30                 | 8   |
| Whip in #116                                  | 1101 E. Hwy 80             | 4   |
| WorkflowOne(Mesquite)                         | 4808 Eastover Circle       | 22  |

**Table 4-38 – City of Mesquite Dealers and Manufacturers of Chemicals**

The U.S. EPA has a publicly accessible Toxic Release Inventory (TRI) database containing information on disposal and other releases of over 650 toxic chemicals from more than 20,000 U.S. industrial facilities.

The goal of TRI is to provide communities with information about toxic chemical releases, waste management activities, and support informed decision-making by industry, government, non-government organizations and the public.

TRI provides the following:

- TRI covers an important subset of toxic chemicals managed at U.S. facilities, but TRI does not cover all chemicals or facilities.
- TRI data reflects annual emissions and does not indicate the frequency or duration of the emissions.
- Quantities reported by TRI facilities reflect chemicals released into the air and water, and chemicals managed through recycling, energy recovery, treatment and disposal.
- The level of toxicity varies among the chemicals on the TRI list.

- TRI does not include information about public exposure to chemicals.
- TRI facility operations and releases are regulated under other EPA programs with requirements designed to limit human and environmental harm.

| City of Mesquite EPA Toxic Release Inventory (TRI) Facilities |  |
|---|--|
| Benjamin Moore & Co (Kearney Rd)                              | Jumpking / ICON – Texas (S Town East Blvd)       |
| Foamex LP (Innovative Way)                                    | Pepsi Bottling Group (interstate 30)             |
| Fritz Chemical Co (Executive Blvd)                            | Senox Group (S Town East Blvd)                   |
| Fritz Industries (N Sam Houston Rd)                           | Tyco Electronics Power Systems Inc. (Skyline Dr) |
| Fritztile LLC (US Hwy 80 East)                                | Univar USA Inc., Mesquite (N Sam Houston Rd)     |
| HB Fuller Co (Executive Blvd)                                 |  |

Table 4-39 – City of Mesquite Toxic Release Inventory Facilities (Source: Environmental Protection Agency)

| Other Facilities that Could Contain Hazardous Materials |                                      |                          |
|---|--------------------------------------|--------------------------|
| Gas stations  | Hospitals/medical supply             | Dry cleaners             |
| Automobile dealers/repair and body shops                | Heavy equipment dealers/repair shops | Building supply centers  |
| Print shops   | Commercial laundry services          | Food/beverage facilities |
| Aviation facilities                                     | Machine/welding facilities           | Trucking facilities      |

Table 4-40 – General Facility Categories that Could Contain Hazardous Materials

### Past Occurrences

Within the last five years, there have been four facilities with Formal Enforcement Actions by the EPA. Over the last three years, there have been two facilities with violations documented by the EPA. The following Table shows the number of releases from TRI facilities in the City of Mesquite.

|  | 2016 | 2017 | 2018 | 2019 | 2020 |
|--|------|------|------|------|------|
| No. of TRI Facilities with Releases  | 1    | 2    | 1    | 0    | 0    |
| <b>Source:</b> <a href="https://echo.epa.gov/facilities/enforcement-case-search/results">https://echo.epa.gov/facilities/enforcement-case-search/results</a> |      |      |      |      |      |

Table 4-41 – Summary of Toxic Release Information for Mesquite – 2016-2020 (Source: US Environmental Protection Agency)

### Probability of Future Occurrences

Based upon past occurrences, it is anticipated there will be hazardous materials releases in the City of Mesquite each year.

### Vulnerability Assessment

Population: Persons with property located within a half-mile buffer of a hazardous material incident are most vulnerable to exposure. First responders are also at risk while containing the spill; however, personal protective equipment (PPE) and other safety measures are required to prevent exposure (time, distance, and shielding).

Critical Facilities: Critical facilities and infrastructure within a half-mile buffer are likely to be affected by a hazardous material incident. Equipment used for containment of the spill could be impacted but safety protocols are followed to reduce/eliminate unnecessary accidents.

Transportation Systems: Information on effects of Hazardous Materials releases due to traffic accidents (roadway and rail) is mentioned above.

Lifeline Utility Systems: Lifeline Utility Systems may be affected by hazardous materials spill and include the City's storm water systems, wastewater system or water systems. The City's storm water system may be contaminated by materials from the spill in the immediate aftermath of the spill. Leakage could be transported to the storm sewer system or the city's wastewater system until responders are able to contain the spill.

Estimates of potential losses caused by hazardous spills are very difficult to determine due to the many variables that exist with hazardous materials incidents (weather, wind direction, type of chemical released, etc.)

### 4.2.10 Extreme Heat

#### ***Hazard Description***

In Mesquite daily high temperatures can rise to 100 degrees, and a persistent pattern of high temperatures can last for several weeks. Humid conditions related to high dew point temperatures, which add to the discomfort of high temperatures, often occur when a "dome" of high atmospheric pressure moves into the region.

#### ***Location and Extent***

Because extreme heat is a hazard that can manifest itself regionally the entire area is subject to extreme heat events.

#### ***Previous Occurrences***

The NOAA captures Extreme heat data by county for conditions of 100 degrees and higher. Tables 4-22 and 4-23 show previous occurrences of extreme heat in Dallas and Kaufman County (City of Mesquite is located in both counties) in conjunction with injuries or deaths. Upon review

of these records it is apparent that high temperatures are a common occurrence in the area primarily during the summer months.

| Date         | Total Duration in days | Deaths    | Injuries   |
|--------------|------------------------|-----------|------------|
| 8/13/2007    | 1                      | 1         | 0          |
| 7/23/2008    | 6                      | 1         | 0          |
| 7/28/2008    | 5                      | 2         | 0          |
| 8/1/2008     | 12                     | 4         | 0          |
| 8/1/2011     | 27                     | 4         | 130        |
| 7/20/2012    | 1                      | 1         | 0          |
| 5/17/2013    | 1                      | 1         | 0          |
| 7/18/2015    | 1                      | 1         | 0          |
| 6/20/2019    | 2                      | 2         | 0          |
| <b>Total</b> |                        | <b>17</b> | <b>130</b> |

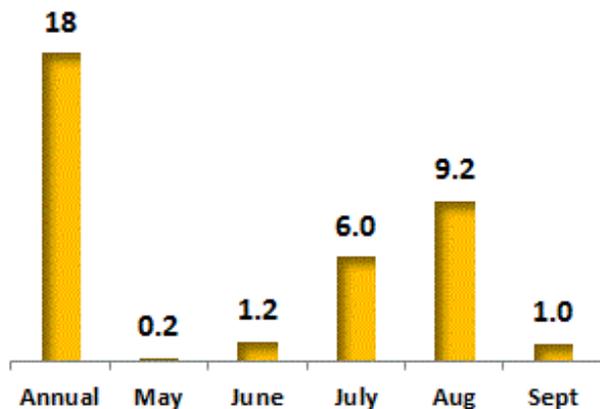
Table 4-42 – Dallas County Excessive heat 1996-2020 (Source: NOAA)

| Date         | Total Duration in days | Deaths   | Injuries |
|--------------|------------------------|----------|----------|
| 8/12/2007    | 1                      | 0        | 5        |
| 8/1/2011     | 27                     | 3        | 0        |
| 6/20/2019    | 2                      | 0        | 0        |
| <b>Total</b> |                        | <b>3</b> | <b>5</b> |

Table 4-43 – Kaufman County Excessive Heat 1996-2020 (Source: NOAA)

## 100° Day Summary for Dallas/Fort Worth

### Average Number of 100° Days (1981-2010):



### First and Last Occurrences (1899-2019):

- Average date of first 100°F: July 1
- Average date of last 100°F: August 26
- Earliest occurrence: Mar 9, 1911 (100°F)
- Latest occurrence: Oct 3, 1951 (106°F)
- Earliest last occurrence: May 30, 1928 (101°F)
- Latest first occurrence: Aug 23, 1989 (101°F)

(March, April, and October have had 100° days, but the average is near zero.)

**Most and Fewest:**

- Most in a calendar year: 71 (2011)
- Fewest in a calendar year: 0 (1973, 1906)
- Most consecutive: 42 (Jun 23 - Aug 3, 1980)
- Most in a month: 31 (Jul 1980)
- Greatest number of months in a year with at least one occurrence: 5
  - 2006 - April, June, July, August, September
  - 1998 - May, June, July, August, September
  - 1925 - April, June, July, August, September
  - 1911 - March, May, June, July, August
- Only month to record both 100°F and 32°F: Mar 1916 (25°F on the 3rd and 100°F on the 21st)

**Probability of Future Occurrences**

High summer temperatures will continue to occur annually in the City of Mesquite. Those high temperatures along with high humidity produce extreme heat.

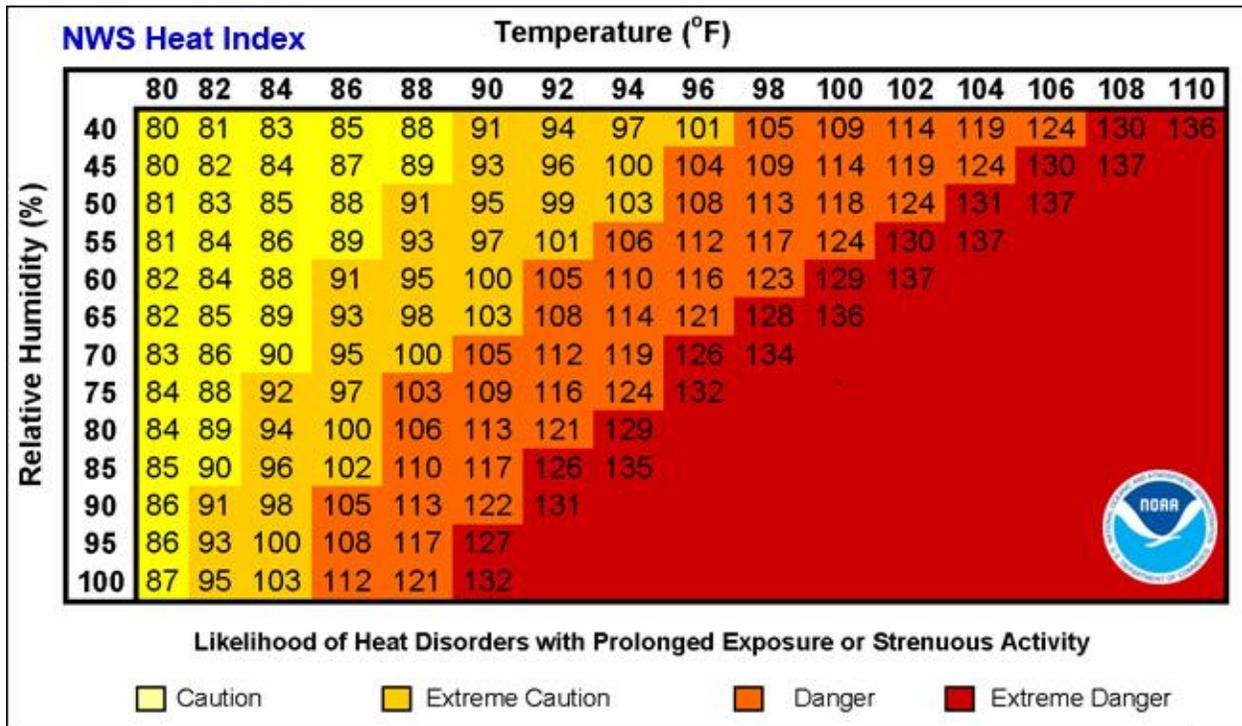


Figure 4-23 – Heat Index (Source: NOAA)

## Vulnerability Assessment

**Population:** Extreme heat can occur anytime from April through October, though the summer months tend to be peak season for high temperatures. The elderly, very young and those with poor health are the most at risk. People who work outside and people who live or work in un-air-conditioned buildings are also at risk.

