CITY OF LA FERIA

Hazard Mitigation Plan

Mitigating Risk for a Safe, Secure, and Sustainable Future

DRAFT: December 2016

H2O PARTNERS

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SECTION 1: INTRODUCTION

BACKGROUND

The City of La Feria is located in western Cameron County, at the intersection of U.S. Highway 83 and Far Road 506. It is twenty-four miles northwest of Brownsville, and is part of the Brownsville-Harlingen-Raymondville and the Matamoros-Brownsville metropolitan areas. Cameron County is the southernmost county in the state of Texas. To the east, the county borders the Gulf of Mexico; Wallacy County is located to the north, while Hidalgo County is located to the west; the Matamoros Municipality, Tamaulipas, Mexico borders the county to the south.

Texas is prone to extremely heavy rains and flooding. While flooding is a well-known risk, the City of La Feria, within Cameron County is susceptible to a wide range of natural hazards, including but not limited to drought, extreme heat, and wildfires. These life-threatening hazards can destroy property, disrupt the economy, and lower the overall quality of life for individuals.

While it is impossible to prevent a hazard event from occurring, the impact of hazards can be lessened in terms of their effect on people and property through effective hazard mitigation planning and implementation. This Hazard Mitigation Action Plan, or *the Plan,* provides an opportunity for the City to evaluate successful mitigation actions and explore opportunities to avoid future disaster loss.

The Federal Emergency Management Agency (FEMA) defines mitigation as, "any action taken to reduce or eliminate the long term risk to human life and property from natural hazards."[1] Mitigation differs from emergency preparedness and protective measures, which focus on activities designed to make communities more prepared to take appropriate action in a disaster with emergency response and equipment. Mitigation activities involve alteration of physical environments to reduce risks and vulnerabilities to hazards and make it more cost-effective to respond to, and recover from, disasters.

[1] www.fema.gov

SCOPE AND PARTICIPATION

The City of La Feria's Hazard Mitigation Action Plan, or *the Plan,* is a single jurisdictional Plan. Numerous entities and businesses participated as stakeholders in the Plan, including Our Lady of the Lake University, the Lower Rio Grande Valley Dev. Council, several churches, BBCA Compass Bank, and the La Feria Chamber of Commerce. These groups, and others, provided valuable input into the planning process.

The focus of the Plan is to mitigate those hazards selected from the State Hazard Mitigation Plan which are deemed to pose a risk to the planning area. For each of the hazards selected, a detailed risk assessment was conducted as part of the hazard mitigation planning process. The risk assessment enables the City to prioritize mitigation actions based on hazards that pose the greatest risk to lives and property.

PURPOSE

The Plan, prepared by the City of La Feria and H2O Partners, Inc., is an opportunity for the City of La Feria's planning team members to evaluate successful mitigation actions and explore opportunities to avoid future disaster loss.

In developing the Plan, the City of La Feria identified 15 hazards to be addressed in developing mitigation projects, as the goal of the Plan is to minimize or eliminate long-term risk to human life and property from known hazards, and identifying and implementing cost-effective mitigation actions. Therefore, the purpose of the Plan is to develop successful mitigation projects to reduce future risk in the community, including loss of life and property damage throughout the City of La Feria.

Through this process, La Feria seeks to:

- Assess any previous mitigation projects and develop unique mitigation strategies to meet future development and risks;
- Encourage improvements in floodplain management, participation in the National Flood Insurance Program (NFIP); and qualifying for FEMA's Community Rating System, thereby reducing flood insurance premiums for citizens;
- Devise solutions to strengthen emergency management by addressing moderate and high risk natural hazards; and
- Develop and implement comprehensive mitigation planning activities for the City of La Feria, and integrate these activities into existing planning mechanisms.

AUTHORITY

The Plan will be tailored specifically for the City of La Feria planning area. When complete, the Plan will comply with all requirements promulgated by the Texas Division of Emergency Management (TDEM) and all applicable provisions of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390), and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004

(P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). It will also comply with FEMA's February 26, 2002 Interim Final Rule ("the Rule") at 44 CFR Part 201, which specifies the criteria for approval of mitigation plans required in Section 322 of the DMA 2000, and standards found in FEMA's "Local Mitigation Plan Review Guide" (October 2011), and the "Local Mitigation Planning Handbook" (March 2013). The Plan will also be developed in accordance with FEMA's Community Rating System (CRS) Floodplain Management Plan standards and policies.

SUMMARY OF SECTIONS

Sections 1 and 2 of the Plan outline the purpose and the process of development. Section 3 profiles the City of La Feria in terms of population and economy, while Section 4 provides an overview of the people and property at risk and hazards facing the area, including the process of identification and risk assessment methodologies utilized.

Sections 5 through 19 present a hazard overview and information on individual hazards. For each hazard, the Plan presents a description of the hazard, a list of historical hazard events, and the results of the vulnerability and risk assessment process.

Section 20 presents mitigation goals and objectives. Mitigation actions for the City are presented in Section 21, while Section 22 identifies plan maintenance mechanisms.

The list of planning team members and stakeholders is located in Appendix A. Public Survey Results are analyzed in Appendix B. Appendix C contains a detailed list of critical facilities for the area, and Appendix D lists dam locations. Appendix E contains information regarding workshops and meeting documentation. Capability assessment results for the City are located in Appendix F.

SECTION 2: PLANNING PROCESS

PLAN PREPARATION AND DEVELOPMENT

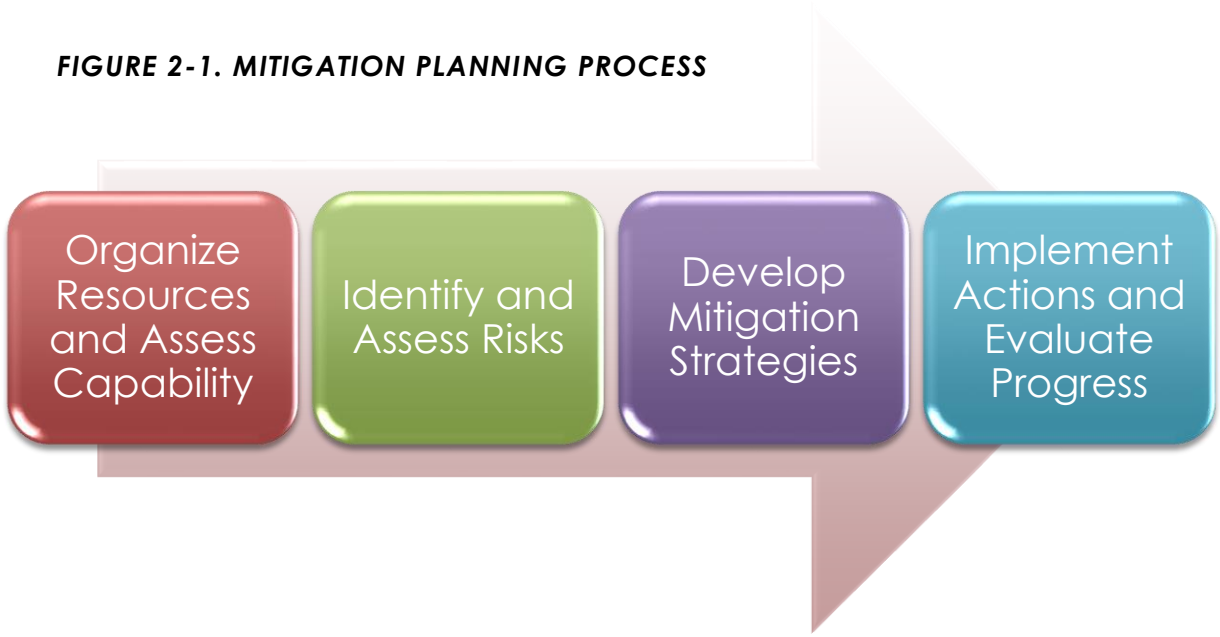
Hazard mitigation planning involves bringing together multiple components and players to create a more disaster-resistant community. Section 2 provides an overview of the planning process including the identification of key steps, and a detailed description of how stakeholders and the public were involved.

OVERVIEW OF THE PLAN

The City of La Feria solicited bids and hired H2O Partners, Inc. (Consultant Team) to provide technical support and oversee the development of the Hazard Mitigation Action Plan, or *the Plan*. The Consultant Team used the October 2011 *Local Multi-Hazard Mitigation Planning Guidance*, *the State and Local Mitigation Planning How-to Guides* (FEMA Publication Series 386), and the

March 2013 *Local Mitigation Planning Handbook* to create the Plan in accordance with the process, as shown in Figure 2-1 below.

FIGURE 2-1. MITIGATION PLANNING PROCESS



The City of La Feria and the consultant team met in September 2015 to begin organizing resources by identifying Planning Team members and conducting a Capability Assessment.

PLANNING TEAM

Key members of H2O Partners, Inc. developed the Plan in conjunction with the Advisory Committee and the Planning Team. The Planning Team was established using a direct representation model. The Advisory Committee comprised of the City of La Feria staff. The Planning Team consisted of representatives from the City's staff, commissioners, and the Planning & Community Development Department. A Stakeholder Working Group was invited to participate via email, attend meetings, and were integral to providing comments and data for the Plan. Appendix A provides a complete listing of all participating Planning Team members and stakeholders by organization and title.

Based on results of completed Capability Assessments, the City of La Feria also described methods for achieving mitigation in the future by expanding on their existing capabilities. Sample mitigation actions developed with similar hazard risk by planning team members were shared at the meetings. These important discussions resulted in development of multiple mitigation actions that are included in the Plan to further mitigate risk from natural hazards in the future.

TABLE 2-1. ADVISORY COMMITTEE

ORGANIZATION	TITLE
City of La Feria	City Manager
City of La Feria	City Secretary/Human Resource Director

TABLE 2-2. PLANNING TEAM MEMBERS

ORGANIZATION	TITLE
City of La Feria	Administrative Assistant
City of La Feria	Commissioner
City of La Feria	Commissioner
City of La Feria	Commissioner
City of La Feria	Commissioner
City of La Feria	Mayor
City of La Feria	Mayor Pro-Tem
City of La Feria	Planning & Community Development Director

PLANNING PROCESS

The process to prepare this Plan included following the four major steps included in Figure 2-1. After the Planning Team was organized, a Capability Assessment survey was developed and distributed at the Kick-Off Workshop. Hazards were identified and assessed, and results associated with each of the hazards were provided at the Risk Assessment Workshop. Based on hazard risk and vulnerabilities to the planning area, specific mitigation strategies were discussed and created at the Mitigation Workshop. Finally, Section 22 includes Plan Maintenance and Implementation procedures that were developed in conjunction with the planning process. Documentation for participation at each workshop is found in Appendix E.

At the Plan development workshops held throughout the planning process described herein, the following factors were taken into consideration:

- The nature/magnitude of risks currently affecting the community;
- Mitigation goals to address current and expected conditions;
- Whether current resources will be appropriate for implementing the Plan;
- Implementation problems, such as technical, political, legal, or coordination issues that may hinder development;
- Anticipated outcomes; and

- How the City of La Feria, agencies, and partners will participate in the implementation process.

KICKOFF WORKSHOP

The Kickoff Workshop was held at La Feria City Hall on September 29, 2015. This initial meeting was an opportunity to inform City officials about how the planning process pertained to their distinct roles and responsibilities, and also methods to involve stakeholder groups such as area churches, RV and Mobile Home Parks, the La Feria Chamber of Commerce, and area businesses. In addition to the kickoff presentation, participants received the following information:

- Project overview regarding the planning process;
- Public Survey access information;
- Hazard Ranking form; and
- Capability Assessment survey for completion.

A risk ranking exercise was conducted at the Kickoff Workshop to get input from the Planning Team and stakeholders pertaining to various risks from a list of natural hazards affecting the planning area. Participants ranked hazards high to low in terms of perceived level of risk, frequency of occurrence, and potential impact.

HAZARD IDENTIFICATION

At the close of the Kickoff Meeting, and through a series of email and phone correspondences, the Planning Team conducted preliminary hazard identification. The group reviewed and considered a full range of natural and human-caused hazards, then narrowed the list to significant hazards by reviewing hazards affecting the area as a whole, the State of Texas Hazard Mitigation Plan, and initial study results from reputable sources such as federal and state agencies. Based on this initial analysis, the team identified a total of eleven natural hazards and four man-caused hazards that pose risk to the planning area.

RISK ASSESSMENT

An initial risk assessment for the city was completed in October 2015. The results of the assessment were presented at a workshop held on April 19, 2016. Participants and stakeholder groups were invited to the Risk Assessment Workshop. At this workshop, the characteristics and consequences of each hazard were evaluated to determine how much of the area would be affected, in terms of potential danger to property and citizens.

Potential dollar losses from each hazard were estimated using the Federal Emergency Management Agency's Hazards U.S. Multi-Hazards (MH) Model (HAZUS-MH) and other modeling techniques. The assessments examined the impact of various hazards on the built environment, including general building stock (e.g., residential, commercial, industrial), critical facilities, lifelines, and infrastructure. The resulting risk assessment profiled hazard events, provided information on previous occurrences, estimated probability of future events, and detailed the spatial extent and magnitude of impact on people and property. Each participant was also provided a risk ranking

sheet at the Risk Assessment workshop and were asked to rank hazards in terms of perceived level of risk, frequency of occurrence, and potential impact.

The assessments were also used to set priorities for mitigation strategy based on potential dollar losses and loss of lives. A hazard profile and vulnerability analysis for each of the hazards can be found in Sections 5 through 19 in this Plan.

MITIGATION REVIEW AND DEVELOPMENT

The mitigation strategy development for the Plan involved developing mitigation goals and new mitigation actions. A Mitigation Workshop was held at La Feria City Hall on April 19, 2016. As with the Risk Assessment Workshop, stakeholder groups were invited.

An inclusive and structured process was used to develop and prioritize new mitigation actions for the Plan. The prioritization method was based on FEMA's STAPLE+E criteria and included social, technical, administrative, political, legal, and economic and environmental considerations. As a result, each Planning Team Member assigned an overall priority to each hazard mitigation action. The overall priority of each action is reflected in the hazard mitigation actions found in section 21.

Planning Team Members then developed action plans identifying proposed actions, costs and benefits, the responsible organization(s), effects on new and existing buildings, implementation schedules, priorities, and potential funding sources.

Specifically the process involved:

- Listing optional hazard mitigation actions based on information collected from previous plan reviews, studies, and interviews with federal, state and local officials. Workshop participants reviewed the optional mitigation actions, and selected actions that were most applicable to their area of responsibility, cost-effective in reducing risk, easily implemented, and likely to receive institutional and community support.
- Workshop participants inventoried federal and state funding sources that could assist in implementing the proposed mitigation actions. Information was collected, including the program name, authority, and purpose of the program, types of assistance and eligible projects, conditions on funding, types of hazards covered, matching requirements, application deadlines, and point of contact.
- Planning Team Members considered the benefits that would result from implementing the hazard mitigation actions compared to the cost of those projects. Although detailed cost-benefit analyses were beyond the scope of this Plan, Planning Team Members utilized economic evaluation as determining factor between hazard mitigation actions.
- Planning Team Members then selected and prioritized mitigation actions.

Hazard mitigation actions identified in the process were made available to the Planning Team for review. In addition, the Plan was made available to the general public for review and comment on the City of La Feria's website.

REVIEW AND INCORPORATION OF EXISTING PLANS

REVIEW

Background information utilized during the planning process included various studies, plans, reports, and technical information from sources such as FEMA, the United States Army Corps of Engineers (USACE), the U.S. Fire Administration, National Oceanic and Atmospheric Administration (NOAA), the Texas Water Development Board (TWDB), the Texas Commission on Environmental Quality (TCEQ), the Texas State Data Center, Texas Forest Service, The Texas Division of Emergency Management (TDEM), and local hazard assessments and plans. Section 4 and the hazard-specific sections of the plan (Sections 5-19) summarize the relevant background information.

Specific background documents, including those from FEMA, provided information on hazard risk, hazard mitigation actions currently being implemented, and potential mitigation actions. Previous hazard events, occurrences and descriptions were identified through NOAA's National Climatic Data Center (NCDC). Results of past hazard events were found through searching the NCDC. The USACE studies were reviewed for their assessment of risk and potential projects in the region. State Data Center documents were used to obtain population projects. The State Demographer webpages were reviewed for population and other projects and included in Section 3 of the Plan. Information from the Texas Forest Service was used to appropriately rank the wildfire hazard, and to help identify potential grant opportunities. Materials from FEMA and TDEM were reviewed for guidance on Plan development requirements.

INCORPORATING EXISTING PLANS INTO THE HMAP PROCESS

A Capability Assessment was completed by key City of La Feria department which provided information pertaining to existing plans, policies, ordinances and regulations to be integrated into the goals and objectives of the Plan. The relevant information was included in a master Capability Assessment, Appendix F.

Existing projects and studies were utilized as a starting point for discussing hazard mitigation actions on Planning and Consultant Team members. The City of La Feria's Comprehensive Plan is incorporated into the Plan as it pertains to mitigating risk from natural disasters and the resulting effects on transportation, and development in the floodplain areas; and educating residents on how to protect themselves and their property. Finally, the 2013 State of Texas Mitigation Plan Update, developed by TDEM, was discussed in the initial planning meeting in order to develop a specific group of hazards to address in the planning effort. The 2013 State Plan Update was also used as a guidance document, along with FEMA materials, in the development of the City of La Feria Plan.

INCORPORATION OF THE HMAP INTO OTHER PLANNING MECHANISMS

Planning Team members will integrate implementation of the Plan with other planning mechanisms for the City of La Feria, such as the Emergency Operations Plan. Existing plans for the City will be reviewed in light of the Plan, and incorporated into the hazard mitigation plan, as appropriate. This section discusses how the Plan will be implemented by the City. It also addresses

how the Plan will be evaluated and improved over time, and how the public will continue to be involved in the hazard mitigation planning process.

The City of La Feria will be responsible for implementing its mitigation actions contained in Section 21. Each hazard mitigation action has been assigned to a specific person or local government office that is responsible for tracking and implementing the action.

A funding source has been listed for each identified action. This source may be used when the jurisdiction begins to seek funds to implement the action. An implementation time period has also been assigned to each action as an incentive and to determine whether actions are implemented on a timely bases.

The City of La Feria will integrate hazard mitigation actions contained in the Plan with existing planning mechanisms such as annual budget reviews, comprehensive plans, emergency response or disaster response plans, local ordinances and protocols, evacuation plans, and regional planning efforts.

Upon formal adoption of the Plan, Planning Team members will review existing plans, along with building codes to guide development and ensure that hazard mitigation actions are implemented. The City of La Feria will be responsible for coordinating period review of the Plan with members of the Advisory Committee to ensure integration of hazard mitigation strategies into these planning mechanisms and codes. The Planning Team will also conduct periodic reviews of various existing planning mechanisms and analyze the need for any amendments or updates in light of the approved Plan. The City of La Feria will ensure that future long-term planning objectives will contribute to the goals of the Plan to reduce the long-term risk to life and property from hazards. Within one year of formal adoption of the Plan, existing planning mechanisms will be reviewed and analyzed as they pertain to the Plan.

Planning Team members will review and revise, as necessary, the long-range goals and objectives in its strategic plan and budgets to ensure that they are consistent with the Plan.

Further, the City of La Feria will work with neighboring jurisdictions to advance the goals of the Plan as it applies to ongoing, long-range planning goals and actions for mitigating risk to natural hazards throughout the planning area.

Table 2-3 identifies types of planning mechanisms and examples of methods for incorporating the Plan into other planning efforts.

TABLE 2-3. EXAMPLES OF METHODS OF INCORPORATION

PLANNING MECHANISM	METHOD OF INCORPORATION
Grant Applications	The City will consult the Plan whenever there are yearly grant funding cycles available through FEMA, including the Pre-Disaster Mitigation (PDM) cycle, and when there is a Disaster Declaration for Texas triggering Hazard

PLANNING MECHANISM	METHOD OF INCORPORATION
	Mitigation Grant Program (HMGP) funds. Mitigation actions will be reviewed by the planning team members and information will be updated for completing applications, such as maps and risk assessment data. If a project is not in the Plan, an amendment may be developed.
Annual Budget Review	The City will review the Plan and mitigation actions therein when conducting its annual budget review. When allocating funds for upcoming operating and construction budgets, high priority mitigation actions will be reviewed during City Council meetings. Each identified staff member/planning Team member will be responsible for bringing mitigation actions to the meeting to discuss feasibility of the potential project in terms of the availability of funds, grant assistance, and preliminary cost benefit review.
Emergency Planning	The Plan will be consulted during updates to the local emergency and/or disaster recovery plan. Risk assessment and vulnerability data will be pulled from the plan and analyzed in conjunction with the review, renewal, or re-writing of an Emergency Operations or Management Plan. This data will either be included within the new emergency planning mechanism or included as an appendix. Mitigation projects that relate to prevention and protection will also be reviewed for relevance to determine if they should be included.
Comprehensive/Capital Improvements	Before any updates to the Comprehensive/Capital Improvement Plans (CIP) are conducted, the City will review the risk assessment and mitigation strategy sections of the Plan, as limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments. Profile information and data regarding National Flood Insurance Program (NFIP) compliance and maintenance will be reviewed in conjunction with any CIP that is developed. If new census or land use data is available, this information should be added to the Plan Update.

PLANNING MECHANISM	METHOD OF INCORPORATION
Floodplain Management Plan and Fire Protection	The Plan will be utilized in updating and maintaining floodplain management and fire protection plans, as the goals of both planning mechanisms are similar. In updating or maintaining these plans, the Plan will be consulted for NFIP compliance, flood risk, wildfire risk, and extent. Information from these sections will be reviewed for inclusion. In addition, mitigation actions that address wildfire and flood will be reviewed for inclusion.

Based on the results of the completed Capability Assessments, the City of La Feria also described methods for achieving mitigation in the future by expanding on their existing capabilities. Some options for improving capabilities would include the following:

- Establish Planning Team members with the authority to monitor the Plan and identify grant funding opportunities for expanding staff.
- Identifying opportunities for cross-training or increasing the technical expertise of staff by attending free training available through FEMA and the Texas Division of Emergency Management (TDEM) by monitoring classes and availability through preparedtexas.org.
- Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes.
- Developing ordinances that will require all new developments to conform to the highest mitigation standards.

Appendix F provides an overview of Planning Team members' existing planning and regulatory capabilities to support implementation of mitigation strategy objectives. Appendix F also provides further analysis of how each intends to incorporate hazard mitigation actions into existing plan, policies, and the annual budget review as it pertains to prioritizing grant applications for funding and implementation of identified hazard mitigation projects.

PLAN REVIEW AND PLAN UPDATE

As with the development of this Plan, the City of La Feria will oversee the review and update process for relevance and to make adjustments, as necessary. At the beginning of each fiscal year, Team Members will meet to evaluate the Plan and review other planning mechanisms to ensure consistency with long-range planning efforts. In addition, planning participants will also meet twice a year to re-evaluate prioritization of the hazard mitigation actions.

TIMELINE FOR IMPLEMENTING MITIGATION ACTIONS

Planning Team members will engage in discussions regarding a timeframe for how and when to implement each mitigation action. Considerations include when the action will be started, how existing planning mechanisms' timelines affect implementation, and when the action should be fully implemented. Timeframes may be general, and there will be short, medium, and long term

goals for implementation based on prioritization of each action, as identified on individual Mitigation Action worksheets included in the Plan for the City of La Feria.

The Planning Team will evaluate and prioritize the most suitable mitigation actions for the community to implement. The timeline for implementation of actions will partially be directed by the city's comprehensive planning process, capital improvements plan, budgetary constraints, and community needs. The City of La Feria is committed to addressing and implementing hazard mitigation actions that may be aligned with and integrated into the Plan.

Overall, the Planning Team is in agreement that goals and actions of The Plan shall be aligned with the timeframe for implementation of mitigation actions with respect to annual review and updates of existing plans and policies.

STAKEHOLDER AND PUBLIC INVOLVEMENT

An important component of mitigation planning is public participation and stakeholder involvement. Input from individual citizens and the community as a whole provides the Planning Team with a greater understanding of local concerns, and increases the likelihood of successfully implemented mitigation actions. If citizens and stakeholders, such as local businesses, non-profits, hospitals, and schools are involved, they are more likely to gain a greater appreciation of the hazards present in their community and take steps to reduce their impact.

Public and stakeholder input in the development of the City of La Feria Hazard Mitigation Action Plan was sought at separate periods, throughout the planning process, and prior to official Plan approval and adoption. Input was sought using three methods: (1) open public meetings, (2) survey instruments, and (3) ensuring the draft Plan deliverables were available for public review on the City of La Feria's website and in government offices.

The draft Plan was made available to the general public for review and comment on the City of La Feria's website. The public was notified at the public meetings that the draft Plan would be available on the City's website. No feedback was received on the draft Plan, although feedback was given on the public survey, and all relevant information was incorporated into the Plan.

The 2016 Plan will be advertised and posted on the City of La Feria's website upon approval from FEMA.

STAKEHOLDER INVOLVEMENT

Stakeholders provide an essential service in hazard mitigation planning; therefore, throughout the planning process, members of community groups, local businesses, neighboring jurisdictions, schools, and hospitals were invited to participate. The Stakeholder Working Group (Table A-3, Appendix A, and Table 2-4, below), is formed from a broad range of representatives from both the public and private sector, and served as a key component in the City's outreach efforts for development of the Plan. A list of organizations invited to attend via email may be found below.

TABLE 2-4. STAKEHOLDER WORKING GROUP

ORGANIZATION	TITLE
Aaron's Brake & Alignment	Owner
All Star Family Dentistry	Dentist
American Legion Post #439	Commander
Animal Control	Advisory
Apostolic Faith Tabernacle	Pastor
Assembly Hall of Jehovah's Witnesses	Elder
BBVA Compass Bank	Branch Manager
Christ In Our Midst Church	Pastor
Dios Es Amor United Methodist Church	Pastor
El Centro Foods	Owner
Faith Vision Church	Pastor
First Baptist Church	Pastor
First United Methodist Church	Pastor
The Hair Shoppe I	Owner
Iglesias Apostolic De La Fe En Cristo Jesus	Pastor
Innovative Block of South Texas	Manager
JC Wing Co.	Principal
Kenwood RV Park	Manager
La Feria Chamber of Commerce	President
La Feria Christian Center	Bishop
La Feria Church of Christ	Minister
La Feria Economic Development Corporation	Director
La Feria Economic Development Corporation	President
La Feria Economic Development Corporation	Vice President
La Feria Family Dentistry, P.A.	Dentist
La Feria Independent School District	Principals

ORGANIZATION	TITLE
La Feria Independent School District	School Board Members
La Feria Independent School District	School Board President
La Feria Independent School District	School Board Secretary
La Feria Independent School District	School Board Vice President
La Feria Independent School District	Superintendent
La Feria Industrial Development Corporation	Members
La Feria Industrial Development Corporation	Vice President
La Feria Irrigation District	Director
La Feria Library Board	Board Members
La Feria Library Board	Secretary/Treasurer
La Feria Library Board	Vice President
La Feria News	Editor
La Feria Planning & Zoning Commission	Board Chairman
La Feria Planning & Zoning Commission	Board Members
La Feria Utilities Board	Board Chairman
La Feria Utilities Board	Board Members
La Feria Zoning Board of Adjustments	Board Chairman
La Feria Zoning Board of Adjustments	Board Members
Linebarger Goggan Blair & Sampson, LLP	Partner
Los Amigos Restaurant	Principal
Lower Rio Grande Valley Development Council	Deputy Executive Director
Lower Rio Grande Valley Development Council	Economic Development Director
Lower Rio Grande Valley Development Council	Executive Director
Lulu's Flower & Gift Shop	Owner
Marod Engineering	Engineer
Megamorphosis, Inc.	Architectural Intern
New Hope Presbyterian Church	Pastor

ORGANIZATION	TITLE
Our Lady of the Lake University	Rio Grande Valley Director
Pentecostal Church	Pastor
Primera Iglesia Bautista	Pastor
Rio Grande Valley Shrine Club	Treasurer
Septic Services by R&R	Owner
South Texas Collaborative Housing Development	Directors
South Texas Collaborative Housing Development	Secretary/Treasurer
South Texas Collaborative Housing Development	Vice President
South Texas Emerging Markets Development Fund, Inc.	Directors
South Texas Emerging Markets Development Fund, Inc.	President
South Texas Emerging Markets Development Fund, Inc.	Secretary/Treasurer
South Texas Emerging Markets Development Fund, Inc.	Vice President
St. Francis Xavier Catholic Church	Reverend
State Farm Insurance	Agent
Stewart Planning	Owner
SWG Engineering, LLC	Associate
SWG Engineering, LLC	Project Engineer
SWG Engineering, LLC	Vice President, P.E.
Tax Increment Reinvestment Zone	Board Member
Tax Increment Reinvestment Zone	Chairman
Tax Increment Reinvestment Zone	Vice Chairman
Texas Department of Transportation	Carrier
Texas House of Representatives	State Representatives
Texas Senate	State Senator
Tonie's Flower Shop	Owner
VIP/La Feria RV Park	Managers
Volunteer Committee Member	Volunteer

ORGANIZATION	TITLE
Way of the Cross Baptist Church	Pastor
Yellow Rose Mobile Home Park	Manager

Stakeholders and the general public that attended the various Planning Team and public meetings played a key role in the planning process and were key to identifying areas of concern and potential mitigation actions.

PUBLIC MEETINGS

A series of open public workshops were held at various locations, to collect public and stakeholder input. Topics of discussion for the meetings included the purpose of hazard mitigation, discussion of the planning process, and types of hazards, both natural and human-caused. Representatives from area neighborhood associations were invited to participate, as well as residents located in and around the area. In an effort to further engage the public, the City utilized social media such as Facebook, Twitter, and the local media. Documentation on the public meetings are found in Appendix E.

Public meetings were held on the following dates and locations:

- September 29, 2015, La Feria City Hall
- April 19, 2016, Chaparral Building

PUBLIC PARTICIPATION SURVEY

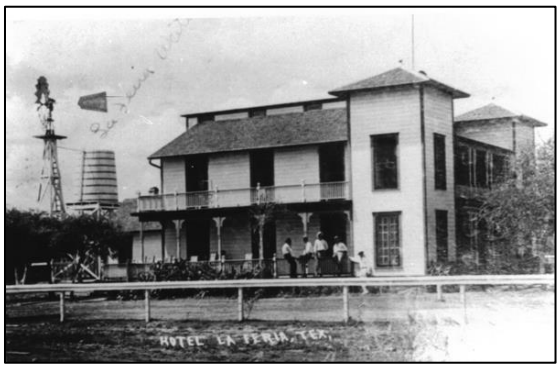
In addition to the open public meetings, the Planning and Consultant Teams developed a public survey designed to solicit input during the planning process from citizens and stakeholders, and to obtain data regarding the identification of any potential hazard mitigation actions or problem areas. The survey was promoted by local officials and a link was made available for citizens to access the survey by visiting the City of La Feria's website. A total of 9 surveys were completed, the results of which are analyzed in Appendix B. The City of La Feria reviewed the input from the surveys and decided which information to incorporate into the Plan as hazard mitigation actions. In response to public input, several hazard mitigation actions were added to the Plan.

SECTION 3: CITY PROFILE

OVERVIEW

The City of La Feria is located in western Cameron County and has a total are of 5.5 square miles, of which 5.4 square miles is land, and 0.1 square miles (1.69%) is water. The area was first settled when the land was assigned by Spain in 1777 to Rosa María Hinojosa de Ballí as part of the La Feria land grant. Several farms were established by the Ballí family with headquarters on the La Feria grant. The family maintained control of the land well into the mid-1800s, and the community that grew up on the grant remained a ranching center into the twentieth century.

In 1909 G.J. Schoenberg, a local land developer, developed the tow of La Feria – that year the post office was opened. The railroad stop named Bixby was established a mile from the town when the St. Louis, Brownsville and Mexico Railway was built through the area in 1911. The following year, the founding father of La Feria stole the Bixby depot and hauled it to the new town site.



La Feria was incorporated in 1933, when its population was 1,594, and it had ninety businesses. In 1960, the town supported the La Feria *News*, three elementary schools, a junior high, a high school, and a population of 3,000. Industries within the town included fruit and vegetable canneries, manufacturers of carnival equipment, cotton trailers, and liquid fertilizer, and three cotton gins.[1]

La Feria has been greatly blessed with tourist trade with the Snowbirds spending their winters in the Valley. At times, the surge of winter snowbirds increases the local population to twice the size of the summer population.

[1] https://tshaonline.org/handbook/online/articles/HGL01

Figure 3-1 shows the general location of the City of La Feria with the surrounding communities and roads that pass through the City.

FIGURE 3-1. LOCATION OF THE CITY OF LA FERIA

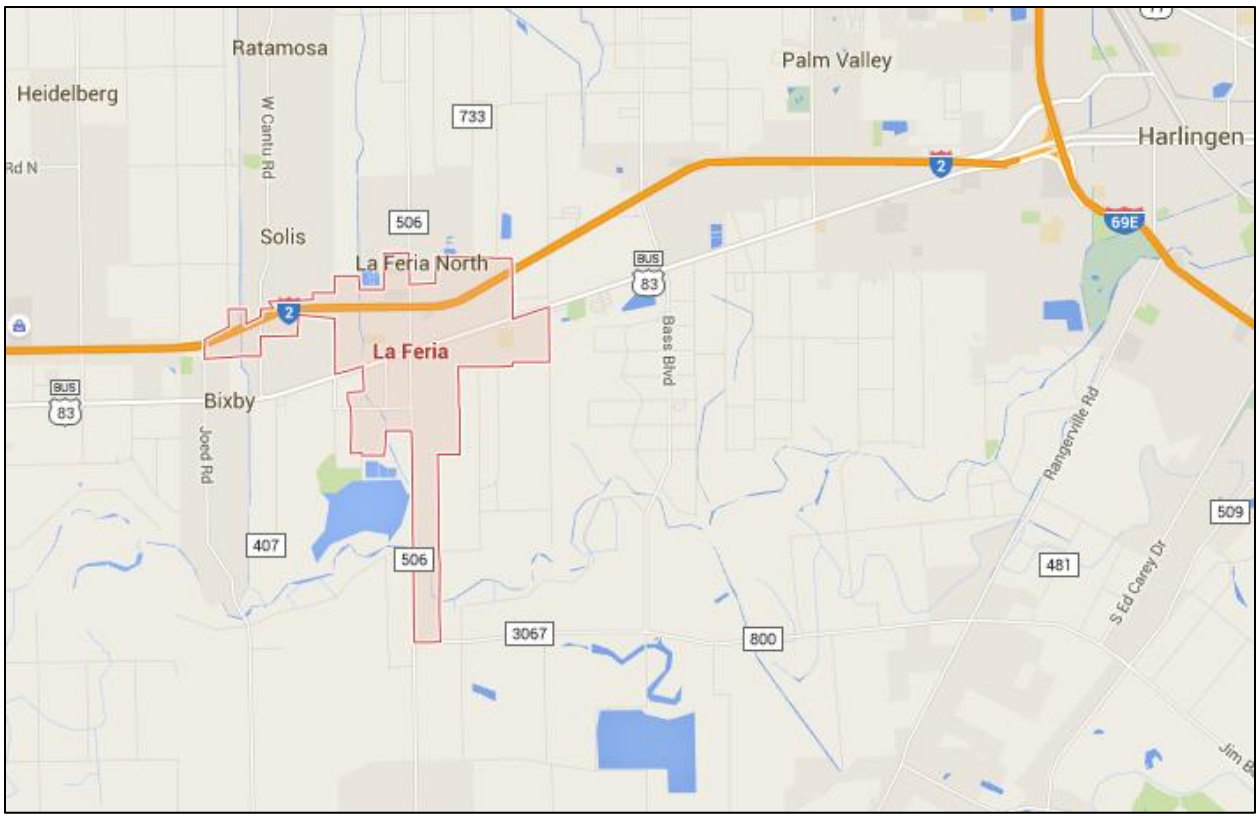
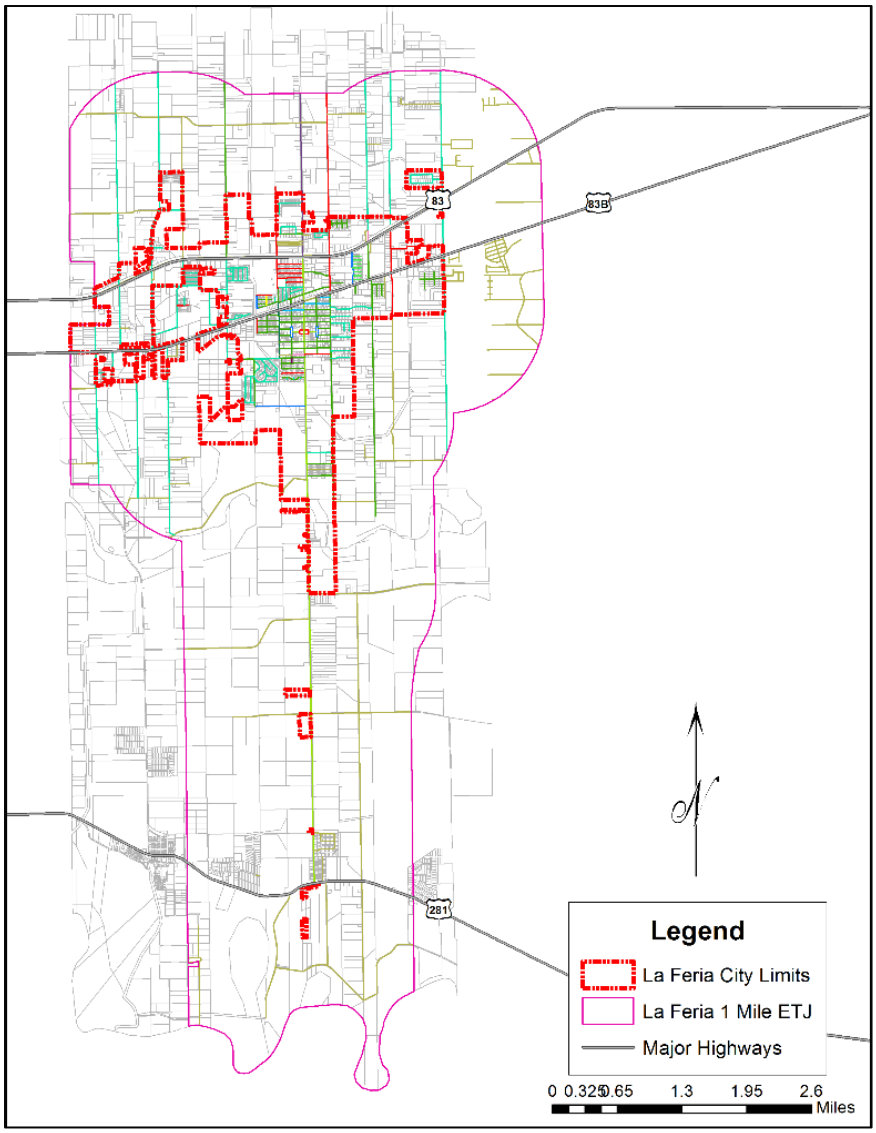


Figure 3-2 shows the La Feria Study Area, including the 1 mile ETJ covered in the risk assessment analysis of the Plan.

FIGURE 3-2. LA FERIA STUDY AREA



POPULATION AND DEMOGRAPHICS

In the official Census population count, as of April 1, 2010, the City of La Feria had a population of 7,302 residents. By July 2013, the number had grown to 7,319, and by July 2015, the population was 7,338. Table 3-2 highlights the special needs populations in the City of La Feria.[2]

Between official U.S. Census population counts, the estimate uses a formula based on new residential building permits and household size. It is simply an estimate and there are many

[2] http://www.census.gov/quickfacts/table/PST045215/4840204,00

variables involved in achieving an accurate estimation of people living in a given area at a given time.

TABLE 3-1. POPULATION DISTRBUTION FOR THE CITY OF LA FERIA

TOTAL 2010 POPULATION	ESTIMATED VULNERABLE OR SENSITIVE POPULATIONS	
	Elderly (Over 65)	Below Poverty Level
7,302	1,174	2,738

POPULATION GROWTH

The official 2010 population for the City of La Feria is 7,302. La Feria experienced an increase in population between 1980 and 2010 by 108.9 percent, or 3,807 people. The City continued to have population growth between 2000 and 2010. Table 3-2 provides historic growth rates in the City of La Feria.

TABLE 3-2. POPULATION FOR THE CITY OF LA FERIA, 1980-2010

1980	1990	2000	2010	POP CHANGE 1980-2010	PERCENT OF CHANGE	POP CHANGE 2000-2010	PERCENT OF CHANGE
3,495	4,360	6,283	7,302	3,807	108.9%	1,019	16.2%

FUTURE DEVELOPMENT

To better understand how future growth and development in the City might affect hazard vulnerability, it is useful to consider population growth, occupied and vacant land, the potential for future development in hazard areas, and current planning and growth management efforts. This section includes an analysis of the projected population change, the number of permits that have been issued throughout the city, and economic impacts.

Population projections from 2010 to 2040 are listed in Table 3-3, as provided by the Office of the State Demographer, Texas State Data Center, and the Institute for Demographic and Socioeconomic Research. Population projections are based on a 0.5 scenario growth rate, which is 50 percent of the population growth rate that occurred during 2000-2010. This information is only available at the County level; however, the population projection shows an increase in population density for the County, which would mean overall growth for the City of La Feria.

TABLE 3-3. CAMERON COUNTY POPULATION PROJECTIONS

COUNTY	LAND AREA (SQ MI)	2010		2020		2030		2040	
		POPULATION							
		Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)
Cameron	1,276	406,220	318.4	479,754	376.0	560,637	439.4	641,946	503.1

ECONOMIC IMPACT

Building and maintaining infrastructure depends on the economy; therefore, protecting infrastructure from risk due to natural hazards in the planning area is important to the City of La Feria. Whether it's expanding culverts under a road that washes out during flash flooding, shuttering a fire station, or flood-proofing a wastewater facility, infrastructure must be mitigated from natural hazards in order to continue providing essential utility and emergency response services in a fast-growing planning area.

Major employers in the area are critical to the health of the economy, as well as effective transportation connectivity.

EXISTING AND FUTURE LAND USE AND DEVELOPMENT TRENDS

The City of La Feria is directed by a Comprehensive Plan, which provides a guide for the physical development of the community by identifying characteristics and features, which influence the community growth patterns. Included in the plan is an analysis of La Feria's historical patterns of development in the areas of housing; population and land use and projections for the City's future. Particular attention is given to the adequacy of each of these major elements for future development needs and how these facilities will affect, and be affected by, future growth.

BUILDING PERMITS

Building permits indicate what types of buildings are being constructed and their relative uses. Table 3-4 lists the number of residential building permits for the City of La Feria that have been granted between 1996 and 2015. The data includes all sizes of family homes for reported permits, as well as the construction costs, to show the potential increase in vulnerability of structures to the various hazards reviewed in the risk assessment. The increase in vulnerability can be attributed to the higher construction costs that would be factored into repairing or replacing a structure using current market values. Permits are reported annually in September; data reflects permits for years 2010, 2011, 2012, 2013, 2014, and 2015 to demonstrate growth rates.

TABLE 3-4. CITY OF LA FERIA RESIDENTIAL BUILDING PERMITS[3]

City of La Feria			
Year	**Buildings**	**Units**	**Construction Cost**
1996	22	22	$1,041,355
2000	30	30	$2,366,012
2005	26	26	$1,670,623
2010	6	6	$782,865
2011	6	6	$782,865
2012	6	6	$1,419,585
2013	7	7	$1,656,182
2014	24	25	$1,875,000
2015	19	19	$1,615,000

[3] http://censtats.census.gov/cgi-bin/bldgprmt/bldgdisp.pl

SECTION 4: RISK OVERVIEW

HAZARD IDENTIFICATION

Section 4 is the first phase of the Risk Assessment, providing background information for the hazard identification process, and descriptions for the hazards identified. The Risk Assessment continues with Sections 5 through 19, which include hazard descriptions and vulnerability assessments.

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, the City of La Feria identified eleven natural hazards and four human-caused hazards that are to be addressed in the Hazard Mitigation Action Plan, or *the Plan*. Of the hazards identified, ten natural hazards and one quasi-technological hazard (dam failure) were identified as significant, as shown in Table 4-1. The hazards were identified through input from Planning Team members, and a review of the current 2013 State of Texas Hazard Mitigation Plan Update (State Plan Update). Readily available online information from reputable sources such as federal and state agencies were also evaluated and utilized to supplement information as needed.

In general there are three main categories of hazards including atmospheric, hydrologic, and technological. Atmospheric hazards are events or incidents associated with weather generated phenomenon. Atmospheric hazards identified as significant for the City of La Feria Planning area include: extreme heat, extreme wind, tornado, hail, hurricane, and winter storm (Table 4-1).

Hydrologic hazards are events or incidents associated with water related damage and account for over 75 percent of Federal disaster declarations in the United States. Hydrologic hazards identified as significant includes flood and drought.

Technological hazards refer to the origins of incidents that can arise from human activities, such as the construction and maintenance of dams. Technological hazards are distinct from natural hazards primarily in that they originate from human activity. The risks presented by natural hazards may be increased or decreased as a result of human activity, however, they are not inherently human-induced. Therefore, dam failure is classified as a quasi-technological hazard, referred to as "technological," in Table 4-1 for purposes of description.

For the purposes of the risk assessment, the wildfire hazard is considered "other," since they may be natural or human-caused, and are neither atmospheric nor hydrologic.

TABLE 4-1. HAZARD DESCRIPTIONS

HAZARD	DESCRIPTION
ATMOSPHERIC	
Extreme Heat	Extreme heat is the condition whereby temperatures hover ten degrees or more above the average high temperature in a region for an extended period.
Hail	Hailstorms are a potentially damaging outgrowth of severe thunderstorms. Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and subsequent cooling of the air mass.
Hurricane	A hurricane is an intense tropical weather system of strong thunderstorms with a well-defined surface circulation and maximum sustained winds of 74 mph or higher.
Lightning	Lightning is a sudden electrostatic discharge that occurs during an electrical storm. This discharge occurs between electrically charged regions of a cloud, between two clouds, or between a cloud and the ground
Thunderstorm Wind	Thunderstorm winds can have gusts of 100 mph or more, and are often accompanied by hail or rain. Windstorms have a broader path that is several miles wide and can cover several counties.
Tornado	A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. Its vortex rotates cyclonically with wind speeds ranging from as low as 40 mph to as high as 300 mph. The destruction caused by tornadoes ranges from light to catastrophic, depending on the intensity, size, and duration of the storm.
Winter Storm	Severe winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Blizzards, the most dangerous of all winter storms, combine low temperatures, heavy snowfall, and winds of at least 35 miles per hour, reducing visibility to only a few yards. Ice storms occur when moisture falls and freezes immediately upon impact on trees, power lines, communication towers, structures, roads, and other hard surfaces. Winter storms and ice storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries to human life.
HYDROLOGIC	
Drought	A prolonged period of less than normal precipitation such that the lack of water causes a serious hydrologic imbalance. Common effects of drought include crop

HAZARD	DESCRIPTION
	failure, water supply shortages, and fish and wildlife mortality.
Flood	The accumulation of water within a body of water, which results in the overflow of excess water onto adjacent lands, usually floodplains. The floodplain is the land adjoining the channel of a river, stream, ocean, lake, or other watercourse or water body that is susceptible to flooding. Most floods fall into the following three categories: riverine flooding, coastal flooding, or shallow flooding.
OTHER	
Wildfire	A wildfire is an uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase the risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by human factors.
TECHNOLOGICAL	
Dam Failure	Dam failure is the collapse, breach, or other failure of a dam structure resulting in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream of the dam.
HUMAN-CAUSED	
Hazardous Materials (Transportation and Fixed-Site)	A hazardous material (as solid, liquid, and/or gaseous contaminants) of flammable or poisonous material that would be a danger to life or to the environment if released without precaution.
Infectious Disease	A clinically evident disease resulting from the presence of pathogenic microbial agents. These infecting agents may be transmitted through liquids, food, bodily fluids, contaminated objects, airborne inhalation, or through vector-borne dissemination.
Pipeline Failure	Fuel pipeline breach or pipeline failure addresses the rare, but serious hazard of an oil or natural gas pipeline that, when breached, has the potential to cause extensive property damage and loss of life.
Terrorism	Incidents involving the application of one or more modes of harmful force to the built environment. These modes may include contamination (chemical, biological, radiological, or nuclear), energy (explosive, arson, electromagnetic waves), or denial of service (sabotage, infrastructure

HAZARD	DESCRIPTION
	breakdown, and transportation service disruption). Terrorism is categorized as one of two types – domestic or international.

Hazards that weren't considered significant and were not included in the Plan are located in Table 4-2, along with the evaluation process used for determining the significance of each of these hazards. Hazards not identified for inclusion at this time may be addressed during future evaluations and updates.

TABLE 4-2. HAZARD IDENTIFICATION PROCESS

HAZARD CONSIDERED	REASON FOR DETERMINATION
Coastal Erosion	The City of La Feria is not located on the coast, therefore coastal erosion does not pose a risk.
Earthquakes	According to the State Plan, an earthquake occurrence for the City of La Feria planning area is considered exceedingly rare. Although a small event is possible, it would pose little to no risk for the area.
Expansive Soils	Expansive soils occurrences and damages are not well documented, however, team members indicate that expansive soils pose little to no risk for the area based on local knowledge and experience.
Land Subsidence	There are no historical occurrences of land subsidence for the City of La Feria planning area and it is located in an area where occurrences are considered rare. The impact would be limited and the frequency of occurrence is unlikely according to the State Plan.

NATURAL HAZARDS AND CLIMATE CHANGE

Climate change is defined as a long-term hazard which can increase or decrease the risk of other weather hazards, and also directly endangers property due to sea level rise and biological organisms due to habitat destruction.

Global climate change is expected to exacerbate the risks of certain types of natural hazards impacted through rising sea levels, warmer ocean temperatures, higher humidity, the possibility of stronger storms and an increase in wind and flood damages due to storm surges. While sea level rise is a natural phenomenon and has been occurring for several thousand years, the general scientific consensus is that the rate has increased fourfold in the past 200 years, from .5 millimeters per year to 2 millimeters per year.

Texas is considered one of the more vulnerable states in the U.S. to both abrupt climate changes and to the impact of gradual climate changes to the natural and built environments. Texas also

has thousands of miles of coastline that are highly vulnerable to the combined impact of sea-level rise and the potential increase of storm intensity.

Mega-droughts can trigger abrupt changes to regional ecosystems and the water cycle, drastically increase extreme summer temperature and fire risk, and reduce availability of the water resources, as Texas experienced during 2011-2012.

Paleoclimate records also show that the climate over Texas had large changes between periods of frequent mega-droughts and the periods of mild droughts that Texas is currently experiencing. While the cause of these fluctuations is unclear, it would be wise to anticipate that such changes could occur again, and may even be occurring now.

The State of Texas will leverage state-of-the-art technologies such as remove sensing and crowd-sourcing and high-resolution digital elevation and climate modeling databases, resulting in a scalable platform that not only disseminates information to the public but allows user-uploaded data to help populate key databases on building and community exposure. Once developed, the system will provide short- and long-term risk information to governments at all levels for prioritizing hazard mitigation and climate adaption policies, as well as to individual homeowners and business owners for self-motivated activities. This system will directly support the objectives of National Oceanic Atmospheric Administration (NOAA) Next Generation Strategic Plan of developing an integrated environment modeling system and fostering partnerships for climate adaption and mitigation. Furthermore, it will advance our capability to assess risk, prepare for, and respond to the impacts of climate change.

The key components of the proposed web-based system consist of:

- Regional maps showing the magnitude of coastal hazards (i.e. flooding, hurricanes, storm surge) based on benchmarks and future projections, including both local subsidence and climate change;
- Exposure databases describing the density of urban development along the coast by land use type;
- Region-specific vulnerability models for building and critical infrastructure;
- Risk indices quantifying relative levels of impact or damage by hazard;
- Community awareness programs guiding local communities on risk management;
- User-friendly interface enabling the public to contribute to the improvement of exposure databases; and
- Real-time and/or simulated feeds of current and future disasters for rapid impact assessment.

The initial focus for database and platform development will be on Texas and Louisiana; however, transferability will be a key consideration when designing the framework, and a long-term implementation plan for other states along the Atlantic and Gulf Coasts will be prepared as part of this project. Project partners sought for this study will include NOAA labs, Department of Homeland Security (DHS), FEMA, National Aeronautics and Space Administration (NASA), local and state governments, universities, and disaster relief organizations.

OVERVIEW OF HAZARD ANALYSIS

The methodologies utilized to develop the Risk Assessment are a historical analysis and a statistical approach. Both methodologies provide an estimate of potential impact by using a common, systematic framework for evaluation.

Records retrieved from National Climatic Data Center (NCDC) and National Oceanic and Atmospheric Administration were reported for the City of La Feria planning area. Remaining records identifying the occurrences of hazard events in the planning area and the maximum recorded magnitude of each event were also evaluated.

The use of geographic information system (GIS) technology to identify and assess risks for the City of La Feria planning area, and evaluate community assets and their vulnerability to the hazards.

The four general parameters that are described for each hazard in the Risk Assessment include frequency of return, approximate annualized losses, a description of general vulnerability, and a statement of the hazard's impact.

Frequency of return was calculated by dividing the number of events in the recorded time period for each hazard by the overall time period that the resource database was recording events. Frequency of return statements are defined in Table 4-3, and impact statements are defined in Table 4-4 below.

TABLE 4-3. FREQUENCY OF RETURN STATEMENTS

PROBABILITY	DESCRIPTION
Highly Likely	Event is probable in the next year.
Likely	Event is probable in the next 3 years.
Occasional	Event is probable in the next 5 years.
Unlikely	Event is probable in the next 10 years.

TABLE 4-4. IMPACT STATEMENTS

POTENTIAL SEVERITY	DESCRIPTION
Substantial	Multiple deaths. Complete shutdown of facilities for 30 days or more. More than 50 percent of property destroyed or with major damage.
Major	Injuries and/or illnesses result in permanent disability. Complete shutdown of critical facilities for at least two weeks. More than 25 percent of property destroyed or with major damage.
Minor	Injuries and/or illnesses do not result in permanent disability. Complete shutdown of critical facilities for more than one week. More than 10 percent of property destroyed or with major damage.
Limited	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 percent of property destroyed or with major damage.

Each of the hazard profiles includes a description of a general Vulnerability Assessment. Vulnerability is the total of assets that are subject to damages from a hazard, based on historic recorded damages. Assets in the region were inventoried and defined in hazard zones where appropriate. The total amount of damages, including property and crop damages, for each hazard is divided by the total number of assets (building value totals) in that community in order to find out the percentage of damage that each hazard can cause to the community.

Once loss estimates and vulnerability were known, an impact statement was applied to relate the potential impact of the hazard on the assets within the area of impact.

HAZARD RANKING

Table 4-5 portrays the results of the planning area's self-assessment for hazard ranking, based on the preliminary results of the risk assessment presented at the Risk Assessment Workshop. This table also takes into account local knowledge regarding frequency of occurrence and the potential impact of each hazard.

TABLE 4-5. HAZARD RISK RANKING

HAZARD	FREQUENCY OF OCCURENCE	POTENTIAL SEVERITY	RANKING
Drought	Highly Likely	Limited	High
Extreme Heat	Likely	Minor	High
Extreme Wind	Highly Likely	Limited	High
Flood	Highly Likely	Limited	High
Hurricane	Likely	Substantial	High
Lightning	Occasional	Limited	High
Winter Storm	Highly Likely	Minor	High
Hail	Unlikely	Limited	Moderate
Tornado	Unlikely	Limited	Moderate
Wildfire	Highly Likely	Limited	Moderate
Hazardous Materials	Likely	Limited	Moderate
Infectious Disease	Unlikely	Substantial	Moderate
Dam Failure/ Levee Break	Unlikely	Substantial	Low
Pipeline Failure	Highly Likely	Limited	Low
Terrorism	Unlikely	Major	Low

SECTION 5: DROUGHT

HAZARD DESCRIPTION

Drought is a period of time without substantial rainfall that persists from one year to the next. Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of anticipated natural precipitation reduction over an extended period of time, usually a season or more in length. Droughts can be classified as meteorological, hydrologic, agricultural, and socioeconomic. Table 5-1 presents definitions for these different types of drought.

TABLE 5-1. DROUGHT CLASSIFICATION DEFINITIONS[1]

METEOROLOGICAL DROUGHT	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
HYDROLOGIC DROUGHT	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.

[1] *Source: Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy, FEMA*

AGRICULTURAL DROUGHT	Soil moisture deficiencies relative to water demands of plant life, usually crops.
SOCIOECONOMIC DROUGHT	The effect of demands for water exceeding the supply as a result of a weather-related supply shortfall.

Droughts are one of the most complex of all natural hazards as it is difficult to determine their precise beginning or end. In addition, droughts can lead to other hazards such as extreme heat and wildfires. Their impact on wildlife and area farming is enormous, often killing crops, grazing land, edible plants, and even in severe cases, trees. A secondary hazard to drought is wildfire because dying vegetation serves as a prime ignition source. Therefore, a heat wave combined with a drought is a very dangerous situation.

LOCATION

Droughts occur regularly throughout Texas and are a normal condition. However, they can vary greatly in their intensity and duration. There is no distinct geographic boundary to drought; therefore, it can occur throughout the City of La Feria planning area equally.

EXTENT

The Palmer Drought Index is used to measure the extent of drought by measuring the duration and intensity of long-term drought-inducing circulation patterns. Long-term drought is cumulative, with the intensity of drought during the current month dependent upon the current weather patterns plus the cumulative patterns of previous months. The hydrological impacts of drought (e.g., reservoir levels, groundwater levels, etc.) take longer to develop. Table 5-2 depicts magnitude of drought, while Table 5-3 describes the classification descriptions.

TABLE 5-2. PALMER DROUGHT INDEX

DROUGHT INDEX	DROUGHT CONDITION CLASSIFICATIONS						
	Extreme	Severe	Moderate	Normal	Moderately Moist	Very Moist	Extremely Moist
Z Index	-2.75 and below	-2.00 to -2.74	-1.25 to -1.99	-1.24 to +.99	+1.00 to +2.49	+2.50 to +3.49	n/a
Meteorological	-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above
Hydrological	-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above

TABLE 5-3. PLAMER DROUGHT CATEGORY DESCRIPTIONS[2]

CATEGORY	DESCRIPTION	POSSIBLE IMPACTS	PALMER DROUGHT INDEX
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.	-1.0 to -1.9
D1	Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing or imminent, voluntary water use restrictions requested.	-2.0 to -2.9
D2	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.	-3.0 to -3.9
D3	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions.	-4.0 to -4.9
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies.	-5.0 or less

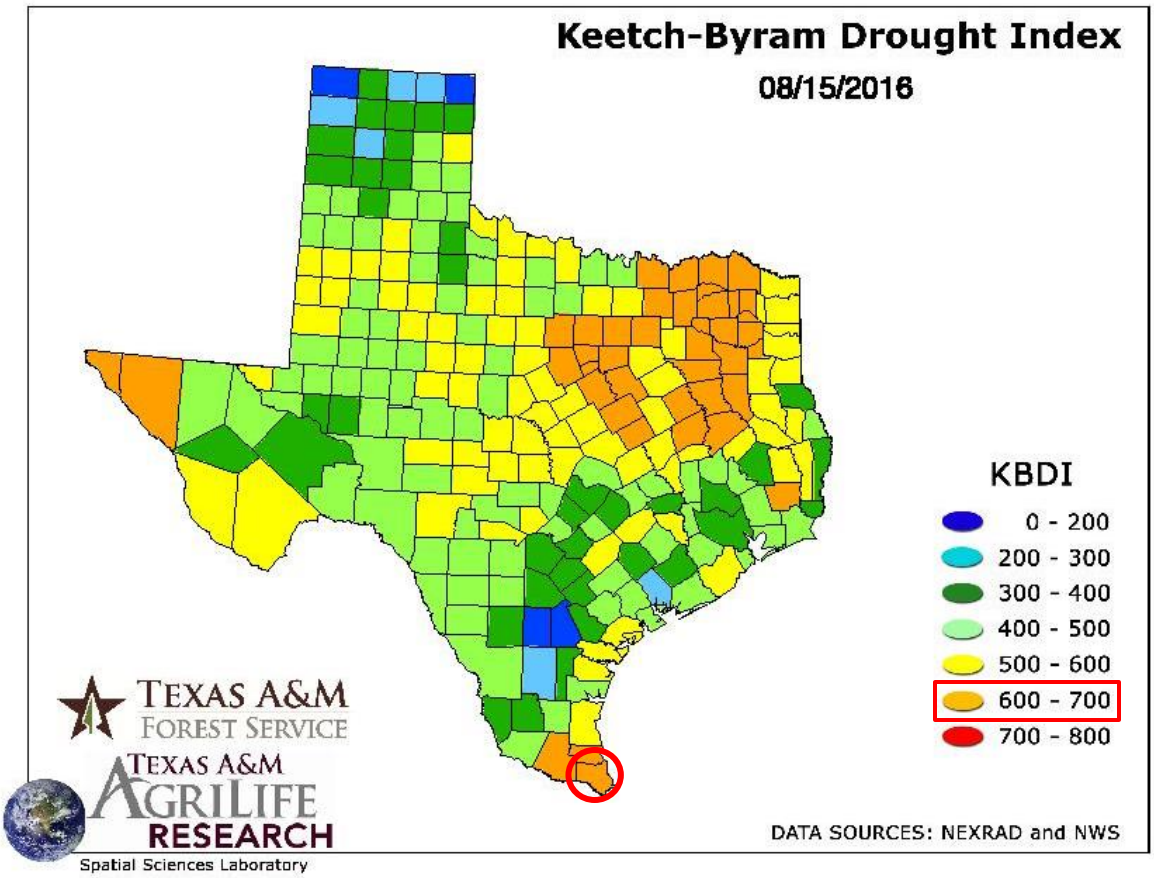
Drought is monitored nationwide by the National Drought Mitigation Center (NDMC). Indicators are used to describe broad scale drought conditions across the U.S. Indicators correspond to the intensity of drought.

Based on the historical occurrences for drought and the location of the City of La Feria in Western Cameron County and part of the Rio Grande delta, the area can anticipate a range of drought from moderate to exceptional, or D1 to D4, based on the Palmer Drought Category.

Texas Forest Service uses the Keetch-Byram Drought Index to determine the fire potential (based on daily water balance 0 precipitation and soil moisture), which uses a rating classification that is color coded with a scale of 0 to 800 (Low risk to high risk). The planning area can experience moderate to severe drought conditions in the summer.

[2] *Source: National Drought Mitigation Center*

FIGURE 5-1. KEETCH-BYRAM DROUGHT INDEX



HISTORICAL OCCURRENCES

The City of La Feria may typically experience an extreme drought. Table 5-4 and 5-5 lists historical events that have occurred in Cameron County, as reported in the National Climatic Data Center (NCDC). Historical drought information, as provided by the NCDC, shows drought activity across a multi-county forecast area for each event; therefore, the drought data for the City of La Feria is included with the Cameron County data. The appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event.

TABLE 5-4. HISTORICAL DROUGHT YEARS, 1996-2016

DROUGHT YEAR
1996
2000
2001
2002
2003
2008
2009
2011
2012
2013
2014
14 unique events

TABLE 5-5. HISTORICAL DROUGHT EVENTS, 1996-2016

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE (2015 Value)
Cameron County	1/1/2001	0	0	$0	$13,274,402
Cameron County	8/18/2009	0	0	$0	$22,958,564
Cameron County	6/1/2011	0	0	$0	$1,935,811
Cameron County	8/23/2011	0	0	$0	$4,918,864
County Totals		**0**	**0**	**$0**	**$43,087,641**
La Feria Totals[3]				**$0**	**$186,569**

SIGNIFICANT PAST EVENTS

January 2001

The United States Department of Agriculture-Farm Service Agency, received a Presidential Disaster Declaration in December of 2000. This declaration was issued for the persistent drought which included 6 counties of south Texas, specifically, Brooks, Jim Hogg, Cameron, Hidalgo, Willacy, and Kenedy counties. Both Zapata and Starr counties received declarations in August of 2000.

The Farm Service Agency estimated approximately 25 million dollars combined in damages in Cameron, Hidalgo, Starr, and Willacy counties. This value does not include Brooks or Jim Hogg counties and does not reflect actual losses or other estimates that any other USDA Agencies may have compiled.

[3] Calculated as a percentage (0.433) of the county

Monthly rainfall departures averaged about a half to an inch below normal in January 2001, the first month of the year. Lack of beneficial rainfall continued to keep much of south Texas in a moderate to severe drought. Storage at Falcon reservoir was 46 feet below conservation level, and 37 feet below conservation at Lake Amistad.

August 2009

Record to near record heat, windy conditions, low humidity, and lack of rainfall allowed the 2009 Drought to peak before the end of August, ensuring massive dryland crop, pastureland, and livestock loss. The Exceptional (D4) drought spread across Cameron County in the middle of the month. The long duration of extreme to exceptional drought, which prevailed for most of July and August, resulted in massive dryland crop and pastureland losses for the entire event. The USDA Farm Service Agency in San Benito reported at the end of August, prior to the September 1 plowing date, was more than $20 million in damage to cotton, corn, sorghum, sugar cane, and pastureland, county-wide. The pattern, featuring a persistent high pressure ridge above the surface from the southwest U.S. through the central Gulf of Mexico, would begin to break at month's end, but the rains were far too little and too late to save much of the crop yield.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, there have been 79 recorded events over 14 extended time periods within a 20 year reporting period. This does not mean that there were 79 separate events. This frequency supports a highly likely probability of future events. Cameron County can experience 3 to 4 months of drought per year. The City of La Feria events is included under the County.

VULNERABILITY AND IMPACT

Loss estimates were based on 20 years of statistical data from the NCDC. A drought event frequency-impact was then developed to determine an impact profile on agriculture products and estimate potential losses due to drought in the area. Table 5-6 shows annualized exposure.

TABLE 5-6. DROUGHT EVENT DAMAGE TOTALS, 1996-2016

JURISDICTION	NUMBER OF EVENTS	PROPERTY DAMAGES (2014 DOLLARS)	CROP DAMAGES (2015 DOLLARS)
Cameron County	14	$0	$43,087,641
COUNTY ANNUALIZED LOSS ESTIMATE:		**$2,154,382**	
LA FERIA ANNUALIZED LOSS ESTIMATE[4]:		**$9,328**	

[4] Calculated as a percentage (0.433) of the county

Drought impacts large areas and crosses jurisdictional boundaries. All existing and future buildings, facilities, and populations are exposed to this hazard and could potentially be impacted. However, drought impacts are mostly experienced in water shortages and crop/livestock losses on agricultural lands and typically have no impact on buildings.

The economic impact of droughts can be significant as they produce a complex web of impacts that spans many sectors of the economy and reach well beyond the area experiencing physical drought. This complexity exists because water is integral to our ability to produce goods and provide services. If droughts extend over a number of years, the direct and indirect economic impact can be significant. In terms of vulnerability, population, agriculture, property, and environment are all vulnerable to drought. The average person will survive only a few days without water, and this timeframe can be drastically shortened for those people with more fragile health – typically children, the elderly, and the ill.

Populations over 65 in the La Feria planning area exceeds 16% of the total population and children under the age of 5 exceed 8% or an estimated total of 1,852[5] potentially vulnerable residents in the planning area based on age. The population is also vulnerable to food shortages when drought conditions exist and potable water is in short supply. Potable water is used for drinking, sanitation, patient care, sterilization, equipment, heating and cooling systems, and many other essential functions in medical facilities.

The following critical facilities would be vulnerable to drought events in the La Feria planning area:

- 6 Government Facilities
- 1 Police Station
- 2 Dome Shelters
- 2 Water Towers
- 2 Water Treatment Facilities
- 2 Fire Departments
- 16 Lift Stations
- 10 Schools (Including ISD Administartion Facilities)
- 2 Pump Stations

Habitat damage is a vulnerability of the environment during periods of drought, for both aquatic and terrestrial species. The environment also becomes vulnerable during periods of extreme or prolonged drought due to severe erosion and land degradation.

Impact of droughts experienced in the City of La Feria planning area has resulted in no injuries and fatalities supporting a limited severity of impact meaning injuries and/or illnesses are treatable with first aid, shutdown of facilities and services for 24 hours or less, and less than 10% of property is destroyed or with major damage. Annualized loss over the 20-year reporting period in La Feria is estimated to be $9,328 annually.

[5] US Census Bureau 2014 data for City of La Feria

ASSESSMENT OF IMPACTS

The drought Impact Reporter was developed in 2005 by the University of Nebraska-Lincoln to provide a national database of drought impacts. Droughts can have an impact on: the agriculture; business and industry; energy; fire; plants and wildlife; relief, response, and restrictions; society and public health; tourism and recreation; and water supply and quality. Table 5-7 lists the drought impacts to Cameron County from 2005 to 2015, based on reports received by the Drought Impact Reporter.

TABLE 5-7. DROUGHT IMPACTS, 2005-2015

DROUGHT IMPACTS 2005-2015	
Agriculture	281
Business & Industry	29
Energy	10
Fire	131
Plants & Wildlife	87
Relief, Response & Restrictions	141
Society & Public Health	84
Tourism & Recreation	7
Water Supply & Quality	84

Drought is frequently associated with a variety of impacts. The planning area may suffer long term economic losses during extended periods of drought. Impacts to the community include:

- Increased law enforcement activities may be required to enforce water restrictions.
- Severe water shortages could result in inadequate supply for human needs as well as lower quality of water for consumption.
- Firefighters may have limited water resources to aid in firefighting and suppression activities, increasing risk to lives and property.
- During drought there is an increased risk for wildfires and dust storms.
- The number of health-related low-flow issues (e.g., diminished sewage flows, increased pollution concentrations, reduced firefighting capacity, and cross-connection contamination) will increase as the drought intensifies.
- Public safety from forest/range/wildfires will increase as water availability and/or pressure decreases.
- Respiratory ailments may increase as the air quality decreases.
- There may be an increase in disease due to wildlife concentrations (e.g., rabies, Rocky Mountain spotted fever, Lyme disease).
- Jurisdictions and residents may disagree over water use/water rights, creating conflict.
- Political conflicts may increase between municipalities, counties, states, and regions.
- Water management conflicts may arise between competing interests.
- The community may need increased operational costs to enforce water restriction or rationing.

- Prolonged drought can lead to increases in illness and disease related to drought.
- Utility providers can see decreases in revenue as water supplies diminish.
- Utilities providers may cut back energy generation and service to their customers to prioritize critical service needs.
- Hydroelectric power generation facilities and infrastructure would have significantly diminished generation capability. Dams simply cannot produce as much electricity from low water levels as they can from high water levels.
- Fish and wildlife food and habitat will be reduced or degraded over time during a drought and disease will increase, especially for aquatic life.
- Wildlife will more to more sustainable locations creating higher concentrations of wildlife in smaller areas, increasing vulnerability and further depleting limited natural resources.
- Severe and prolonged drought can result in the reduction of a species, or cause the extinction of a species altogether.
- Plant life will suffer from long-term drought. Wind and erosion will also pose a threat to plant life as soil quality will decline.
- Dry and dead vegetation will increase the risk of wildfire.
- Land subsidence threat increases as groundwater is depleted.
- Recreational activities that rely on water may be curtailed, such as hunting and fishing, resulting in fewer tourists and lower revenue.
- Drought poses a significant risk to annual and perennial crop production and overall crop quality leading to higher food costs.
- Drought related declines in production may lead to an increase in unemployment.
- Drought may limit livestock grazing resulting in decreased livestock weight, potential increased livestock mortality, and increased cost for feed.
- Negatively impacted water suppliers may face increased costs resulting from the transport water or develop supplemental water resources.
- Long term drought may negatively impact future economic development.

The overall extent of damages caused by periods of drought is dependent on its extent and duration. The level of preparedness and pre-event planning done by government, businesses and citizens will contribute to the overall economic and financial conditions throughout a drought.

SECTION 6: EXTREME HEAT

HAZARD DESCRIPTION

Extreme heat is the condition whereby temperatures hover ten degrees or more above the average high temperature in a region for an extended period. Extreme heat during the summer months is a common occurrence throughout the State of Texas, and Cameron County is no exception. Severe, excessive summer heat is characterized by a combination of excessively high temperatures and exceptionally humid conditions. When these conditions persist over a period of time, it is defined as a heat wave. The City of La Feria planning area typically experience extended heat waves.

Although heat can damage buildings and facilities, it presents a more significant threat to the safety and welfare of citizens. The major human risks associated with severe summer heat include: heat cramps; sunburn; dehydration; fatigue; heat exhaustion; and even heat stroke. The most vulnerable population to heat casualties are children and the elderly or infirmed, who frequently live on low fixed incomes and cannot afford to run air-conditioning on a regular basis. This population is sometimes isolated, with no immediate family or friends to look out for their well-being.