**Critical Facilities:** Critical facilities are not likely to be affected by extreme heat.

**Essential Service:** Prolonged periods of excessive heat can increase the load on the power grid.

**Transportation System:** Extreme heat does not have a direct impact on the transportation system.

**Lifeline Utility Systems:** Extreme heat has the potential of affecting the supply of electricity. When demand is high the electrical grid can become stressed.

|  |                |   |                          |
|--|----------------|---|--------------------------|
| <b>Hazard:</b>   |                | <b>Extreme Heat</b>   |                          |
| <b>Potential Severity of Impact:</b>                                       |                |   |                          |
| <b>Substantial</b>   |                |   |                          |
|  |                | Multiple deaths   |                          |
|  |                | Complete shutdown of facilities for 30 days or more               |                          |
|  |                | More than 50% of property destroyed or with major damage          |                          |
| <b>Major</b>   |                |   |                          |
|  |                | Injuries and/or illnesses result in permanent disability          |                          |
|  |                | Complete shutdown of critical facilities for at least 2 weeks     |                          |
|  |                | More than 25% of property destroyed or with major damage          |                          |
| <b>Minor</b>   |                |   |                          |
|  |                | Injuries and/or illnesses do not result in permanent disability   |                          |
|  |                | Complete shutdown of critical facilities for at least 1 week      |                          |
|  |                | More than 10% of property destroyed or with major damage          |                          |
| <b>Limited</b>   |                |   |                          |
| <b>X</b>   |                | Injuries and/or illnesses are treatable with first aid            |                          |
|  |                | Minor quality of life lost  |                          |
|  |                | Shutdown of critical facilities and services for 24 hours or less |                          |
|  |                | Less than 10% of property destroyed or with major damage          |                          |
| <b>Frequency of Occurrence:</b>  |                |   | <b>Seasonal Pattern:</b> |
| X  | Highly Likely: | Event probable in next year                                       |                          |
|  | Likely:        | Event probable in next 3 years                                    |                          |
|  | Occasional:    | Event possible in next 5 years                                    |                          |
|  | Unlikely:      | Event possible in next 10 years                                   |                          |
| Can happen throughout much of the year with peak occurrences in the summer |                |   |                          |
| <b>Source Documents, Studies, Maps, Etc. Researched:</b>                   |                |   |                          |

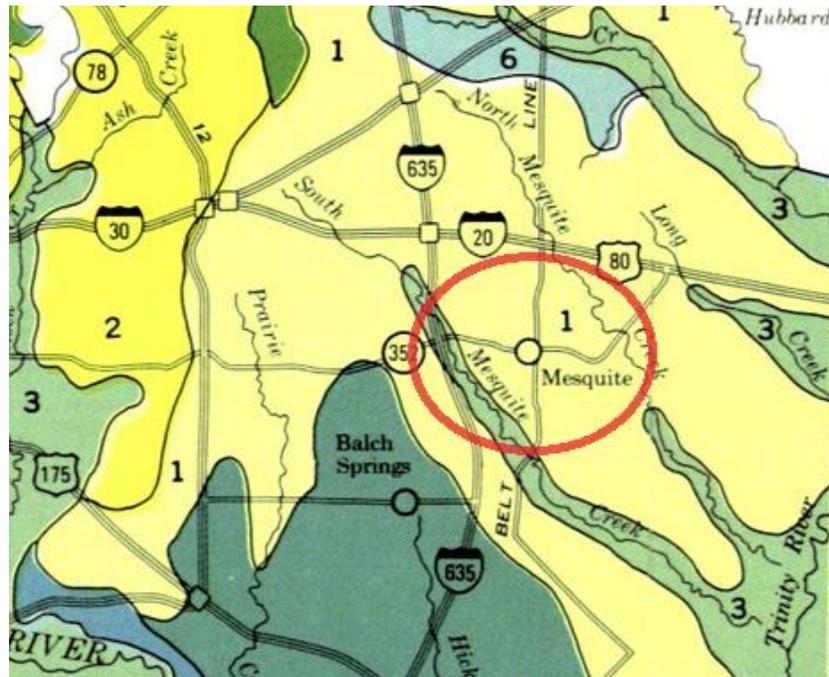
|  |                            |
|--|----------------------------|
| NOAA   |                            |
| <b>Probable Duration:</b>                          |                            |
| Extended period of time (several weeks or months). |                            |
| <b>Warning Time (Potential Speed of Onset):</b>    |                            |
|  | Minimal (or no) warning    |
|  | 3 to 6 hours warning       |
|  | 6 to 12 hours warning      |
| X  | More than 12 hours warning |
| <b>Cascading Potential:</b>                        |                            |
| Increased demand on power supply                   |                            |
| <b>Existing Warning Systems:</b>                   |                            |
| National Weather Service                           |                            |

Table 4-42 City of Mesquite Hazard Mitigation Committee Extreme Heat Hazard Ranking

#### 4.2.11 Expansive Soil

##### ***Hazard Description***

Expansive soils are types of soil that shrink or swell as the moisture content decreases or increases. Structures built on these soils may experience shifting, cracking, and breaking damage. Like many areas in Texas, the City of Mesquite has its share of foundation damage caused by expansive soils. The region has a number of soil types with relatively high clay content, which can exhibit a moderate to high shrink-swell potential.



L E G E N D \*

- 1** HOUSTON BLACK-HEIDEN: Deep, nearly level to strongly sloping, clayey soils; on uplands
- 2** EDDY-STEPHEN-AUSTIN: Very shallow, shallow, and moderately deep, gently sloping to moderately steep, loamy and clayey soils; on uplands
- 3** TRINITY-FRIO: Deep, nearly level, clayey soils; on flood plains
- 4** AUSTIN-HOUSTON BLACK: Moderately deep and deep, nearly level to sloping, clayey soils; on uplands
- 5** WILSON-RADER-AXTELL: Deep, nearly level to gently sloping, loamy soils; on uplands
- 6** FERRIS-HEIDEN: Deep, gently sloping to strongly sloping, clayey soils; on uplands
- 7** SILAWA-SILSTID-BASTSIL: Deep, nearly level to sloping, loamy and sandy soils; on stream terraces

Figure 4-24 – City of Mesquite Soil (Source: USDA Soil Survey 1980)

## Location and Extent

Expansive soil is a hazard present across large geographic areas and can be considered a threat to structures across the City. The exact extent of the effects of expansive soils effects on Mesquite cannot be accurately predicted because soil expansion is reliant upon other factors, such as rainfall.

## Previous Occurrences

There is no data available on previous occurrences of damage from expansive soils because it is not required to be reported.

|  |   |                                 |  |
|--|---|---------------------------------|--|
| <b>Hazard:</b>   | <b>Expansive Soil</b>   |                                 |  |
| <b>Potential Severity of Impact:</b>                     |   |                                 |  |
| <b>Substantial</b>                                       |   |                                 |  |
|  | Multiple deaths   |                                 |  |
|  | Complete shutdown of facilities for 30 days or more               |                                 |  |
|  | More than 50% of property destroyed or with major damage          |                                 |  |
| <b>Major</b>   |   |                                 |  |
|  | Injuries and/or illnesses result in permanent disability          |                                 |  |
|  | Complete shutdown of critical facilities for at least 2 weeks     |                                 |  |
|  | More than 25% of property destroyed or with major damage          |                                 |  |
| <b>Minor</b>   |   |                                 |  |
|  | Injuries and/or illnesses do not result in permanent disability   |                                 |  |
|  | Complete shutdown of critical facilities for at least 1 week      |                                 |  |
|  | More than 10% of property destroyed or with major damage          |                                 |  |
| <b>Limited</b>   |   |                                 |  |
| <b>X</b>   | Injuries and/or illnesses are treatable with first aid            |                                 |  |
|  | Minor quality of life lost  |                                 |  |
|  | Shutdown of critical facilities and services for 24 hours or less |                                 |  |
|  | Less than 10% of property destroyed or with major damage          |                                 |  |
| <b>Frequency of Occurrence:</b>                          |   | <b>Seasonal Pattern:</b>        |  |
| X  | Highly Likely:  | Event probable in next year     | Not applicable. Can occur throughout the year. |
|  | Likely:   | Event probable in next 3 years  |  |
|  | Occasional:   | Event possible in next 5 years  |  |
|  | Unlikely:   | Event possible in next 10 years |  |
| <b>Source Documents, Studies, Maps, Etc. Researched:</b> |   |                                 |  |
| USDA   |   |                                 |  |
| <b>Probable Duration:</b>                                |   |                                 |  |

|   |                            |
|---|----------------------------|
| On going  |                            |
| <b>Warning Time (Potential Speed of Onset):</b> |                            |
| X   | Minimal (or no) warning    |
|   | 3 to 6 hours warning       |
|   | 6 to 12 hours warning      |
|   | More than 12 hours warning |
| <b>Cascading Potential:</b>                     |                            |
| Property destruction                            |                            |
| <b>Existing Warning Systems:</b>                |                            |
| Not applicable                                  |                            |

Table 4-43 City of Mesquite Hazard Mitigation Committee Expansive Soil Hazard Ranking

### 4.3 Estimating Potential Losses

*Requirement CFR §201.6(c)(2)(ii)(B) [the plan should describe vulnerability in terms of an estimate of the potential dollar losses to vulnerable structures identified and a description of the methodology used to prepare the estimate.*

Loss estimates are based on city-owned facilities and infrastructure. GIS mapping tools provide a visual account for the location of assets to further identify how these losses could affect the City of Mesquite. Each of the loss calculations is based on the best available data, but should be considered estimates only, as highly detailed engineering studies would be required to produce information that is more accurate.

#### **Building Ranking**

In order to understand more clearly the possible vulnerability of city-owned facilities to future hazards, the Hazard Mitigation Committee looked at each facility and prioritized them based on a series of criteria from Level 1 to Level 5, with Level 1 being the most critical buildings. (The asset list, along with property values, are provided in Appendix 8.4-A). Table 4-42 lists the methodology and results for building ranking.

| Criticality Level | Description   | Number of Buildings | Building Scheduled Value |
|-------------------|---|---------------------|--------------------------|
| Level 1           | Public safety buildings (Police, Fire, public works facilities, shelters) and other buildings that MUST remain operational during a disaster event. | 57                  | \$83,575,289             |

|         |   |    |              |
|---------|---|----|--------------|
| Level 2 | Buildings that provide essential government services and must be operational within 12 to 24 hours of a disaster. These facilities include buildings used for response/recovery operations. | 10 | \$28,765,600 |
| Level 3 | Buildings that must be functional during recovery operations such as government administrative buildings, courthouses and essential community centers.                                      | 1  | \$475,000    |
| Level 4 | Buildings that support normal day-to-day activities.  | 89 | \$56,967,244 |
| Level 5 | Support buildings and facilities that do not meet any of the other criteria such as pole barns, pavilions, piers, and storage sheds.  | 91 | \$8,687,400  |

Table 4-44 – City of Mesquite Building Ranking Methodology

### 4.3.1 Flood

The flood risk assessment for the City of Mesquite was developed by identifying facilities located within the .2% annual flood zones (A, AE, AO, D, and VE zones). The flood zones were intersected with existing critical facilities to determine the areas at risk from this hazard. Damage estimates assumed 20% damage would occur.

| Building Type | Number of Buildings Impacted | 20% Estimated Loss |
|---------------|------------------------------|--------------------|
| Level 1       | 6                            | \$44,380           |
| Level 2       | 0                            | \$0                |
| Level 3       | 0                            | \$0                |
| Level 4       | 9                            | \$151,873          |
| Level 5       | 11                           | \$312,980          |

Table 4-45 – Estimated City of Mesquite Facility Loss (by \$) Following Major Flood Event.

### 4.3.2 Tornado

To estimate vulnerability in the City of Mesquite, a worst-case tornado scenario was developed assuming an F3 tornado touched down and damaged 100% of the facilities.

Damage estimates were attained by assuming a 50% damage function to building stock throughout the city. This scenario shows one possibility, and is not all-inclusive of the risk to the City of Mesquite. The entire planning area is at an equal risk from potentially devastating effects of tornadoes. The path and strength of future tornadoes will vary.

| Building Type | Number of Buildings Impacted | 50% Estimated Loss |
|---------------|------------------------------|--------------------|
| Level 1       | 57                           | \$41,787,644       |

|         |    |              |
|---------|----|--------------|
| Level 2 | 10 | \$14,382,800 |
| Level 3 | 1  | \$237,500    |
| Level 4 | 89 | \$28,483,622 |
| Level 5 | 91 | \$4,343,700  |

*Table 4-46 – Estimated City of Mesquite Facility Loss (by \$) Following EF-3 Tornado*

## **CHAPTER 5**

# **COMMUNITY CAPABILITY ASSESSMENT**

## 5.0 Community Capability Assessment

***Requirement 201.6(c)(3): [The risk assessment should include a] mitigation strategy that provides the jurisdictions 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.***

The purpose of this assessment is to provide additional methods of evaluating potential hazards prone to the city through an inventory and analysis of existing mitigation capabilities. This type of assessment provides the community with an improved understanding of its preparedness levels and capabilities to mitigate natural hazards.

The Committee conducted the community capability assessment in two phases:

- 1) Assess the preparedness of the City's departments and state and local agencies
- 2) Identify existing policies, programs, plans, ordinances and codes supporting mitigation

### 5.1 Capabilities of State and Local Agencies

A number of public and private entities are crucial in assessing a community's capability to deal with hazard mitigation, preparedness, response and recovery. The following public entities were identified by the City of Mesquite Hazard Mitigation Planning Committee as crucial in the assessment and enhancement of a community's capacity to deal with hazards:

- **City of Mesquite**
  - City of Mesquite Office of Emergency Management
  - City of Mesquite Fire Department
  - City of Mesquite Police Department
  - City of Mesquite Community Development (Planning and Zoning and Building Inspection)
  - City of Mesquite Public Works
    - City of Mesquite Engineering
    - City of Mesquite Geographic Information Systems (GIS)
- **Mesquite Independent School District**
- **Dallas County**

- Dallas County Homeland Security and Emergency Management
- Dallas County Sheriff's Department
- **Kaufman County**
  - Kaufman County Emergency Management
- **Public / Private Entities**
  - Public Utilities (Telephone, Electricity, Natural Gas)
  - Union Pacific Railroad
  - American Red Cross
- **State Agencies**
  - Texas Division of Emergency Management (TDEM)
  - Texas Commission on Environmental Quality (TCEQ)
  - Texas Water Development Board (TWDB)
  - Texas Department of Transportation (TxDOT)
  - Texas Engineering Extension Service (TEEX)
  - Texas Forest Service (TFS)
- **Federal Agencies**
  - Federal Emergency Management Agency (FEMA)

### City of Mesquite Departments

#### **City of Mesquite Office of Emergency Management**

The Mesquite Office of Emergency Management (OEM) is a department under the City of Mesquite Fire Department. The authority for this Office is found under Chapter 418 of Texas State Statutes. The mission of the OEM is to “*Minimize the impacts of emergencies and disasters on the people, property, environment, and economy of the City of Mesquite through the wise use and management of all resources.*”

The Emergency Management Coordinator (EMC) is responsible for development and maintenance of the Mesquite Emergency Operations Plan (MEOP), which follows guidance set by the State of Texas Planning Standards. The EOP is structured as follows:

#### Basic Plan

- |         |                         |
|---------|-------------------------|
| Annex A | Warning                 |
| Annex B | Communications          |
| Annex C | Shelter and Mass Care   |
| Annex D | Radiological Protection |

|         |  |
|---------|--|
| Annex E | Evacuation                                     |
| Annex F | Firefighting                                   |
| Annex G | Law Enforcement                                |
| Annex H | Health and Medical Services                    |
| Annex I | Emergency Public Information                   |
| Annex J | Recovery                                       |
| Annex K | Public Works and Engineering                   |
| Annex L | Utilities                                      |
| Annex M | Resource Management                            |
| Annex N | Direction and Control                          |
| Annex O | Human Services                                 |
| Annex P | Hazard Mitigation (reference to this document) |
| Annex Q | Hazardous Materials and Oil Spill Response     |
| Annex R | Search and Rescue                              |
| Annex S | Transport                                      |
| Annex T | Donations Management                           |
| Annex U | Legal  |
| Annex V | Terrorist Incident Response                    |

The EMC is also responsible for ensuring operational readiness of the Emergency Operations Center (EOC), maintenance of the City Continuity of Operations Plan (COOP), managing homeland security and hazard mitigation grants, and coordinating all-hazards mitigation, preparedness, response, and recovery planning, training, and exercise with Emergency Management stakeholders. This includes partners in the public, private, and non-profit sectors at the local, state, and federal levels.

The City of Mesquite OEM provides technical support and expertise to provide alert and warning notifications for hazards that may threaten the City of Mesquite. The promulgation of the City of Mesquite Hazard Mitigation Action Plan (HMAP) will assist the Mesquite Office of Emergency Management in performing its duties and functions.

The City of Mesquite OEM serves as the centralized point for all information released to the public concerning disasters. The OEM is also responsible for developing and maintaining a public information and education program relating to all-hazards mitigation, preparedness, response, and recovery.

### **City of Mesquite Fire Department**

The Mesquite Fire Department operates from seven fire stations strategically located throughout the City. Fire Administration is located at 1515 North Galloway Avenue in Mesquite. The City of

Mesquite Fire Department maintains an Insurance Services Office (ISO) Class 1 rating. ISO is the leading supplier of statistical, underwriting, and actuarial information for the property / casualty insurance industry. Most insurers use the PPC classifications (Public Protection Classification) for underwriting and calculating premiums for residential, commercial, and industrial properties.

To determine a community's PPC, ISO conducts a field survey. Expert ISO staff visit the community to observe and evaluate features of the fire-protection systems.

1. Fire alarm and communications systems. A review of the fire alarm system accounts for 10% of the total classification. The review focuses on the community's facilities and support for handling and dispatching fire alarms.
2. A review of the fire department accounts for 50% of the total classification. ISO focuses on a fire department's first-alarm response and initial attack to minimize potential loss. Here, ISO reviews such items as engine companies, ladder or service companies, distribution of fire stations and fire companies, equipment carried on apparatus, pumping capacity, reserve apparatus, department personnel, and training.
3. A review of the water-supply system accounts for 40% of the total classification. ISO reviews the water supply a community uses to determine the adequacy for fire-suppression purposes. Hydrant size, type, and installation, as well as the inspection frequency and condition of fire hydrants.

The mission of the Mesquite Fire Department is to protect the citizens and visitors of the City of Mesquite by minimizing loss of life and property resulting from fire, medical emergencies, and other disasters in such a manner that will retain the public's support and confidence in all aspects of service delivery. This mission will be accomplished through Fire Prevention, Investigation, Public Education and Training efforts as well as by maintaining a quick and effective response for fire suppression, Emergency Medical Services and other emergency and non-emergency functions.

### **City of Mesquite Police Department**

The Mesquite Police Department operates from one central station at 777 North Galloway Avenue in Mesquite. The Police Department divides the City into nine police districts in order to effectively provide law enforcement services. Within the Mesquite Police Department, there are 239 sworn police officers and 93 civilian support personnel. The missions of the Mesquite Police Department include:

- The protection of life and property,
- The preservation of peace and the suppression of disorder,
- The prevention of crime and the promotion of traffic safety,
- The apprehension of offenders and the recovery of stolen property, and

- The enforcement of city ordinances, state laws and federal laws within the framework of law and societal expectations.

### **City of Mesquite Community Development (Planning and Zoning and Building Inspections)**

The City of Mesquite Department of Community Services is staffed with professional urban planners, building code officials and support staff. This department is responsible for the creation and implementation of building codes and land-use standards, and oversees housing development. The Planning and Zoning and Building Inspections divisions are housed within the Community Services Department.

The Planning Division is responsible for implementation of the city's Comprehensive Plan and administration of the City's Zoning Ordinance and Subdivision Ordinance. The planning division is responsible for promulgation and administration of codes and ordinances involving land use and land development.

The Building Inspections Division is responsible for the enforcement of building, housing, plumbing, electrical, mechanical, gas, and other related codes and ordinances of the city.

Codes and ordinances currently adopted and implemented by the City of Mesquite, focusing at least to some extent, on regulating development in flood hazard areas are listed below:

- Zoning Ordinances
- Subdivision Regulations
- Building and Housing Codes
- Erosion, Sediment and Post-Construction Ordinances

### **City of Mesquite Geographic Information Systems (GIS)**

The GIS Division plays a key role in the creation and maintenance of data systems used by other departments. The prevention of hazards, particularly those associated with flood plain management and storm water planning and management are reliant on GIS to maintain accurate maps and data.

### **City of Mesquite Public Works**

The City of Mesquite Department of Public Works maintains water, sewer, solid waste, storm collection, storm drainage, and flood control services. Public Works and the Building Official have enforcement authority for the Erosion, Sediment and Post-Construction Control Ordinance and the Flood Damage Prevention Ordinance. They work closely with the Engineering Department, including review of proposed new construction.

### **City of Mesquite Engineering**

The City of Mesquite Engineering Department works closely with Public Works and Planning to provide professional engineering oversight for infrastructure projects, site planning for new construction, and drainage and storm water facilities.

### **Expanding/Improving existing authorities, plans, policies and resources**

The City of Mesquite will continue to expand and improve on trainings, exercises, public education programs, and policies to keep the stakeholders and residents informed of updated and new information and techniques as they become available. The City will stay up to date with current best practices and technology, which will provide the City with the optimum foundation in providing mitigation measures in the protection of life and property for the City of Mesquite, residents, and visitors. Additionally, City officials may hire additional staff and will also send staff to training to learn about effective mitigation practices. City officials can also develop ordinances that require all new development to conform to the highest mitigation standards.

### **Mesquite Independent School District**

The Mesquite Independent School District (MISD) serves the citizens of Mesquite. The MISD system has 48 campuses serving approximately 40,000 students. The Mesquite ISD encompasses an area of approximately 60 square miles along either side of I-635 in east Dallas County. It draws from the communities of Mesquite, Garland, and Balch Springs as well as areas of Dallas.

The MISD is dedicated to providing a safe school environment conducive to teaching and learning. During times of disaster, the MISD works closely with the City of Mesquite Office of Emergency Management to determine which schools will remain open or close following an emergency or disaster. MISD may also assist the City with transporting Gulf Coast evacuees to shelters within the Dallas / Fort Worth Metroplex should a hurricane threaten or impact the Gulf Coast. The City of Mesquite serves as the sheltering hub for the State of Texas for evacuees being evacuated from the Gulf Coast due to impending hurricanes.

### **Dallas County Departments**

#### **Dallas County Office of Homeland Security and Emergency Management**

The City of Mesquite sits primarily within Dallas County. The Dallas County Office of Homeland Security and Emergency Management (HSEM) is a function of Dallas County government. HSEM is responsible for management of a county-wide emergency management program, homeland security program, manages the county emergency operations center (EOC), works with municipalities, state/federal agencies, partners, NGO, volunteer groups and others to provide emergency protective actions for the over 2.6 million residents of Dallas County, Texas.

Dallas County HSEM maintains its own Hazard Mitigation Action Plan and mitigation efforts with which the City of Mesquite coordinates. The City of Mesquite OEM and the Dallas County HSEM coordinate their preparedness, response, recovery, and mitigation activities on a regular basis.

### **Dallas County Sheriff's Department**

The Dallas County Sheriff's Department is the Chief law enforcement agency for Dallas County. Dallas County operates one of the largest jail's in the United States with an average jail population of over 6,000 inmates and more than 2,000 employees. Dallas County has jurisdiction over the City of Mesquite, and coordinates with the City of Mesquite Police Department on a regular basis.

## **Kaufman County Departments**

### **Kaufman County Office of Homeland Security and Emergency Management**

The City of Mesquite partially sits in Kaufman County. The Kaufman County Office of Emergency Management (OEM) is responsible for coordinating the activities of volunteer, public and private agencies in all phases of emergency management (preparedness, response, recovery, and mitigation). The OEM also develops plans, training programs, and exercises for Kaufman County and its Emergency Management stakeholders.

The OEM also assists City, State, and Federal officials and their respective constituents with disaster preparedness, response, mitigation, and recovery programs. The OEM also serves as a repository of information concerning hazard identification and mitigation procedures as well as a contact point for incoming information regarding potential threats to the local community or region. OEM also provides the public and media organizations with accurate and timely information regarding emergency management programs and issues in the County.

The City of Mesquite OEM and the Kaufman County OEM coordinate their preparedness, response, recovery, and mitigation activities on a regular basis.

## **5.2 Public / Private Entities**

### **Public Utilities**

The City of Mesquite receives electricity and natural gas service from the following suppliers who are regulated by the Public Utility Commission of Texas.