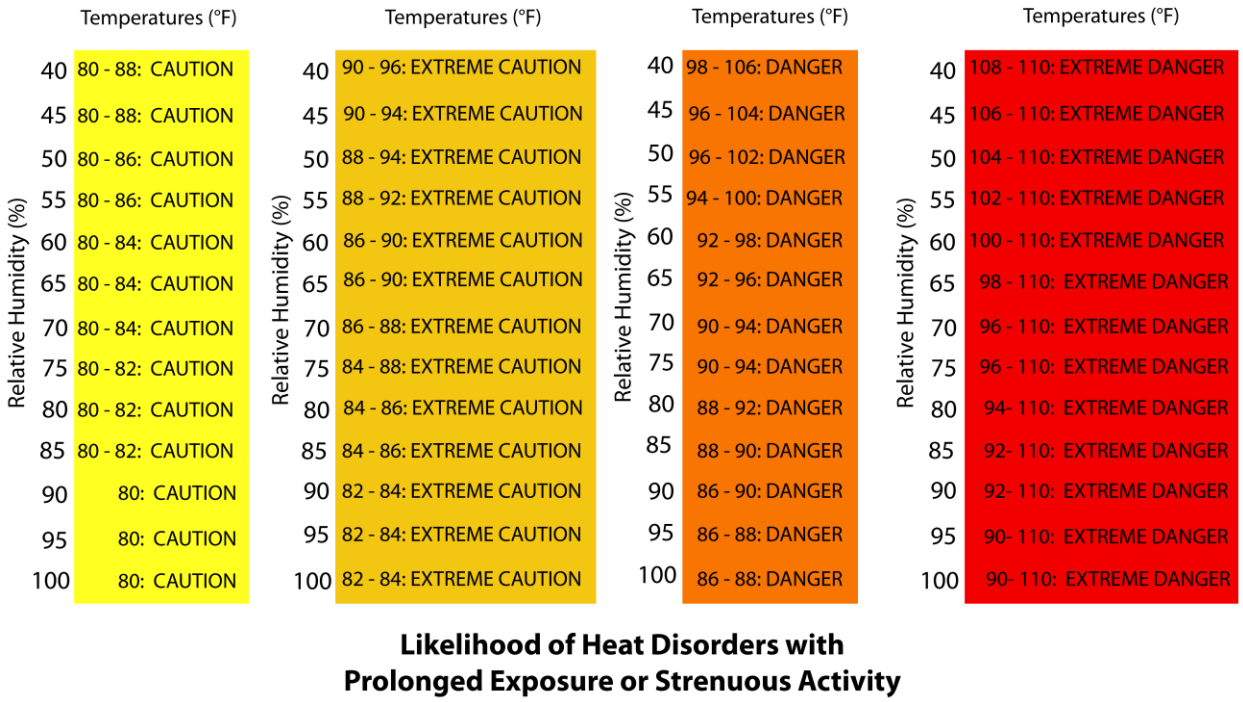
LOCATION

Though injuries or deaths from extreme heat have been recorded at different locations throughout the planning area, there is no specific geographic scope to the extreme heat hazard. Extreme heat could occur anywhere within the City of La Feria planning area.

EXTENT

The magnitude or intensity of an extreme heat event is measured according to temperature in relation to the percentage of humidity. According to the National Oceanic Atmospheric Administration (NOAA), this relationship is referred to as the "Heat Index," and is depicted in Figure 6-1. This index measures how hot it feels outside when humidity is combined with high temperatures.

FIGURE 6-1. EXTENT SCALE FOR EXTREME SUMMER HEAT[1]



The Extent Scale in Figure 6-1 displays varying categories of caution depending on the relative humidity combined with the temperature. For example, when the temperature is at 90 degrees Fahrenheit (F) or lower, caution should be exercised if the humidity level is at or above 40 percent.

The shaded zones on the chart indicate varying symptoms or disorders that could occur depending on the magnitude or intensity of the event. "Caution" is the first category of intensity and it indicates when fatigue due to heat exposure is possible. "Extreme Caution" indicates that sunstroke, muscle cramps or heat exhaustion are possible, and a "Danger" level means that these symptoms are likely. "Extreme Danger" indicates that heat stroke is likely. The National Weather Service (NWS) initiates alerts based on the Heat Index as shown in Table 6-1.

[1] *Source: NOAA*

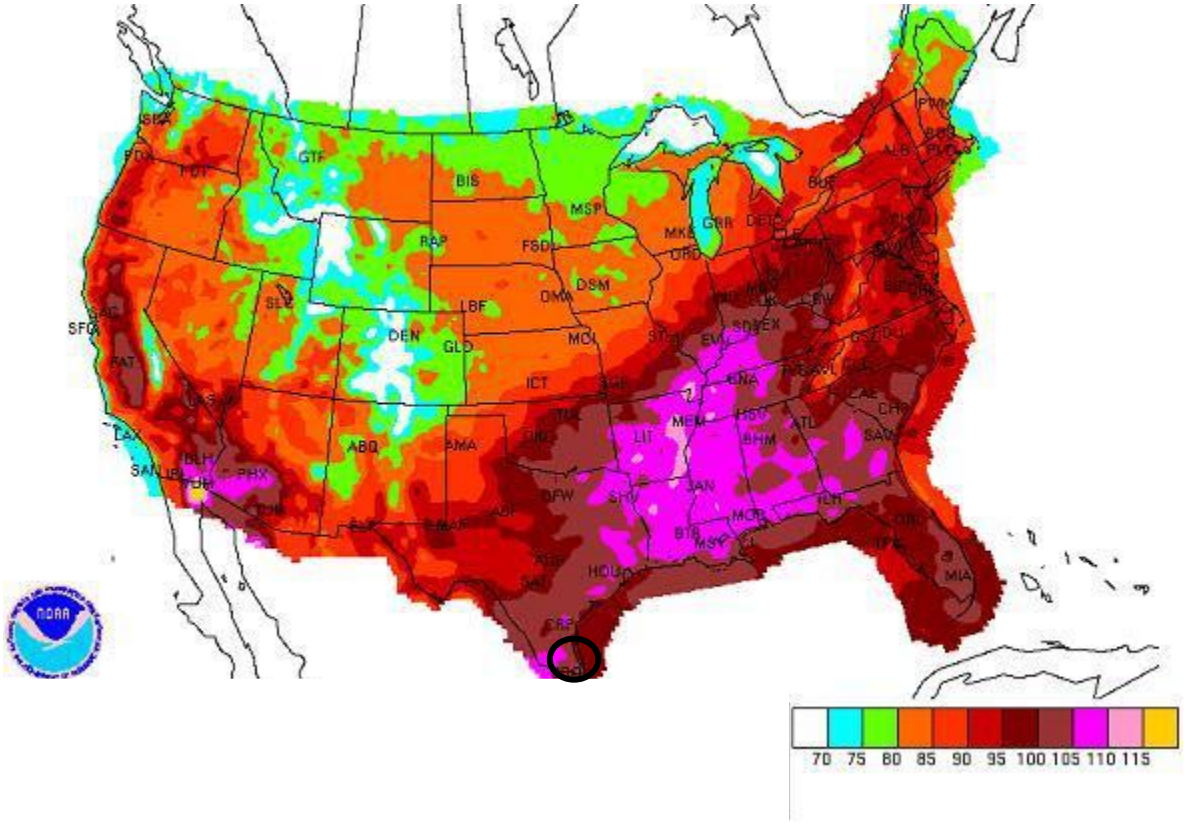
TABLE 6-1. HEAT INDEX & WARNINGS

CATEGORY	HEAT INDEX	POSSIBLE HEAT DISORDERS	WARNING TYPE
Extreme Danger	125°F and higher	Heat stroke or sun stroke likely.	A heat advisory will be issued to warn that the Heat Index may exceed 105°F.
Danger	103 – 124°F	Sunstroke, muscle cramps, and/or heat exhaustion are likely. Heatstroke possible with prolonged exposure and/or physical activity.	
Extreme Caution	90 – 103°F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.	An Excessive Heat Warning is issued if the Heat Index rises above 105°F at least 3 hours during the day or above 80°F at night.
Caution	80 – 90°F	Fatigue is possible with prolonged exposure and/or physical activity.	

Most of the County is a flat plain, gently sloping to the northeast. The area is known as the Rio Grande Plains in South Texas. The vegetation along the eastern coast is typical Gulf Prairie and Marsh areas, the majority being marsh grasses, bluestems, and grama grasses. The rest of the County has small trees, brush, and weeds. There are a few naturally occurring trees, the majority of which are mesquite and oaks. Due to its geography, and its subtropical and sub-humid climate, the City of La Feria planning area can expect an extreme heat event each summer. Citizens, especially children and the elderly should exercise caution by staying out of the heat for prolonged periods when a heat advisory or excessive heat warning is issued. Also at risk are those working or remaining outdoors.

Figure 6-2 displays the daily maximum heat index as derived from NOAA based on data compiled from 1838 to 2015. The black circle shows the City of La Feria planning area. The color purple indicates a daily maximum heat index of 105 to 110 degrees F. The entire planning area could experience extreme heat from 100° to more than 105° and should mitigate to the extent of "danger", which can include sunstroke, muscle cramps, and heat exhaustion.

FIGURE 6-2. AVERAGE DAILY MAXIMUM HEAT INDEX DAYS[2]



HISTORICAL OCCURRENCES

Every summer, the hazard of heat-related illness becomes a significant public health issue throughout much of the US. Mortality from all causes increases during heat waves, and excessive heat is an important contributing factor to deaths from other causes, particularly among the elderly. Preliminary data suggest that by August 21, 2009, record high summer temperatures in Texas resulted in more than 120 heat-related deaths statewide. The United States Immigration and Naturalization Service reported that 51 foreign nationals died along the Texas/Mexico border though none of the reported deaths occurred in Cameron County. Table 6-2 depicts historical occurrences of mortality from heat from 1994 to 2004 from the Texas Department of State Health Services, and 2005 to 2016 from the NCDC database.

[2] *Source: NRDC; the black circle indicates the City of La Feria planning area*

TABLE 6-2. EXTREME HEAT RELATED DEATHS IN TEXAS

YEAR	DEATHS
1994	1
1995	12
1996	10
1997	2
1998	66
1999	22
2000	71
2001	20
2002	1
2003	0
2004	3
2005	49
2006	2
2007	2
2008	7
2009	6
2010	4
2011	20
2012	2
2013	2
2014	0
2015	5
2016	0

Because the Texas Department of State Health Services reports on total events statewide, previous occurrences for extreme heat are derived from the NCDC and SHELDUS databases. According to

heat related incidents located solely within Cameron County there are five heat waves[3] on record for Cameron County (Table 6-3).

TABLE 6-3. HISTORICAL EXTREME HEAT EVENTS, 1996-2016

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	5/22/2008	0	0	$0	$0
Cameron County	6/12/2009	1	0	$0	$0
Cameron County	7/6/2009	0	0	$0	$0
Cameron County	7/30/2009	0	0	$0	$0
Cameron County	8/20/2009	0	0	$0	$0

SIGNIFICANT PAST EVENTS

July 31, 2009

Heat index values held between 103 and 108 for most July days in the Rio Grande Valley between Cameron and Zapata County. The heat index rose above critical values towards the end of the month. At the Lower Rio Grande Valley National Wildlife Refuge along the extreme southeast Hidalgo and southwest Cameron County line, heat index peaked at 11. Duration of the critical heat index was from 2 to 4 hours each afternoon; overnight temperatures largely remained near or above 80.

PROBABILITY OF FUTURE EVENTS

According to historical records, the planning area has experienced 5 events in a 20 year reporting period. This provides a frequency of occurrence of 1 event every three years. This frequency supports a likely probability of future events.

VULNERABILITY AND IMPACT

There is no defined geographic boudary for extreme heat events. While the City of La Feria is exposed to extreme temperatures; existing buildings, infrastructure and critical facilities are not likely to sustain significant damage from extreme heat events. Therefore, any estimated property losses associated with the extreme heat hazard are anticipated to be minimal across the area.

Extreme temperatures do however present a significant threat to life and safety for the population of the area as a whole. Heat casualties for example are typically caused by a lack of adequate

[3] *Even though the County experiences heat waves each summer, NCDC only records events reported. Based on reports, only five events are on record.*

air-conditioning or heat exhaustion. The most vulnerable population to heat casualties are the elderly or infirmed, who frequently live on low fixed incomes and cannot afford to run air-conditioning on a regular basis. This population is sometimes isolated, with no immediate family or friends to look out for their well-being.

Populations 65 and older in the La Feria planning area exceeds 16% of the total population or an estimated total of 1,220[4] potentially vulnerable residents in the planning area based on age.

Students in the Independent School Districts are also susceptible as sporting events and practices are often held outside during early fall or late spring when temperatures are at the highest. Another segment of the population at risk are those whose jobs consist of strenuous labor outdoors. Additionally, Livestock and crops can become stressed, decreasing in quality or in production, during times of extreme heat.

Extreme high temperatures can have significant secondary impacts, leading to droughts, water shortages, increased fire danger, and prompt excessive demands for energy. The possibility of rolling blackouts increases with unseasonably high temperatures in what is a normally mild month with low power demands.

Typically more than 12 hours of warning time would be given before the onset of an extreme heat event. Only minor property damage would result. The potential impact of excessive summer heat is considered "Minor" as injuries and/or illnesses do not result in permanent disability.

Impact of extreme heat experienced in the area has a substantial severity as there has been a death reported near the planning area; although in terms of structures, the impact from extreme heat would be negligible. It is possible that critical facilities and infrastructure could be shut down for 24 hours if cooling units are running constantly, leading to a temporary power outage. Less than ten percent of residential and commercial property could be damaged if extreme heat events lead to structure fires.

The potential impact of extreme heat for the City of La Feria planning area can be considered "Minor," resulting in few injuries and minimal disruption to the quality of life. Based on historical records over a 20-year period, annualized losses for the City of La Feria are negligible.

ASSESSMENT OF IMPACTS

The greatest risk from extreme heat is to public health and safety. Potential impacts the community may expect include:

- Vulnerable populations, particularly the elderly and infants, can face serious or life-threatening health problems from exposure to extreme heat including hyperthermia; heat cramps; heat exhaustion; and heat stroke (or sunstroke).

[4] US Census Bureau 2014 data for the City of La Feria

- Response personnel including utility workers, public works personnel, and any other professions where individuals are required to work outside, are more subject to extreme heat related illnesses since their exposure would typically be greater.
- High energy demand periods can outpace the supply of energy, potentially creating the need for rolling brownouts which would elevate the risk of illness to vulnerable residents.
- Highways and roads may be damaged by excessive heat causing asphalt roads to soften and concrete roads to shift or buckle.
- Vehicles engines and cooling systems typically run harder during extreme heat events resulting in increases in mechanical failures.
- Extreme heat events during times of drought can exacerbate the environmental impacts associated with drought, decreasing water and air quality and further degrading wildlife habitat.
- Extreme heat increases ground-level ozone (smog), increasing the risk of respiratory illnesses.
- Tourism and recreational activities may be negatively impacted during extreme heat events, reducing seasonal revenue.
- Food suppliers can anticipate an increase in food costs due to increases in production costs and crop and livestock losses.
- Fisheries may be negatively impacted by extreme heat, suffering damage to fish habitats (either natural or man-made) and a loss of fish and/or other aquatic organisms due to decreased water flows or availability.
- Negatively impacted water suppliers may face increased costs resulting from the transport water or develop supplemental water resources.

The economic and financial impacts of extreme heat on the community will depend on the duration of the event, demand for energy, drought associated with extreme heat, and many other factors. The level of preparedness and the amount of planning done by the jurisdiction, local businesses and citizens will impact the overall economic and financial conditions before, during, and after an extreme heat event.

SECTION 7: FLOOD

HAZARD DESCRIPTION

Floods generally result from excessive precipitation, and the severity of a flood event is determined by a combination of several major factors, including stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surface. Generally, floods are long-term events that may last for several days.

The primary types of general flooding are inland and coastal flooding. Inland or riverine flooding is a result of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Inland or riverine flooding is overbank flooding of rivers and streams, typically resulting from large-scale weather systems that generate prolonged rainfall over a wide geographic area, thus it is a naturally occurring and inevitable event. Some river floods occur seasonally when winter or spring rainfalls fill river basins with too much water, too quickly. Torrential rains from decaying hurricanes or tropical systems can also produce river flooding.

Coastal flooding occurs when normally dry, low-lying land is flooded by seawater. The extent of coastal flooding is a function of the elevation inland flood waters penetrate which is controlled by the topography of the coastal land exposed to flooding.

Coastal flooding is largely a natural event, however human influence on the coastal environment can exacerbate coastal flooding. Extraction of water from groundwater reservoirs in the coastal zone can enhance subsidence of the land increasing the risk of flooding. Engineered protection structures along the coast such as sea walls alter the natural processes of the beach, often leading

to erosion on adjacent stretches of the coast which also increases the risk of flooding. Coastal flooding is covered in detail under the profile for Hurricanes.

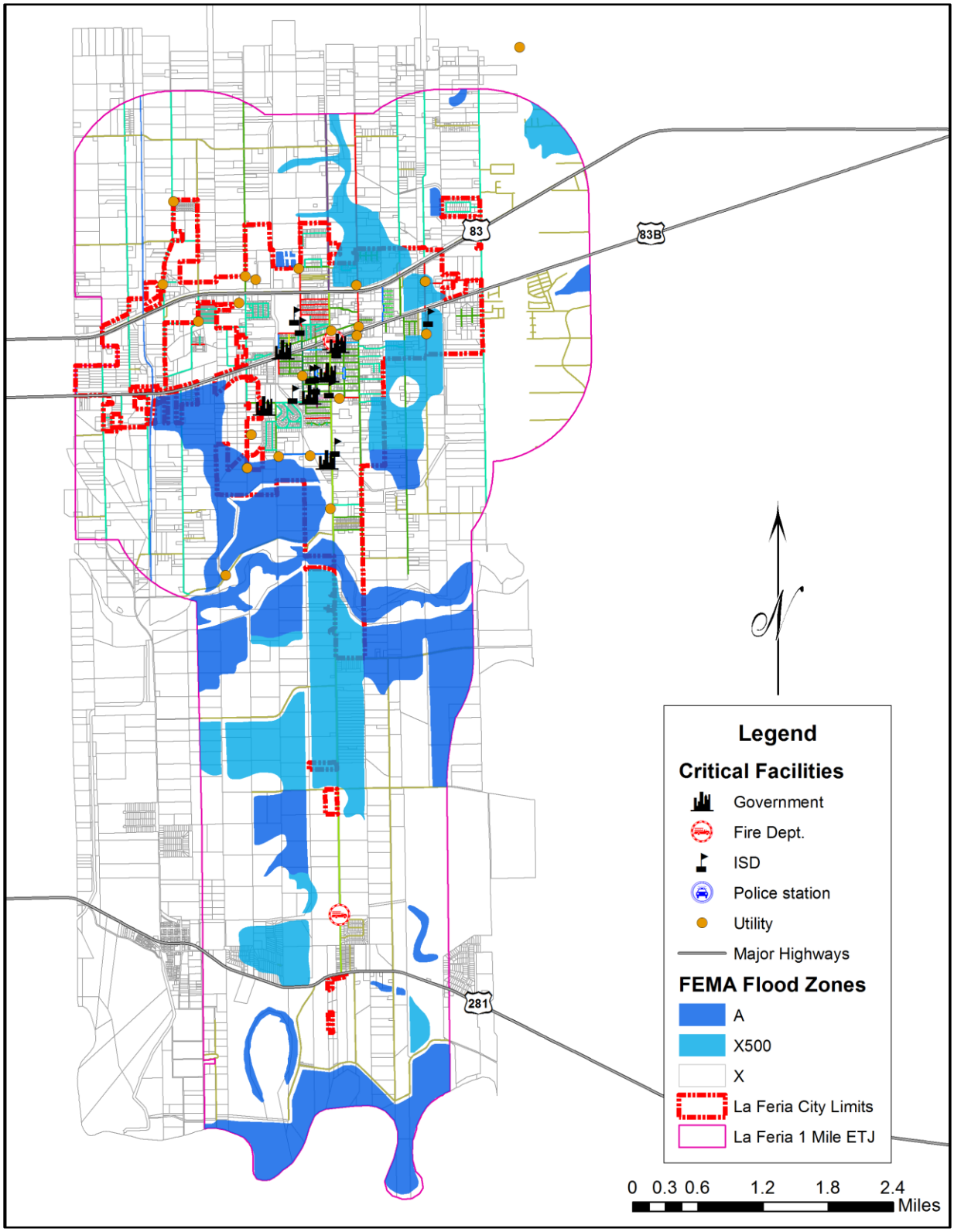
LOCATION

The Digital Flood Insurance Rate Mate (DFIRM) data provided by FEMA for the City of La Feria planning area shows the following flood hazard areas:

- Zone A: Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance requirements and floodplain management standards apply.
- Zone X: Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones.

Locations of flood zones in the planning area based on the digital Flood Insurance Rate Map (DFIRM) from FEMA are illustrated in Figure 7-1.

FIGURE 7-1. ESTIMATED FLOOD ZONES CITY OF LA FERIA



EXTENT

The severity of a flood event is determined by a combination of several factors including: stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and degree of vegetative clearing and impervious surface. Typically, floods are long-term events that may last for several days.

Determining the intensity and magnitude of a flood event is dependent upon the flood zone and location of the flood hazard area in addition to depths of flood waters. Extent of flood damages can be expected to be more damaging in the areas that will convey a base flood. FEMA categorizes areas on the terrain according to how the area will convey flood water. Flood zones are the categories that are mapped on Flood Insurance Rate Maps. Table 7-1 provides a description of FEMA flood zones and the flood impact in terms of severity or potential harm. Flood Zones A and X are the only hazard areas mapped in the region. Figure 7-1 should be read in conjunction with the extent for flooding in Tables 7-1, 7-2, and 7-3 to determine the intensity of a potential flood event.

TABLE 7-1. FLOOD ZONES

INTENSITY	ZONE	DESCRIPTION
HIGH	ZONE A	Areas with a one percent annual chance of flooding and a 26 percent 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 A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a Base Flood Elevation (BFE) (old format).
	ZONE AE	The base floodplain where base flood elevations are provided. AE Zones are now used on the new format FIRMs instead of A1-A30 Zones.
	ZONE AO	River or stream flood hazard areas and areas with a one percent 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 percent chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
	ZONE AH	Areas with a one percent annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from one to three feet. These areas have a 26 percent chance

INTENSITY	ZONE	DESCRIPTION
		of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
	ZONE A99	Areas with a one percent annual chance of flooding that will be protected by a federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.
	ZONE AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
MODERATE to LOW	ZONE X 500	An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than one foot or with drainage areas less than one square mile; or an area protected by levees from 100-year flooding.

Zone A is interchangeably referred to as the 100-year flood, the one-percent-annual chance flood, or the Special Flood Hazard Area (SFHA), or more commonly, the base flood. This is the area that will convey the base flood and constitutes a threat to the planning area. The impact from a flood event can be more damaging in areas that will convey a base flood.

Structures built in the SFHA are subject to damage by rising waters and floating debris. Moving flood water exerts pressure on everything in its path and causes erosion of soil and solid objects. Utility systems, such as heating, ventilation, air conditioning, fuel, electrical systems, sewage maintenance systems and water systems, if not elevated above base flood elevation, may also be damaged.

The intensity and magnitude of a flood event is also determined by the depth of flood waters. Table 7-2 below describes the category of risk and potential magnitude of an event in correlation to water depth. The water depths depicted in Table 7-2 are an approximation based on elevation data (above sea level). Table 7-3 describes the extent associated with stream gauge data provided by the United States Geological Survey (USGS).

TABLE 7-2. EXTENT SCALE – WATER DEPTH (MEAN SEA LEVEL, MSL)

SEVERITY	MSL (in feet)	DESCRIPTION
BELOW FLOOD STAGE	0 to 15	Water begins to exceed low sections of banks and the lowest sections of the floodplain.
ACTION STAGE	16 to 23	Flow is well into the floodplain, minor lowland flooding reaches low areas of the floodplain. Livestock should be moved from low lying areas.
FLOOD STAGE	24 to 28	Homes are threatened and properties downstream of river flows or in low lying areas begin to flood.
MODERATE FLOOD STAGE	29 to 32	At this stage the lowest homes downstream flood. Roads and bridges in the floodplain flood severely and are dangerous to motorists.
MAJOR FLOOD STAGE	33 and above	Major flooding approaches homes in the floodplain. Primary and secondary roads and bridges are severely flooded and very dangerous. Major flooding extends well into the floodplain, destroying property, equipment and livestock.

TABLE 7-3. EXTENT FOR CAMERON COUNTY[1]

JURISDICTION	ESTIMATED SEVERITY PER FLOOD EVENT[2]	PEAK FLOOD EVENT
Cameron County	Major Flood Stage, 33 feet and above	Major Action Stage: Rio Grande near San Benito had floodwaters reach 61.05 feet in September 1967, as well as 33.24 feet near Brownsville in September 1942.

The range of flood intensity that the planning area can experience is high, or Zone A. Based on reporting from the USGS, a flood event can place the County at the extent of "Major Flood Stage" as shown in Tables 7-2 and 7-3. Based on historical occurrences, the City of La Feria planning area

[1] *Severity estimated by averaging floods at certain stage level over the history of flood events. City of La Feria dada wasn't available, only Cameron County.*

could expect to experience from 4 to 5 inches of water, causing flooding effects within a 2 hour period.

The data described in Tables 7-1 through 7-3, together with Figure 7-1, and historical occurrences for the area, provides an estimated potential magnitude and severity for the planning area. The City of La Feria, as shown in Figure 7-1, has areas designated as Zone A. Reading this figure in conjunction with Table 7-1 means the area is an area of high risk for flood.

HISTORICAL OCCURRENCES

Historical evidence indicates that areas within the planning area are susceptible to flooding, especially in the form of flash flooding. It is important to note that only flood events that have been reported have been factored into this risk assessment, therefore it is likely that additional flood occurrences have gone unreported before and during the recording period. Table 7-4 identifies historical flood events that resulted in damages, injuries, or fatalities within the City of La Feria planning area.

Historical Data is provided by the Storm Prediction Center (NOAA), and NCDC databases for Cameron County. Historical events reported at the county level were utilized to estimate the damages for the La Feria planning area. Cameron County property damages for the analysis period totaled $271,330,351 and crop damages totaled $98,742,238. Table 7-5 provides the historical flood event summary reported for the planning area as well as estimated damages taken from the total reported county damages.

TABLE 7-4. HISTORICAL FLOOD EVENTS, 1960-2016

JURISDICTION	DATE	TIME	PROPERTY DAMAGE (2015 DOLLARS)	CROP DAMAGE (2015 DOLLARS)
La Feria	8/23/2008	3:00 PM	$5,526	$0
La Feria	8/27/2008	2:17 PM	$1,105	$0

TABLE 7-5. SUMMARY OF HISTORICAL FLOOD EVENTS, 1960-2016

JURISDICTION	EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE (2015 DOLLARS)	CROP DAMAGE (2015 DOLLARS)
La Feria (Reported)	2	0	0	$6,631	$0
La Feria (Estimated)[3]	81	0	0	$1,174,860	$427,554
Total Losses				**$1,609,045**	

[3] Calculated as a percentage (0.433) of the reported county damages

SIGNIFICANT EVENTS

Flash Flood on August 23, 2008 – La Feria

Three separate intense thunderstorm cells developed near the Cameron/Hidalgo County line just north of the Rio Grande on the afternoon August 23, each tracking northward and dumping heavy rains over western Cameron County, generally between Santa Maria and La Feria. Doppler radar estimated 4 to 5 inches of rainfall over prior flooded poor drainage areas from Hurricane Dolly, exactly a month earlier, over and just south of La Feria. It is likely that additional flooding developed in poor drainage areas affected by the heavy rainfall.

Flash Flood on September 19, 2010 – Cameron County

Upper level energy, low level convergence, and a possible overnight low level jet stream of extremely moisture laden air from the Gulf of Mexico produced prolonged torrential rains across south central Cameron County September 19th. The area shifted to the east and northeast by early morning, but not before dumping 5 to 7 inches of rain from Brownsville to San Benito and creating extensive flooding, impacting 100 or more structures, particularly in poorly draining areas. Dozens of roads were closed temporarily or, in some cases, through the day. Though the rains ended between 8 and 9 AM CST, significant poor drainage flooding continued through 11 AM CST and pockets of flooding remained into the morning of September 20th. Dozens of pumps equipment were borrowed from Hidalgo County to assist with clearing water in poor drainage locations for the next few days. Damage estimates for the event exceeded five million. No fatalities or injuries were reported as a direct consequence of the rains.

PROBABILITY OF FUTURE EVENTS

Based on recorded historical occurrences and extent within the City of La Feria planning area, flooding was determined to be "Highly Likely" meaning an event is probable within the next year.

VULNERABILITY AND IMPACT

A property's vulnerability to a flood depends on its location and proximity to the floodplain. Structures that lie along banks of a waterway are the most vulnerable and are often repetitive loss structures.

The City encourages development outside of the floodplain, although there are some critical facilities, homes, and businesses already located in the floodplain.

Critical facilities in the planning area that are located in the floodplain and are vulnerable to flooding include:

- 1 School
- 4 Lift Stations

The severity of a flooding event varies depending on the relative risk to citizens and structures located within each city. Impact of floods experienced in the City of La Feria has resulted in no

injuries and no fatalities supporting a limited severity of impact meaning shutdown of facilities for 24 hours or less, and less than 10% of property may be destroyed.

Historic loss estimates due to flood are presented in Table 7-6 below. Considering an estimated 83 flood events over a 56-year period, frequency is approximately one to two flood events every year for Cameron County.

TABLE 7-6. POTENTIAL ANNUALIZED LOSSES, 1960-2016

JURISDICTION	FREQUENCY	PROBABILITY OF FUTURE EVENTS	ANNUAL LOSS ESTIMATES (2015 DOLLARS)
La Feria	1.48	Highly Likely	$28,733

ASSESSMENT OF IMPACTS

Flooding is the deadliest natural disaster that occurs in the U.S. each year, and it poses a constant and significant threat to the health and safety of the people in the planning area. Impacts to the planning area can include:

- Flood-related rescues may be necessary at swift water and low water crossings or in flooded neighborhoods where roads have become impassable, placing first responders in harm's way.
- Evacuations may be required for entire neighborhoods because of rising floodwaters, further taxing limited response capabilities and increasing sheltering needs for displaced residents.
- Health risks and threats to residents are elevated after the flood waters have receded due to contaminated flood waters (untreated sewage and hazardous chemicals) and mold growth typical in flooded buildings and homes.
- Significant flood events often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage can result in an increase in structure fires and/or carbon monoxide poisoning, as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- Floods can destroy or make residential structures uninhabitable, requiring shelter or relocation of residents in the aftermath of the event.
- First responders are exposed to downed power lines, contaminated and potentially unstable debris, hazardous materials, and generally unsafe conditions, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Emergency operations and services may be significantly impacted due to damaged facilities.
- Significant flooding can result in the inability of emergency response vehicles to access areas of the community.
- Critical staff may suffer personal losses or otherwise impacted by a flood event and unable to report for duty, limiting response capabilities.

- City or county departments may be flooded, delaying response and recovery efforts for the entire community.
- Private sector entities that the City and its residents rely on, such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Damage to infrastructure may slow economic recovery since repairs may be extensive and lengthy.
- Some businesses not directly damaged by the flood may be negatively impacted while utilities are being restored or water recedes, further slowing economic recovery.
- When the community is affected by significant property damage it is anticipated that funding would be required for infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, as well as normal day-to-day operating expenses.
- Displaced residents may not be able to immediately return to work, further slowing economic recovery.
- Residential structures substantially damaged by a flood may not be rebuilt for years and uninsured or underinsured residential structures may never be rebuilt, reducing the tax base for the community.
- Large floods may result in a dramatic population fluctuation, as people are unable to return to their homes or jobs and must seek shelter and/or work outside of the affected area.
- Large floods may dramatically impact the revenue produced from tourism along the coast, causing further economic loss for the affected communities.
- Businesses that are uninsured or underinsured may have difficulty reopening, which results in a net loss of jobs for the community and a potential increase in the unemployment rate.
- Recreation activities may be unavailable and tourism can be unappealing for years following a large flood event, devastating directly related local businesses and negatively impaction economic recovery.
- Flooding may cause significant disruptions of clean water and sewer services, elevating health risks and delaying recovery efforts.
- The psycho-social effects on flood victims and their families can traumatize them for long periods of time, creating long term increases in medical treatment and services.
- Extensive or repetitive flooding can lead to decreases in property value for the affected community.
- Flood poses a potential catastrophic risk to annual and perennial crop production and overall crop quality leading to higher food costs.
- Flood related declines in production may lead to an increase in unemployment.
- Large floods may result in loss of livestock, potential increased livestock mortality due to stress and water borne disease, and increased cost for feed.

The overall extent of damages caused by floods is dependent on the extent, depth and duration of flooding, and the velocities of flows in the flooded areas. The level of preparedness and pre-event planning done by government, businesses and citizens will contribute to the overall economic and financial conditions in the aftermath of a flood event.

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) PARTICIPATION

Flood insurance offered through the National Flood Insurance Program (NFIP) is the best way for home and business owners to protect themselves financially against the flood hazard. The City of La Feria participates in the NFIP.

As an additional indicator of floodplain management responsibility, communities may choose to participate in FEMA's Community Rating System (CRS). This is an incentive-based program that allows communities to undertake flood mitigation activities that go beyond NFIP requirements. Currently, the City of La Feria does not participate in CRS, but this is a goal and objective of the Plan that was discussed during Planning Team meetings. As a participant in the NFIP, La Feria currently has in place minimum NFIP standards for new construction and substantial Improvements of structures, but are considering adopting higher regulatory NFIP standards. Additional freeboard would minimize flooding caused by flash flooding and many drainage issues as a result of generally flat terrain typical of the area.

The flood hazard areas throughout the planning area are subject to periodic inundation, which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief, of which adversely affect public safety.

These flood losses are created by the cumulative effect of obstructions in floodplains which cause an increase in flood heights and velocities, and by the occupancy of flood hazard areas by uses vulnerable to floods and hazardous to other lands because they are inadequately elevated, flood-proofed or otherwise protected from flood damage. Mitigation actions are included to address flood maintenance issues as well, including routinely clearing debris from roadside ditches and bridges, and expanding drainage culverts and storm water structures to more adequately convey flood waters.

It is the purpose of the community to continue to promote the public health, safety and general welfare by minimizing public and private losses due to flood conditions in specific areas. The City of La Feria is guided by their local Flood Damage Prevention Ordinance. The community will continue to comply with NFIP requirements through their local permitting, inspection, and record-keeping requirements for new and substantially developed construction. Further, the NFIP program promotes sound development in floodplain areas and includes provisions designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- Minimize prolonged business interruptions;
- Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in floodplains;
- Help maintain a stable tax base by providing for the sound use and development of flood-prone areas in such a manner as to minimize future flood blight areas; and
- Ensure that potential buyers are notified that property is in a flood area.

In order to accomplish these tasks, the City of La Feria seeks to follow these guidelines to achieve flood mitigation by:

- Restrict or prohibit uses that are dangerous to health, safety or property in times of flood, such as filling or dumping, that may cause excessive increases in flood heights or velocities;
- Require that uses vulnerable to floods, including facilities, which serve such uses, be protected against flood damage at the time of initial construction, as a method of reducing flood losses;
- Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of floodwaters;
- Control filling, grading, dredging and other development, which may increase flood damage; and
- Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

NFIP COMPLIANCE AND MAINTENANCE

As mentioned, La Feria has developed mitigation actions that relate to either NFIP maintenance or compliance. Compliance and maintenance actions can be found in Section 22.

Flooding was identified by the community as a high risk hazard during hazard ranking activities at the Risk Assessment Workshop. However, many of the mitigation actions were developed with flood mitigation in mind. A majority of these flood actions address compliance with the NFIP and implementing flood awareness programs. The City recognizes the need and is working towards adopting higher NFIP regulatory standards to further minimize flood risk in the community. The City will also focus on promoting the availability of flood insurance by placing NFIP brochures and flyers in public libraries or public meeting places.

REPETITIVE LOSS

The Severe Repetitive Loss (SRL) Grant Program under FEMA provides federal funding to assist states and communities 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. The Texas Water Development Board (TWDB) administers the SRL grant program for the State of Texas.