Electricity:   Oncor  
                  Farmers Electric Coop  
                  Brazos Electric Power Cooperative

Natural Gas:  Atmos Energy

Numerous carriers throughout the City provide telephone and cellular services. Propane gas is also available as an alternative fuel through numerous private retailers.

The public utility companies have disaster response plans and are responsible for their distribution system and facilities, ensuring services are restored as quickly as possible after a disaster occurs. In addition, they provide educational information on their web sites to residents and business owners on storm preparedness.

### **Union Pacific Railroad**

Union Pacific Railroad (UPR) has a large intermodal and auto load facility at 4425 Forney Rd in Mesquite. Hazardous Materials are frequently transported through this facility. UPR is required to follow safety requirements put forth by the National Transportation Safety Board and the Federal Railroad Administration for transport of hazardous and non-hazardous materials.

These rules include the following as set forth by Emergency Order 28 on August 2, 2013:

- Designate trains carrying loads of hazardous materials that will not be left unattended on main line tracks or sidings outside of yards or terminals unless specifically authorized.
- Develop a written plan that specifies locations and circumstances under which it is safe to leave unattended trains or vehicles transporting hazardous material loads on main line tracks or sidings outside yards or terminals.
- Develop a process for employees in securing unattended trains or vehicles that includes specific communications with the train dispatchers.
- Review, verify and adjust as necessary protocols related to securing unattended trains or vehicles.
- Implement Operating Rules/Instructions regarding job briefings that include appropriate securement protocols.
- Implement procedures for inspecting equipment for proper securement in cases where an emergency responder has been on, under or between equipment. Provide notice of Emergency Order 28 to all affected employees.

### **American Red Cross**

The American Red Cross is the only disaster relief agency chartered by the United States Congress to perform disaster relief operations. The agency plays a key role in creating and preparing a fully trained volunteer base of people to assist in disaster relief.

The American Red Cross plays a crucial role in coordination and management of emergency shelters and has a liaison person assigned at the City of Mesquite Emergency Operations Center during disasters.

Within 24 hours after a disaster, American Red Cross damage assessment teams conduct a preliminary damage assessment. This preliminary assessment includes a drive-by overview of damaged areas to determine the extent and severity of damage. The preliminary damage assessment determines staff and equipment needs and aids in establishing the number and location of shelters needed. Disaster relief operations requires the preliminary assessment data be provided to state and national headquarters, so post-disaster staffing can be determined and assigned from the national level.

The American Red Cross determines the type and magnitude of family services required to assist those in need. The basis for determining the need for family services is a detailed damage assessment. This damage assessment is completed by using street sheets and a street-by-street drive-by survey. The survey is a structure-by-structure determination of severity of damage, using a rating of “0” where structures receive no damage, “1” where minor damage occurred, “2” where major damage resulted from the disaster and “3” where the structure was destroyed.

The American Red Cross then provides service centers for disaster relief personnel to interact with those in need of relief. The number and location of service centers is determined after the detailed assessment is complete. Service centers remain open until most cases are closed.

The American Red Cross also assists families in returning to normal using recovery mechanisms of the agency.

### **State Agencies**

The information regarding State agencies has been taken from the State of Texas Hazard Mitigation Plan.

#### **Texas Division of Emergency Management (TDEM)**

The Texas Division of Emergency Management (TDEM) maintains an Emergency Management Plan for Texas, and coordinates the State’s mitigation, preparedness, response, and recovery operations; provides guidance and assistance to local jurisdictions for emergency management program development; administers federally funded emergency management programs; provides training and annually conducts public awareness exercises and campaigns for hurricanes and severe weather. In addition, the State Hazard Mitigation Officer is the chairperson of the multi-agency State Hazard Mitigation Team.

#### **Texas Commission on Environmental Quality (TCEQ)**

The TCEQ serves as the State-coordinating agency for the Dam Safety Program (Section 12.052 of the Texas Water Code). The TCEQ’s primary function is to monitor and regulate both private and public dams in Texas. The Dam Safety Program requires periodic inspections of dams that pose a high or significant hazard and makes recommendations for improvements that enhance

safety of the dam. These recommendations are then reported to dam owners to help assist them in maintaining safe facilities. Additional functions that TCEQ may perform include:

- Providing technical assistance to dam owners, which includes political subdivisions;
- Assisting dam owners in addressing deficiencies at dams that could become problems during flood events;
- Evaluating adequacy of laws and regulations to prevent flood damage to dams and levees;
- Evaluating scientific data used to prevent flood damage to dams and levees;
- Conducting dam or levee failure studies;
- Publishing information on dams and emergency action plans;
- Evaluating proposed mitigation projects to assure compliance with dam and levee safety;
- Providing information and assistance on public inquiries regarding dams and levees.

### **Texas Water Development Board (TWDB)**

The TWDB administers two of FEMA's pre-disaster Hazard Mitigation Assistance grant programs that provide federal funding for mitigation activities that reduce or eliminate the long-term risk of flood damage to lives and property. These grants are open to all political subdivisions (municipalities, counties, and tribal entities) currently participating in the National Flood Insurance Program (NFIP) with jurisdiction over a particular area having special flood hazards.

The Severe Repetitive Loss (SRL) program provides federal funding to assist political subdivisions in implementing mitigation measures to reduce or eliminate the long-term risk of flood damage to severe repetitive loss residential structures insured under the NFIP. For properties that qualify, SRL funds can be used for acquisition and demolition, relocation, elevation, mitigation reconstruction, minor localized flood reduction projects, and dry flood proofing (for historic properties only).

The Flood Mitigation Assistance (FMA) program provides federal funding to assist communities in funding cost-effective measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP. Two types of grants are available – Planning and Project. Planning grants can only be used to develop or update the flood hazard component of the Multi-Hazard Mitigation Plan, with the goals of assessing flood risk and identifying feasible and cost-effective alternatives to reduce that risk. Project grants can be used to assist all structures insured under the NFIP for acquisition and demolition, relocation, elevation, minor localized flood reduction projects, and dry flood proofing. Applicants for FMA Project Grants must have an approved Multi-Hazard Mitigation Plan. TWDB may apply directly for technical assistance funding under the FMA program.

The TWDB administers the Flood Protection Planning grant program through the State's Research and Planning Fund. These grants are available to political jurisdictions to develop flood

protection plans for watersheds, major or minor, to identify structural and non-structural flood mitigation measures to reduce the risk of flood damages to lives and property. TWDB employs four full-time staff to administer its grant programs.

The TWDB administers the Fund Development program, which provides loans for the planning, design, and construction of water supply, wastewater, and flood control projects. Structural flood protection improvements may include construction of stormwater retention basins, enlargement of stream channels, public beach re-nourishment, control of coastal erosion, and modification or reconstruction of bridges. Non-structural flood protection improvements may include acquisition of floodplain land for use in public open space, acquisition and removal of buildings located in a floodplain, relocation of residents of buildings removed from a floodplain, flood warning systems, and the development of floodplain management plans. An environmental review is required for all construction projects.

The Texas Natural Resources Information System (TNRIS) is a division of the TWDB that is responsible for producing, archiving, and distributing geographic data to agencies, businesses, and the public. TNRIS supports hazard mitigation in a variety of ways. They make data available to organizations for planning or response. They actively assist in events by developing, locating, and preparing data for a specific need, and they updated the State Critical Facility Database for TDEM Mitigation. When necessary, TNRIS actively participates in hazard mitigation by preparing data for use in the field and by emergency managers. TNRIS is capable of providing personnel to the State Operations Center to assist with data management for tropical storm and emergency preparedness events. TNRIS provided personnel to the FEMA field office during the Space Shuttle Columbia recovery to assist field crews with data integration organization and map productions. TNRIS staff in Austin prepared data for the field office and other agencies participating in the recovery effort.

In addition, TNRIS established an NFIP Mapping Services Group in April 2009 to serve as the state's principal center for statewide floodplain mapping resources. Their primary activities include cataloging and maintaining flood studies for areas not served by Cooperating Technical Partners (CTP's), developing and maintaining base mapping data sets, supporting TWDB field staff with technical solutions to address local mapping needs, serving as a coordinating group among state agencies, and collecting and reporting mapping needs to FEMA. In addition, TNRIS Floodplain Mapping Services will manage technology resources to meet the needs of the public through accessibility to base data and web-based floodplain mapping resources. TNRIS will work with existing CTP's to provide support by maintaining flood data standards and will provide regular updates and technical services to provide a common approach to finding and managing data.

### **Texas Department of Transportation (TxDOT)**

The Texas Public Works Association (TPWA)/ TxDOT Drainage Task Force was formed in September 2003 in order to improve coordination, with focus on FEMA requirements and to make sure that TxDOT and TPWA are in mutual agreement on the interpretation of the process. Of primary interest were:

- Permits vs. State Sovereignty: TxDOT, by State law, is prohibited from obtaining permits from a Community. It is suggested that some other non-permit documentation of coordination may be acceptable and fulfill the intent of the permit process.
- Communication/Informal Coordination: TxDOT pledged to revise guidance in the Hydraulic Design Manual to fulfill the intent of the NFIP. The effort would address communication and how TxDOT can meet the criteria for communities without violating State sovereignty.

TxDOT is also supporting the effort to certify floodplain managers (CFMs). Currently, all engineers in TxDOT's central hydraulics branch are CFMs. In addition, TxDOT has been supporting FEMA's —Managing Floodplain Development through the NFIP II class and encouraging TxDOT personnel to attend the class and become CFMs. This class provides the training that TxDOT personnel need to develop projects in FEMA-mapped floodplains and puts TxDOT staff on an equal level of program expertise when coordinating and resolving differences with the communities. The greatest benefit is the interaction between TxDOT personnel and the FPAs that improved the level of understanding between both parties.

TxDOT has also encouraged participation in the planning process of any community's master drainage plan. The concept is for the community to be aware of TxDOT's long range plans within their community and incorporate any improvements into the master drainage plan. This enables the community to work with TxDOT to actively plan mitigation projects in their area, and conserve and coordinate resources while providing drainage improvements through mitigation.

### **Texas Engineering Extension Service (TEEX)**

TEEX provides pre-incident mitigation to the counties, cities, and towns of the State of Texas by providing solid proactive training programs. These programs are taken to the citizens wherever they are requested and delivered by a well-trained staff in order to prepare responsible persons in each community to respond with the proper resources to the full spectrum of disaster situations. This training encompasses man-made disasters as well as weather related situations.

TEEX also provides communities with post-incident mitigation personnel to assist the community officials in order to help guide their leadership past the first hours or days when the community is struggling to get services back in order. These personnel act as liaisons between many of the responding agencies and the effected community elected officials, this type of assistance is continued until the leadership is able to get a grasp on the devastation and a developed plan to lead these citizens toward the recovery and rebuilding of their lives, homes and businesses.

### **Texas Forest Service (TFS)**

TFS Predictive Services staff calculate and predict the statistical probability of fire occurrence and behavior; disseminate wildfire assessment information to elected officials, including KBDI drought information for burn ban determinations; and work with the National Weather Service to determine areas of extreme fire danger to pre-position personnel.

TFS Prevention staff work with local governments and the public to develop targeted prevention

campaigns based on local fire activity.

TFS Urban Wildland Interface staff helps communities determine wildfire risk levels, identify hazards, and determine mitigation treatment options through the Community Wildfire Protection Plan (CWPP) process. A user-friendly CWPP —template is available online to empower communities to determine their own choices for reducing wildfire hazards.

TFS makes available Southern Fire Risk Assessment System (SFRAS) maps available to communities and counties. These maps can be used for wildfire mitigation purposes including maps that depict Surface Fuels, Wildfire Occurrence, Urban Wildland Interface Areas, Wildfire Suppression Difficulty, etc.

### 5.3 Federal Departments

#### **Federal Emergency Management Agency (FEMA)**

FEMA's mission is to support US citizens and first responders to ensure that, as a nation, we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards. FEMA has 13,731 employees across the country – at Headquarters, the ten regional offices, the National Emergency Training Center, Center for Domestic Preparedness/Noble Training Center and other locations. FEMA's Region VI in Denton, Texas serves the states of Texas, Oklahoma, Arkansas, Louisiana, and New Mexico.

FEMA's Hazard Mitigation Assistance (HMA) grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages. Currently, FEMA administers the following HMA grant programs:

- **Hazard Mitigation Grant Program (HMGP):** HMGP assists in implementing long-term hazard mitigation measures following Presidential disaster declarations. Funding is available to implement projects in accordance with State, Tribal, and local priorities.
- **Pre-Disaster Mitigation (PDM):** PDM provides funds on an annual basis for hazard mitigation planning and the implementation of mitigation projects prior to a disaster. The goal of the PDM program is to reduce overall risk to the population and structures, while at the same time, also reducing reliance on Federal funding from actual disaster declarations.
- **Flood Mitigation Assistance (FMA):** FMA provides funds on an annual basis so that measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the National Flood Insurance Program (NFIP).

## 5.4 Planning and Regulatory Capability

*Requirement 201.6(c)(C)(3): [The risk assessment should include a] mitigation strategy that provides the jurisdictions 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.*

The planning and regulatory capability section describes the preparation of plans and studies and effective implementation strategy through ordinances, policies and programs. The commitment of the community to guide and manage growth, development, and redevelopment is often demonstrated through the preparation and use of such documents. In addition to emergency response and mitigation planning, other planning initiatives present significant opportunities to integrate comprehensive hazard mitigation principles and practices into the local decision-making process. Implementation of plans is achieved through capital improvement projects, ordinances and land development.

The City of Mesquite Hazard Mitigation Action Plan (HMAP) will become a link to updates of plans and ordinances outlined within this section. This is accomplished by providing a copy of the approved plan to each city department and to consultants contracted by the City to assist with the development and/or update of relevant plans and studies.

### Summary of Existing Plans, Ordinances and Programs

Table 5-1 provides a summary of relevant local and regional plans, ordinances and programs in place or under development. A checkmark indicates the given item is currently in place and being implemented or is being developed for future implementation. As these are updated, the City of Mesquite HMAP will be consulted so the goals and strategies identified are integrated where applicable.

Mitigation actions are identified in Chapter Six to integrate the programs, policies and planning initiatives listed in Table 5-1 that promote public education/awareness, compliance of the city's regulations/ordinances, and mitigation-related projects noted in the Comprehensive Plan.

| Hazard Mitigation-Related Plans, Ordinances and Programs  |                   |                |                 |                  |
|---|-------------------|----------------|-----------------|------------------|
| Plan Category/Name  | City of Mesquite  | Dallas County* | Kaufman County* | Regional / State |
| <b>Emergency Management Plans</b>   |                   |                |                 |                  |
| Emergency Operations Plan (EOP)   | ✓                 | ✓              | ✓               | ✓                |
| Continuity of Operations Plan (COOP)  | ✓                 | ✓              | ✓               | ✓                |
| Hazard Mitigation Plans   | Under review      | ✓              | ✓               | ✓                |
| <b>Local General Plans</b>  |                   |                |                 |                  |
| Comprehensive Plan  | ✓                 | ✓              | ✓               |                  |
| <b>Local Codes and Regulations</b>  |                   |                |                 |                  |
| Building & Fire Codes   | ✓                 | ✓              | ✓               | ✓                |
| Erosion, Sediment, and Post-Construction Control  | Included in below | ✓              | ✓               |                  |
| Stormwater and Flood Protection Ordinance   | ✓                 | ✓              | ✓               |                  |
| Tree Preservation Ordinance   | ✓                 | ✓              |                 |                  |
| National Flood Insurance Program  | ✓                 | ✓              | ✓               |                  |
| NFIP Community Rating System (CRS)  |                   |                |                 |                  |
| Subdivision Ordinance   | ✓                 | ✓              | ✓               |                  |
| Zoning Ordinance  | ✓                 | ✓              | ✓               |                  |
| <p><b>*Certain county plans and codes are relevant to the City of Mesquite in terms of standards in future annexation areas. Flooding, wildfire and emergency management plans affect larger areas than the specific governmental entity.</b></p> |                   |                |                 |                  |

Table 5-1 – Hazard Mitigation-Related Plans, Ordinances, and Programs

**Emergency Management Plans**

Emergency Management is the discipline of coordinating all-hazards prevention / mitigation, preparedness, response, and recovery (the four phases of Emergency Management). Emergency Management agencies can be found at the local, state, and federal levels of government, as well as in the private and non-profit sectors. The four phases of Emergency Management that are managed by these entities are cyclical in nature, and have no defined beginning or end.

The phases of Emergency Management are defined as follows:

1. **Prevention / Mitigation:** Eliminating or reducing the effects of a hazard before it occurs.
2. **Preparedness:** Planning, training, and exercise done prior to an emergency or disaster to enhance the ability to respond to and recovery from a threat or actual event.
3. **Response:** Actions taken to protect life, property, and environment following an emergency or disaster.
4. **Recovery:** The process of restoring services and impacted areas to normalcy following an emergency or disaster.



*Figure 5-1 – Emergency Management Cycle*

The City of Mesquite Office of Emergency Management (OEM) oversees and maintains all elements of the City of Mesquite Emergency operations Plan (EOP). The structure of the EOP is outlined above in this Chapter. The City of Mesquite OEM oversees the City’s comprehensive Emergency Management program and coordinates with surrounding jurisdictions and the State of Texas when dealing with activities related to the four phases of Emergency Management. Dallas County and Kaufman County also have EOPs that they manage respectively. The State of Texas maintains a statewide EOP that covers State of Texas efforts in all four phases of Emergency Management, as well as support that they can provide to local Emergency Management agencies before, during, and after an emergency or disaster.

### **Hazard Mitigation Plans**

#### **City of Mesquite Hazard Mitigation Action Plan**

Hazard mitigation planning is a tool to identify methodologies that the jurisdiction can use to eliminate or reduce the impact of future hazards. The City of Mesquite Hazard Mitigation Action Plan (HMAP) was originally written in 2013, and received FEMA approval in 2014. The City shall update this Plan every five years. The HMAP includes the following elements:

- Hazard and Risk Assessment (HIRA)
- Community Capabilities Assessment
- Mitigation Strategies

#### **Dallas County and Kaufman Hazard Mitigation Action Plans**

The Dallas County and Kaufman County Hazard Mitigation Action Plans (HMAPs) were developed to address the unincorporated jurisdictions of Dallas County and Kaufman County. These Plans are to both be updated in 2020.

#### **State of Texas Hazard Mitigation Plan (2013-2018)**

The State of Texas Hazard Mitigation applies to all State agencies, boards, commissions, and departments assigned mitigation responsibilities. It also applies to others as designated by the Governor or Director of the Texas Division of Emergency Management. The State of Texas Hazard Mitigation Plan outlines risks, mitigation capabilities, strategies and actions on a statewide level.

### **Local General Plans**

#### **Comprehensive Plan**

Comprehensive Plans are long-range plans that include the entire geographical area of the county or municipality and all elements of the built environment.

The City of Mesquite's Comprehensive Plan, adopted in 2019, serves as a policy guide for the physical and economic development of the city. Desired policies are implemented by city ordinances and public and private development. Since the plan provides general guidelines, documents that are more detailed are developed such as Subdivision Ordinance, Residential Development Plans, and the Stormwater and Flood Protection Ordinance.

There are common themes in Hazard Mitigation Plans and Comprehensive Plans including appropriate use of land in relation to natural barriers such as flood areas; protection of natural and historic resources; adequate transportation; community facilities; and infrastructure. Goals

and objectives correlating with hazard mitigation planning are discussed in Chapter 6 of this HMAP document.

### **Extraterritorial Jurisdictional Element of Comprehensive Plan**

Based on the *Texas Local Government Code*, Mesquite has an extraterritorial jurisdiction (ETJ) which extends **five** miles from the current city limits and covers a large area in western Kaufman County. The **24** square mile ETJ area, lying primarily to the south of Forney and west of Crandall, is bisected by I-20. This area would allow expansion of the current city boundaries if such expansion were deemed desirable. This Element contains elements for environmental preservation, to include preservation of the designated Floodplain and riparian corridors by making such areas undevelopable.

### **Local Codes, Ordinances, and Regulations**

#### **Building and Fire Codes**

The Fire Code of the City of Mesquite provides minimum standards for design of all buildings. Buildings for use by the public have additional standards including use of fire-resistant building materials, fire extinguishers, sprinklers for certain sizes and types of buildings, spacing between buildings, and adequate ingress and egress routes. On May 1, 2017, the City of Mesquite amended their Code to adopt the International Fire Code, 2015 edition.

The following codes have been adopted by the City of Mesquite:

#### **Residential Codes and Amendments:**

- 2015 International Residential Code Amendments
- 2014 National Electrical Code Amendments
- 2015 International Property Maintenance Code

#### **Commercial Codes and Amendments:**

- 2015 International Building Code/Amendments
- 2015 International Plumbing Code/Amendments
- 2015 International Mechanical Code/Amendments
- 2015 International Fuel Gas Code/Amendments
- 2015 Energy Conservation Code/Amendments
- 2015 International Property Maintenance Code
- 2014 National Electrical Code Amendments

#### **Stormwater and Flood Protection Ordinance**

The Stormwater and Flood Protection Ordinance seeks to prevent excessive storm water runoff

resulting from new development and other land disturbances. By requiring best management practices before, during and after construction or disturbance, erosion of soil resulting in siltation in gutters, streams and waterways is controlled. This not only protects adjoining property owners, but also helps prevent flash flooding and infill of waterways. The goals of these elements of the Ordinance are to:

Minimize increase in storm water runoff from any development to reduce siltation, increases in stream temperature, stream bank erosion, and maintain the integrity of stream channels.

- Minimize increase in nonpoint source pollution caused by storm water runoff from development which otherwise degrades local water quality.
- Minimize the annual volume of surface water runoff flowing from any specific site during and following development to not exceed the pre-development hydrologic regime to the maximum extent practicable.
- Reduce stormwater runoff rates and volumes, soil erosion, and nonpoint source pollution, whenever possible, through storm water management controls and ensure these management controls are properly maintained and pose no threat to public safety.

Additionally, the Ordinance has language that is required by the National Flood Insurance Program (described below) that aims to minimize public and private losses due to flood conditions using provisions designed to:

- Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards.
- Control the alteration of natural floodplains, stream channels, and natural protective barriers involved in the accommodation of floodwaters.
- Control filling, grading, dredging and other development that may increase erosion of flood damage.
- Prevent or regulate the construction of flood barriers that will unnaturally divert floodwaters or may increase flood hazards to other lands.

### **Tree Preservation Ordinance**

The purpose of the Tree Protection Ordinance is to regulate, control and promote the planting of trees; encourage the protection of existing trees in the streets and public grounds within the City of Mesquite; and regulate the preservation, replacement, and indiscriminate removal of trees on private property. The intent is to protect existing trees and promote planting of additional trees for soil conservation, control air pollution, manage on-site storm water runoff, enhance water quality, preserve wooded wetlands and enhance the beauty, health and safety of the City.

### **National Flood Insurance Program (NFIP)**

The City of Mesquite became a member of the National Flood Insurance Program (NFIP) in July

1971. The NFIP establishes a self-funded program to provide federally backed flood insurance to residents in communities that are a part of the program. Federal NFIP regulations require the City to review all new development in the floodplain to ensure it meets guidelines set forth by the Federal Emergency Management Agency (FEMA). City floodplain and drainage regulations are stricter than federal NFIP regulations to ensure residents are protected. City participation in the NFIP is also a condition for many federal grant and disaster aid programs.

### **Community Rating System**

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. At this point, the City of Mesquite is not a member of the CRS. However, this is currently being developed and is an initiative put forth in Chapter 6 of this HMAP.

### **Subdivision Ordinance**

The Subdivision Ordinance regulates the division of land by requiring specific standards for the following:

- Legal Platting and Recording Process
- Standards for layout of lots and streets including survey and monuments
- Storm water pollution prevention and drainage
- Infrastructure including streets, sanitary sewer, storm water facilities and other utilities
- Inspection and permitting
- Administration and enforcement including remedy for non-conformance

The distribution of mitigation materials will be presented to developers through the local development process as outlined in the mitigation action items.

### **Zoning Ordinance**

The purpose of the Zoning Ordinance is to provide regulations designed to lessen congestion; secure safety from fire, panic and other dangers; promote health and general welfare; provide adequate light and air; prevent the overcrowding of land; avoid undue concentration of population; facilitate the adequate provision of transportation, water, sewerage, schools, parks and other public requirements.