Severe Repetitive Loss properties are defined as residential properties that are:

- Covered under the NFIP and have at least four flood related damage claim payments (building and contents) over $5,000.00 each, and the cumulative amount of such claims payments exceed $20,000; or
- At least two separate claim payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

In either scenario, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart.[4] Table 7-7 shows repetitive loss and severe repetitive loss properties for the City of La Feria.

TABLE 7-7. REPETITIVE LOSS AND SEVERE REPETITIVE LOSS PROPERTIES

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[5]
City of La Feria	0038881	NO	Single Family	2	$73,180	-
City of La Feria	0244130	YES	Single Family	2	$14,312	-
City of La Feria	0048359	NO	Single Family	2	$114,588	-
City of La Feria	0045944	NO	Single Family	2	$2,662	-

[4] *Source: Texas Water Development Board*

[5] *In this column: "V" stands for "Validated"; "VN" stands for "Validated Nonresidential"; "VU" stand for "Validated Uninsured"; "VNU" stands for "Validated Nonresidential Uninsured"; "P" stands for "Pending"; "PU" stands for "Pending Uninsured"; and "PN" stands for "Pending Nonresidential".*

SECTION 8: WILDFIRE

HAZARD DESCRIPTION

A wildfire event can be a potentially damaging consequence of drought. A wildfire event can rapidly spread out of control and occurs most often in the summer, when the brush is dry and flames can move unchecked through a highly vegetative area. Wildfires can start as a slow burning fire along the forest floor, killing and damaging trees. The fires often spread more rapidly as they reach the tops of trees, with wind carrying the flames from tree to tree. Usually, dense smoke is the first indication of a wildfire.

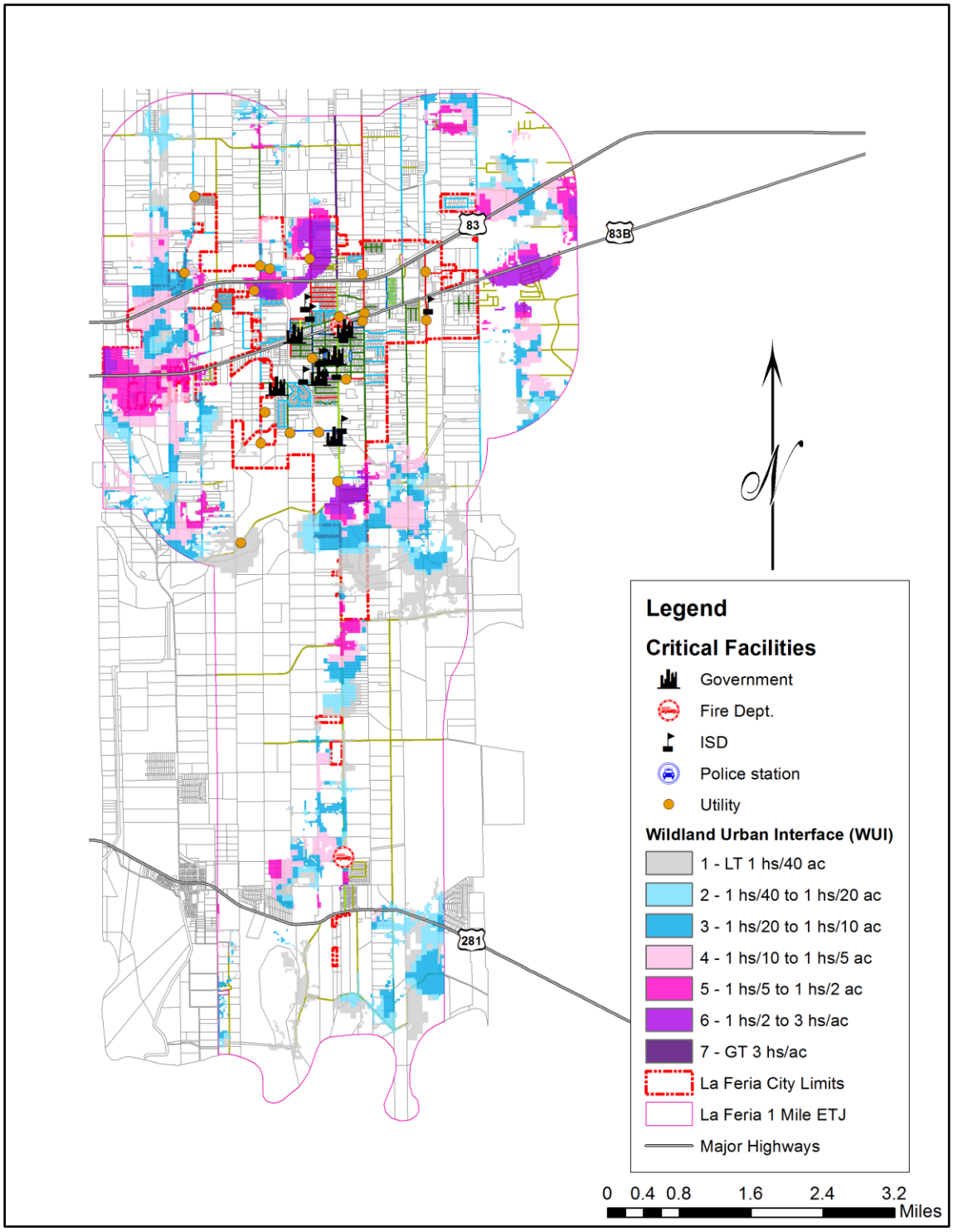
A wildfire event often begins unnoticed and spreads quickly, lighting brush, trees and homes on fire. For example, a wildfire may be started by a campfire that was not doused properly, tossed cigarette, burning debris, or arson.

Texas has seen a significant increase in the number of wildfires in the past 30 years, which included wildland, interface or intermix fires. Wildland Urban Interface or Intermix (WUI) fires occur in areas where structures and other human improvements meet or intermingle with undeveloped wildland or vegetative fuels.

LOCATION

Wildfires can vary greatly in terms of size, location, intensity and duration. While wildfires are not confined to any specific geographic location, they are most likely to occur in open grasslands. The threat to people and property from a wildfire event is greater in the fringe areas where developed areas meet open grass lands, such as the WUI as seen in Figure 8-1. It is estimated that 8 percent of the total population in La Feria live within the WUI. However, the entire planning area is at risk for wildfires.

FIGURE 8-1. WILDLAND URBAN INTERFACE MAP CITY OF LA FERIA

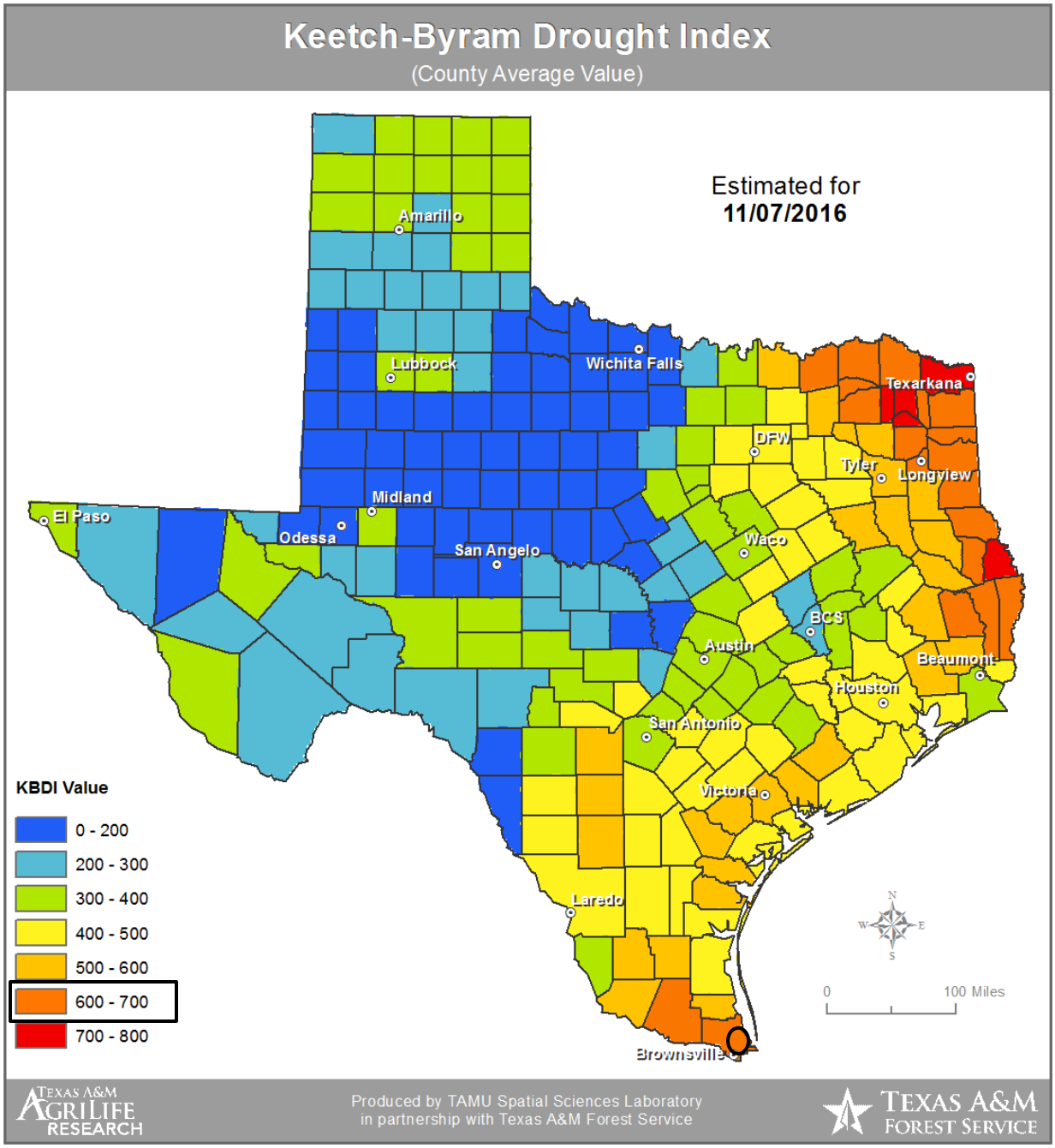


EXTENT

Risk for a wildfire event is measured in terms of magnitude and intensity using the Keetch Byram Drought Index (KBDI), a mathematical system for relating current and recent weather conditions to potential or expected fire behavior. The KBDI determines forest fire potential based on a daily water balance, derived by balancing a drought factor with precipitation and soil moisture (assumed to have a maximum storage capacity of eight inches), and is expressed in hundredths of an inch of soil moisture depletion.

Each color in Figure 8-2 represents the drought index at that location. The drought index ranges from 0 to 800. A drought index of 0 represents no moisture depletion, and a drought index of 800 represents absolutely dry conditions.

FIGURE 8-2. KEETCH-BYRAM DROUGHT INDEX (KBDI) FOR THE STATE OF TEXAS, 2016[1]



[1]*The City of La Feria is located within the black circle.*

Fire behavior can be categorized at four distinct levels on the KBDI:

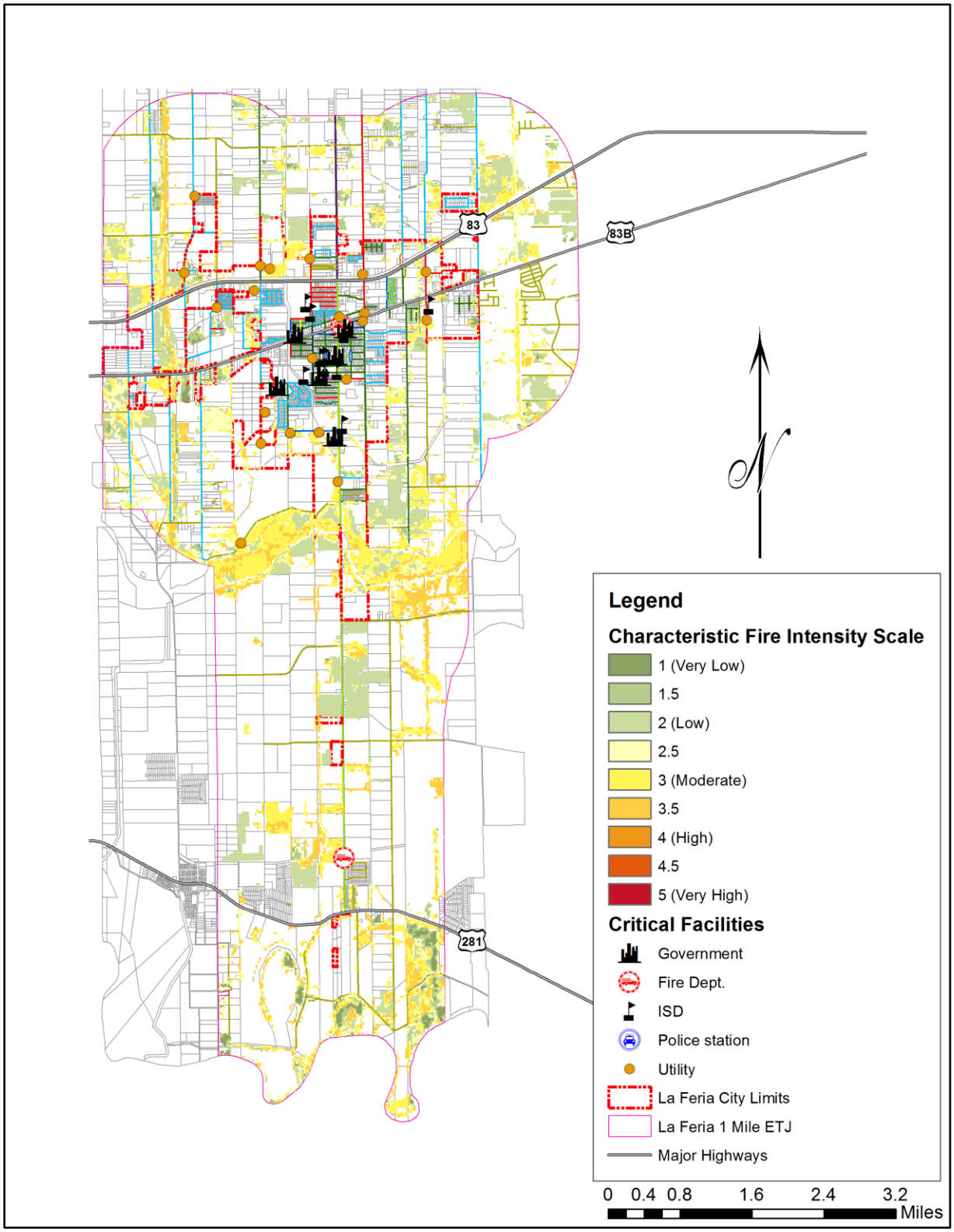
- **0 - 200:** Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.
- **200 - 400:** Fires more readily burn and will carry across an area with no gaps. Heavier fuels will not readily ignite and burn. Expect smoldering and the resulting smoke to carry into and possibly through the night.
- **400 - 600:** Fires intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.
- **600 - 800:** Fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

The KBDI is a good measure of the readiness of fuels for a wildfire event. The KBDI should be referenced as the area experiences changes in precipitation and soil moisture, and caution exercised in dryer, hotter conditions.

The range of intensity for the City of La Feria planning area in a wildfire event is within 600 to 700. The average extent to be mitigated for the planning area is a KBDI of 618. At this level fires intensity begins to significantly increase and fires readily burn in all directions, exposing mineral soils in some locations.

The Texas Forest Service's Fire Intensity Scale identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist based on weighted average of four percentile weather categories. The City of La Feria is between a potential low to moderate wildfire intensities. Figures 8-3 identifies the wildfire intensity for the City of La Feria planning area.

FIGURE 8-3. FIRE INTENSITY SCALE MAP CITY OF LA FERIA



HISTORICAL OCCURRENCES

The Texas Forest Service reported 4 wildfire events between 1996 and 2016. Damages for the reported events was not available. The National Climatic Data Center (NCDC) did not have any reported events through the same period. The Texas Forest Service (TFS) started collecting wildfire data in 1985 and volunteer fire departments started reporting events until 2005. Due to a lack of recorded data for wildfire events prior to 2005, frequency calculations are based on a ten-year period, using only data from recorded years. Table 8-1 identifies the number of wildfires and total acreage burned.

TABLE 8-1. HISTORICAL WILDFIRE EVENTS SUMMARY

Jurisdiction	Number of Events	Acres Burned
La Feria	4	4

TABLE 8-2. ACREAGE OF SUPPRESSED WILDFIRE BY YEAR

JURISDICTION	2005	2006	2007	2008	2009
La Feria	2	2	0	0	0

PROBABILITY OF FUTURE EVENTS

Wildfires can occur at any time of the year. As the City grows and develops into wildland, the potential area of occurrence of wildfire increases. With 4 events in a 20 year period, an event within the City of La Feria planning area is occasional, meaning an event is probable within the next five years.

VULNERABILITY AND IMPACT

Periods of drought, dry conditions, high temperatures, and low humidity are factors that contribute to the occurrence of a wildfire event. Areas along railroads and people whose homes are in woodland settings have an increased risk of being affected by wildfire.

The heavily populated, urban areas within the City of La Feria are not likely to experience large, sweeping fires. Areas outside of city limits and in the unincorporated areas of Cameron County are vulnerable. Unoccupied buildings and open spaces that have not been maintained have the greatest vulnerability to wildfire. The overall level of concern for wildfires is located mostly along the perimeter of the study area where wildland and urban areas interface.

The following critical facilities would be vulnerable to wildfire events in the La Feria planning area:

- 6 Government Facilities
- 1 Police Station
- 2 Dome Shelters
- 2 Water Towers

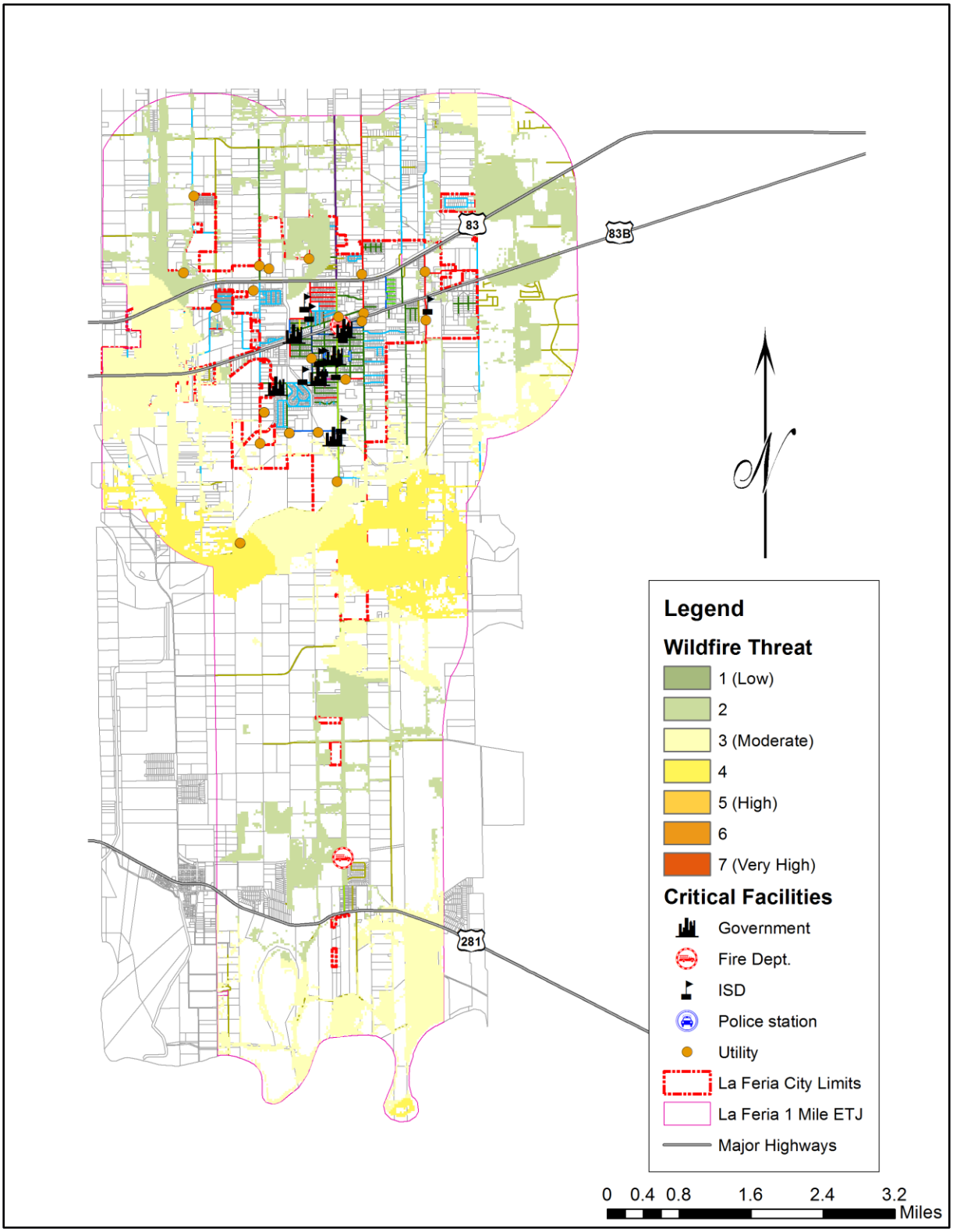
- 2 Water Treatment Facilities
- 2 Fire Departments
- 16 Lift Stations
- 10 Schools (Including ISD Administartion Facilities)
- 2 Pump Stations

The following critical facilities are located in the WUI and are more susceptible to wildfire:

- 1 Water Tower
- 1 Fire Station
- 1 Pump Station
- 4 Lift Stations

Figure 8-4 shows the threat of wildfire to the City of La Feria planning area.

FIGURE 8-4. WILDFIRE THREAT CITY OF LA FERIA



Diminished air quality is an environmental impact that can result from a wildfire event and pose a potential health risk. The smoke plumes from wildfires can contain potentially inhalable carcinogenic matter. Fine particles of invisible soot and ash that are too microscopic for the respiratory system to filter can cause immediate and possibly long term health effects. The elderly or those individuals with compromised respiratory systems may be more vulnerable to the effects of diminished air quality after a wildfire event.

Climatic conditions such as severe freezes and drought can significantly increase the intensity of wildfires since these conditions kill vegetation, creating a prime fuel source for wildfires. The intensity and rate at which wildfires spread are directly related to wind speed, temperature, and relative humidity.

The severity of impact from major wildfire events can be substantial. Such events can cause multiple deaths, shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. Severity of impact is gauged by acreage burned, homes and structures lost, and the number of resulting injuries and fatalities. For the City of La Feria planning area, the impact from a wildfire event can be considered "Limited," meaning injuries and/or illnesses are treatable with first aid, shutdown of facilities and services for 24 hours or less, and less than 10% of property is destroyed or with major damage.

ASSESSMENT OF IMPACTS

A Wildfire event poses a potentially significant risk to public health and safety, particularly if the wildfire is initially unnoticed and spreads quickly. The impacts associated with a wildfire are not limited to the direct damages. Potential impacts for the planning area include:

- Persons in the area at the time of the fire are at risk for injury or death from burns and/or smoke inhalation.
- First responders are at greater risk of physical injury since they are in close proximity to the hazard while extinguishing flames, protecting property or evacuating residents in the area.
- First responders can experience heart disease, respiratory problems, and other long term related illnesses from prolonged exposure to smoke, chemicals, and heat.
- Emergency services may be disrupted during a wildfire if facilities are impacted, roadways are inaccessible or personnel are unable to report for duty.
- Critical city and/or county departments may not be able to function and provide necessary services depending on the location of the fire, and the structures or personnel impacted.
- Non-critical businesses may be directly damaged, suffer loss of utility services, or be otherwise inaccessible, delaying normal operations and slowing the recovery process.
- Displaced residents may not be able to immediately return to work, further slowing economic recovery.
- Roadways in or near the WUI could be damaged or closed due to smoke and limited visibility.
- Older homes are generally exempt from modern building code requirements, which may require fire suppression equipment in the structure.

- Some high density neighborhoods feature small lots with structures close together, increasing the potential for fire to spread rapidly.
- Air pollution from smoke may exacerbate respiratory problems of vulnerable residents.
- Charred ground after a wildfire cannot easily absorb rainwater, increasing the risk of flooding and potential mudflows.
- Wildfires can cause erosion, degrading stream water quality.
- Wildlife may be displaced or destroyed.
- Historical or cultural resources may be damaged or destroyed.
- Tourism can be significantly disrupted, further delaying economic recovery for the area.
- Vegetated dunes can be stripped, significantly damaging the function of the dunes to protect inland areas from the destructive forces of wind and waves.
- Economic disruption negatively impacts the programs and services provided by the community due to short and long term loss in revenue.
- Fire suppression costs can be substantial, exhausting the financial resources of the community.
- Residential structures lost in a wildfire may not be rebuilt for years, reducing the tax base for the community.
- Recreation and tourism can be unappealing for years following a large wildfire, devastating directly related businesses.
- Direct impacts to municipal water supply may occur through contamination of ash and debris during the fire, destruction of aboveground delivery lines, and soil erosion or debris deposits into waterways after the fire.

The economic and financial impacts of a wildfire event on local government will depend on the scale of the event, what is damaged, costs of repair or replacement, lost business days in impacted areas, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by government, businesses and citizens will contribute to the overall economic and financial conditions in the aftermath of a wildfire event.

SECTION 9: TORNADO

HAZARD DESCRIPTION

Tornadoes are among the most violent storms on the planet. A tornado is a rapidly rotating column of air extending between, and in contact with, a cloud and the surface of the earth. The most violent tornadoes are capable of tremendous destruction, with wind speeds of 250 miles per hour or more. In extreme cases, winds may approach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long.

The most powerful tornadoes are produced by "Supercell Thunderstorms." Supercell Thunderstorms are created when horizontal wind shears (winds moving in different directions at different altitudes) begin to rotate the storm. This horizontal rotation can be tilted vertically by violent updrafts, and the rotation radius can shrink, forming a vertical column of very quickly swirling air. This rotating air can eventually reach the ground, forming a tornado.

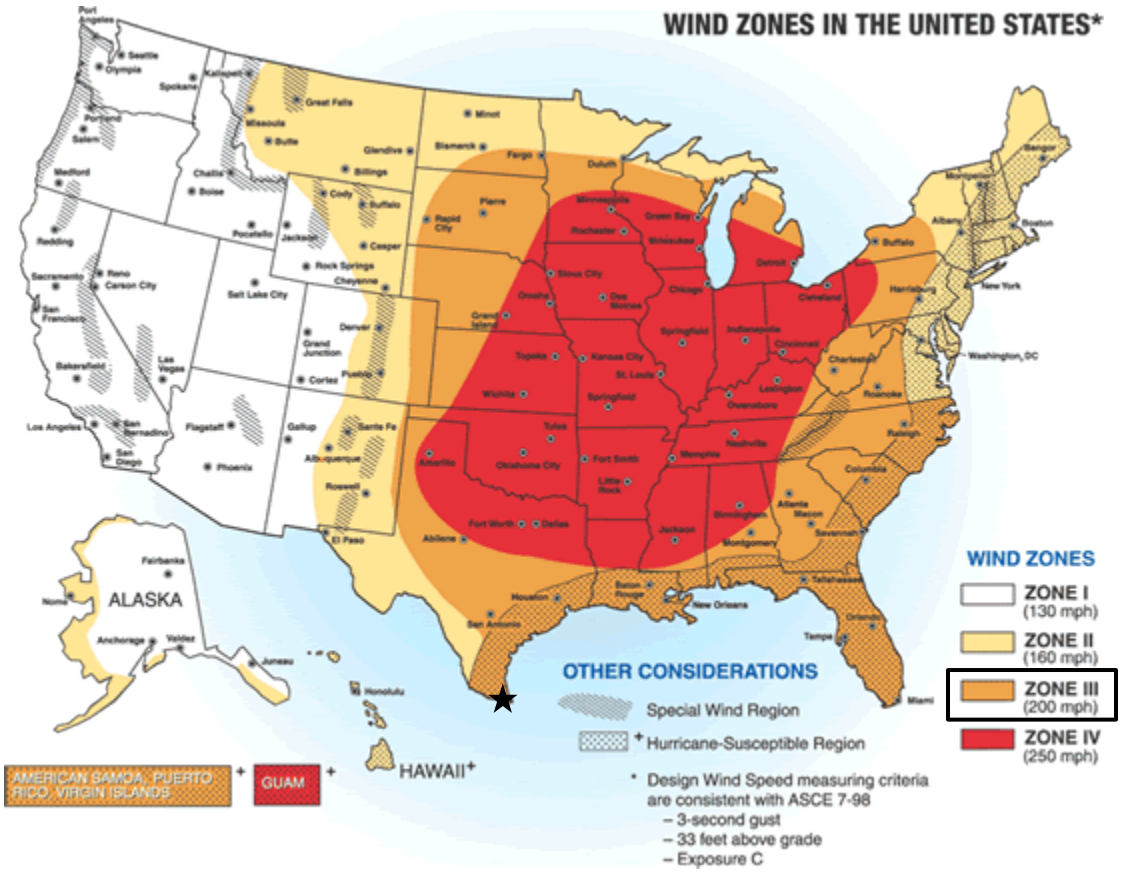
TABLE 9-1. VARIATIONS AMONG TORNADOES

WEAK TORNADOES	STRONG TORNADOES	VIOLENT TORNADOES
• 69% of all tornadoes • Less than 5% of tornado deaths • Lifetime 1-10+ minutes • Winds less than 110 mph	• 29% of all tornadoes • Nearly 30% of all tornado deaths • May last 20 minutes or longer • Winds 110 – 205 mph	• 2% of all tornadoes • 70% of all tornado deaths • Lifetime can exceed one hour • Winds greater than 205 mph

LOCATION

Tornadoes do not have any specific geographic boundary and can occur throughout the planning area uniformly. It is assumed that the City of La Feria planning area is uniformly exposed to tornado activity. La Feria is located in Wind Zone III (Figure 9-1), where tornado winds can be as high as 200 mph.

FIGURE 9-1. FEMA WIND ZONES IN THE UNITED STATES[1]



EXTENT

The destruction caused by tornadoes ranges from light to inconceivable depending on the intensity, size and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, such as residential homes (particularly mobile homes).

[1] *City of La Feria planning area is indicated by the star.*

TABLE 9-2. THE FUJITA TORNADO SCALE[2]

F-SCALE NUMBER	INTENSITY	WIND SPEED (MPH)	TYPE OF DAMAGE DONE	PERCENT OF APPRAISED STRUCTURE VALUE LOST DUE TO DAMAGE
F0	Gale Tornado	40 – 72	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.	None Estimated
F1	Moderate Tornado	73 – 112	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 roads; attached garages may be destroyed.	0% – 20%
F2	Significant Tornado	113 – 157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.	50% – 100%
F3	Severe Tornado	158 – 206	Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.	100%
F4	Devastating Tornado	207 – 260	Well-constructed homes leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.	100%
F5	Incredible Tornado	261 – 318	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles flying through the air in excess of 330 yards; trees debarked; steel reinforced concrete badly damaged.	100%

[2] *Source: http://www.tornadoproject.com/fscale/fscale.htm*

Tornado magnitudes prior to 2005 were determined using the traditional version of the Fujita Scale (Table 9-2). Since February 2007, the Fujita Scale has been replaced by the Enhanced Fujita Scale (Table 9-3), which retains the same basic design and six strength categories as the previous scale. The newer scale reflects more refined assessments of tornado damage surveys, standardization, and damage consideration to a wider range of structures.

TABLE 9-3. ENHANCED FUJITA SCALE FOR TORNADOES

STORM CATEGORY	DAMAGE LEVEL	3 SECOND GUST (MPH)	DESCRIPTION OF DAMAGES	PHOTO EXAMPLE
EF0	Gale	65 – 85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.	
EF1	Weak	86 – 110	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 roads; attached garages may be destroyed.	
EF2	Strong	111 – 135	Considerable damage; roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.	
EF3	Severe	136 – 165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.	
EF4	Devastating	166 – 200	Well-constructed homes leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.	
EF5	Incredible	200+	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles flying through the air in excess of 330 yards; trees debarked; steel reinforced concrete badly damaged.	

Both the Fujita Scale and Enhanced Fujita Scale should be referenced in reviewing previous occurrences since tornado events prior to 2007 will follow the original Fujita Scale. The largest magnitude reported within the planning area is F2 of the Fujita Scale, a "strong" tornado. The largest magnitude reported within Cameron County is F3, a "Severe Tornado." Based on the

planning areas location in wind zone III, the planning area could experience anywhere from an EF0 to an EF4 depending on the wind speed.

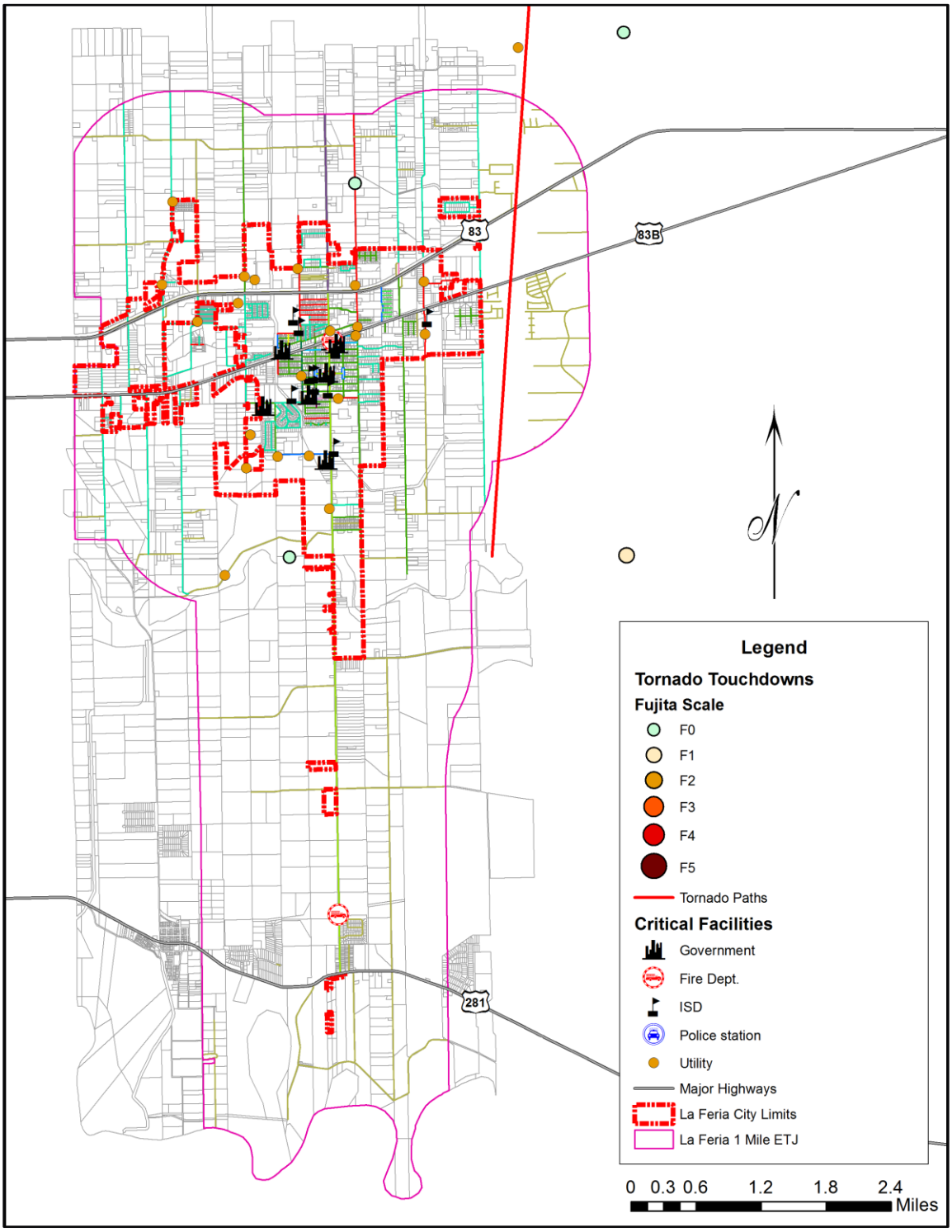
The events in the City of La Feria have been between EF0 to an EF4 (Table 9-3). Therefore, the range of intensity that the planning area would be expected to mitigate is a tornado event that would be a low to moderate risk, an EF0 to EF4.

HISTORICAL OCCURRENCE

Only reported tornadoes were factored into the Risk Assessment. It is likely that additional occurrences have gone unreported over the past 66 years.

Figure 9-2 identifies the locations of previous occurrences in the City of La Feria planning area from 1950 to July 2016. A total of 3 events have been recorded by the Storm Prediction Center (NOAA) and NCDC databases for La Feria.

FIGURE 9-2. SPATIAL HISTORICAL TORNADO EVENTS, 1950-2016[3]



[3] *Source: NOAA Records*

TABLE 9-4. HISTORICAL TORNADO EVENTS, 1950-2016

Jurisdiction	Date	Magnitude	Deaths	Injuries	PROPERTY DAMAGE (2015 Value)	CROP DAMAGE (2015 Value)
La Feria	5/24/1970	F2	0	0	$155,711	$0
La Feria	5/14/1992	F0	0	0	$0	$0
La Feria	8/24/1996	F0	0	0	$0	$0
Totals			**0**	**0**	**$155,711**	

SIGNIFICANT PAST EVENTS

May 24 1970 – La Feria

A strong F2 tornado touched down just outside of Raymondville on the east and moved southward along a 25 mile path to the Arroyo Colorado southeast of La Feria in Cameron County. The path skirted Sebastian and Adams Gardens on the east. High winds and hail, up to two inches in diameter, accompanied the tornado. The path of wind damage was about four miles wide in places. Many trailer homes were overturned and roof damage was wide spread. Wind, hail and rain damaged or destroyed about 7,000 acres of cotton and 17,000 acres of grain in Willacy County, and 4,000 acres of cotton and 7,000 acres of grain in Cameron County.

PROBABILITY OF FUTURE EVENTS

Tornadic storms can occur at any time of year and at any time of day, but they are typically more common in the spring months during the late afternoon and evening hours. A smaller, high frequency period can emerge in the fall during the brief transition between the warm and cold seasons. According to historical records, La Feria experiences one tornado event approximately every 20 years. This frequency supports an unlikely probability of future events, meaning an event is probable in the next ten years.

VULNERABILITY AND IMPACT

Because tornadoes often cross-jurisdictional boundaries, all existing and future buildings, facilities and populations in the planning area are considered to be exposed to this hazard and could potentially be impacted. The damage caused by a tornado is typically a result of high wind velocity, wind-blown debris, lightning, and large hail.

The following critical facilities would be vulnerable to tornado events in the La Feria planning area:

- 6 Government Facilities
- 1 Police Station
- 2 Dome Shelters

- 2 Water Towers
- 2 Water Treatment Facilities
- 2 Fire Departments
- 16 Lift Stations
- 10 Schools (Including ISD Administartion Facilities)
- 2 Pump Stations

The average tornado moves from southwest to northeast, but tornadoes have been known to move in any direction. Consequently, vulnerability of humans and property is difficult to evaluate since tornadoes form at different strengths, in random locations, and create relatively narrow paths of destruction. Although tornadoes strike at random, making all buildings vulnerable, three types of structures are more likely to suffer damage:

- Manufactured Homes;
- Homes on crawlspaces (more susceptible to lift); and
- Buildings with large spans, such as shopping malls, gymnasiums, and factories.

According to the US Census Bureau, 35.7% (approximately 971) of the residential structures in the La Feria planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant tornado events. In addition, communities with manufactured housing in the La Feria planning area would also be vulnerable to tornados. The US Census data indicates approximately 654 manufactured homes in the La Feria planning area.

Utility systems on roofs at school districts and hospitals would be vulnerable and could be damaged by debris and high winds. Tornadoes can possibly cause a significant threat to people as they could be struck by flying debris, falling trees/branches, utility lines, and poles. First responders could also not be able to respond to calls due to blocked roads. Tornadoes commonly cause power outages which could cause health and safety risks to faculty and students at schools, as well as to patients in hospitals.

The average loss estimate of property and crop is $155,711 (in 2015 dollars). The approximate annual loss estimate is summarized in Table 9-5 for the planning area.

TABLE 9-5. HISTORICAL TORNADO EVENTS SUMMARY, 1960-2016

JURISDICTION	FREQUENCY	PROBABILITY OF FUTURE EVENTS	AVERAGE ANNUALIZED LOSSES
La Feria	0.05	Unlikely	$2,396
County	0.67	Highly Likely	$255,656

Based on historic loss and damages, the impact of tornadoes experienced in the City of La Feria has resulted in 0 injuries and 0 fatalities supporting a limited severity of impact meaning injuries and/or illnesses are treatable with first aid, shutdown of facilities lasts for 24 hours or less, and less than 10% of property is destroyed.

ASSESSMENT OF IMPACTS

Tornadoes have the potential to pose a significant risk to the population and can create dangerous situations. Often providing and preserving public health and safety is difficult. Impacts to the planning area can include:

- Individuals exposed to the storm can be struck by flying debris, falling limbs, or downed trees causing serious injury or death.
- Structures can be damaged or crushed by falling trees, which can result in physical harm to the occupants.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.
- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.
- Tornadoes often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage can result in an increase in structure fires and/or carbon monoxide poisoning, as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- Tornadoes can destroy or make residential structures uninhabitable, requiring shelter or relocation of residents in the aftermath of the event.
- First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Emergency operations and services may be significantly impacted due to damaged facilities, loss of communications, damaged emergency vehicles and equipment.
- Downed power lines and large debris, such as downed trees, can result in the inability of emergency response vehicles to access areas of the community.
- Critical staff may be personally injured or otherwise impacted by a tornado and unable to report for duty, limiting response capabilities.
- City or county departments may be damaged or destroyed, delaying response and recovery efforts for the entire community.
- Private sector entities that the City and its residents rely on, such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Economic disruption negatively impacts the programs and services provided by the community due to short and long term loss in revenue.
- Damage to infrastructure may slow economic recovery since repairs may be extensive and lengthy.
- Some businesses not directly damaged by the tornado may be negatively impacted while roads and utilities are being restored, further slowing economic recovery.
- When the community is affected by significant property damage it is anticipated that funding would be required for infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, as well as normal day-to-day operating expenses.

- Displaced residents may not be able to immediately return to work, further slowing economic recovery.
- Residential structures destroyed by a tornado may not be rebuilt for years, reducing the tax base for the community.
- Large or intense tornadoes may result in a dramatic population fluctuation, as people are unable to return to their homes or jobs and must seek shelter and/or work outside of the affected area.
- Businesses that are uninsured or underinsured may have difficulty reopening, which results in a net loss of jobs for the community and a potential increase in the unemployment rate.
- Recreation activities may be unavailable and tourism can be unappealing for years following a large tornado, devastating directly related local businesses.

The economic and financial impacts of a tornado event on the community will depend on the scale of the event, what is damaged, costs of repair or replacement, lost business days in impacted areas, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by government, businesses and citizens will contribute to the overall economic and financial conditions in the aftermath of a tornado event.

SECTION 10: HURRICANE

HAZARD DESCRIPTION

According to the National Oceanic and Atmospheric Administration (NOAA), a hurricane is an intense tropical weather system of strong thunderstorms with well-defined surface circulation and maximum sustained winds of 74 miles per hour (mph) or higher. In the Northern Hemisphere, circulation of winds near the Earth's surface is counterclockwise.

As a hurricane develops, the barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. Tropical depressions intensify into tropical storms when maximum sustained winds increase to between 35-46 knots (39-73 mph). At these wind speeds, the storm becomes more organized and circular in shape and begins to resemble a hurricane. Tropical storms can be equally problematic without ever becoming a hurricane, resulting in heavy rainfall, high winds and tidal surge in coastal communities. When maximum sustained winds reach or exceed 39 mph, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 mph, the storm is deemed a hurricane.

The intensity of a land falling hurricane is expressed in categories relating wind speeds and potential damage. Tropical storm-force winds are strong enough to be dangerous to those caught in them. For this reason, emergency managers plan to have evacuations completed and personnel sheltered before winds of tropical storm-force arrive, which precedes the arrival of hurricane-force winds.

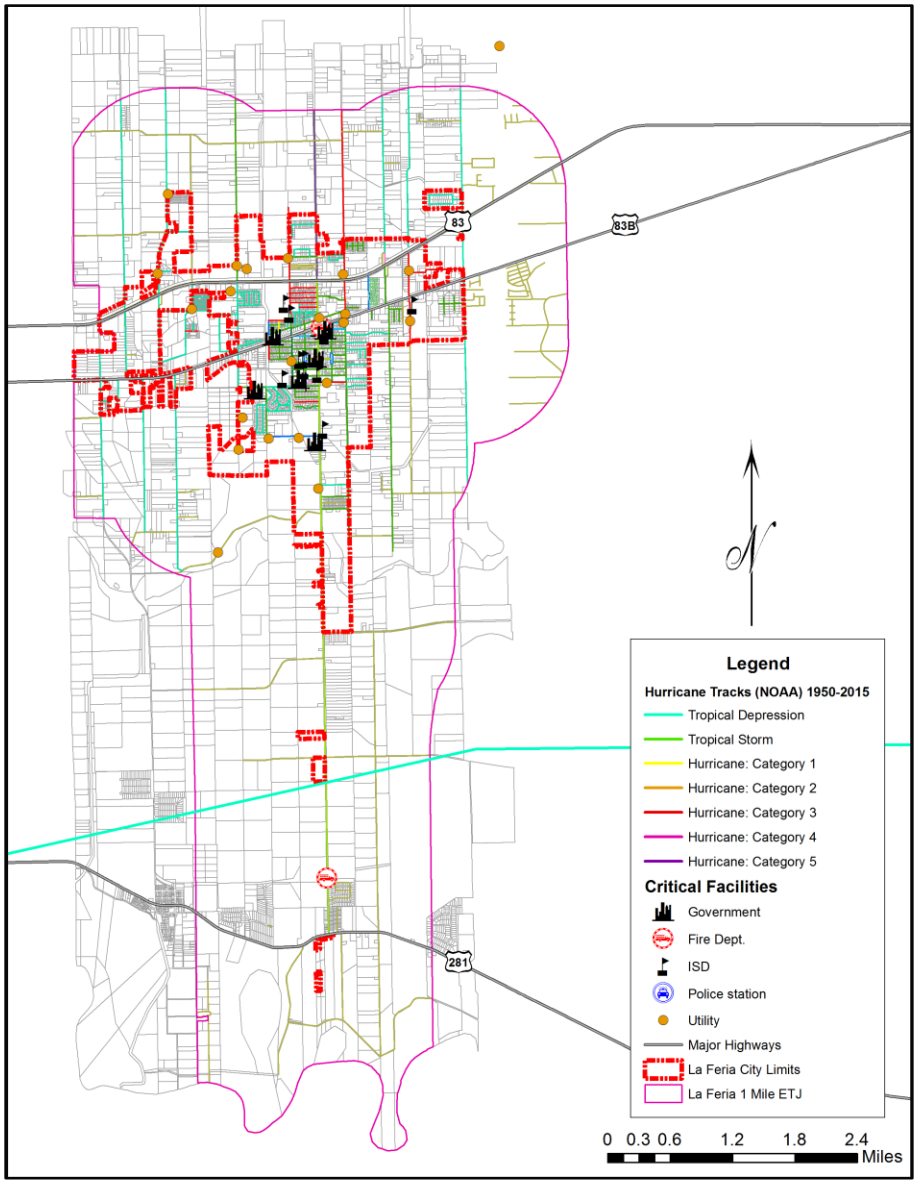
According to the National Hurricane Center, the greatest potential for loss of life related to a hurricane is from storm surge. This happens when low pressure and high circular winds "pile" the water into a dome shape that can be 50-100 miles wide. The surge travels with the storm and is most severe on the right side of the storm, relative to the direction the storm travels. The surge can be 15 feet deep, topped by waves, and make landfall ahead of the center, or "eye", of the

hurricane. Wind-driven waves are superimposed on the storm tide. This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with normal high tides.

LOCATION

La Feria is vulnerable to threats directly and indirectly related to a hurricane event, such as high-force winds, and flooding. Hurricanes and/or tropical storms can impact the planning area from June to November, the official Atlantic U.S. hurricane season. La Feria is located in a moderate to high risk area for hurricane wind speeds of 110 to 140 miles per hour (mph) as shown in Figure 10-1.

FIGURE 10-1. LOCATION OF HURRICANE WIND ZONES



EXTENT

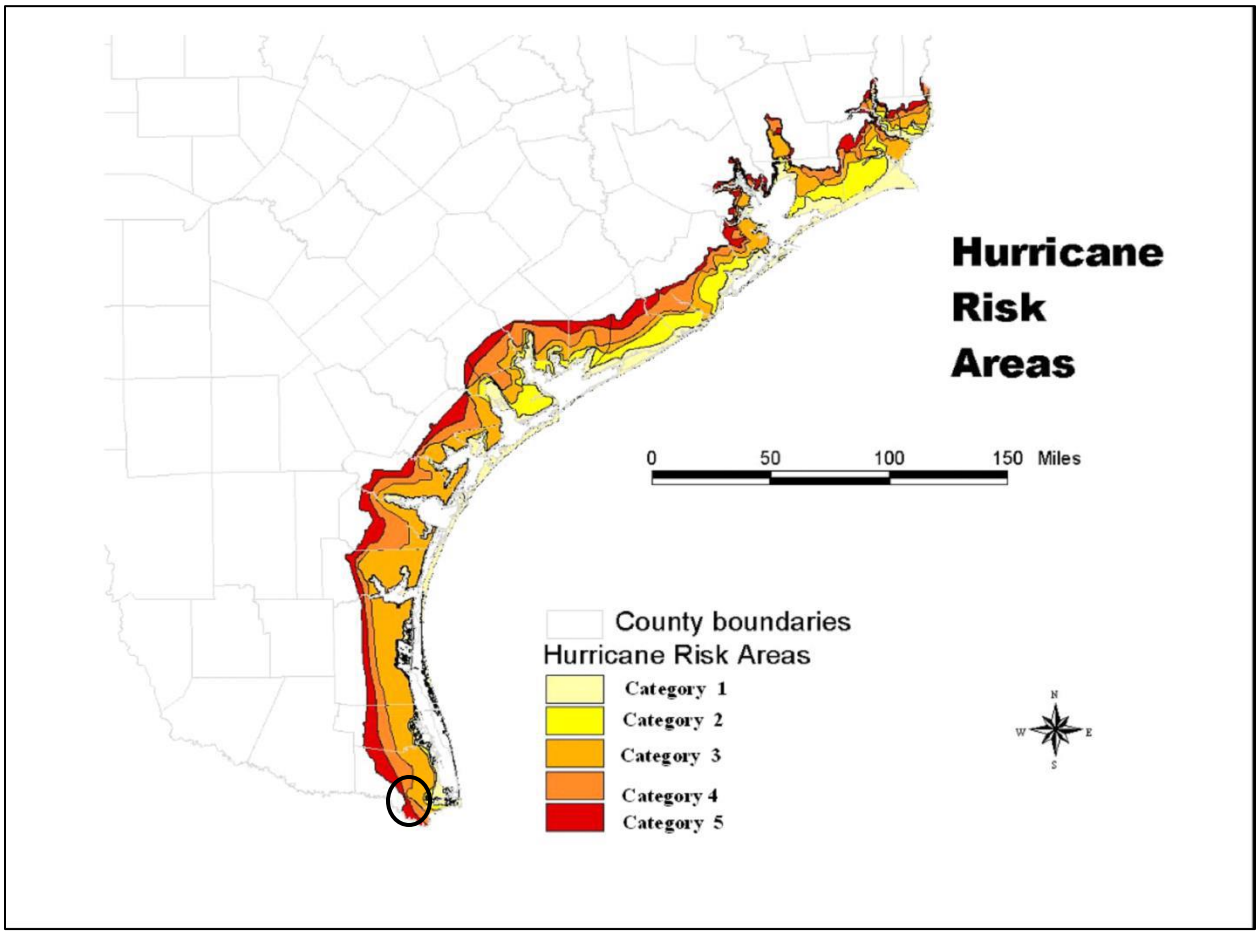
Hurricanes are categorized according to the strength and intensity of their winds using the Saffir-Simpson Hurricane Scale (See Table 10-1). A Category 1 storm has the lowest wind speeds, while a Category 5 hurricane has the highest. This scale only ranks wind speed, but lower category storms can inflict greater damage than higher category storms depending on where they strike, other weather they interact with and how slow they move.

TABLE 10-1. EXTENT SCALE FOR HURRICANES

CATEGORY	MAXIMUM SUSTAINED WIND SPEED (Mph)	MINIMUM SURFACE PRESSURE (Millibars)	STORM SURGE (Feet)
1	74 – 95	Greater than 980	3 – 5
2	96 – 110	979 – 965	6 – 8
3	111 – 130	964 – 945	9 – 12
4	131 – 155	944 – 920	13 – 18
5	155 +	Less than 920	19 +

Based on the historical storm tracks for hurricanes and tropical storms, the average extent to be mitigated for the City of La Feria planning area is a Category 3 storm. The planning area is located in the 110-140 wind zone in terms of average wind speeds that should be mitigated in the event of a hurricane. This data is based on the design wind speeds for a 100-year event. Figure 10-2 displays the location of hurricane risk by storm category along the Gulf Coast.

FIGURE 10-2. LOCATION OF HURRICANE RISK ALONG THE TEXAS COAST



HISTORICAL OCCURRENCES

Previous occurrences include storms that had a direct path through Cameron County, and the tracks near the county. Table 10-2 below lists the storms that have impacted the Cameron County, including La Feria, during the years of 1854-2016.

TABLE 10-2. HISTORICAL HURRICANE EVENTS FOR CAMERON COUNTY, INCLUDING CITY OF LA FERIA PLANNING AREA, 1854-2016

JURISDICTION	DATE	MAGNITUDE	FATALITIES	INJURIES	PROPERTY DAMAGE (2015 Value)	CROP DAMAGE (2015 Value)
Countywide	6/25/1854	Hurricane - Unnamed	Unknown	Unknown	$0	$0
Countywide	8/4/1880	Hurricane - Unnamed	Unknown	Unknown	$0	$0

JURISDICTION	DATE	MAGNITUDE	FATALITIES	INJURIES	PROPERTY DAMAGE (2015 Value)	CROP DAMAGE (2015 Value)
Countywide	9/11/1887	Hurricane - Unnamed	Unknown	Unknown	$0	$0
Brownsville	9/16/1886	Hurricane - Unnamed	Unknown	Unknown	$0	$0
San Benito	9/24/1857	Tropical Storm	Unknown	Unknown	$0	$0
Countywide	6/25/1909	Hurricane - Unnamed	0	0	$0	$0
Countywide	8/22/1933	Hurricane - Unnamed	0	0	$0	$0
Countywide	9/9/1936	Tropical Storm	0	0	$0	$0
Countywide	9/8/1961	Hurricane Carla	0	4	$4,019,209	$4,019,209
Countywide	9/16/1963	Hurricane Cindy	0	0	$971,998	$97,200
Countywide	9/5/1967	Hurricane - Beulah	0	0	$245,466,250	$0
Countywide	6/23/1968	Tropical Storm Candy	0	1	$310,799	$310,799
Countywide	7/31/1970	Hurricane Celia	0	6	$4,034,609	$414,368
Countywide	9/9/1971	Hurricane Fern	0	0	$481,571	$481,571
Countywide	9/14/1971	Hurricane Edith	0	0	$5,153	$5,153
Countywide	9/4/1973	Tropical Storm	0	0	$223,299	$22,329,675
Countywide	7/30/1978	Hurricane - Amelia	0	0	$0	$0
Countywide	7/31/1980	Hurricane - Allen	0	0	$15,360,014	$1,536,001
Countywide	11/12/1980	Tropical Storm Jeanne	0	1	$9,024	$0
Countywide	9/16/1988	Hurricane Gilbert	0	0	$257,830	$2,579
Countywide	9/6/1998	Tropical Storm Frances	0	0	$0	$0
Countywide	7/20/2005	Storm Surge/Tide	0	0	$0	$0
Countywide	7/23/2008	Hurricane - Dolly	0	2	$469,694,454	$0

JURISDICTION	DATE	MAGNITUDE	FATALITIES	INJURIES	PROPERTY DAMAGE (2015 Value)	CROP DAMAGE (2015 Value)
Countywide	9/1/2008	Storm Surge/Tide	0	0	$0	$0
Countywide	9/12/2008	Storm Surge/Tide	0	0	$22,103	$0
Countywide	6/30/2010	Storm Surge/Tide	0	0	$163,681	$0
Countywide	7/9/2010	Hurricane - Two	0	0	$0	$0
Countywide	9/6/2010	Tropical Storm Hermine	0	0	$13,094,526	$0
Total			**0**	**14**	**$783,311,073**	

SIGNIFICANT EVENTS

Tropical Storm Hermine on September 6, 2010

Hermine arrived in fits and starts, with frequent gusty feeder band showers followed by relatively calm conditions through the day and early evening of September 6th. Between 9:30 and 10 PM CDT, the action got underway as the central core of Hermine brought a rapid increase in sustained winds and gusts, along with increasingly heavy rainfall. Between 11 PM and 12 AM CDT, the northern doughnut crossed the Rio Grande over lower populated southwest Cameron County. Meanwhile, intense feeder bands east of the center, where some of the strongest winds were sampled, pounded Brownsville with sustained winds of 40 to 55 mph and gusts as high as 69 mph at the Brownsville/SPI International Airport. Between 1 and 1:30 AM, a very intense band would reform around the center, curling from just south of Harlingen to north of Brownsville. This band would cross Harlingen just prior to 2 AM, and produced near hurricane force gusts (72.5 mph) along with brief sustained winds of 59 mph, which damaged a number of roofs, knocked down limbs and uprooted trees, and wiped out power to more than 14,000 residents, many in the Harlingen/San Benito area. In all, between 46,000 and 50,000 customers in Cameron County were without power during the peak of the storm, including those in the AEP Texas, Brownsville PUB, and Magic Valley Electric Co-op service areas. After the inner core of Hermine sliced through, winds quickly diminished below tropical storm force from south to north across the county, between 1:30 AM CDT near the river and 2:30 CDT near the Willacy County line. Significant damage included roof collapses to at least one apartment complex in Brownsville, and the La Casita apartments in Harlingen, displacing at least two families. A large part of an industrial building roof collapsed in north Harlingen, and other poorly constructed lightweight roofs were blown off in Brownsville and the Port of Brownsville. Hundreds of medium to large tree limbs fell along the Highway 77 corridor from Brownsville through San Benito and the central and east side of Harlingen. Boaters, particularly Mexican shrimping vessels, did their best to seek refuge in the Port of Brownsville prior to the arrival of the storm. The sharp increase in waves broke as high as the windows of the

Harbormaster office. Sixty-four vessels reached the Port, but 5 others became stranded at the coast, including three running aground in Texas and two in Mexico when buoys floated toward the beach and guided the boats toward the rocks. Each boat was able to beach safely, with no human casualties.

Hurricane Dolly on July 23, 2008

The approach of Hurricane Dolly to the barrier shoreline of South Padre Island early on the morning of July 23rd brought sustained tropical storm force winds inland to the east side of Brownsville, including the Port, just before 7:30 AM on the 23rd. Prior rain bands had produced frequent gusts to 40 mph, but the arrival of sustained tropical storm winds was soon followed by wind damage and power outages, particularly during the afternoon. Prior to Dolly's landfall along the Cameron/Willacy County line, the western and southern eyewall intensified. The core of the eyewall traversed northern Cameron County, where impacts were more substantial than in southern Cameron County. Northern Cameron (Harlingen, San Benito, Rio Hondo): A period of estimated and measured sustained winds between 60 and 70 mph, with frequent gusts to hurricane force (at least 78 mph measured at 2.25 meters), developed around 1 PM and continue through around 5 PM, beginning in northeast Cameron County near Arroyo City and extending west through Las Yescas, Rio Hondo, Harlingen, San Benito, Palm Valley, and La Feria, not only created widespread freshwater flooding, but created notable damage to poorly fastened roofs and some walls, particularly at industrial parks, strip centers, and farm buildings, especially from Harlingen to points east. Otherwise, numerous large limbs, power lines and power poles, highway signs and billboards, were blown down across the area during this time period. As Dolly's center eased slowly from southern Willacy into northern Hidalgo County, the last of the sustained tropical storm force winds began to exit Cameron County from Palm Valley to Santa Rosa and La Feria, just after midnight on the 24th. Southern Cameron: Along and just north of the Rio Grande, from the Kellers Corner/Brownsville Airport area through Brownsville and to points west, roughly along federal highway 281 through Los Indios out toward the Hidalgo/Cameron County line, conditions were a bit more benign, as the core of the southern and western eyewall generally missed the area. Here, sustained tropical storm force winds persisted from around 8:30 AM until 6 PM, though gusts above 40 mph persisted until near midnight. In this area, sustained wind generally peaked between 45 and 55 mph, with peak gusts just below hurricane force between 11:30 AM and 2 PM. Here, damage was primarily to thousands of tree limbs, hundreds of power lines, and many elevated highway signs and billboards, but structural damage was primarily to unfastened shingles of roofs of moderate to well-constructed buildings, and occasional failures of more poorly constructed roofs at industrial parks and farm buildings. At the peak of the storm, power was out to just about all of Cameron County, with an estimated 115,000 customers down during the middle of the afternoon. Across northern Cameron County, power recovery took days to more than a week, while many locations in southern Cameron County returned to power within a few days after Dolly's passage.

PROBABILITY OF FUTURE EVENTS

Due to the close proximity to the Gulf Coast, and the previous history of hurricanes for the area, the likelihood or future probability of a tropical storm or hurricane in the City of La Feria planning area is likely, meaning an event is probable in the next three years.

VULNERABILITY AND IMPACT

Hurricane-force winds can cause major damage to large areas; hence all existing buildings, facilities and populations are equally exposed and vulnerable to this hazard and could potentially be impacted. Warning time for hurricanes has lengthened due to modern and early warning technology. Hurricane-force winds can easily destroy poorly constructed buildings and mobile homes, as well as debris such as signs, roofing materials, and small items left outside become extremely hazardous in hurricanes and tropical storms. Extensive damage to trees, towers, and underground utility lines (from uprooted trees) and fallen poles cause considerable civic disruption.

According to the US Census Bureau, 35.7% (approximately 971) of the residential structures in the La Feria planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant hurricane events. In addition, communities with manufactured housing in the La Feria planning area would also be vulnerable to hurricanes. The US Census data indicates approximately 654 manufactured homes in the La Feria planning area.

The following critical facilities would be vulnerable to hurricane events in the La Feria planning area:

- 6 Government Facilities
- 1 Police Station
- 2 Dome Shelters
- 2 Water Towers
- 2 Water Treatment Facilities
- 2 Fire Departments
- 16 Lift Stations
- 10 Schools (Including ISD Administartion Facilities)
- 2 Pump Stations

Storm track data was available for the past 150 years; however, property and crop loss data is only available from 1960 to the present. Table 10-3 shows impact or loss estimation for storms impacting the county. Damages are reported on a countywide basis and are not available for the City of La Feria. Annual loss estimates were based on the 56 year reporting period for such damages (Table 10-2). The average annual loss estimate for Cameron County is approximately $14 million. The average annual loss estimate for the City of La Feria is approximately $61 thousand.

TABLE 10-3. POTENTIAL ANNUALIZED LOSSES, 1960-2015

JURISDICTION	NUMBER OF EVENTS	PROPERTY & CROP LOSS (2015 DOLLARS)	ANNUAL LOSS ESTIMATES (2015 DOLLARS)
Cameron County	28	$783,311,073	$13,987,698
La Feria[1]	28	$3,391737	$60,567

The potential severity of impact from a hurricane for the City of La Feria planning area is classified as substantial; meaning multiple deaths, complete shutdown of critical facilities and services for 30 days or more, and more than 50 percent of property would be destroyed or have major damage.

ASSESSMENT OF IMPACTS

Hurricane events have the potential to pose a significant risk to people, and can create dangerous and difficult situations for public health and safety officials. Impacts to the planning area can include:

- Individuals exposed to the storm can be struck by flying debris, falling limbs, or downed trees causing serious injury or death.
- Structures can be damaged or crushed by falling trees, which can result in physical harm to the occupants.
- Residential structures may suffer substantial damage, requiring immediate shelter and long term displacement assistance for residents.
- Driving conditions in the city may be dangerous during a hurricane event, especially over elevated bridges, elevating the risk of injury and accidents during evacuations if not timed properly.
- Additional resources may be required for emergency preparedness and response during the summer months due to increases in populations.
- Emergency evacuations may be necessary prior to a hurricane landfall, requiring emergency responders, evacuation routing and temporary shelters.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.
- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.
- During hurricane landfall, first responders may be prevented from responding to calls, as the winds may reach a speed in which their vehicles and equipment are unsafe to operate.

[1] Calculated as a percentage (0.433) of the reported county damages

- Hurricane events often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning, as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.
- Extreme hurricane events may rupture gas lines and down trees and power lines, increasing the risk of structure fires during and after a storm event.
- Extreme hurricane events may lead to prolonged evacuations during search and rescue, and immediate recovery efforts requiring additional emergency personnel and resources to prevent entry, and protect citizens and property.
- First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions.
- Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.
- Critical staff may be unable to report for duty, limiting response capabilities.
- City or county departments may be damaged, delaying response and recovery efforts for the entire community.
- Private sector entities that the City and its residents rely on, such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Economic disruption negatively impacts the programs and services provided by the community due to short and long term loss in revenue.
- Some businesses not directly damaged by the hurricane may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Older structures built to less stringent building codes may suffer greater damage as they are typically more vulnerable to hurricane damage.
- Large scale hurricanes can have significant economic impact on the affected area, as it must now fund expenses such as infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, as well as normal day-to-day operating expenses.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damages without a backup power source.

The economic and financial impacts of a hurricane on the area will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses and citizens will also contribute to the overall economic and financial conditions in the aftermath of any hurricane event.

SECTION 11: LIGHTNING

HAZARD DESCRIPTION

Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a "bolt" when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes the thunder which often accompanies lightning strikes. While most often affiliated with severe thunderstorms, lightning often strikes outside of heavy rain and might occur as far as 10 miles away from any rainfall.

According to FEMA, an average of 300 people are injured and 80 people are killed in the United States each year by lightning. Direct lightning strikes also have the ability to cause significant damage to buildings, critical facilities and infrastructure. Lightning is also responsible for igniting wildfires that can result in widespread damages to property before firefighters have the ability to contain and suppress the resultant fire.

LOCATION

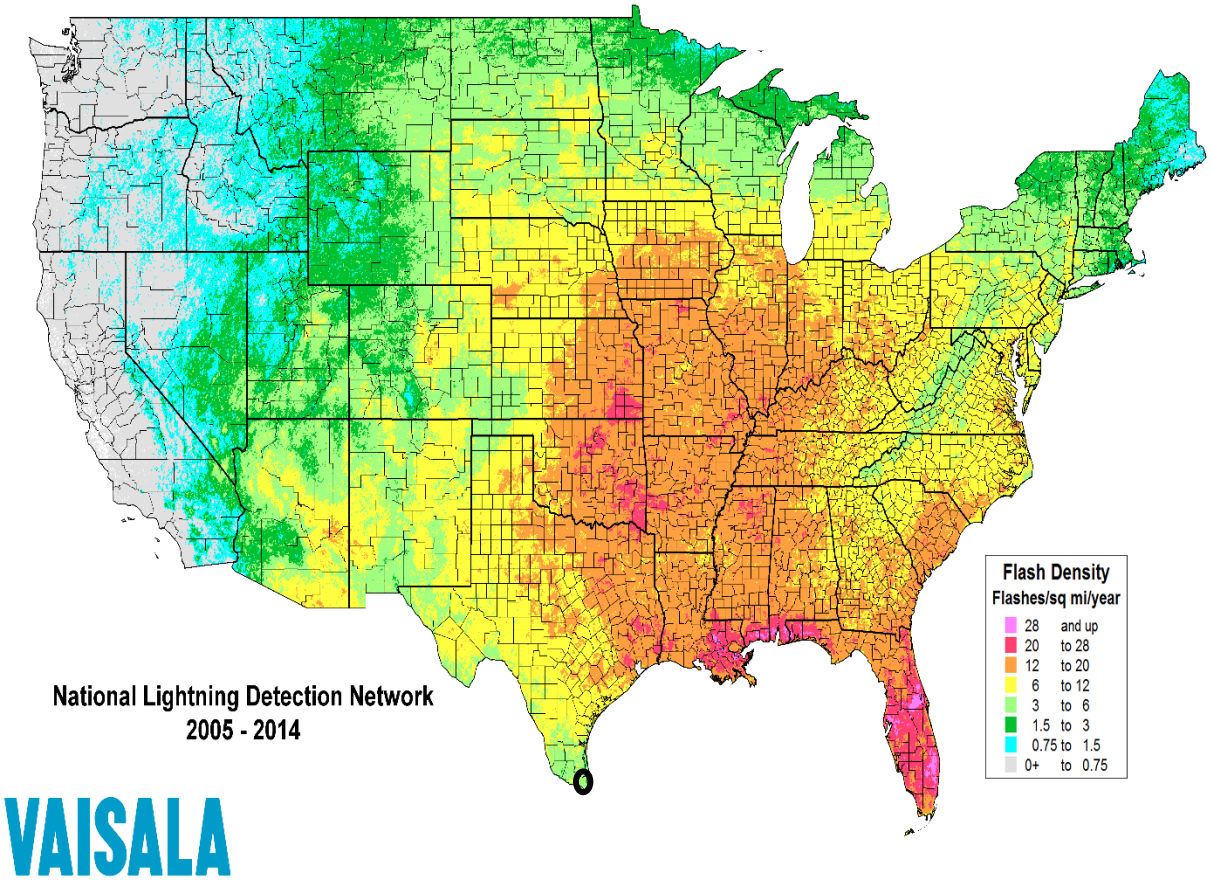
Lightning can strike in any geographic location, and is considered a common occurrence in Texas. The La Feria planning area is located in a region of the country that is moderately susceptible to lightning strike. Therefore lightning could occur at any location within the La Feria planning area. It is assumed that the La Feria planning area is uniformly exposed to the threat of lightning.

EXTENT

The planning area considers a flash density of less than two to be a minor severity and a flash density of three and greater to be a major severity. Any lightning strike that causes death or property damage is considered a major severity. The Vaisala's U.S. National Lightning Detection

Network lightning flash density map (Figure 11-1) shows a range of 3 to 6 lightning flashes per square mile per year for the City of La Feria.

FIGURE 11-1. LIGHTNING FLASH DENSITY, 2005-2014



HISTORICAL OCCURRENCES

Table 11-1 depicts historical occurrences of lighting for Cameron County, including the La Feria planning area, with associated damages according to the National Climatic Data Center (NCDC) data. Since January 1996, 3 recorded lightning events are known to have impacted Cameron County, based upon NCDC records.

The NCDC is a national data source organized under the National Oceanic and Atmospheric Administration. The NCDC is the largest archive available for climate data; however, it is important to note that the only incidents recorded are those that are reported to the NCDC that have been factored into this risk assessment. Damage estimates provided in a table for losses have been modified to reflect the damage in 2015 dollars.

TABLE 11-1. HISTORICAL LIGHTNING EVENTS, WITH REPORTED DAMAGES, 1996-2016

JURISDICTION	DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	9/29/2011	10:59 AM	0	0	$1,587	$0
Cameron County	5/12/2012	3:10 PM	0	0	$5,182	$0
Cameron County	5/28/2014	3:15 PM	0	0	$10,051	$0

SIGNIFICANT PAST EVENTS

September 29, 2011 – Cameron County

Scattered thunderstorms associated with a weak upper level disturbance produced welcome, but locally heavy, rainfall in Zapata County, along with locally gusty winds across the Rio Grande Plains and Rio Grande Valley as drier, cooler air aloft mixed down to the surface in the form of outflows ahead of many of the storms. Earlier in the day, a locally strong storm dropped nearly 3/4 inch of rain at the Brownsville/SPI International Airport on the east side of town. Lightning struck a radio tower near the Brownsville Public Utilities Board (Brownsville PUB) facility just before noon on September 29th, starting a small blaze in a storage room which was quickly put out by firefighters. Fiber stored in the room were deemed a total loss.

PROBABILITY OF FUTURE EVENTS

Based on historical records and input from the planning team the probability of occurrence for future lightning events in the La Feria planning area is considered occasional, or an event probable in the next five years. According to NOAA, La Feria is located in an area of the country that experiences 3-6 lightning flashes per square mile per year (approximately 17 to 33 flashes per year). Given this estimated frequency of occurrence, it can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the planning area.