**5.5 Warning Systems, Public Outreach and Information Systems**

Effective pre-event public warning systems and outreach is of utmost importance in hazard mitigation planning. The ability to maintain current and up-to-date data on the location and type of structures is also vital. The City of Mesquite has multiple ways to warn the public, as well as provide information and education on topics such as hazard mitigation. These methods are itemized in Table 5-2 and followed by a brief discussion.

|  |
|--|
| <b>Warning Systems, Public Outreach Programs and Information Systems</b> |
| <b>Warning Systems</b>   |
| NOAA Weather Emergency Alert System (EAS)                                |
| Cable Override System  |
| Outdoor Warning System   |
| Social Media Devices   |
| Citizen Notification Service   |
| <b>Public Outreach Programs</b>  |
| Local Outreach Programs  |
| Regional outreach programs   |
| <b>Information Systems</b>   |
| GIS Data   |

*Table 5-2 City of Mesquite Information, Education, and Warning Systems*

**Warning Systems**

**NOAA Weather Emergency Alert System (EAS)**

The Federal Communications Commission (FCC) designed the Emergency Alert System (EAS) so officials can quickly send out important emergency information targeted to a specific area. The EAS is a digital-based automated system and uses coding protocols similar to NOAA Weather Radio (NWR) Specific Area Message Encoding (SAME). EAS sends out alerts not just to broadcast media but also to cable television, satellites, pagers, Direct Broadcast Satellite, High Definition Television, and Video Dial Tone. EAS also accounts for the needs of special populations such as the deaf and those with special language requirements

The City of Mesquite has the ability to transmit Civil Emergency Messages through the EAS via the National Weather Service.

### **Cable Override System**

The City of Mesquite has the ability to use a special phone number and code to override the local cable company signal in order to transmit emergency information.

### **Outdoor Warning System**

The City of Mesquite has an extensive system comprised of 25 Outdoor Warning Sirens strategically located throughout the city. These are activated from the Police Department Dispatch Center. Mesquite's Outdoor Warning system is meant to warn residents who are outside only. It is difficult to hear these sirens inside buildings.

The siren will rotate 360 degrees sounding a steady tone for 3 minutes. Depending on the type of situation, it may be continually activated until the danger passes. There is no all-clear message.

The City of Mesquite Office of Emergency Management will activate the Outdoor Warning System when:

- The National Weather Service (NWS) issues a Severe Thunderstorm Warning with destructive winds in excess of 70 mph or a Tornado Warning, for areas within or around the City of Mesquite
- Trained storm spotters have reported a tornado in the City of Mesquite, or in neighboring jurisdictions, that could potentially affect the City of Mesquite
- Reported hail of one and one half inch in diameter or greater
- A chemical emergency
- When requested by the Governor of Texas
- When requested by the President of the United States

### **Social Media**

The City of Mesquite frequently uses its Facebook, Nextdoor and Twitter accounts to relay information to its citizens. In an emergency, the appropriate information will be disseminated to subscribers in order to give them instructions or information to assist with their preparation, response, or recovery to the incident. Information on social media accounts is more instantaneously distributed than on website or voice and print media.

### **Notify Me Notification Service**

The City of Mesquite's Notify Me Notification Service is an opt-in service to which citizens can subscribe. This free service allows citizens to receive timely notifications about events and activities throughout the city. This information tool will be used to provide response and recovery information in the time of a large-scale emergency or disaster.

### **Public Outreach Programs**

#### **Local Public Outreach**

The City of Mesquite Office of Emergency Management (OEM) participates in numerous Public Outreach events each year. These events all center around all-hazards mitigation, preparedness, response, and recovery. In some instances, the OEM may be asked to provide a workshop or lecture on emergency or disaster-related topics. In all instances, print material is available for the public to take with them in order for them to prepare themselves prior to an emergency or disaster.

The City of Mesquite OEM also has a website where citizens can gain information on how they can prepare themselves for the next disaster ([www.cityofmesquite.com/oem](http://www.cityofmesquite.com/oem)).

#### **Regional Public Outreach**

The City of Mesquite is an active member in the North Central Texas region's KnoWhat2Do program. The motto of this program is Think. Prepare. Act. This program is a regional public education effort for the 16 county North Central Texas region. The premise behind the program is to encourage residents and businesses of the Dallas / Fort Worth area to understand the hazards that are possible in the region and prepare for them. The website for the program is [www.KnoWhat2Do.com](http://www.KnoWhat2Do.com).



### **Information Systems**

#### **Geographic Information System**

In order to maintain accurate databases and maps for local decision makers and the public, Geographic Information Systems (GIS) are maintained by the City and accessible online at <https://www.cityofmesquite.com/512/Online-Interactive-Maps>. Available maps include:

- City of Mesquite Property Information – Parcels and Subdivisions
- Floodplain Map
- Zoning Parcels

## **CHAPTER 6**

# **MITIGATION STRATEGIES OVERVIEW**

## 6.0 Mitigation Strategies Overview

***Requirement §201.6(c)(3): The plan shall include 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.***

The purpose of City of Mesquite mitigation strategy is to avoid, minimize and mitigate the impacts of natural and manmade disasters on both people and property within the city limits. Activities to achieve this goal are currently reached through established building and zoning codes plus other regulations and activities. As the city continues to grow and develop/update plans, ordinances and regulations, a careful review of the city's mitigation strategy should be conducted and incorporated into any future changes/additions to policies. This ensures the goals of providing a safe and livable community will continue in the face of hazards.

To facilitate future incorporation of the mitigation strategies outlined in this plan, a copy will be available electronically to each applicable city department. The approved plan will also be available to any consultants contracted to assist the city with future studies and plans being developed or updated.

### 6.1 Priorities and Progress Made Since the Mitigation Plan 2014

#### ***Priorities***

The commitment of the City of Mesquite remains a high priority in reducing vulnerabilities articulated throughout this plan. The hazard identification and risk assessment, mitigation strategies and plan maintenance chapters provide specific information identifying areas of concern and procedures to implement continued commitment in reducing or eliminating those vulnerabilities.

#### ***Progress Made on Mitigation Strategies***

The City has been actively engaging in mitigation efforts before the first approved Hazard Mitigation plan in 2014. A representative list of completed and/or ongoing accomplishments of actions have been identified in the plan and is provided in Table 6-1

| Previous Mitigation Actions, City of Mesquite   |                |
|---|----------------|
| Description   | Date completed |
| <b>Property Acquisition</b> – 1036 Darnel Lane purchase of a flood prone home   | 5/5/2010       |
| <b>Drainage Improvement</b> – Installation of storm sewer and low grading to alleviate house flooding at 1421 Woodcrest Drive.  | 6/6/2010       |
| <b>Drainage Control</b> – Drainage channel erosion control and box culvert replacement project.   | 8/15/2013      |
| <b>Emergency Action Plan and Water Rights permit</b> - New TCEQ Dam safety regulations require the development of Hydrology and Hydraulic information for dams including a dam breach analysis. The new regulations also require the development of an Operations and Maintenance Plan, an Emergency Action Plan (EAP) and obtaining a water rights permit for the dam. Feasibility study to study Palos Verdes dam with emphasis on costs and design of repair to overflow structure, downstream overflow improvements and dam safety and breach analysis was completed.   | 9/24/2009      |
| <b>Paving and Drainage Improvements</b> – Project consists of reconstruction of 2-lane rural asphalt section to a 4-lane dividend concrete section in 80' wide ROW. Also included major upgrades to drainage, water and sanitary sewer.   | 3-1-2013       |
| <b>Overflow pipe repair</b> – The overflow piping through the Palos Verdes Dam is a 48 – inch corrugated metal pipe. The bottom of this overflow pipe has corroded, allowing storm water to flow underneath the pipe. Inspection of the overflow piping after the recent rain of September 8, 2010 revealed a significant void under the pipe. This void has the potential of migrating through the entire dam (a failure mode known as piping) and could result in a sudden uncontrolled emptying of the lake. After this recent inspection, staff has become sufficiently concerned with the size and depth of the void under the overflow piping that they located. The repairs consisted of placing a new bottom in the culvert that would span the corroded area (approximately 2-feet in width) and then pressure grouting (with high density polyurethane closed cell foam) the void area underneath and around the overflow pipe to eliminate the void. | 11-3-2010      |
| <b>Paving and Drainage Improvements</b> – Project reconstructed Road from N. Galloway Avenue to Belt Line Road from its existing 2 lane asphalt roadway to a 4 lane concrete street with curb, gutter, full drainage system, new bridge and utility improvements.   | 7-31-2009      |
| <b>Emergency Action Plan and Water Rights Permit</b> - New TCEQ Dam safety regulations require the development of Hydrology and Hydraulic information for dams including a dam breach analysis. The new regulations also require the development of an Operations and Maintenance Plan, an Emergency Action Plan (EAP) and obtaining a water rights permit for the dam.   | 12-7-2012      |

Table 6-1 – Previous Mitigation Actions, City of Mesquite

## 6.2 National Flood Insurance Program Compliance

***Requirement §201.6(c)(2)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.***

The City of Mesquite has participated in the National Flood Insurance Program (NFIP) since the July 1971 and is proactive in mitigating properties classified as Repetitive Flood Claim (RFC) or Severe Repetitive Loss (SRL). A list of properties mitigated through elevation, acquisition and/or demolition and those properties remaining on the RFC/SRL list are maintained by the City's engineering department. A list of properties and the progress made by the City on mitigation RFC/SRL properties can be found in Chapter 4.

Properties will continue to be mitigated as opportunities and funding become available. Chapter Six - Capabilities Assessment contains information on the City's Flood Damage Prevention Ordinances to prevent future RFC/SRL properties from occurring.

### Community Rating System

The Community Rating System (CRS) is a voluntary program for National Flood Insurance Program (NFIP) participating communities. 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 was developed to provide incentives in the form of premium discounts for communities, to go beyond the minimum floodplain management requirements, and to develop extra measures for protection from flooding.

The City of Mesquite is still discussing the benefits of joining the CRS program.

## 6.3 Mitigation Goals and Objectives

***Requirement 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.***

The City of Mesquite Hazard Mitigation Committee reviewed the mitigation strategies from the previous plan ensuring the City's objectives for reducing potential losses is still effective. In general, the Committee determined the goals should be developed into a broad-based approach.

The Committee analyzed loss estimates in the risk assessment from information gathered during the community capability assessment (relevant plans, studies and ordinances), and public input determining additional goals, objectives and actions to be added. This ensures the City is

addressing all potential hazard impacts appropriately to advance their strategies in reducing potential loss.

The mitigation goals for natural and technological related hazards are designed to serve as general guidelines explaining what the City hopes to achieve. The goals are long-term, broad policy-type statements representing the overall vision of the mitigation plan. Objectives define the strategies and implementation steps used in attaining the identified goals, and are specific and measurable. Finally, actions are specific tasks aimed to help the City achieve its mitigation goals and objectives. Action items were prioritized and assigned to an appropriate department/agency to assure implementation.

Table 6-2 provides a listing of the goals and objectives for the plan.

|  |
|--|
| <b>Goal 1: Minimize loss of life, injury, damage to property and environment from natural/ technological hazards</b> |
| Objective 1.1: Protect the life, health and safety of residents  |
| Objective 1.2: Protect existing/new critical facilities and infrastructure   |
| Objective 1.3: Provide protection for future/existing developments to the extent possible                            |
| <b>Goal 2: Maintain and enhance the city’s emergency management/mitigation capabilities</b>                          |
| Objective 2.1: Update/develop plans/studies for all hazards  |
| Objective 2.2: Incorporate/improve mitigation strategies into the city’s ordinances, plans and polices               |
| Objective 2.3: Conduct/develop drills/training for all hazards   |
| Objective 2.4: Participate in the Community Rating System  |
| <b>Goal 3: Establish public education and awareness activities</b>   |
| Objective 3.1: Expand the city's Public Outreach Campaigns   |
| Objective 3.2: Promote disaster preparedness planning for families and area businesses                               |

*Table 6-2 – City of Mesquite Hazard Mitigation Goals and Objectives*

## 6.4 Identification and Analysis of Mitigation Actions

***Requirement §201.6(c)(3)(ii): [The 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.***

Each Department within the City of Mesquite organizational structure is responsible for implementing mitigation actions as prescribed in this plan. Under the direction of the Hazard Mitigation Coordinator and Mitigation Committee, funding will be sought from a variety of sources to implement mitigation projects in both pre-disaster and post-disaster environments. In addition, each Department will be responsible for the integration of mitigation actions into the planning processes of their respective projects and providing mitigation input into their respective capital improvement/risk management process. Mitigation actions will be integrated into other planning documents of the City of Mesquite Emergency Management Department. Opportunities to integrate the requirements of this Plan into other planning mechanisms shall continue to be identified through future meetings of the Hazard Mitigation Committee and the 5-year review process described herein.