VULNERABILITY AND IMPACT

Vulnerability is difficult to evaluate since lighting events can occur at different strength levels, in random locations, and can create a broad range of damages depending on the strike location. Due to the randomness of these events, all existing and future structures, and facilities in La Feria could potentially be impacted and remain vulnerable to possible injury and property loss from lightning strikes.

The direct and indirect losses associated with these events include injury and loss of life, damage to structures and infrastructure, agricultural losses, utility failure (power outages), and stress on community resources. The entire population of La Feria is considered exposed to the lightning hazard. The peak lightning season in the State of Texas is from June to August; however, the most

fatalities occur in July. Fatalities occur most often when people are outdoors and/or participating in some form of recreation. Population located outdoors is considered at risk and more vulnerable to a lightning strike compared to being inside a structure. Moving to a lower risk location will decrease a person's vulnerability.

The entire general building stock and all infrastructure of La Feria are considered exposed to the lightning hazard. Lightning can be responsible for damages to buildings; cause electrical, forest and/or wildfires; and damage infrastructure such as power transmission lines and communication towers. Agricultural losses can be extensive due to lightning and resulting fires.

The following critical facilities would be vulnerable to lightning events in the La Feria planning area:

- 6 Government Facilities
- 1 Police Station
- 2 Dome Shelters
- 2 Water Towers
- 2 Water Treatment Facilities
- 2 Fire Departments
- 16 Lift Stations
- 10 Schools (Including ISD Administartion Facilities)
- 2 Pump Stations

Impact of lightning experienced in the La Feria planning area has resulted in no injuries and no fatalities. Impact of lighting events experienced in the La Feria planning area would be "Limited," and injuries and illnesses would be treatable with first aid, the quality of life lost would be minor, and facilities would be shut down for 24 hours or less. Overall, the average loss estimate for Cameron County (in 2015 dollars) is $16,820, having an approximate annual loss estimate of $885 (Table 11-2).

TABLE 11-2. POTENTIAL ANNUALIZED LOSSES FOR THE CITY OF LA FERIA

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Cameron County	$16,820	$885
La Feria[1]	$73	$4

ASSESSMENT OF IMPACTS

Lightning events have the potential to pose a significant risk to people, and can create dangerous and difficult situations for public health and safety officials. Impacts to the planning area can include:

[1] Calculated as a percentage (0.433) of the reported county damages

- Individuals exposed to the storm can be directly struck, posing significant health risks and potential death.
- Structures can be damaged or crushed by falling trees damaged by lightning, which can result in physical harm to the occupants.
- Lightning strikes can result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning, as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.
- Lightning strikes can be associated with structure fires and wildfires, creating additional risk to residents and first responders.
- Emergency operations and services may be significantly impacted due to power outages and/or loss of communications.
- City or county departments may be damaged, delaying response and recovery efforts for the entire community.
- Economic disruption due to power outages and fires negatively impacts the programs and services provided by the community due to short and long term loss in revenue.
- Some businesses not directly damaged by lighting events may be negatively impacted while utilities are being restored, further slowing economic recovery.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damages without a backup power source.

The economic and financial impacts of lightning on the area will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses and citizens will also contribute to the overall economic and financial conditions in the aftermath of any lightning event.

SECTION 12: THUNDERSTORM WIND

HAZARD DESCRIPTION

Thunderstorms create extreme wind events which includes straight line winds. Wind, is the horizontal motion of the air past a given point, beginning with differences in air pressures. Pressure that is higher at one place than another sets up a force pushing from the high toward the low pressure; the greatest the difference in pressures, the stronger the force. The distance between the area of high pressure and the area of low pressure also determines how fast the moving air is accelerated.

Thunderstorms are created when heat and moisture near the Earth's surface are transported to the upper levels of the atmosphere. By-products of this process are the clouds, precipitation, and wind that become the thunderstorm.

According to the National Weather Service (NWS), a thunderstorm occurs when thunder accompanies rainfall. Radar observers use the intensity of radar echoes to distinguish between rain showers and thunderstorms.

Straight line winds are responsible for most thunderstorm wind damages. One type of straight line wind, the downburst, is a small area of rapidly descending air beneath a thunderstorm. A downburst can cause damage equivalent to a strong tornado and make air travel extremely hazardous.

LOCATION

Thunderstorm wind events can develop in any geographic location, and are considered a common occurrence in Texas. Therefore a thunderstorm wind event could occur at any location

within the City of La Feria planning area, as these storms develop randomly and are not confined to any geographic area. It is assumed that the entire La Feria planning area is uniformly exposed to the threat of thunderstorm winds.

EXTENT

The extent or magnitude of a thunderstorm wind event is measured by the Beaufort Wind Scale. Table 12-1 describes the different intensities of wind in terms of speed and effects, from calm to violent and destructive.

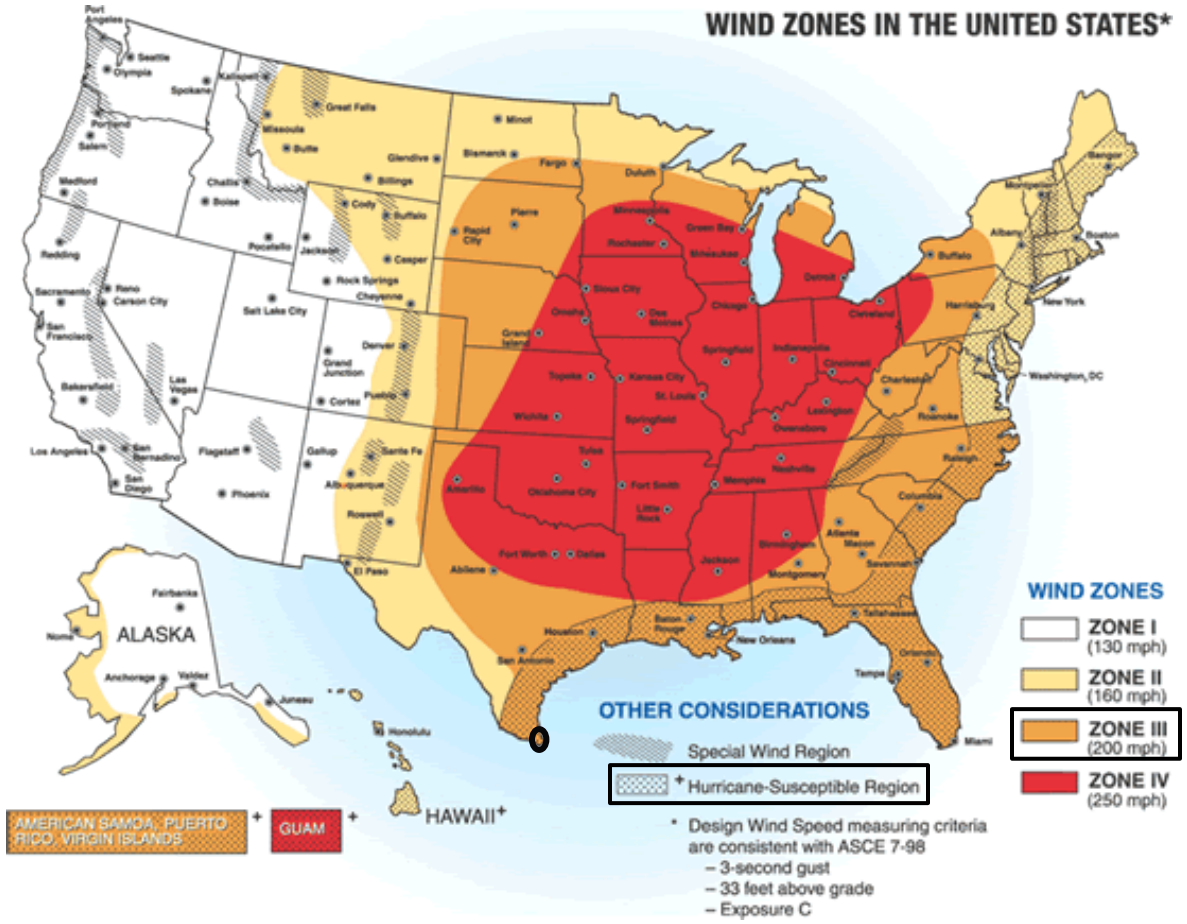
TABLE 12-1. BEAUFORT WIND SCALE[1]

FORCE	WIND (KNOTS)	WMO CLASSIFICATION	APPEARANCE OF WIND EFFECTS
0	Less than 1	Calm	Calm, smoke rises vertically
1	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-7	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	12-12	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	13-18	Moderate Breeze	Dust, leaves and loose paper lifted, small tree branches move
5	19-24	Fresh Breeze	Small trees in leaf begin to sway
6	25-31	Strong Breeze	Larger tree branches moving, whistling in wires
7	32-38	Near Gale	Whole trees moving, resistance felt walking against wind
8	39-46	Gale	Whole trees in motion, resistance felt walking against wind
9	47-54	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	55-63	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	64-72	Violent Storm	If experienced on land, widespread damage
12	73+	Hurricane	Violence and destruction

The figure 8.1displays the wind zones as derived from NOAA.

[1] *Source: World Meteorological Organization*

FIGURE 12-1. WIND ZONES IN THE UNITED STATES[2]



On average, the planning area experiences two to three thunderstorm wind events every year. The City of La Feria planning area is located within the Zone III, meaning they can experience winds up to 200 mph. The planning area has experienced a significant wind event, or an event with winds in the range of "Force 12" on the Beaufort Wind Scale with winds above 73 knots.

HISTORICAL OCCURRENCES

Tables 12-2, 12-3 and 12-4 depict historical occurrences of thunderstorm wind events for the La Feria planning area according to the National Climatic Data Center (NCDC) data. Since January 1955, 134 thunderstorm wind events are known to have impacted Cameron County, based upon NCDC records. Table 12-3 presents information on known historical events for La Feria and Cameron County, with resulting damages. Table 12-4 depicts a summary of damages reported

[2] *Cameron County is indicated by the circle.*

for the La Feria planning area. It is important to note that high wind events associated with other hazards, such as tornadoes, are not accounted for in this section.

The NCDC is a national data source organized under the National Oceanic and Atmospheric Administration. The NCDC is the largest archive available for climate data; however, it is important to note that the only incidents recorded are those that are reported to the NCDC that have been factored into this risk assessment. In the tables that follow throughout this section, some occurrences seem to appear multiple times in one table. This is due to reports from various locations throughout the County. In addition, property damage estimates are not always available. When this occurs, estimates are not provided. Where an estimate has been provided in a table for losses, the dollar amounts have been altered to indicate the damage in 2015 dollars.

TABLE 12-2. HISTORICAL THUNDERSTORM WIND EVENTS, WITH REPORTED DAMAGES, 1955-2016

MAXIMUM WIND SPEED RECORDED (KNOTS)	NUMBER OF REPORTED EVENTS
0-30	0
31-40	7
41-50	17
51-60	21
61-70	1
71-80	1
81-90	0
91-100	1
Unknown	9

TABLE 12-3. HISTORICAL THUNDERSTORM WIND EVENTS, 1955-2016[3]

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (2015 DOLLARS)	CROP DAMAGE (2015 DOLLARS)
Cameron County	3/12/1993	6:05 AM	Unknown	0	0	$82,013	$820
Cameron County	6/13/1994	11:30 AM	Unknown	0	0	$8,028	$803

[3] *Only recorded events with fatalities, injuries, and/or damages are listed.*

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (2015 DOLLARS)	CROP DAMAGE (2015 DOLLARS)
Cameron County	2/28/1995	3:30 PM	Unknown	0	0	$1,555	$0
Cameron County	2/28/1995	3:40 PM	Unknown	0	0	$9,331	$0
Port Isabel	4/4/1995	8:30 PM	Unknown	0	0	$7,807	$0
South Padre Island	4/4/1995	8:30 PM	Unknown	0	0	$7,807	$0
Cameron County	2/1/1998	4:22 PM	Unknown	0	0	$7,299	$0
Cameron County	11/4/1998	3:15 AM	Unknown	0	0	$110,944	$0
Los Fresnos	5/18/1999	5:15 AM	Unknown	0	0	$2,856	$0
Laguna Vista	5/2/2000	7:20 PM	100 knots	0	0	$6,908,972	$0
South Padre Island	8/19/2003	2:00 AM	50 knots	0	0	$6,441	$0
Cameron County	8/19/2003	2:00 AM	50 knots	0	0	$6,441	$0
Cameron County	2/25/2004	1:30 PM	40 knots	0	0	$37,642	$0
Cameron County	7/20/2005	6:00 AM	55 knots	0	0	$45,510	$0
Port Isabel	10/31/2005	9:23 PM	60 knots	0	0	$12,184	$0
Cameron County	4/29/2006	12:01 AM	60 knots	0	0	$59,014	$0
San Benito	12/23/2006	5:45 PM	52 knots	0	0	$5,091	$0
Cameron County	12/23/2006	5:30 PM	52 knots	0	0	$11,803	$0
Cameron County	2/16/2008	12:00 PM	38 knots	0	0	$1,101	$0
Bayview	3/2/2008	12:00 PM	42 knots	0	0	$550	$0
Cameron County	3/2/2008	12:00 PM	39 knots	0	0	$3,303	$0
Port Isabel	3/17/2008	11:00 AM	41 knots	0	0	$225	$0
Cameron County	3/18/2008	9:00 AM	37 knots	0	0	$1,651	$0
Cameron County	5/16/2008	2:50 AM	70 knots	0	0	$55,258	$0

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (2015 DOLLARS)	CROP DAMAGE (2015 DOLLARS)
Cameron County	5/16/2008	3:00 AM	75 knots	0	0	$221,033	$0
Rio Hondo	6/24/2008	11:08 AM	50 knots	0	0	$277	$0
Port Isabel	5/24/2009	5:00 AM	46 knots	0	0	$11,091	$0
Cameron County	5/27/2009	4:25 PM	52 knots	0	0	$2,210	$0
Cameron County	6/1/2009	2:16 PM	53 knots	0	0	$1,109	$0
Los Fresnos	10/26/2009	1:50 PM	49 knots	0	0	$1,109	$0
Cameron County	12/24/2009	4:25 AM	42 knots	0	0	$1,105	$0
Port Isabel	5/18/2010	9:25 AM	56 knots	0	0	$27,280	$0
Cameron County	5/18/2010	8:20 AM	52 knots	0	0	$5,435	$0
Cameron County	5/18/2010	9:05 AM	50 knots	0	0	$10,870	$0
Port Isabel	2/9/2011	1:00 PM	42 knots	0	0	$527	$0
South Padre Island	11/26/2011	10:00 PM	36 knots	0	0	$2,107	$0
San Benito	5/15/2012	8:49 PM	48 knots	0	0	$3,097	$0
Cameron County	1/29/2013	12:17 PM	42 knots	0	0	$1,017	$0
Rancho Viejo	4/28/2013	12:19 PM	52 knots	0	2	$2,043	$0
Cameron County	4/28/2013	12:23 PM	56 knots	0	6	$51,071	$0
Cameron County	4/28/2013	12:25 PM	52 knots	0	0	$2,043	$0
South Padre Island	11/22/2013	4:00 PM	33 knots	0	0	$5,087	$0
Cameron County	11/22/2013	2:40 PM	34 knots	0	0	$3,052	$0
Cameron County	12/21/2013	5:34 AM	42 knots	0	0	$1,017	$0
Cameron County	12/21/2013	10:58 AM	42 knots	0	0	$5,087	$0

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (2015 DOLLARS)	CROP DAMAGE (2015 DOLLARS)
Bayview	1/24/2014	3:54 AM	42 knots	0	0	$1,252	$0
Laguna Vista	1/24/2014	3:54 AM	42 knots	0	0	$1,252	$0
Port Isabel	1/24/2014	3:54 AM	42 knots	0	0	$1,252	$0
South Padre Island	1/24/2014	3:54 AM	42 knots	0	0	$1,252	$0
Cameron County	4/14/2014	2:00 PM	44 knots	0	0	$1,001	$0
Primera	4/24/2015	10:25 PM	52 knots	0	0	$10,000	$0
San Benito	4/24/2015	10:25 PM	52 knots	0	0	$5,000	$0
Cameron County	4/24/2015	10:20 PM	52 knots	0	0	$2,000	$0
Cameron County	5/12/2015	12:25 AM	52 knots	0	0	$1,000	$0
Cameron County	8/17/2015	5:05 PM	52 knots	0	0	$15,000	$0
Cameron County	8/17/2015	5:17 PM	56 knots	0	0	$30,000	$0
Brownsville	4/18/2016	10:00 PM	43 knots	0	0	$5,000	$0
Port Isabel	6/2/2016	6:15 PM	44 knots	0	0	$5,000	$0
Rancho Viejo	6/4/2016	9:40 AM	52 knots	0	0	$2,000	$0
TOTAL				**0**	**8**	**$7,881,704**	

TABLE 12-4. LA FERIA SUMMARY OF HISTORICAL THUNDERSTORM WIND EVENTS, 1955-2016

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE	INJURIES	FATALITIES	PROPERTY DAMAGE (2015 DOLLARS)	CROP DAMAGE (2015 DOLLARS)
La Feria	9	53 knots	0	0	$10,133	$803
Cameron County	127	100 knots	3	0	$7,839,945	$823
Total Losses	**134**	**(Max Extent)**	**3**	**0**	**$7,881,704**	

SIGNIFICANT PAST EVENTS

June 13, 1994 – La Feria

Strong thunderstorm winds downed multiple trees throughout the city and damaged power lines, resulting in loss of power to residents.

May 16, 2008 – Cameron County

A severe thunderstorm wind event which caused structure, vehicle, and power line damage struck the northern portion of Harlingen, producing an 86 mph wind gust at Valley International Airport, damaging three hangar roofs on the airport grounds. Pieces from one of these roofs, made of heavier asphalt underlines, knocked out at least two large windows in the control tower. In a nearby neighborhood just west of the airport, dozens of large tree limbs were snapped and some fences were partially blown down. The storm continued to produce damages as it moved farther east, with a 25 square foot portion of one residence's roof ripped away by the winds in Las Yescas. The storm gradually weakened as it headed through largely uninhabited eastern Cameron County, on its way to dissipation in the Gulf.

PROBABILITY OF FUTURE EVENTS

Most thunderstorm wind events occur during the spring, in the months of March, April and May, and in the fall, during the month of September. Due to the limited number of events reported for the City of La Feria, the analysis focused on the reported events for Cameron County to reflect a greater probability for the planning area. This more accurately depicts the risk for the planning area based on the planning team and stakeholder accounts. Based on available records of historic events, 134 events in a 61 year reporting period provides a frequency of occurrence of 2 to 3 events every year. Even though the intensity of extreme wind events is not always damaging for the La Feria planning area, the frequency of occurrence for an extreme wind event is highly likely, meaning that an event is probable within the next year for the planning area.

VULNERABILITY AND IMPACT

Vulnerability is difficult to evaluate since extreme wind events can occur at different strength levels, in random locations, and can create relatively narrow paths of destruction. Due to the randomness of these events, all existing and future structures, and facilities in the planning area could potentially be impacted and remain vulnerable to possible injury and property loss from strong winds.

According to the US Census Bureau, 35.7% (approximately 971) of the residential structures in the La Feria planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant wind events. In addition, communities with manufactured housing in the La Feria planning area would also be vulnerable to extreme wind. The US Census data indicates approximately 654 manufactured homes in the La Feria planning area.

The following critical facilities would be vulnerable to extreme wind in the La Feria planning area:

- 6 Government Facilities
- 1 Police Station
- 2 Dome Shelters
- 2 Water Towers
- 2 Water Treatment Facilities
- 2 Fire Departments
- 16 Lift Stations
- 10 Schools (Including ISD Administartion Facilities)
- 2 Pump Stations

Trees, power lines and poles, signage, manufactured housing, radio towers, concrete block walls, storage barns, windows, garbage recepticles, brick facades, and vehicles, unless reinforced, are vulnerable to extreme wind events. More severe damage involves windborne debris, in some instances, patio furniture and other lawn items have been reported to have been blown around by wind and, very commonly, debris from damaged structures in turn have caused damage to other buildings not directly impacted by the event. In numerous instances roofs have been reported as having been torn off of buildings.

An extreme wind can also result in traffic disruptions, injuries and in rare cases, fatalities. Impact of thunderstorm wind experienced in the La Feria planning area has resulted in no injuries or fatalities. Impact of extreme wind events experienced in the planning area would be "Limited," injuries and/or illnesses are treatable with first aid, with shutdown of facilities and services for 24 hours or less, and less than 10% of property destroyed or with major damage. Overall, the average loss estimate (in 2015 dollars) is $47,731, having an approximate annual loss estimate of $796 (Table 12-5), which would be considered negligible annual damages.

TABLE 12-5. HISTORICAL EVENTS SUMMARY AND POTENTIAL ANNUALIZED LOSSES

JURISDICTION	FREQUENCY	PROBABILITY OF FUTURE EVENTS	AVERAGE ANNUALIZED LOSSES
La Feria	0.13	Unlikely	$796
Cameron County	2.1	Highly Likely	$130,411

ASSESSMENT OF IMPACTS

Extreme wind events have the potential to pose a significant risk to people, and can create dangerous and difficult situations for public health and safety officials. Impacts to the planning area can include:

- Individuals exposed to the storm can be struck by flying debris, falling limbs, or downed trees causing serious injury or death.

- Structures can be damaged or crushed by falling trees, which can result in physical harm to the occupants.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.
- Driving conditions in the planning area may be dangerous during extreme wind events, especially over elevated bridges.
- Manufactures homes of portable buildings in the city may suffer more significant damage during an extreme wind event than a site built structure.
- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.
- During exceptionally heavy wind events, first responders may be prevented from responding to calls, as the winds may reach a speed in which their vehicles and equipment are unsafe to operate.
- Extreme wind events often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning, as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.
- First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions.
- Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.
- Critical staff may be unable to report for duty, limiting response capabilities.
- City or county departments may be damaged, delaying response and recovery efforts for the entire community.
- Private sector entities that the City and its residents rely on, such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Economic disruption negatively impacts the programs and services provided by the community due to short and long term loss in revenue.
- Some businesses not directly damaged by extreme wind events may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Older structures built to less stringent building codes may suffer greater damage as they are typically more vulnerable to extreme winds.
- Large scale wind events can have significant economic impact on the affected area, as it must now fund expenses such as infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, as well as normal day-to-day operating expenses.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damages without a backup power source.

The economic and financial impacts of extreme wind on the area will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the

community, local businesses and citizens will also contribute to the overall economic and financial conditions in the aftermath of any extreme wind event.

SECTION 13: HAIL

HAZARD DESCRIPTION

Hailstorm events are a potentially damaging outgrowth of severe thunderstorms. During the developmental stages of a hailstorm, ice crystals form within a low pressure front due to the rapid rising of warm air into the upper atmosphere, and the subsequent cooling of the air mass. Frozen droplets gradually accumulate into ice crystals until they fall as precipitation that is round or irregularly shaped masses of ice greater than 0.75 inches in diameter. The size of hailstones is a direct result of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a by-product of heating on the Earth's surface. Higher temperature gradients above Earth's surface result in increased suspension time and hailstone size.

LOCATION

Hailstorms are an extension of severe thunderstorms that could potentially cause severe damage. As a result, they are not confined to any specific geographic location, and can vary greatly in size, location, intensity and duration. Therefore, the City of La Feria planning area is equally at risk to the hazard of hail.

EXTENT

The National Weather Service (NWS) classifies a storm as "severe," if there is hail three-quarters of an inch in diameter (approximately the size of a penny) or greater, based on radar intensity or as seen by observers. The intensity category of a hailstorm depends on hail size and the potential damage it could cause, as depicted in the National Climatic Data Center (NCDC) Intensity Scale in Table 13-1.

TABLE 13-1. HAIL INTENSITY AND MAGNITUDE[1]

SIZE CODE	INTENSITY CATEGORY	SIZE (Diameter Inches)	DESCRIPTIVE TERM	TYPICAL DAMAGE
H0	Hard Hail	Up to 0.33	Pea	No damage
H1	Potentially Damaging	0.33 – 0.60	Marble	Slight damage to plants and crops
H2	Potentially Damaging	0.60 – 0.80	Dime	Significant damage to plants and crops
H3	Severe	0.80 – 1.20	Nickel	Severe damage to plants and crops
H4	Severe	1.2 – 1.6	Quarter	Widespread glass and auto damage
H5	Destructive	1.6 – 2.0	Half Dollar	Widespread destruction of glass, roofs, and risk of injuries
H6	Destructive	2.0 – 2.4	Ping Pong Ball	Aircraft bodywork dented and brick walls pitted
H7	Very Destructive	2.4 – 3.0	Golf Ball	Severe roof damage and risk of serious injuries
H8	Very Destructive	3.0 – 3.5	Hen Egg	Severe damage to all structures
H9	Super Hailstorms	3.5 – 4.0	Tennis Ball	Extensive structural damage, could cause fatal injuries
H10	Super Hailstorms	4.0 +	Baseball	Extensive structural damage, could cause fatal injuries

The intensity scale in Table 13-1 ranges from H0 to H10, with increments of intensity or damage potential in relation to hail size (distribution and maximum), texture, fall speed, speed of storm translation, and strength of the accompanying wind. Based on available data regarding the previous occurrences for the area, the City of La Feria planning area may experience hailstorms ranging from an H0 to an H5. The planning area can mitigate a storm from low risk or hard hail to a destructive, super hailstorm with ping pong ball size hail that leads to aircraft bodywork dented and brick walls pitted.

[1] *NCDC Intensity Scale, based on the TORRO Hailstorm Intensity Scale*

HISTORICAL OCCURRENCES

Historical evidence shown in Figure 13-1 shows that the planning area is vulnerable to hail events overall, which typically result from severe thunderstorm activity. A total of 5 reported historical hail events impacted the City of La Feria between 1955 and 2016 (Summary Table 13-2). These events were reported to NCDC and NOAA databases, and may not represent all hail events to have occurred during the past 61years. Only those events for La Feria with latitude and longitude available were plotted (Figure 13-1).

FIGURE 13-1. SPATIAL HISTORICAL HAIL EVENTS, 1955-2016

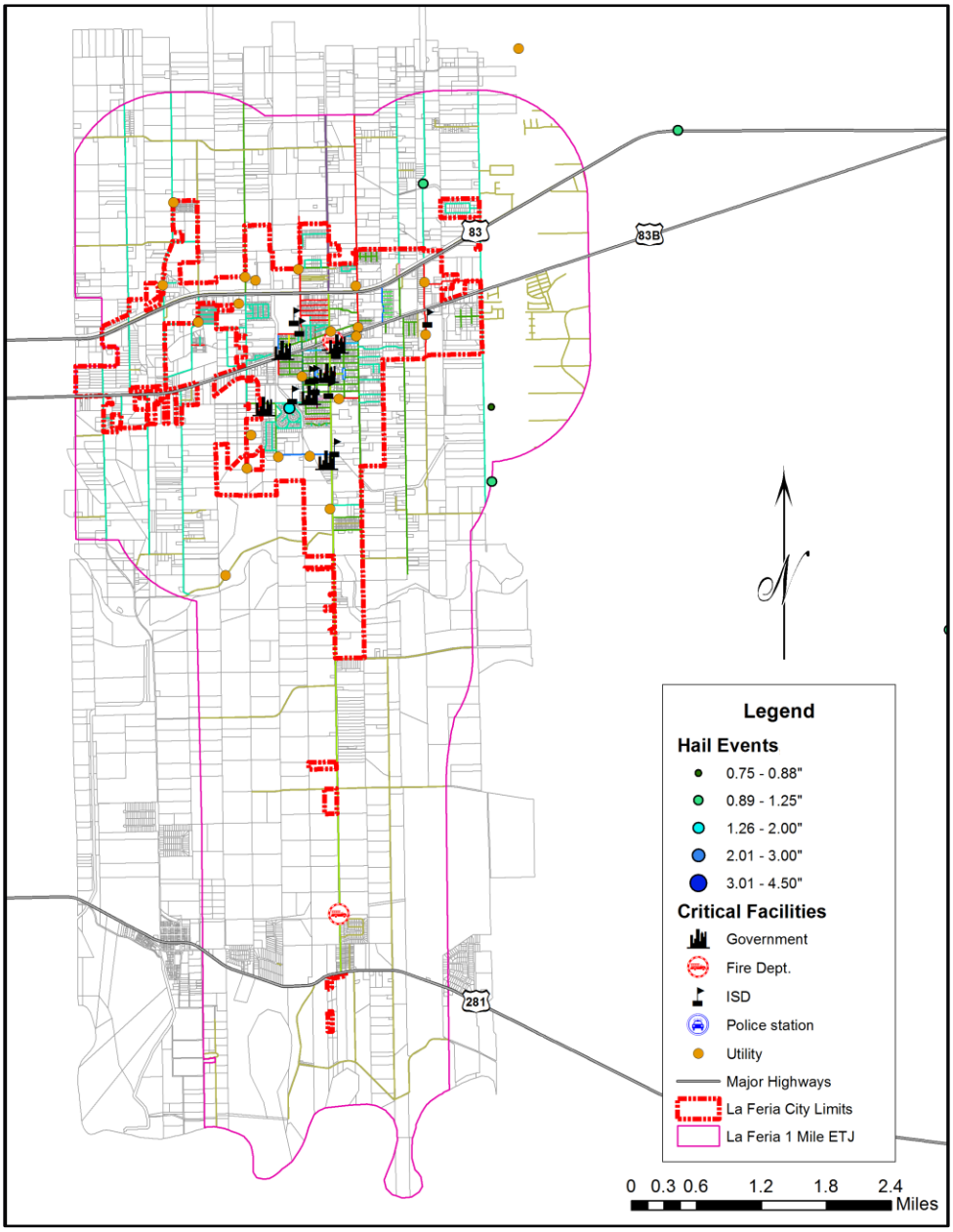


TABLE 13-2. HISTORICAL HAIL EVENTS IMPACT, 1955-2016

JURISDICTION	Number of Events	MAGNITUDE	INJURIES	FATALITIES	PROPERTY DAMAGE (2015)	CROP DAMAGE (2015)
La Feria	5	2.0 Inches	0	0	$0	$0
Cameron County	43	4.0 Inches	5	0	$64,739,764	$8,028
Total Losses	**48**	**(Max Extent)**	**5**	**0**	**$64,747,792**	

SIGNIFICANT PAST EVENTS

May 11, 1971 - Cameron County

Large hail damaged property and crops in the Lower Rio Grande Valley with the heaviest losses from Weslaco eastward. In Brownsville, hailstones four inches in diameter and chunks of ice 5 x 7 inches across and weighing twelve ounces, smashed car windshields, greenhouses, windows and damaged roofs. The average size of hailstones was approximately ¾ inch in diameter. Property damages was estimated at $2,800,000 or $16,519,437 in 2015 dollars. Automobiles suffered body damage as well as windshield damage. Manufactured home roofs were punctured. One large tract of 80 acres of honeydew melons was reported to be an entire loss.

May 5, 2012 – La Feria

A line of strong to severe thunderstorms associated with a cold front moving across the region, developed over southern Kenedy County and moving south across Willacy and Cameron counties around midnight on December 5th. This front was preceded by just enough instability to produce a small band of damaging winds and hail. Several reports of strong wind gusts and wind damage were reported around the Raymondville area in Willacy County. Further south in Cameron County, quarter to half dollar sized hail was reported in La Feria. Residents reported quarter to half dollar size hail in La Feria near FM 506.

May 12, 2012 – La Feria

A little more than a day after a thunderstorm system brought more severe weather to the Rio Grande Valley, the last vestige of very unstable air held forth mainly along and east of Highway 77. Despite unfavorable upper level conditions, the combination of the unstable air with a trigger in the form of a wind shift/dry line which moved within striking distance of Highway 77 allowed a small but strong cluster of thunderstorms to develop. These storms would produce develop quarter to half dollar sized hail at least between west Harlingen and La Feria and points south. Once again, there was some damage to vehicles caught in the hail, much containing jagged edges. Many residents caught by surprise by the rapid development moved their vehicles under gas station

canopies, car washes, and highway underpasses. Area Residents reported quarter size hail near La Feria.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, 5 events in a 61 year reporting period for the City of La Feria provides a frequency of occurrence of approximately 1 event probable in the next 10 years. This frequency supports an unlikely probability of future events.

VULNERABILITY AND IMPACT

Damage from hail approaches $1 billion in the U.S. each year. Much of the damage inflicted by hail is to crops. Even relatively small hail can shred plants to ribbons in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are most commonly damaged by hail.

Utility systems on roofs at school districts and hospitals would be vulnerable and could be damaged. Hail could cause a significant threat to people as they could be struck by hail and falling trees and branches. First responders could not be able to respond to calls due to blocked roads. Also, hail could cause power outages which could cause health and safety risks to faculty and students at schools, as well as to patients in hospitals.

According to the US Census Bureau, 35.7% (approximately 971) of the residential structures in the La Feria planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant hail events. In addition, communities with manufactured housing in the La Feria planning area would also be vulnerable to hail damage. The US Census data indicates approximately 654 manufactured homes in the La Feria planning area.

The following critical facilities would be vulnerable to hail events in the La Feria planning area:

- 6 Government Facilities
- 1 Police Station
- 2 Dome Shelters
- 2 Water Towers
- 2 Water Treatment Facilities
- 2 Fire Departments
- 16 Lift Stations
- 10 Schools (Including ISD Administartion Facilities)
- 2 Pump Stations

The impact of hail in the City of La Feria has resulted in no injuries or fatalities. Based on historic loss and damages, the impact of hail damages on the City of La Feria planning area can be considered limited severity of impact meaning injuries and/or illnesses are treatable with first aid, shutdown of facilities and services for 24 hours or less, and less than 10% of property is destroyed or with major damage. Overall, the average loss estimate (in 2015 dollars) negligible.

TABLE 13-3. HISTORICAL EVENTS SUMMARY AND POTENTIAL ANNUALIZED LOSSES

JURISDICTION	FREQUENCY	PROBABILITY OF FUTURE EVENTS	AVERAGE ANNUALIZED LOSSES
La Feria	0.08	Unlikely	$0
Cameron County	0.79	Highly Likely	$1,061,439

ASSESSMENT OF IMPACTS

Hail events have the potential to pose a significant risk to people, and can create dangerous situations. Impacts to the planning area can include:

- Hail may create hazardous road conditions during and immediately following an event, delaying first responders from providing for or preserving public health and safety.
- Individuals and first responders who are exposed to the storm may be struck by hail, falling branches, or downed trees resulting in injuries or possible fatalities.
- Residential structures can be damaged by falling trees, which can result in physical harm to occupants.
- Large hail events will likely cause extensive roof damage to residential structures along with siding damage and broken windows, creating a spike in insurance claims and a rise in premiums.
- Automobile damage may be extensive depending on the size of the hail and length of the storm.
- Hail events can result in power outages over widespread areas increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage can result in an increase in structure fires and/or carbon monoxide poisoning, as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- First responders are exposed to downed power lines, damaged structures, hazardous spills, and debris that often accompany hail events, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Downed power lines and large debris, such as downed trees, can result in the inability of emergency response vehicles to access areas of the community.
- Hazardous road conditions may prevent critical staff from reporting for duty, limiting response capabilities.
- Economic disruption negatively impacts the programs and services provided by the community due to short and long term loss in revenue.
- Some businesses not directly damaged by the hail event may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damages without a backup power source.

- Hazardous road conditions will likely lead to increases in automobile accidents, further straining emergency response capabilities.
- Depending on the severity and scale of damage caused by large hail events, damage to power transmission and distribution infrastructure can require days or weeks to repair.
- A significant hail event could significantly damage agricultural crops, resulting in extensive economic losses for the community and surrounding area.
- Hail events may injure or kill livestock and wildlife.

The economic and financial impacts of hail will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning conducted by the community, local businesses and citizens will contribute to the overall economic and financial conditions in the aftermath of any hail event.

SECTION 14: DAM FAILURE

Portions of the City of La Feria Hazard Mitigation Plan are considered confidential and not for release to the public. The information in this section is covered under Privacy Act of 1974 (5 U.S.C. Section 552a).

SECTION 15: WINTER STORM

HAZARD DESCRIPTION

A severe winter storm event is identified as a storm with snow, ice, or freezing rain. This type of storm can cause significant problems for area residents. Winter storms are associated with freezing or frozen precipitation such as freezing rain, sleet, snow and the combined effects of winter precipitation and strong winds. Wind chill is a function of temperature and wind. Low wind chill is a product of high winds and freezing temperatures.

Winter storms that threaten the City of La Feria usually begin as powerful cold fronts that push south from central Canada. Although the City is at risk to ice hazards, extremely cold temperatures, and light snow, the effects and frequencies of winter storm events are generally mild and short-lived.

Data from the National Oceanic and Atmospheric Administration (NOAA) and National Climatic Data Center (NCDC) Storm Events Database shows the total frequency of occurrence of all events identified as blizzards heavy snow, ice storm, lake-effect snow, and winter storm or winter weather. As indicated in Figure 15-1, on average, the area experiences less than ten extreme cold days a year, meaning one to ten days are at or around freezing temperatures. During times of ice and snow accumulation, response times will increase until public works road crews are able to make major roads passable. Table 15-1 describes the types of winter storms possible to occur in the City of La Feria.

FIGURE 15-1. EXTREME COLD DAYS, 1960-2003[1]

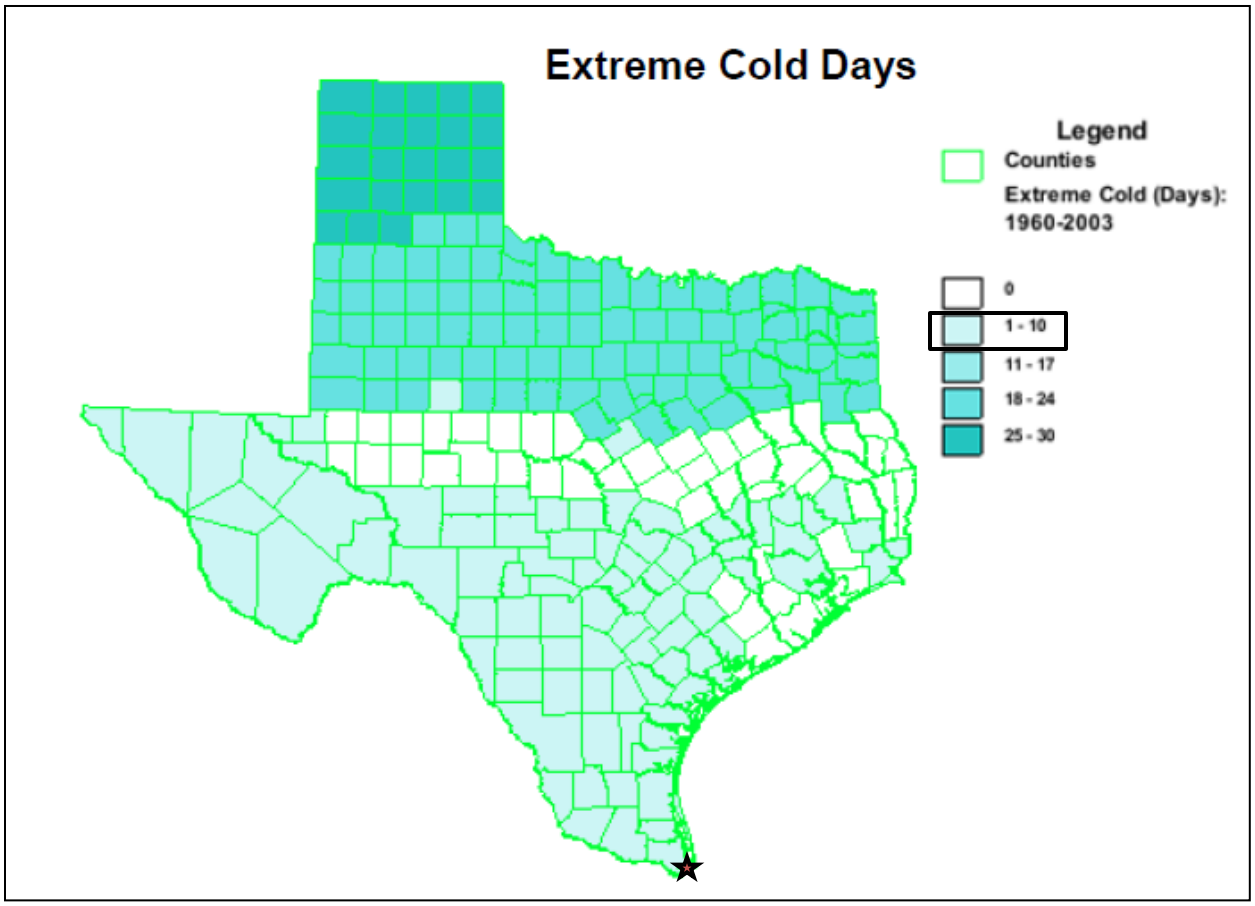


TABLE 15-1. TYPES OF WINTER STORMS

TYPE OF WINTER STORM	DESCRIPTION
Winter Weather Advisory	This alert may be issued for a variety of severe conditions. Weather advisories may be announced for snow, blowing or drifting snow, freezing drizzle, freezing rain, or a combination of weather events.
Winter Storm Watch	Severe winter weather conditions may affect your area (freezing rain, sleet or heavy snow may occur separately or in combination).
Winter Storm Warning	Severe winter weather conditions are imminent.

[1] *Source: National Weather Service. The City of La Feria is indicated by star.*

TYPE OF WINTER STORM	DESCRIPTION
Freezing Rain or Freezing Drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice glaze on roads and all other exposed objects.
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.
Blizzard Warning	Sustained wind speeds of at least 35 mph are accompanied by considerable falling or blowing snow. This alert is the most perilous winter storm with visibility dangerously restricted.
Frost/Freeze Warning	Below freezing temperatures are expected and may cause significant damage to plants, crops and fruit trees.
Wind Chill	A strong wind combined with a temperature slightly below freezing can have the same chilling effect as a temperature nearly 50 degrees lower in a calm atmosphere. The combined cooling power of the wind and temperature on exposed flesh is called the wind-chill factor.

LOCATION

Winter storm events are not confined to specific geographic boundaries. Therefore, all existing and future buildings, facilities, and populations in the City of La Feria are considered to be exposed to a winter storm hazard and could potentially be impacted.

EXTENT

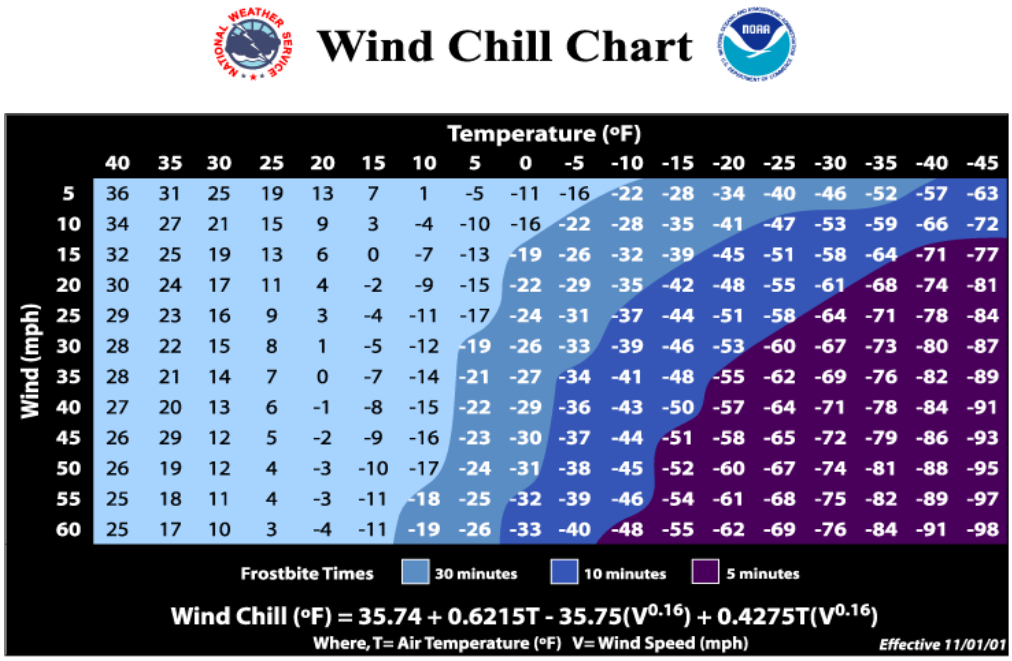
The extent or magnitude of a severe winter storm is measured in intensity based on the temperature and level of accumulations as shown in Table 15-2. Table 15-2 should be read in conjunction with the wind-chill factor described in Figure 15-2 to determine the intensity of a winter storm. The chart is not applicable when temperatures are over 50°F or winds are calm. This is an index developed by the National Weather Service.

TABLE 15-2. MAGNITUDE OF SEVERE WINTER STORMS

INTENSITY	TEMPERATURE RANGE (Fahrenheit)	EXTENT DESCRIPTION
Mild	40° – 50°	Winds less than 10 mph and freezing rain or light snow falling for short durations with little or no accumulations
Moderate	30° – 40°	Winds 10 – 15 mph and sleet and/or snow up to 4 inches

INTENSITY	TEMPERATURE RANGE (Fahrenheit)	EXTENT DESCRIPTION
Significant	25° – 30°	Intense snow showers accompanied with strong gusty winds, between 15 and 20 mph with significant accumulation
Extreme	20° – 25°	Wind driven snow that reduces visibility, heavy winds (between 20 to 30 mph), and sleet or ice up to 5 millimeters in diameter
Severe	Below 20°	Winds of 35 mph or more and snow and sleet greater than 4 inches

FIGURE 15-2. WIND CHILL CHART



Wind chill temperature, is a measure of how cold the wind makes real air temperature feel to the human body. Since wind can dramatically accelerate heat loss from the body, a blustery 30°F day would feel just as cold as a calm day with 0°F temperatures. The City of La Feria has never experienced a blizzard, but based on 16 previous occurrences recorded from 1996 to 2016 for Cameron County, it has been subject to winter storm watches, warnings, freezing rain, sleet, snow and wind chill.

Based on historical data for the City of La Feria area, the average event to mitigate would be a mild to moderate winter storm. The City can expect only a light dusting of ice and snow during a winter storm event with no accumulation and temperatures between 30°F and 50°F with winds ranging from zero to 15 mph.

HISTORICAL OCCURRENCES

Table 15-3 shows historical occurrences for Cameron County from 1996 to 2016 provided by the NCDC database. There have been 16 recorded winter storm events in Cameron County. Historical winter storm information, as provided by the NCDC, identifies winter storm activity across a multi-county forecast area for each event. The appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event.

TABLE 15-3. HISTORICAL WINTER STORM EVENTS, 1996-2016

DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE	PROPERTY DAMAGE (2015 DOLLARS)	CROP DAMAGE (2015 DOLLARS)
1/7/1996	0	0	$0	$0	$0	$0
1/12/1997	0	0	$0	$0	$0	$0
12/23/2004	0	0	$0	$0	$0	$0
12/24/2004	0	0	$0	$0	$0	$0
12/5/2009	0	0	$0	$0	$0	$0
1/9/2010	0	0	$0	$0	$0	$0
1/9/2010	0	0	$0	$0	$0	$0
12/26/2010	0	0	$0	$0	$0	$0
2/2/2011	0	0	$0	$5,000,000	$0	$5,289,101
2/3/2011	0	0	$15,000	$0	$15,867	$0
2/3/2011	0	0	$0	$0	$0	$0
2/4/2011	0	0	$0	$0	$0	$0
2/10/2011	0	0	$0	$0	$0	$0
2/11/2011	0	0	$0	$0	$0	$0
1/29/2014	0	0	$0	$0	$0	$0
1/29/2014	0	0	$0	$0	$0	$0

SIGNIFICANT PAST EVENTS

February 3, 2011 – Cameron County

A weak upper level disturbance combined with just enough low level moisture to develop a mist of freezing drizzle and light freezing rain soon after sunrise on the 3rd across the Lower Valley, spreading west and north through the day. The precipitation combined with gusty north winds to lock down temperatures at or below 32 degrees for more than 30 hours in all areas. Between 30 and 32 hours of freezing temperatures covered Cameron County, beginning during the early morning of February 3rd and continuing through late morning on February 4th, after which skies cleared and sunshine warmed temperatures back into the 40s. Through the period, temperatures held generally within a 2 degree range at any one location, between 28 and 30 degrees. Hard freezes - defined as 2 or more hours below 28 degrees - did not occur, but temperatures did touch 27 degrees in a few spots.

The long duration freeze was accompanied by a thickening coat of glaze ice. This significantly reduced the damage to citrus trees and fruit. The same stress caused more significant damage to tropical plants such as Emperor/Royal Palms and the sugar cane crop. All planted Emperor Palms lost their fronds to the long duration freeze, as well as the glaze ice. The Texas AgriLife Research Center in Weslaco reported some damage to cabbage, watermelon, peppers, leafy greens, and tomatoes. More significant damage was reported to the sugar cane crop. Of 26,000 acres of sugar cane, 5500 were severely damaged. At least 116 vehicle accidents were reported in the Brownsville/San Benito/Harlingen Metropolitan area during the 24 hour period from 6 AM on the 3rd through 6 AM on the 4th.

January 29, 2004 – Cameron County

A combination of cold high pressure near the earth's surface combined with an upper level disturbance that moved across northern Mexico late on the 28th through the early morning of the 29th brought rain that froze on contact with exposed surfaces, resulting in an icy glaze across much of the Rio Grande Valley during the early morning hours. The glaze covered exposed surfaces such as trees and grasses, power lines/poles, fences, vehicles, roofs, and more. The rain also created some icing on elevated highways and bridges.

An ice storm hit Cameron County where 1/8 to 1/2 inch of glaze accreted on trees, power lines, cars, and other exposed surfaces. News reports indicated 9000 customers were without electricity during the peak of the storm early on the 29th, throughout communities in Cameron County. There was likely some damage to tender tropical vegetation.

PROBABILITY OF FUTURE EVENTS

According to historical records, the City of La Feria experiences one winter storm event every one to two years. Hence, the probability of a future winter storm event affecting the City planning area is highly likely, with a winter storm likely to occur within the next year.

VULNERABILITY AND IMPACT

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

An economic impact may occur due to increased consumption of heating fuel, which can lead to energy shortages and higher prices.

House fires and resulting deaths tend to occur more frequently from increased and improper use of alternate heating sources. Fires during winter storms also present a greater danger because water supplies may freeze and impede firefighting efforts.

All populations, buildings, critical facilities, and infrastructure in the City of La Feria planning area are vulnerable to severe winter events. People and animals are subject to health risks from extended exposure to cold air. Elderly people are at greater risk of death from hypothermia during these events, especially in rural areas where populations are sparse, icy roads may impede travel, and there are fewer neighbors to check in on the elderly. According to the U.S. Center for Disease Control, every year hypothermia kills about 600 Americans, half of whom are 65 years of age or older.

Populations 65 and older in the La Feria planning area exceeds 16% of the total population or an estimated total of 1,220[2] potentially vulnerable residents in the planning area based on age.

The following critical facilities would be vulnerable to winter storm events in the La Feria planning area:

- 6 Government Facilities
- 1 Police Station
- 2 Dome Shelters
- 2 Water Towers
- 2 Water Treatment Facilities
- 2 Fire Departments
- 16 Lift Stations
- 10 Schools (Including ISD Administartion Facilities)
- 2 Pump Stations

Based on the level of risk and historical occurrences for winter storms in the City of La Feria, the impact for winter storm is "Minor." Overall, the average loss estimate of property and crop (in 2015 dollars) is $22,971, having an approximate annual loss estimate of $1,149. Loss estimates were based on 20 years of statistical data from the NCDC. Table 15-4 shows annualized exposure.

[2] US Census Bureau 2014 data for the City of La Feria

TABLE 15-4. WINTER STORM EVENT DAMAGE TOTAL, 1996-2016

JURISDICTION	NUMBER OF EVENTS	PROPERTY DAMAGES	CROP DAMAGES	PROPERTY DAMAGES (2015 DOLLARS)	CROP DAMAGES (2015 DOLLARS)
Cameron County	16	$15,000	$5,000,000	$15,867	$5,289,101
TOTAL LOSSES:		**$5,015,000**		**$5,304,968**	
La Feria[3]		**$21,715**		**$22,971**	

ASSESSMENT OF IMPACTS

The greatest risk from a winter storm hazard is to public health and safety. Potential impacts for the community may include:

- Vulnerable populations, particularly the elderly and infants, can face serious or life-threatening health problems from exposure to extreme cold including hypothermia and frostbite.
- Loss of electric power or other heat source can result in increased potential for fire injuries or hazardous gas inhalation because residents burn candles for light or use fires or generators to stay warm.
- Response personnel, including utility workers, public works personnel, debris removal staff, tow truck operators, and other first responders are subject to injury or illness resulting from exposure to extreme cold temperatures.
- Response personnel would be required to travel in potentially hazardous conditions, elevating the life safety risk due to accidents, and potential contact with downed power lines.
- Operations or service delivery may experience impacts from electricity blackouts due to winter storms.
- Power outages are possible throughout the planning area due to downed trees and power lines and/or rolling blackouts.
- Critical facilities without emergency backup power may not be operational during power outages.
- Emergency response and service operations may be impacted by limitations on access and mobility if roadways are closed, unsafe, or obstructed.
- Hazardous road conditions will likely lead to increases in automobile accidents, further straining emergency response capabilities.

[3] *Planning area damages as a percentage (0.433%) of reported Cameron County damages*

- Depending on the severity and scale of damage caused by ice and snow events, damage to power transmission and distribution infrastructure can require days or weeks to repair.
- A winter storm event could lead to tree, shrub, and plant damage or death.
- Schools may be forced to close early due to deteriorating road conditions.
- Severe cold and ice could significantly damage agricultural crops.
- Exposed water pipes may be damaged by severe or late season winter storms at both residential and commercial structures, causing significant damages.

The economic and financial impacts of winter weather on the community will depend on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by businesses and citizens will also contribute to the overall economic and financial conditions in the aftermath of a winter storm event.

SECTION 16: HAZARDOUS MATERIALS

HAZARD DESCRIPTION

Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. A hazardous material (HAZMAT) incident involves a substance outside normal safe containment in sufficient concentration to pose a threat to life, property, or the environment.

Chemicals are found everywhere. They purify drinking water, increase crop production, and simplify household chores. But chemicals also can be hazardous to humans or the environment if used or released improperly. Hazards can occur during production, storage, transportation, use, or disposal. You and your community are at risk if a chemical is used unsafely or released in harmful amounts into the environment where you live, work, or play.

In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops.

The Toxics Release Inventory (TRI) is a publicly available database from the federal Environmental Protection Agency (EPA) which contains information on toxic chemical releases and other waste management activities that are reported annually by certain covered industry groups federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990. Each year, facilities that meet certain activity thresholds must report their releases and other waste management activities for listed toxic chemicals to the EPA and their state or tribal entity. A facility must report if it meets the following three criteria:

- The facility falls within one of the following industrial categories: manufacturing; metal mining; coal mining; electric generating facilities that combust coal and/or oil; chemical wholesale distributors; petroleum terminals and bulk storage facilities; Resource Conservation and Recovery Act (RCRA) Subtitle C Treatment, Storage and Disposal (TSD) facilities; and solvent recovery services.
- Have ten or more full-time employee equivalents.
- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year. Persistent, Bio-accumulative and

Toxic (PBT) chemicals are subject to different thresholds of ten pounds, 100 pounds or 0.1 grams depending on the chemical.

Tier 2 data is a publicly available database from the Texas Department of State Health Services Tier 2 Chemical Reporting Program. Under EPCRA, all facilities which store significant quantities of hazardous chemicals must share this information with state and local emergency responders and planners. Facilities in Texas share this information by filing annual hazardous chemical inventories with the Texas Department of State Health Services (DSHS), Local Emergency Planning Committees (LEPCs), and local fire departments. The Texas Tier 2 Report contains facility identification information and detailed chemical data about hazardous chemicals stored at the facility.

A facility must report if it meets the following criteria:

- Any company using chemicals that could present a physical or health hazard must report them, according to Tier 2 requirements.
- If an industry has an Occupational Safety and Health Administration (OSHA) deemed hazardous chemical that exceeds the appropriate threshold at a certain point in time, then the chemical must be reported. These chemicals may be on the list of 356 Extremely Hazardous Substances (EHS) or could be one of the 650,000 reportable hazardous substances (not on the EHS list). This reporting format is for a "snapshot in time." EHS chemicals have to be reported if the quantity is either greater than 500 pounds, or if the Threshold Planning Quantity (TPQ) amount is less than 500 pounds.

LOCATION

Under the Community Right-to-Know program laws upheld at the state and federal level, all facilities which store significant quantities of hazardous chemicals must share this information with state and local emergency responders and planners. Facilities in Texas share this information by filing annual hazardous chemical inventories with the state, with Local Emergency Planning Committees (LEPCs), and with local fire departments.

Figure 16-1 shows the locations of available georeferenced TRI and Tier 2 toxic sites in and around the City of La Feria planning area. For fixed site analysis, only toxic sites that have georeferenced data available were analyzed and the circle buffers are drawn around each hazardous material site. Two size buffers, 500 and 2,500 meters are assumed in respect to the different levels of effect – immediate (primary) and secondary.

FIGURE 16-1. FIXED HAZMAT ANALYSIS LOCATIONS AND BUFFERS

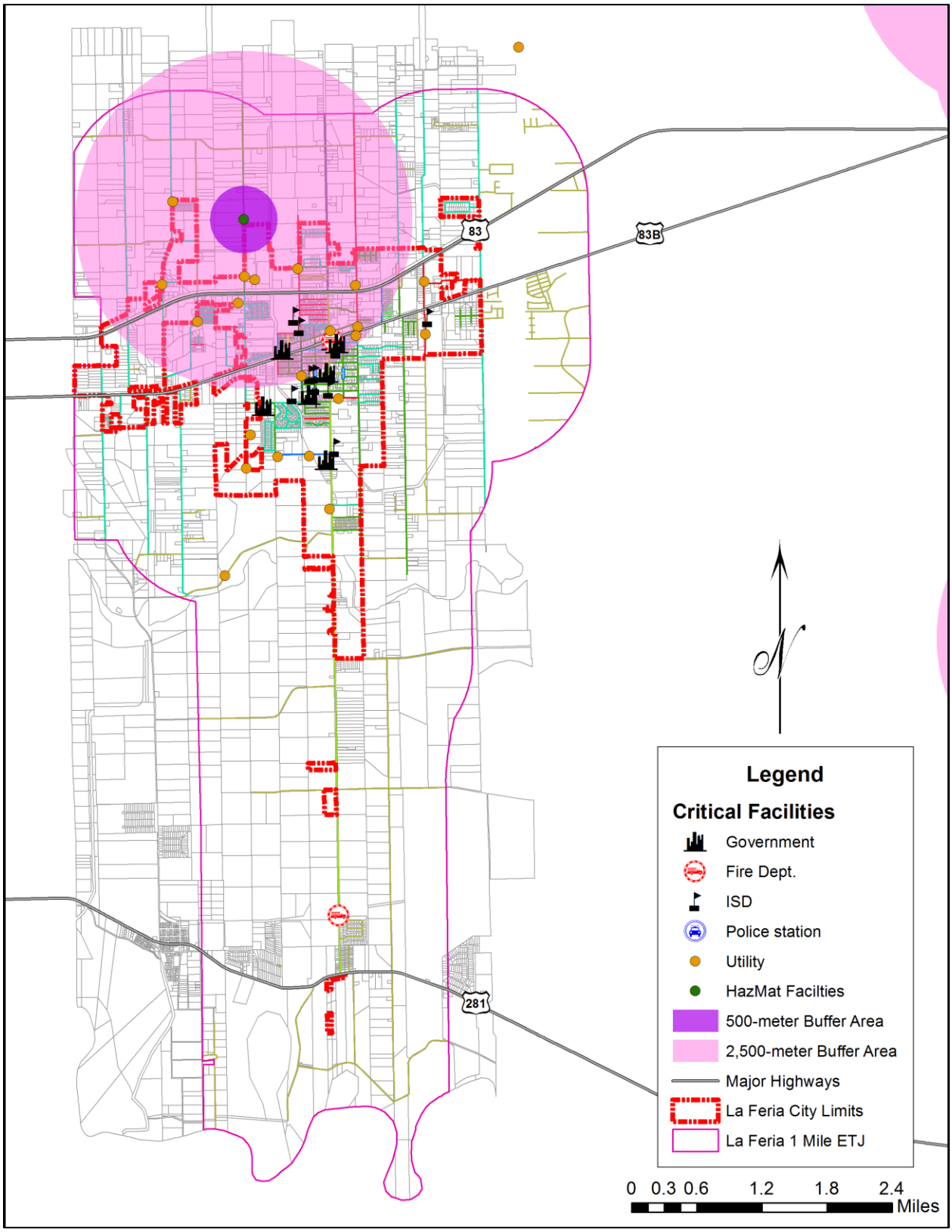


TABLE 16-1. TRI HAZMAT FACILITIES WITHIN CITY OF LA FERIA PLANNING AREA

FACILITY NAME	ADDRESS	TOTAL RELEASES	CHEMICALS
Hanson Pipe and Precast	1300 N Rabb Rd	0	Lead

EXTENT

The extent of a hazardous material release will depend on whether it is from a mobile or fixed site and the size of impact. The range of intensity will vary greatly depending on the circumstances. These factors and conditions include the material, toxicity, duration of the release, and environmental conditions such as the wind and precipitation.

Hazardous materials or toxic releases can have substantial impact on communities. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions would directly affect how the hazard develops. The micro-meteorological effects on buildings and terrain can alter travel patterns and duration of agents. Shielding in the form of permanent shelter can protect people from harmful effects. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features can substantially increase damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

The spatial extent of a hazardous material release is minimal or expected to affect less than 10% of people or property.

HISTORICAL OCCURRENCES

Hazardous materials are substances which if released or misused can cause death, serious injury, long-lasting health effects, and damage to structure and other properties as well as to the environment. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines.

A total of 26 transportation incidents have been reported in the City of La Feria over the last 66 years. The data collected is from 1950 to 2016 and identifies the hazardous materials transportation incidents as in-transit, loading, and unloading of transport vehicles. The reported events are summarized in Table 16-2 below.

TABLE 16-2. HAZARDOUS MATERIALS INCIDENTS EVENT SUMMARY[1]

JURISDICTION	DATE	INJURIES	FATALITIES	TOTAL DAMAGES (2015 VALUE)
La Feria	12/22/2009	0	0	$1,712
La Feria	9/24/2011	0	0	$2,213
La Feria	4/7/2016	0	0	$3,500
TOTAL		**0**	**0**	**$7,425**

PROBABILITY OF FUTURE EVENTS

The likelihood or future probability of occurrence of a hazardous materials release in the City of La Feria planning area is highly likely, meaning an event could occur in the next year.

VULNERABILITY AND IMPACT

Based on the prevalence and geographic proximity of hazardous materials transportation routes and fixed locations, the majority of the City of La Feria planning area is vulnerable. The risk to the population depends on a variety of factors, including: type and amount of chemical released, weather conditions, prevailing winds, time of day, and season.

The environment is often vulnerable in a hazardous materials incident and can be heavily damaged by a hazardous materials incident. The particular transportation route and fixed site involved are significant factors in determining the risk to public health and safety, and will determine the number of people in proximity to the hazard. Depending on the nature of the hazardous materials incident, the public could be required to either evacuate the area or shelter in place, which will interrupt normal routines.

It is possible that a hazardous materials incident could involve a number of fatalities. It is likely that inhaled hazardous gasses may result in respiratory problems, including burning sensations in the lungs, nose, and throat. Releases that involve solids or liquids can be absorbed through the skin, and may cause burns on contact. In some instances, the threat to health and safety may not be evident for an extended period of time.

Impact of hazardous materials incidents experienced in the City of La Feria has resulted in no injuries or fatalities supporting a possible limited severity of impact meaning injuries and/or illnesses are treatable with first aid, shutdown of facilities and services for 24 hours or less, and less than 10% of property is destroyed or with major damage.

[1] Only events with damages, deaths or injuries are listed.

There are no critical facilities located within the 500 meter buffer.

TABLE 16-3. CRITICAL FACILITIES VULNERABLE TO HAZARDOUS MATERIAL RELEASES, 2,500 METER BUFFER

NAME	TYPE
City Hall	Government
Fire Department	Fire Department
La Feria Irrigation District	Utility
La Feria ISD Administration	ISD
La Feria ISD High School	ISD
Lee Elementary School	ISD
Lift Station #4	Utility
Lift Station #7	Utility
Lift Station #8	Utility
Lift Station #9	Utility
Lift Station #10	Utility
Lift Station #11	Utility
Lift Station #12	Utility
Lift Station #13	Utility
Lift Station #16	Utility
Police Station	Police Station
Public Works	Government
Public Works Warehouse	Government
W B Green Junior High School	ISD
Water Tower 1	Utility
Water Tower 2	Utility

SECTION 17: TERRORISM

HAZARD DESCRIPTION

The Federal Bureau of Investigation (FBI) categorizes terrorism in the United States as domestic terrorism, or international terrorism. Domestic terrorism, involves groups or individuals whose terrorist activities are directed at elements of our government or population without foreign direction. International terrorism, involves groups or individuals whose terrorist activities are foreign-based, and directed by countries or groups outside the United States, or whose activities transcend their national boundaries.

A terrorist attack event can take several forms depending on the technological means available to the terrorist, nature of the issue motivating the attack, and points of weakness of the terrorist's target. Bombings are the most frequently used terrorist method in the United States. A terrorist using a chemical or biological weapon is of particular concern to officials. Special training and equipment is necessary to safely manage a Weapons of Mass Destruction incident.

Biological agents, are infectious microbes or toxins used to produce illness or death in people, animals or plants. Biological agents can be dispersed as aerosols or airborne particles. Terrorists may use biological agents to contaminate food or water as they are extremely difficult to detect.

Chemical agents, kill or incapacitate people, destroy livestock, or ravage crops. Some chemical agents are odorless and tasteless and are therefore difficult to detect. Chemical agents can have an immediate effect, within a few seconds to a few minutes, or a delayed effect, within several hours to several days.

The U. S. Department of Defense estimates that 26 nations may possess chemical agents and weapons, and an additional 12 may be seeking to develop them. The Central Intelligence

Agency reports that at least ten countries are believed to be in possession or conducting research on biological agents for weaponization.

Terrorist events involve the application of one or more modes of harmful force to the built environment. These modes include contamination, such as chemical, biological radiological, or nuclear hazards; energy, such as explosives, arson, and even electromagnetic waves; or denial of service, such as sabotage, infrastructure breakdown, and transportation service disruption.

LOCATION

There is no distinct geographic boundary to the threat of terrorism. An event is possible throughout the City of La Feria planning area.

Terrorists most often search for highly visible targets that can be impacted while avoiding detection. However, the motivation behind at terrorist event can be varied and the target's surrounding area is considered at risk.

EXTENT

The Homeland Security Advisory System, issued by the U. S. Department of Homeland Security, previously used a color-coded terrorism warning system that identified five threat levels. In 2011, the Department of Homeland Security (DHS) replaced the color-coded alerts of the Homeland Security Advisory System (HSAS) with the National Terrorism Advisory System (NTAS), designed to more effectively communicate information about terrorist threats by providing timely, detailed information to the American public.

NTAS now consists of two types of advisories: Bulletins and Alerts. DHS has added Bulletins to the advisory system to be able to communicate current developments or general trends regarding threats of terrorism. NTAS Bulletins permit the Secretary to communicate critical terrorism information that, while not necessarily indicative of a specific threat against the United States, can reach homeland security partners or the public quickly, thereby allowing recipients to implement necessary protective measures. Because DHS may issue NTAS Bulletins in circumstances not warranting a more specific warning, NTAS Bulletins provide the Secretary with greater flexibility to provide timely information to stakeholders and members of the public.

Figure 17-1. National Terrorism Advisory System

When there is specific, credible information about a terrorist threat against the United States, DHS will share an NTAS Alert with the American public when circumstances warrant doing so. The Alert may include specific information, if available, about the nature of the threat, including the geographic region, mode of transportation, or critical infrastructure potentially affected by the threat, as well as steps that individuals and communities can take to protect themselves and help prevent, mitigate or respond to the threat. The Alert may take one of two forms: Elevated, if there is credible threat information, but only general information about timing and target such that it is reasonable to recommend implementation of protective measures to thwart or mitigate against an attack, or Imminent, if the threat is believed credible, specific, and impending in the very near term. Terrorism Advisory System Alerts are described in Figure 17-1.[1]

The Red Cross also issues Advisory System Recommendations for individuals, families, neighborhoods, schools and businesses for each alert level. These may be found at: www.redcross.org.

Heightened periods for terrorism risk are based on intelligence and other information. A potential terrorist event could devastate the community physically, economically and psychologically for many years to come. Warning time for terrorism is minimal to none.

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Heightened periods for terrorism risk are based on intelligence and other information. A potential terrorist event could devastate the community physically, economically and psychologically for many years to come. Warning time for terrorism is minimal to none.

[1] Source: Department of Homeland Security, https://www.dhs.gov/national-terrorism-advisory-system

HISTORICAL OCCURRENCES

In 2007, the Texas Department of Public Safety, which is responsible for Homeland Security in Texas, reported that individuals with ties to Hezbollah, Hamas, and al-Qaida were arrested crossing the border from Mexico. From March 2006 to September 2007, almost 350 individuals "from terrorism-related countries" were arrested at the border. While there have been no terrorism events for the planning area, the United States border is considered vulnerable to terrorist infiltration.

PROBABILITY OF FUTURE EVENTS

The type, frequency, and location of many natural hazards are identifiable and somewhat predictable because natural hazards are governed by the laws of physics and nature. However, malevolence cannot be forecast with any accuracy. Therefore, there is potential for intentional terrorist acts to occur anywhere and at any time. According to the historical incident data, a terrorism incident for the City of La Feria planning area is unlikely, with an event occurring on average once every ten years.

VULNERABILITY AND IMPACT

There is no defined geographic boundary for a terrorist event. All of the population, buildings, critical facilities, infrastructure and lifelines and hazardous materials facilities are considered exposed to the hazards of terrorism and could potentially be affected.

There are no past local terrorist events. Therefore, all assets and facilities are potentially at risk to damages that may for the most part be secondary.

Terrorist events can have a "Major" severity of impact. They can cause injuries, illnesses, or both and result in permanent disability, complete shutdown of City area facilities for at least two weeks, and cause more than 25 percent of affected properties to be destroyed or suffer major damage.

ASSESSMENT OF IMPACTS

Terrorism poses a potentially significant risk to public health and safety. Persons in the area at the time of a terrorist attack are at risk for injury or death from a variety of threats.

The chance for death, injury, and financial loss increases as population density increases. Therefore, locations in the planning area with high population density should be considered to have the most risk.

Response personnel face similar potential impacts as the general public. Response personnel can be at increased risk of physical injury because the nature of their responsibilities may bring them closer to the hazard and secondary incendiary devices are often directed at response personnel.

Response personnel can be subjected to more long-term impacts resulting from prolonged exposure to chemicals or biological weapons.

Depending on the characteristics and location of the event, it is possible that operations and service delivery could be impacted by a terrorist attack. While the Cameron County Office of Emergency Management (OEM) has a protected facility from which to operate, the facility may not be accessible in the event of a terrorist attack near the facility. If the County OEM office was inaccessible, then staff members would be limited to performing work with the resources that were accessible to them from their remote location.

City departments may not be as protected as the County OEM and may suffer more interruptions as a result of damages from a terrorist attack. If hard or electronic files are damaged, destroyed or otherwise inaccessible, a department may be unable to perform its assigned tasks and deliver its designated services. This interruption could have significant impacts throughout the City, and could negatively impact its ability to respond to and recover from the terrorist event. Without a Continuity of Operations Plan (COOP) that takes into account department-specific issues, or regular exercise of that COOP, critical departments may not be able to function and provide necessary services.

Damage from a terrorist event can impact utility infrastructure, either directly or indirectly. This could result in a temporary loss of function for businesses in the planning area that rely on utilities for operation, even if those businesses were not directly impacted by the terrorist event. Additionally, businesses can suffer interruption from closed or blocked roadways; for example, firefighters and law enforcement personnel may need to close a roadway during response and investigative operations. This could negatively impact other businesses in the area that were not otherwise damaged.

Most property, facilities, and infrastructure within the planning area are at risk from damage or destruction from a terrorism event, including residential and commercial structures and their supporting utilities, vehicles and transportation infrastructure, and community buildings, such as hospitals, police stations, and schools. Roadways in or near the terrorist event could be impacted because of damage or closure due to response or investigative operations.