The Emergency Management Coordinator of the City of Mesquite Emergency Management Department, acting as the Hazard Mitigation Coordinator Chairperson, has overall responsibility for implementing the Hazard Mitigation Plan and ensuring the all municipalities participate in the planning process.

### Classification of Mitigation Actions

***Numbering of Actions:*** Numeric and alpha sequencing will be used to identify the mitigation actions in this plan.

***Responsible and Support Agency/Department:*** To be successful in implementing and tracking mitigation actions, ownership must be given to the appropriate agency/department responsible for the activity. The identifications made in the actions outlined in this plan were based on current conditions and may require modification upon implementation. A designation of “to be determined” was applied when the actions may have varying degrees of activation and the responsible and/or support group will be dependent upon the phase being implemented.

***Background and Next Steps:*** Each action includes background information identifying the need and the next steps provide the potential implementation measures desired.

***Priorities:*** The Committee assessed the goals of this plan, the requirements of the NFIP, other relevant plans and studies, capabilities outlined in Chapter 5 and determined the following factors were consistent in each of these initiatives. A scale of 1 to 5 was used to rank the actions as a high, moderate, or low priority. (The completed ranking worksheet is provided in Appendix 8-6.A)

- Risk to people
- Risk to facilities/infrastructure (loss of function)
- Level of need and severity of the problem
- Benefit(s) from completion of the project
- Ease of implementation
- Availability of resources to complete the project.

The factors above were combined with an overall priority ranking for the action with the highest possible score of 30 as defined below:

Low – score of 6-14

Moderate – score of 15-22

High – score of 23-30

***Date of Origin:*** To improve the tracking of mitigation actions for implementation, a date of origin field was added. New projects identified during the development of this plan will be dated 2020.

***Timeline and Potential Funding:*** In addition to the prioritization criteria listed above, project timelines and potential funding sources were discussed and annotated.

***Hazard Type and Mitigation Groups:*** Each mitigation action was identified for the natural hazard it addresses and sorted into a mitigation group as defined below:

Prevention: Government, administrative, and regulatory actions or processes influencing the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.

Property Protection: Actions involving the modification of existing buildings or infrastructure to protect them from a hazard or remove them from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, flood proofing, storm shutters, and shatter-resistant glass.

Public Education and Awareness: Actions that inform and educate citizens, elected officials, and property owners about potential risks from hazards and potential ways to mitigate these risks. Actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

Natural Resource Protection: Actions that not only minimize hazard losses but also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

Emergency Services: Actions protecting people before, during, and after a hazard event. Administrative and emergency operations offices that provide critical and vital services, coordinate warnings, responses, and recovery from a disaster are identified. Actions include

protection of warning system capabilities, protection or hardening of critical facilities, protection of infrastructure needed for emergency response and training.

Structural Projects: Actions involving the construction of structures to reduce the impact of a hazard include storm water controls. (e.g. culverts, floodwalls, seawalls, retaining walls, and safe rooms.)

Technical Assistant Projects: Actions that involve required support/education from federal, state and local agencies, data collection for GIS mapping, utilization of technology, and upgrades as products are developed.

**Hazard Mitigation Goals, Objectives, and Actions**

**Goal 1:** Minimize loss of life, injury, damage to property and natural systems from natural and technological hazards

|  |   |
|--|---|
| <b>Objective 1.1: Protect the life, health and safety of residents</b> |   |
| <b>Action 1.1-1 – Enhance Alert and Warning System within the city</b> |   |
| <b>Plan Year Identified</b>  | 2014, 2020  |
| <b>Hazard Type</b>   | Tornado, Severe Winter Weather, Flood, Severe Storms, Dam Failure, Drought, Earthquake, Wildfire, Technological Hazards, Extreme Heat, Expansive Soil   |
| <b>Mitigation Strategy</b>   | Emergency Services  |
| <b>Priority</b>  | Medium  |
| <b>Background/Next Steps</b>   | Implement new technologies and procedures in accordance with the Integrated Public Alert and Warning System (IPAWS) to enhance the current alert and warning system. Develop an alert and warning procedure for the City Emergency Management Plan. |
| <b>Responsible Agency</b>  | Emergency Management, Engineering   |
| <b>Support Agency</b>  | Emergency Management Department   |
| <b>Estimated Timeline</b>  | 2020  |
| <b>Potential Funding Source(s)</b>                                     | HMGP, General Fund, UASI  |

|   |   |
|---|---|
| <b>Objective 1.2: Protect existing/new critical facilities and infrastructure</b> |   |
| <b>Action 1.2-1 – Add generators to all critical facilities</b>                   |   |
| <b>Plan Year Identified</b>   | 2014, 2020  |
| <b>Hazard Type</b>  | Tornado, Severe Winter Weather, Flood, Severe Storms, Dam Failure, Drought, Earthquake, Wildfire, Technological Hazards, Extreme Heat, Expansive Soil |
| <b>Mitigation Strategy</b>  | Property Protection   |
| <b>Priority</b>   | High  |
| <b>Background/Next Steps</b>  | Research the current critical facilities located within the city and make a list of buildings that are not equipped with generators.                  |
| <b>Responsible Agency</b>   | Facilities Department   |
| <b>Estimated Timeline</b>   | Ongoing   |
| <b>Potential Funding Source(s)</b>  | HMGP, CDBG  |
| <b>Action 1.2-2 – Implement a process for power lines and infrastructure</b>      |   |

|                                    |   |
|------------------------------------|---|
| <b>Plan Year Identified</b>        | 2014, 2020  |
| <b>Hazard Type</b>                 | Severe Storms, Dam Failure, Earthquake, Wildfire, Extreme Heat, Severe Winter Weather, Flood, Expansive Soil, Tornado   |
| <b>Mitigation Strategy</b>         | Property Protection   |
| <b>Priority</b>                    | High  |
| <b>Background / Next Steps</b>     | Implement a process of monitoring and maintaining all utilities that can help prevent damage. Implement annual check of all utilities. Work with Oncor to ensure the process for inspection of power infrastructure is conducted. |
| <b>Responsible Agency</b>          | Public Works, Facilities and Engineering  |
| <b>Support Agency</b>              | Public works, Building, Engineering Departments, Oncor  |
| <b>Estimated Timeline</b>          | Ongoing   |
| <b>Potential Funding Source(s)</b> | HMGP, CDBG  |

|  |   |
|--|---|
| <b><i>Objective 1.3: Provide protection for future/existing developments</i></b>             |   |
| <b>Action 1.3-1 - Require concurrence from all departments on projects through site plan</b> |   |
| <b>Plan Year Identified</b>  | 2014, 2020  |
| <b>Hazard Type</b>   | Tornado, Severe Winter Weather, Flood, Severe Storms, Dam Failure, Drought, Earthquake, Wildfire, Technological Hazards, Extreme Heat, Expansive Soil   |
| <b>Mitigation Strategy</b>   | Property Protection   |
| <b>Priority</b>  | High  |
| <b>Background/Next Steps</b>   | Research, develop, and expand City facility building standards to incorporate use of hazard resistant materials. The City adopted 2015 Building Codes and will continue to adopt the most relevant codes. |
| <b>Responsible Agency</b>  | Building Department   |
| <b>Support Agency</b>  | Public Works and Planning and Zoning Departments  |
| <b>Estimated Timeline</b>  | On going  |
| <b>Potential Funding Source(s)</b>   | General Funds   |
| <b>Action 1.3-2 - Promote/Build retention ponds when appropriate</b>                         |   |
| <b>Plan Year Identified</b>  | 2014, 2020  |
| <b>Hazard Type</b>   | Flooding  |
| <b>Mitigation Strategy</b>   | Structural  |
| <b>Priority</b>  | High  |
| <b>Background/Next Steps</b>   | Requirement for retention ponds will be included in the city's Master Drainage Plan according to standards. Implement when applicable   |
| <b>Responsible Agency</b>  | Engineering Department  |

|                                    |   |
|------------------------------------|---|
| <b>Support Agency</b>              | Developers                                |
| <b>Estimated Timeline</b>          | On going                                  |
| <b>Potential Funding Source(s)</b> | CDBG, included in new development funding |

**Goal 2:** Maintain and enhance the city’s emergency management/mitigation capabilities

|  |  |
|--|--|
| <b><i>Objective 2.1 Update/develop plans/studies for all hazards</i></b>               |  |
| <b>Action 2.1-1 - Update the City's Comprehensive Emergency Management Plan (CEMP)</b> |  |
| <b>Plan Year Identified</b>  | 2014, 2020   |
| <b>Hazard Type</b>   | Extreme Heat   |
| <b>Mitigation Strategy</b>   | Prevention   |
| <b>Priority</b>  | High   |
| <b>Background/Next Steps</b>   | Develop and implement an extreme heat safety program and outline the procedure in the City CEMP. |
| <b>Responsible Agency</b>  | Emergency Management Department  |
| <b>Estimated Timeline</b>  | Ongoing  |
| <b>Potential Funding Source(s)</b>   | Homeland Security, EMPG  |

|   |   |
|---|---|
| <b><i>Objective 2.2 Incorporate/improve mitigation strategies into the city’s ordinances, plans and polices</i></b> |   |
| <b>Action 2.2-1 – Annual review of city's ordinances and regulations for all-hazards mitigation</b>                 |   |
| <b>Plan Year Identified</b>   | 2014, 2020  |
| <b>Hazard Type</b>  | Flooding, Tornado, Severe Weather   |
| <b>Mitigation Strategy</b>  | Prevention  |
| <b>Priority</b>   | High  |
| <b>Background/Next Steps</b>  | Ordinances and regulations include but are not limited to building codes, flood damage prevention, freeboard, stormwater, fire, etc. Update efforts for enforcement and improve when necessary. Increase compliance with 24” freeboard requirement for 10 year flood plain. |
| <b>Responsible Agency</b>   | Building Department   |
| <b>Support Agency</b>   | Applicable city departments   |
| <b>Estimated Timeline</b>   | Ongoing   |
| <b>Potential Funding Source(s)</b>  | General funds   |
| <b>Action 2.2-2 - Integrate mitigation into local development review process</b>                                    |   |

|                                    |  |
|------------------------------------|--|
| <b>Plan Year Identified</b>        | 2014, 2020   |
| <b>Hazard Type</b>                 | Tornado, Severe Winter Weather, Flood, Severe Storms, Dam Failure, Drought, Earthquake, Wildfire, Technological Hazards, Extreme Heat, Expansive Soil            |
| <b>Mitigation Strategy</b>         | Prevention   |
| <b>Priority</b>                    | High   |
| <b>Background/Next Steps</b>       | Review current local development and subdivision review process for opportunities to incorporate the distribution of hazard mitigation information to developers |
| <b>Responsible Agency</b>          | Planning and Zoning Department   |
| <b>Estimated Timeline</b>          | Ongoing  |
| <b>Potential Funding Source(s)</b> | General funds  |

|   |  |
|---|--|
| <b><i>Objective 2.3 Conduct/develop drills/training for all hazards</i></b> |  |
| <b>Action 2.3-1 - Conduct annual Tabletop Exercise</b>                      |  |
| <b>Plan Year Identified</b>   | 2014, 2020   |
| <b>Hazard Type</b>  | Tornado, Severe Winter Weather, Flood, Severe Storms, Dam Failure, Drought, Earthquake, Wildfire, Technological Hazards, Extreme Heat, Expansive Soil  |
| <b>Mitigation Strategy</b>  | Emergency Services   |
| <b>Priority</b>   | High   |
| <b>Background/Next Steps</b>  | Emergency Operations Center personnel continue to participate in at least one tabletop exercise on an annual basis. Opportunities for mitigation of a different hazard on a rotating basis are identified as one of the goals or objectives, captured in lessons learned, and addressed in the after action report for implementation. |
| <b>Responsible Agency</b>   | Emergency Management Department  |
| <b>Estimated Timeline</b>   | Ongoing  |
| <b>Potential Funding Source(s)</b>  | General Funds  |

|  |                                   |
|--|-----------------------------------|
| <b><i>Objective 2.4 Participate in the Community Rating System</i></b> |                                   |
| <b>Action 2.4-1 – Develop the Community Rating System</b>              |                                   |
| <b>Plan Year Identified</b>  | 2014, 2020                        |
| <b>Hazard Type</b>   | Flood, Severe Storms, Dam Failure |
| <b>Mitigation Strategy</b>   | Prevention                        |

|                                    |   |
|------------------------------------|---|
| <b>Priority</b>                    | High  |
| <b>Background/Next Steps</b>       | <p>The Community Rating System (CRS) rewards communities that exceed the minimum NFIP requirements. Depending upon the level of participation, flood insurance premium rates are discounted for policyholders.</p> <p>The City has still only had discussions about the establishment of a committee to participate in the Community Rating System.</p> |
| <b>Responsible Agency</b>          | Public Works  |
| <b>Support Agency</b>              | Hazard Mitigation Committee   |
| <b>Estimated Timeline</b>          | Ongoing   |
| <b>Potential Funding Source(s)</b> | General Funds   |

**Goal 3:** Establish public education and awareness activities

|  |   |
|--|---|
| <b><i>Objective 3.1 Expand the city's Public Outreach Campaigns</i></b>                      |   |
| <b>Action 3.1-1 - Establish and maintain a hazard mitigation link on the city's web page</b> |   |
| <b>Plan Year Identified</b>  | 2013, 2020  |
| <b>Hazard Type</b>   | Tornado, Severe Winter Weather, Flood, Severe Storms, Dam Failure, Drought, Earthquake, Wildfire, Technological Hazards, Extreme Heat, Expansive Soil   |
| <b>Mitigation Group</b>  | Education and Awareness   |
| <b>Priority</b>  | High  |
| <b>Background/Next Steps</b>   | The City has several outreach initiatives to communicate hazard information to the public and visitors to the area. This allows for a centralized place on the city's web page dedicated to hazard mitigation. Current information includes but not be limited to structural mitigation for homeowners. |
| <b>Responsible Agency</b>  | Communications and Marketing  |
| <b>Support Agency</b>  | Applicable city, county, state and federal agencies   |
| <b>Estimated Timeline</b>  | Ongoing   |
| <b>Potential Funding Source(s)</b>   | General funds   |

|   |            |
|---|------------|
| <b><i>Objective 3.2 Promote disaster preparedness planning for families and area businesses</i></b> |            |
| <b>Action 3.2-1 – Conduct hazard mitigation workshops</b>   |            |
| <b>Plan Year Identified</b>   | 2014, 2020 |

|                                    |   |
|------------------------------------|---|
| <b>Hazard Type</b>                 | Tornado, Severe Winter Weather, Flood, Severe Storms, Dam Failure, Drought, Earthquake, Wildfire, Technological Hazards, Extreme Heat, Expansive Soil |
| <b>Mitigation Strategy</b>         | Prevention  |
| <b>Priority</b>                    | High  |
| <b>Background/Next Steps</b>       | Conduct at least one hazard mitigation workshop annually to assist families and business owners with mitigation.                                      |
| <b>Responsible Agency</b>          | Emergency Management Department   |
| <b>Estimated Timeline</b>          | On going  |
| <b>Potential Funding Source(s)</b> | General Funds   |

### 6.5 Implementation of Mitigation Actions

***Requirement §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) 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.***

As funding is identified and justification determined, the mitigation actions will be developed into projects. For projects eligible for mitigation funding, cost-benefit analyses will be used. The cost of the proposed projects (money, time, etc.) will be weighed against the potential benefits (reduced losses, improved safety, etc.) in order for the City to determine the appropriate action required. Special priorities will be given to initiatives addressing critical facilities and infrastructure required to carry out their mission and provide safety to the population served.

While cost-benefit analyses are fundamental to the decision-making process for City of Mesquite, project cost is an overriding factor when determining which projects should be pursued. The city operates under tight budget constraints and must use prudence in the allocation of funds. They will strive to justify implementation based on long-term financial implications regarding potential mitigation projects.

Once mitigation actions are identified and resources secured, City of Mesquite will implement and administer their projects. Some projects may be coordinated with a support agency such as the State of Texas Division of Emergency Management (TDEM) through the Unified Hazard Mitigation Assistance program. City of Mesquite will coordinate with TDEM and refer to the FEMA Hazard Mitigation Assistance Unified Guidance (July 2013) for development of applications for identified mitigation actions eligible under the program in this plan.

## **Administration**

The City of Mesquite is responsible for the administration of mitigation actions when implemented. Administration includes completion of grant applications and applicable quarterly progress reports. TDEM established a web site to document grants under the HMGP guidelines.

## **6.6 Grant Sources**

### ***Federal Hazard Mitigation Assistance Grants***

The Federal Emergency Management Agency (FEMA) provides funding for five Hazard Mitigation Assistance Grant Programs. These programs, described in detail in FEMA's *Hazard Mitigation Assistance Unified Guidance, July 12, 2013*, are summarized for future reference when mitigation activities are implemented. The grant programs are administered within the State of Texas by the Texas Division of Emergency Management. A brief description of each program follows:

**Hazard Mitigation Grant Program (HMGP)** is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The key purpose of HMGP is to ensure critical mitigation measures, reducing loss of life and property from future disasters, are not lost during the reconstruction process following a disaster. *(HMGP funds are available when authorized under a Presidential disaster declaration in the areas of the State requested by the Governor.)*

**Pre-Disaster Mitigation Program (PDM)** is authorized by Section 203 of the Stafford Act to assist States, Indian Tribal Governments, and local communities in implementing a sustained pre-disaster natural hazard mitigation program reducing risk to the population and structures from future hazard events and to reduce reliance on Federal funding from future disasters. *(Funds provided annually subject to the availability of appropriation funding)*

**Flood Mitigation Assistance (FMA)** is authorized by Section 1366 of the National Flood Insurance Act of 1968 (NFIA) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). *(Funds provided annually subject to the availability of appropriation funding)*

**Repetitive Flood Claims Program (RFC)** is authorized by Section 1323 of the NFIA with the goal of reducing flood damages to individual properties with one or more claim payments for losses made under flood insurance coverage, and resulting in the greatest savings to the National Flood Insurance Fund (NFIF) in the shortest period of time. *(Funds provided annually subject to the availability of appropriation funding)*

**Severe Repetitive Loss Pilot Program (SRL)** is authorized by Section 1361 of the NFIA with the goal of reducing flood damage to residential properties experiencing severe repetitive losses under flood insurance coverage and resulting in the greatest savings to the NFIF in the

shortest period of time. (Funds provided annually subject to the availability of appropriation funding.)

**Eligibility**

| Eligible Activities  | HMGP | PDM | FMA | RFC | SRL |
|--|------|-----|-----|-----|-----|
| <b>1. Mitigation Projects</b>                                    | X    | X   | X   | X   | X   |
| Property Acquisition and Structure Demolition                    | X    | X   | X   | X   | X   |
| Property Acquisition and Structure Relocation                    | X    | X   | X   | X   | X   |
| Structure Evaluation   | X    | X   | X   | X   | X   |
| Mitigation Reconstruction  |      |     |     |     | X   |
| Dry Floodproofing of Historic Residential Structures             | X    | X   | X   | X   | X   |
| Dry Floodproofing of Non-Residential Structures                  | X    | X   | X   | X   |     |
| Minor Localized Flood Reduction Projects                         | X    | X   | X   | X   | X   |
| Structural Retrofitting of Existing Buildings                    | X    | X   |     |     |     |
| Non-Structural Retrofitting of Existing Buildings and Facilities | X    | X   |     |     |     |
| Safe Room Construction   | X    |     |     |     |     |
| Infrastructure Retrofit  | X    | X   |     |     |     |
| Soil Stabilization   | X    | X   |     |     |     |
| Wildfire Mitigation  | X    | X   |     |     |     |
| Post-Disaster Code Enforcement                                   | X    |     |     |     |     |
| 5% Initiative Projects   | X    |     |     |     |     |
| <b>2. Hazard Mitigation Planning</b>                             | X    | X   | X   |     |     |
| <b>3. Management Costs</b>                                       | X    | X   | X   | X   | X   |

Table 6-3 – Examples of Eligible Mitigation Projects by Funding Program (Source: FEMA Hazard Mitigation Assistance Unified Guidance, July 12, 2013)

### Examples of Eligible Mitigation Projects:

**Property Acquisition and Structure Demolition** – Voluntary acquisition of an existing at-risk structure and conversion of the land to open space through demolition of the structure.

**Property Acquisition and Structure Relocation** – Voluntary physical relocation of an existing structure to an area outside of a hazard-prone area.

**Structure Elevation** – Physically raising an existing structure to the Base Flood Elevation (BFE) or higher, if required by FEMA or local ordinance.

**Mitigation Reconstruction** – Construction of an improved elevated building on the same site where an existing building and/or foundation has been partially or completely demolished or destroyed.

**Dry Floodproofing** – Techniques applied to keep structures dry by sealing the structure to keep floodwaters out.

**Dry Floodproofing of Historic Residential Structures** – Permissible only when other techniques that would mitigate to the BFE causing the structure to lose its status as a Historic Structure.

**Dry Floodproofing of Non-residential Structures** – must be performed in accordance with NFIP Technical Bulletin (TB) 3-93, *Non-Residential Floodproofing—Requirements and Certification*, and the requirements pertaining to dry floodproofing of non-residential structures found in 44 CFR Sections 60.3(b)(5) and (c)(4).

**Minor Localized Flood Reduction Projects** – Projects to lessen the frequency or severity of flooding and decrease predicted flood damages, such as the installation or modification of culverts and storm water management activities like creating retention and detention basins.

**Structural Retrofitting of Existing Buildings** – Modifications to the structural elements of a building to reduce or eliminate the risk of future damage and to protect inhabitants.

**Non-structural Retrofitting of Existing Buildings and Facilities** – Modifications to the non-structural elements of a building or facility to reduce or eliminate the risk of future damage and to protect inhabitants.

**Safe Room Construction** – Safe room construction projects are designed to provide immediate life-safety protection for people in public and private structures from tornado and severe wind events, including hurricanes.

**Infrastructure Retrofit** – Measures to reduce risk to existing utility systems, roads, and bridges.

**Soil Stabilization** – Projects to reduce risk to structures or infrastructure from erosion and landslides, including installing geo-textiles, stabilizing sod, installing vegetative buffer strips, preserving mature vegetation, decreasing slope angles, and stabilizing with rip rap and other means of slope anchoring.

**Wildfire Mitigation** – Projects to mitigate the vulnerability of at-risk structures and associated loss of life from the threat of future wildfire.

**Post-Disaster Code Enforcement** – Projects designed to support the post-disaster rebuilding effort by ensuring sufficient expertise is on hand ensuring appropriate codes and standards, including NFIP local ordinance requirements, are utilized and enforced.

**5% Initiative Projects** – Provide an opportunity to fund mitigation actions consistent with the goals and objectives of the State or Tribal (Standard or Enhanced), local mitigation plans and meets all HMGP program requirements, but may be difficult to conduct a standard benefit/cost analysis to prove cost effectiveness.

### **Hazard Mitigation Planning**

Mitigation plans are the foundation for effective hazard mitigation. A mitigation plan demonstrates the commitment to reduce risks from natural hazards and serves as a strategic guide for decision makers as they commit resources. The mitigation planning process includes hazard identification and risk assessment leading to the development of a comprehensive mitigation strategy reducing risks to life and property. The mitigation strategy section of the plan identifies a range of specific mitigation actions and projects being considered to reduce risks to new and existing buildings and infrastructure.

### **Management Costs**

Management costs are any indirect costs and administrative expenses reasonably incurred by a Grantee or Sub grantee in administering a grant or sub grant award.

For more information concerning applications for FEMA Hazard Mitigation Assistance Grants, contact:

*State of Texas Division of Emergency Management  
Mitigation Section  
512-424-2208*

## **CHAPTER 7**

### **PLAN MAINTENANCE**