When a terrorist attack occurs there are many potential environmental impacts due to the varied ways an event can occur. The environmental impacts associated with terrorism include, but are not limited to:

- Air pollution;
- Soil contamination;
- Water pollution and hydrologic impacts; and
- Radiological contamination.

Examples of potential terrorist impacts on the environment:

- During severe drought, a terrorist group conducts an arson campaign with multiple fire-bomb attacks that result in large-scale fires throughout the area. Fire affected regions sustain losses to agriculture and forest areas.

- An intentional release of hazardous materials into soil, water, or into the air that leads to environmental contamination and potential changes of the ecosystem, such as habitat loss.
- Failure of control systems of major utility companies due to cyber-attack, leading to damages of critical infrastructure and consequent environmental impacts, such as uncontrolled release of chemicals into the environment, initiation of random fires, or radiological contamination.

The financial and economic impacts associated with a terrorist event may be significant. A major attack, where a large number of structures are damaged or destroyed, can have serious economic and financial consequences for a community. These consequences will depend on what is damaged, the extent of the damage, and the services the damaged structures provided to the community.

The economic and financial impacts of a terrorist event on local government will depend on the scale of the event, what is damaged, costs of repair or replacement, lost business days in impacted areas, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by businesses and citizens will also contribute to the overall economic and financial conditions in the aftermath of a terrorist event.

Public confidence in local government may be impacted by how response and recovery efforts resulting from the event are handled. A response demonstrating that the City, its leaders, and officials were prepared for the event, anticipated the magnitude, and understood what could happen, will boost the City's reputation and standing with residents. However, if the perception developed, correctly or incorrectly, that the response was slow, that needs or complaints of its residents were ignored, or that the leadership fails to anticipate the magnitude of the event, then public confidence can decline.

A terrorist attack that is responded to and handled with little damage to structures or infrastructure will enhance public perception. Visual images of the first responders can be a powerful tool to aid in the public trust and confidence regarding public safety.

SECTION 18: INFECTIOUS DISEASE

HAZARD DESCRIPTION

An infectious disease is as a clinically evident disease resulting from the presence of pathogenic microbial agents. According to FEMA, infectious diseases are a major threat around the world, killing millions globally each year. Transmission of an infectious disease may occur through one or more means including physical contact with infected individuals. These infecting agents may also be transmitted through liquids, food, bodily fluids, contaminated objects, airborne inhalation or through vector-borne dissemination.

There are three classifications of disease impacts: endemic, epidemic and pandemic. An endemic, is present at all times at a low frequency, such as chicken pox in the United States. An epidemic, is a sudden severe outbreak of disease, such as the bubonic plague during Medieval Times. A pandemic, is an epidemic that becomes very widespread and affects a whole region, a continent, or the world, for example the 1957 flu pandemic caused at least 70,000 deaths in the United States and one to two million deaths worldwide. In recent years, fears of pandemic have risen because the globalized economy and growing population fosters large scale international travel and trade. Growing populations increase the vulnerability of all areas to disease because a denser population increases the risk of exposure to an infectious disease, allowing the disease too quickly and advancing the spread of infection.

The top 11 infectious diseases according to the World Health Organization (WHO) based upon number of deaths are presented in Table 18-1.

TABLE 18-1. WORLDWIDE MORTALITY DUE TO INFECTIOUS DISEASE[1]

RANK	CAUSE OF DEATH	APPROXIMATE WORLDWIDE DEATHS IN 2008	PERCENTAGE OF ALL DEATHS WORLDWIDE
1	Lower Respiratory Infections	3.5 million	6.1%
2	Diarrheal diseases	2.5 million	4.3%
3	HIV/AIDS	1.8 million	3.1%
4	Tuberculosis (TB)	1.3 million	2.4%
5	Malaria	827,000	1.5%
6	Meningitis	340,000	0.6%
7	Pertussis	195,000	0.3%
8	Measles	155,000	0.3%
9	Hepatitis B	128,000	0.2%
10	Syphilis	100,000	0.2%
11	Tetanus	88,000	0.2%

LOCATION

Pandemics are random and only a few happen every century. The impacts from an infectious disease event can affect all areas of the world, therefore all areas are vulnerable. Since air travel and worldwide shipping have increased, it has become increasingly difficult to contain localized outbreaks as infected or exposed people travel across the globe in a matter of hours. Third world countries have fewer resources to fight disease and may be more vulnerable than more industrialized nations. In the United States, the U.S. public health system works at the federal, state and local level to monitor diseases, plan and prepare for outbreaks, and prevent epidemics where possible.

EXTENT

The severity of a pandemic virus can be evaluated from the perspective of the individual who has been infected; or from the population level, how many complications and deaths might be

[1] *Source: World Health Organization*

expected as a whole. The most common measure of severity for a pandemic virus event is the case-fatality rate (CFR) as depicted in Figure 18-1.

The magnitude of a pandemic event is identified in terms of warning levels based on population. Figure 18-2 illustrates the various warning levels for pandemic. Dr. Margaret Chan, Director General of the WHO announced in June of 2009 that H1N1 had reached Phase 6, Pandemic.

FIGURE 18-1. CASE-FATALITY RATE FOR SEVERITY

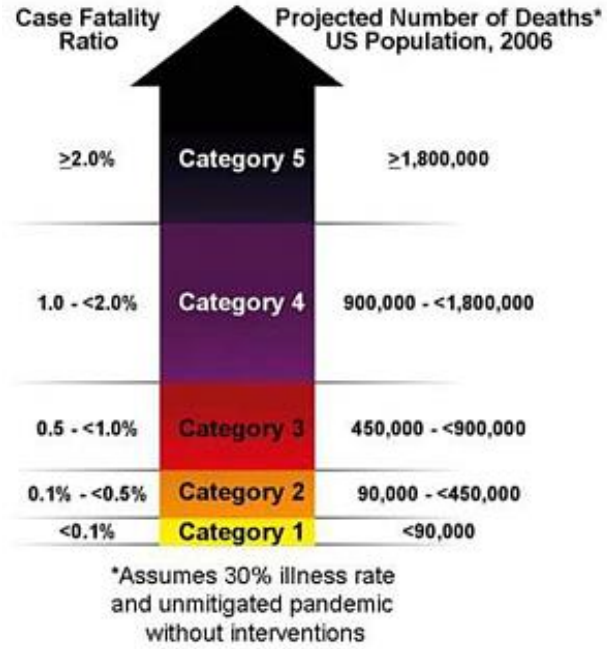
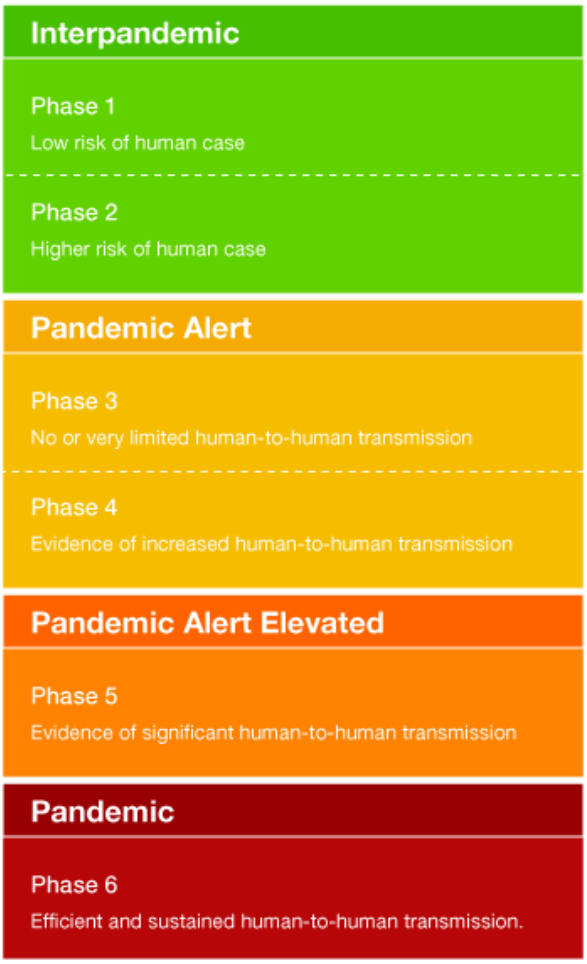


FIGURE 18-2. RISK LEVELS FOR PANDEMIC[2]



HISTORICAL OCCURRENCES

Occurrences of a biological event hazard are fairly common. Recently, there have been a number of *E. coli* and similar outbreaks traced to issues or deficiencies in the nation's food supply. In Texas, there have been several occurrences of biological hazards, as reported by the Center for Disease Control (CDC). In 2005, there were cases of dengue fever reported in South Texas, near the border with Mexico. In 2005, approximately 1,100 evacuees from Hurricanes Katrina and Rita were infected with norovirus in the Houston area. During the winter of 2009 and early spring of 2010, 429 cases of mumps were reported in the greater Houston area.

Statewide, outbreaks of infectious diseases are recorded by the Texas Department of State Health Services, Infectious Disease Control Unit (ICDU). The IDCU tracks reported cases of all non-genetic diseases. Table 18-2 below reports the infectious disease outbreaks in Cameron County in 2013.

[2] *Source: World Health Organization*

The total number of cases for these diseases range from one reported case to as many as 1,792 reported cases during the timeframe studied.

Table 18-2. Infectious Disease cases in Cameron County, 2013[3]

INFECTIOUS DISEASE	2013
AIDS	41
Chlamydia	1,792
Pertussis	61
Syphilis	<5
Tuberculosis	53
Varicella (Chicken Pox)	44

In March of 2009, a novel strain of Influenza A (H1N1 or "Swine Flu") virus was detected in Mexico and the United States. The virus has since spread worldwide. As of September 27, 2009, more than 340,000 cases of Swine Flu have been confirmed worldwide and approximately 4,100 deaths have been reported[4].

The most commonly reported symptoms include cough, fever, sore throat, and gastrointestinal symptoms, such as vomiting and diarrhea. Most individuals infected with H1N1 did not require hospitalization and had symptoms that lasted four days.[5]

PROBABILITY OF FUTURE EVENTS

Epidemics and pandemics have occurred in human and animal populations for thousands of years. As humans began to gather and congregate in urban areas, the potential for pandemics and epidemics increased. As trade routes became established and contact with other cities became more frequent, the potential for transmission of illnesses increased. In modern society, the ease of global travel has created a situation where viruses and bacteria can spread quickly from one continent to another.

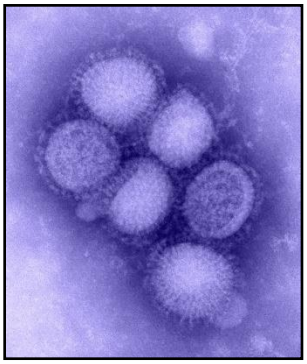
The probability of an infectious disease outbreak in the City of La Feria planning area is unlikely and an event has the probability of and event occurring in the next ten years.

[3] Source: Texas Department of State Health and Human Services, Infectious Disease Control Unit

[4] World Health Organization

[5] *Carrat, F. et al. Timelines of Infection and Disease in Human Influenza: A Review of Volunteer Challenge Studies. American Journal of Epidemiology, 2008, 167: 775–785.*

VULNERABILITY AND IMPACT



Estimated potential losses to the built environment are difficult to calculate because infectious disease causes little damage to the built environment and generally losses are experienced through public health response and medical costs, and lost wages of patients. Therefore, it is assumed that all buildings and facilities are exposed to disease but would experience negligible damage in the occurrence of an outbreak event. For example, upkeep and maintenance of buildings and facilities would fall behind due to the high absenteeism of employees or the closing of facilities.

Critical infrastructure services, such as emergency services, utility services, water services and telecommunications can be limited by an infectious disease event. With the H1N1 pandemic, most of the people affected have mild illness and do not require hospitalization. People at the highest risk for developing complications from H1N1 include children younger than five, adults 65 year of age and older, and pregnant women. People who have medical conditions, such as asthma; heart disease; chronic lung disease; blood, endocrine, kidney, liver or metabolic disorders; or a weakened immune system, can experience a worsening of existing conditions if they contract the H1N1 virus.

The response costs to the public health sector for an outbreak, and the impact to health as a whole for the City of La Feria planning area, could potentially be "Substantial." Multiple deaths could occur and city facilities could be shut down for 30 days or more. Property damage could result from high absenteeism of persons responsible for property management.

ASSESSMENT OF IMPACTS

Pandemics impact larger than normal segments of the population, and few sectors of the population are left untouched by infectious disease. The physical problems associated with the infectious disease may be short term or may lead to long-term physical maladies.

The impact of an infectious disease event will be measured by the number of fatalities, how the community is affected, and to what extent. If a large number of people get sick simultaneously, major social consequences will occur. Absenteeism in the workplace can have negative impacts on the overall functioning of society, particularly if it is prolonged.

The risks to public health and safety include first responders and others with increased exposure to the disease. Response personnel likely to experience the greatest impact would be those with medical responsibilities, such as fire fighters, ambulance workers, and clinic and hospital personnel. Response personnel could be in frequent contact with those who are either sick or infected, and are prone to suffer proportionally higher impacts as a result.

Depending on the severity of the infectious disease event, there could be serious problems with continuity of operations and delivery of services. If city staff stay home due to illness, someone in their home is ill, or because they fear becoming ill, the ability of local government to maintain operations and deliver services could be seriously limited or compromised. A pandemic illness

that impacts city staff could have significant negative impacts, particularly for departments that do not have or exercise a Continuity of Operations Plan (COOP). Without a COOP that takes into account department-specific issues, or regular exercise of that COOP, critical departments may not be able to function and provide necessary services.

A pandemic event may result in heightened stress for responders, health care providers, public health workers, individuals, and communities. A vital part of pandemic planning is the development of strategies and tactics to address these potential problems. Psychological health resources should be provided to ensure that special populations are identified prior to the event and that unique service and transportation needs are incorporated into the local pandemic influenza emergency management plan. Stress management support to those who are symptomatic, those who believe they are ill, and to staff who are dealing with the increased workloads and personal concerns will be required. The public will require information on how to recognize and cope with the short- and long-term risks of sustained stress during mass vaccinations, for those debilitated by an illness, and their caregivers.

An infectious disease hazard affects living beings, therefore the vulnerability of property to an infectious disease event is minimal. Pandemics are unlikely to directly result in physical damage to the built environment. However, there is the possibility of indirect damage resulting from staff absenteeism and lack of routine operations and maintenance. For example, the city's flood control system, though largely operational through a telemetry system, requires some hands-on maintenance. Increased absenteeism of maintenance staff could result in reduced maintenance operations, which could negatively impact the operation of the system.

Human infectious diseases do not normally pose a risk to the natural environment. Infectious diseases tend to be specific to humans, and therefore pose little threat to the natural environment or non-mammalian species. However, certain exceptions exist including the avian flu, which can affect both birds and humans. It is possible that other pathogens may affect more than one species, but those pathogens would likely be limited to specific species.

The historic and cultural resources of the area are generally immune to the effects of infectious disease events. However, historic and cultural resources attract significant numbers of tourists and visitors, increasing the potential for exposure and transmission of a variety of pathogens. Large events such as spring festivals draw large crowds. It would only take the presence of one infected person at a large event or attraction to cause the transmission of an infectious disease in the planning area and potentially damage the local tourism industry. A negative impact on local tourism could have serious economic ramifications for the community and for the businesses that operate or participate in these attractions and events.

Seasonal flu occurs annually and is estimated to cost the U.S. economy between $71 million and $167 million per year (Source: *World Health Organization*). Severe pandemics have been predicted to cause more than $700 billion in economic losses, and to result in a 5.5% decrease in U.S. Gross Domestic Product (GDP) (Source: *Federal Reserve Bank of St. Louis*).

Major infectious disease events and pandemics can be expected to have larger and deeper impacts to the local and national economy. If the disease is slow-progressing, particularly long-lasting, or has long-term residual effects, the impact to the economy could be extended.

If the normal movement of the epidemic within society needs to be curtailed, a process known as "social distancing," then a greater impact to the local economy could occur. Social distancing can be accomplished by a number of means; two ways of increasing social distance activity restrictions are to cancel events and close buildings or to restrict access to certain sites or buildings. These measures are sometimes called "focused measures to increase social distance."

Depending on the situation, examples of cancellations and building closures might include: cancellation of public events, such as concerts, sports events, movies, plays; and closure of recreational facilities, such as community swimming pools, youth clubs, gymnasiums. While necessary to limit the spread of the pathogen, facility closures could have economic ramifications (Source: *GlobalSecurity.Org*).

Infectious disease events are complicated hazards. Accurate information and clear, concise explanation during an infectious disease event are critical when conveying messages to the public. When a communication to the public fails, it can result in a loss of credibility, and can result in a loss of public confidence in leadership.

Infectious disease events can undermine the public's confidence in its government and leaders. Public dissatisfaction with government response will typically increase as the number of cases rise and public fear increases. Perceptions of inequality in medical care, particularly if those inequalities are based on socioeconomic status, ethnicity, age, gender, or seniority, can lead to increased dissatisfaction with government and leadership, and may result in a weakening of social order or hostility towards those in leadership or medical roles. Required rationing of supplies or vaccinations should be conscientiously carried out to avoid the appearance of bias or impropriety. Decisions regarding vaccinations, guidance, and treatment should be explained clearly and consistently to the public.

There could be significant public resistance to a decision to quarantine those who are ill or exposed, to restrict travel, or to implement social distancing. Any decision to restrict individual movement must be accompanied by a major public relations campaign to assure the public that these actions are necessary. If decisions are perceived by the public as necessary for their protection, the public is more likely to comply with official instruction.

SECTION 19: PIPELINE FAILURE

HAZARD DESCRIPTION

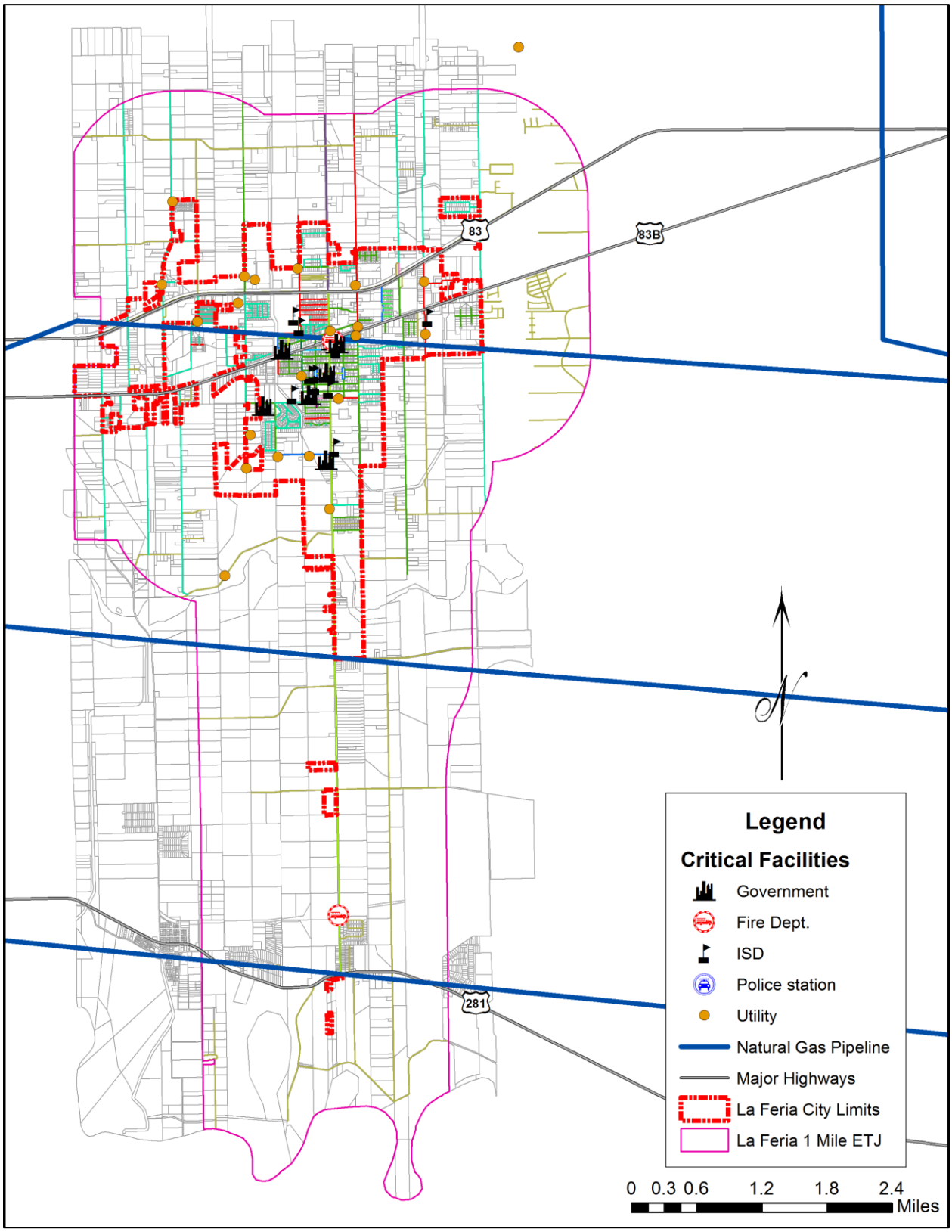
Energy pipeline breach or pipeline failure of an oil or natural gas pipeline is a serious hazard event. An estimated 2.4 million miles of pipelines in the United States carry hazardous materials. Natural gas pipelines transport natural gas and oil. Liquid petroleum pipelines transport crude oil and refined products from crude oils, such as gasoline, home heating oil, jet fuel, kerosene, liquefied propane, ethylene, butane and petrochemical products. Oil pipelines can also transport liquefied gases, such as carbon dioxide.

Pipeline failure is a rare occurrence and has the potential to cause extensive property damage and loss of life. Pipelines have caused fires and explosions that killed more than 200 people and injured more than 1,000 people nationwide with 50 of the injuries in Texas in the last decade.

LOCATION

Figure 19-1 shows the location of gas and oil energy pipelines and pipeline accidents in the City of La Feria and Cameron County according to the Pipeline and Hazardous Materials Safety Administration and Railroad Commission of Texas.

FIGURE 19-1. PIPELINE LOCATION



EXTENT

The U.S. Department of Transportation's (DOT) Pipeline and Hazardous Material Safety Administration (PHMSA), acting through the Office of Pipeline Safety (OPS), administers the Department's national regulatory program to assure the safe transportation of natural gas, petroleum, and other hazardous materials by pipeline. The OPS develops regulations and other approaches to risk management to assure safety in design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Since 1986, the pipeline safety program has been funded by a user-fee assessed on a per-mile basis for all pipeline operators that OPS regulates.

HISTORICAL OCCURRENCES

Pipeline failure events can be caused by corrosion, equipment failure, damage from excavations, incorrect operation, and natural forces. Incidents are generally categorized by severity and type of affected pipeline system component.

The PHMSA defines significant events as those incidents reported by pipeline operators when any of the following occur:

- Fatality or injury requiring in-patient hospitalization;
- $50,000 or more in total costs, measured in 1984 dollars;
- Highly volatile liquid releases of 5 barrels or more or other liquid releases of 50 barrels or more; and
- Liquid releases resulting in an unintentional fire or explosion.

The PHMSA defines a serious pipeline incident as an event involving a fatality or injury requiring in-patient hospitalization.

Table 19-1 summarizes 21 historical pipeline events for Cameron County, including the City of La Feria planning area.

TABLE 19-1. HISTORICAL PIPELINE ACCIDENTS, 1970-2015[1]

JURISDICTION	NUMBER OF EVENTS	INJURIES	FATALITIES	PROPERTY DAMAGE (2015 VALUE)	CROP DAMAGE (2015 VALUE)
La Feria	0	0	0	$0	$0
Cameron County	21	2	0	$956,007	$0
Total Losses	**21**	**2**	**0**	**$956,007**	

PROBABILITY OF FUTURE EVENTS

Cameron County has experienced multiple pipeline failures. Although records do not specify incidents in the City of La Feria, the location of pipelines in portions of the planning area make the city vulnerable to the hazard. According to the historical incident data, a pipeline incident for the City of La Feria planning area is highly likely, and an event can occur on average once every year.

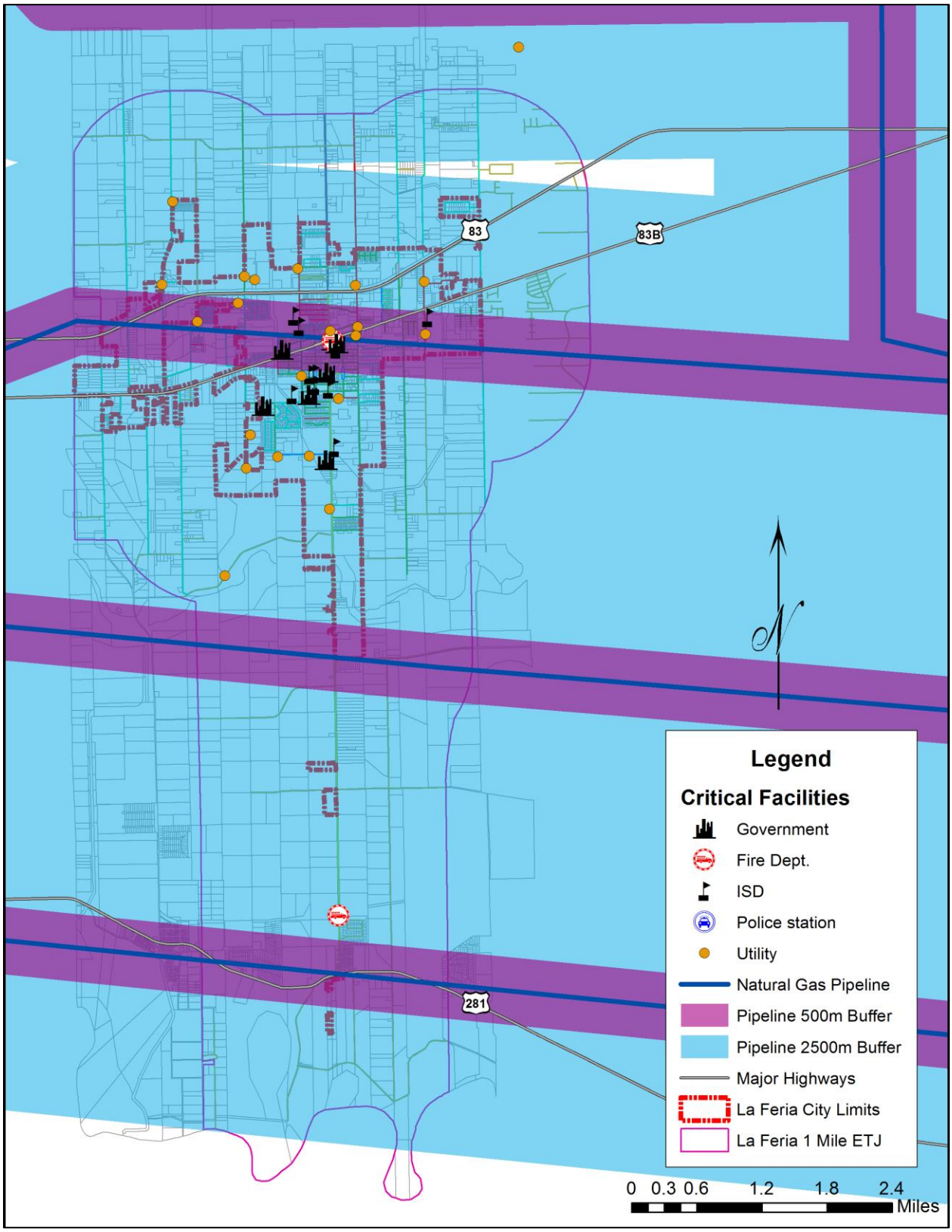
VULNERABILITY AND IMPACT

The County has experienced multiple pipeline failures and based on the location of pipelines, a large area of the County is vulnerable. Within the City of La Feria there are natural gas and gasoline/fuel oil pipelines, making the planning area vulnerable to pipeline failures. The severity of impact depends on a variety of factors, including type of pipeline and volume released; weather conditions; prevailing winds; time of day; and presence of ignition source. Pipeline breaches have the potential to cause multiple deaths and complete shutdown of facilities for 30 days or more.

Impact of hazardous materials incidents experienced in the City of La Feria planning area has resulted in no injuries or fatalities supporting a possible limited severity of impact meaning injuries and/or illnesses are treatable with first aid, shutdown of facilities and services for 24 hours or less, and less than 10% of property is destroyed or with major damage.

[1] *Source: Pipeline and Hazardous Materials Safety Administration and Railroad Commission of Texas*

FIGURE 19-2. 500 AND 2,500 BUFFER AROUND PIPELINE



ASSESSMENT OF IMPACTS

The risk to public health and safety during a pipeline failure event depends on a number of factors, including the type and amount of chemical(s) involved, location, weather conditions, time of day, and presence of an ignition source. The location of pipelines determines the potential number of people in proximity to the hazard and is a significant factor when determining the risk to public health and safety. It is possible that a release of materials from a pipeline failure could involve a number of fatalities. It is likely that inhaled hazardous gases may result in respiratory problems, including burning sensations in the lungs, nose, and throat. A release of solids or liquids can be absorbed through the skin, and may cause burns on contact. In some instances, the threat to health and safety may not be evident for an extended period of time.

Depending on the nature and extent of a pipeline failure, the public could be required to either evacuate the area or shelter in place, which will interrupt normal routines. Response personnel are also at risk from more concentrated or prolonged exposure to the agent involved in the event. Through response efforts, response personnel may respond and come in contact with hazardous substances before the nature of the hazard is determined. Response personnel also have a greater likelihood of impacts from secondary explosions or leaks.

Generally, pipeline failure events will interrupt operations and services within a limited area. The nature of the interruption will depend on the facilities in the impacted area. For example, if the event results in the temporary closure or evacuation of a hospital, this will also impact all hospitals in the area because area hospitals may be expected to assume the patient load for the now-inaccessible facility. However, if the event is near non-essential businesses, the operational or service interruption might not be as far-reaching. While the closure of businesses would result in negative impacts for those businesses, this scenario would not have the same community impacts as the first example.

Damage to roadways, railways, and physical infrastructure resulting from a pipeline failure event can impair normal operations and delivery of services.

During a pipeline failure event, the pressure in a pipeline can disrupt the soil above a break. Any facility or piece of infrastructure over or adjacent to a rupture could be damaged or destroyed. If gas ignites, it will set flammable objects near it on fire. Depending on environmental factors such as wind, proximity of vegetation or other fuels, and dryness of the environment, the fire could spread to other nearby structures damaging or destroying them. Any infrastructure in the area of the incident could be impacted by a pipeline failure event. Gas lines, water lines, sewer lines, and communication lines can be interrupted or destroyed, depending on the nature of the event. If the event is significant enough, utilities in the area may need to be temporarily suspended or disconnected, which would impact multiple facilities and properties.

Environmental risks from pipeline failure events can range from nonexistent to catastrophic, depending on the nature and extent of the release. Often minor environmental testing or monitoring is completed after a hazardous materials event, especially incidents in which there may be no impacts to monitor, because testing and monitoring can be expensive in terms of

financial investments and staff resources. The inability to monitor and report on local environmental impacts is concerning to local hazardous materials officials.

A pipeline failure event can cause physical damage to historical or cultural resources in the City of La Feria planning area, if there is a presence of an ignition source during a pipeline failure event. Based on proximity, a resource could be impacted or have blocked access due to contamination concerns. Long-term lack of access, need for cleanup, or related negative publicity regarding the release could reduce ability of historic and cultural sites to attract tourists and generate income.

The risks to local economic and financial sectors can be deeply felt and long-lasting. The depth and range of economic impacts will depend on the nature and severity of the event. Cleanup costs, loss of access to facilities, and lost business revenue are possible after a pipeline failure event.

For minor pipeline failure events, there is generally no impact to public confidence because most people are either not impacted or are unaware that the event has even occurred. For larger incidents, the threat to public confidence is determined by how the public perceives the event is handled. Public perception will impact the public's behavior during the next event.

Pipeline failure events often test the mechanisms and processes by which emergency management officials provide information, including evacuation orders, to the public. Misunderstood, confusing, conflicting messages, or delivery mechanisms that are ineffective, could have devastating impacts to public confidence in emergency management staff and leadership.

The perception of incorrect, slow, or ineffective handling of an incident, particularly if that incident requires an evacuation of the public, can result in a less cooperative or successful evacuation during the next event because the public may have less confidence in emergency management leadership. The public may blame local, state, or federal governments for the event, if the cause of the event is viewed as a lack of responsible regulation or oversight, as occurred during the BP Deepwater Horizon oil spill incident in 2010. Without ongoing communication regarding pipeline and protective measures, the public may not perceive the government as aware and capable when an event occurs.

SECTION 20: MITIGATION STRATEGY

MITIGATION GOALS

Based on the results of the risk and capability assessments, the Planning Team was able to develop and prioritize the mitigation strategy. At the Risk Assessment Workshop and the Mitigation Workshop, both held on April 19, 2016, Planning Team members refined the Plan's mitigation strategy. The following goals and objectives were identified.

GOAL 1

Protect public health and safety.

OBJECTIVE 1.1

Partner with agencies serving vulnerable populations to minimize harm in the event of an emergency.

OBJECTIVE 1.2

Promote disaster contingency planning and facility safety among institutions that provide essential services such as food, clothing, shelter and health care to vulnerable populations.

OBJECTIVE 1.3

Educate individuals and communities about disaster preparedness and mitigation.

OBJECTIVE 1.4

Improve disaster warning systems.

OBJECTIVE 1.5

Strengthen local building code enforcement.

OBJECTIVE 1.6

Train emergency responders.

GOAL 2

Protect critical public facilities and infrastructure.

OBJECTIVE 2.1

Implement mitigation programs that protect critical facilities and services and promote reliability of lifeline systems to minimize impacts from hazards, maintain operations, and expedite recovery in an emergency.

OBJECTIVE 2.2

Consider known hazards when siting new facilities and systems.

OBJECTIVE 2.3

Create redundancies for critical networks such as water, sewer, digital data, power and communications.

OBJECTIVE 2.4

Educate public officials, developers, realtors, contractors, building owners, and the public about hazard risks and building requirements.

GOAL 3

Protect the environment.

OBJECTIVE 3.1

Consider the secondary effects of disasters, such as hazardous waste and hazardous materials spills, when planning and developing mitigation projects.

OBJECTIVE 3.2

Use environmentally and conservation friendly materials in mitigation projects whenever possible and economically feasible.

GOAL 4

Increase public education and awareness.

OBJECTIVE 4.1

Enhance understanding of local hazards and the risks they pose.

OBJECTIVE 4.2

Educate the public on actions they can take to prevent or reduce the loss of life or property from all hazards and increase individual efforts to respond to potential hazards.

OBJECTIVE 4.3

Publicize and encourage the adoption of appropriate hazard mitigation measures.

GOAL 5

Encourage partnerships.

OBJECTIVE 5.1

Partner with private sector, including small businesses, to promote structural and non-structural hazard mitigation as part of standard business practice.

OBJECTIVE 5.2

Educate businesses about contingency planning, targeting small businesses and those located in high risk areas.

OBJECTIVE 5.3

Partner with private sector to promote employee education about disaster preparedness and practice conservation while at work and at home.

SECTION 21: MITIGATION ACTIONS

SUMMARY

As discussed in Section 2, at the mitigation workshop the planning team and stakeholders met to develop mitigation actions for each of the natural and human-caused hazards included in the Plan. Each of the actions in this section were prioritized based on FEMA's Social, Technical, Administrative, Political, Legal, Economic and Environmental (STAPLEE) criteria necessary for the implementation of each action. As a result of this exercise, an overall priority was assigned to each mitigation action.

As part of the economic evaluation of the STAPLEE analysis, the city analyzed each action in terms of the overall costs, measuring whether the potential benefit to be gained from the action outweighed costs associated with it. As a result of this exercise, priority was assigned to each mitigation action by marking them as High (H), Moderate (M), or Low (L). An action that is ranked as "High" indicates that the action will be implemented as soon as funding is received. A "Moderate" action is one that may not be implemented right away depending on the cost and number of citizens served by the action. Actions ranked as "Low" indicate that they will not be implemented without first seeking grant funding and after "High" and "Moderate" actions have been completed.

All mitigation actions created by Planning Team members are presented in this section in the form of Mitigation Action Worksheets. More than one hazard is sometimes listed for an action, if appropriate. Actions presented in this section represent a comprehensive range of mitigation actions per current State and FEMA Guidelines, including two actions, per hazard, and of two different types.

*TABLE 21-1. CITY OF LA FERIA MITIGATION ACTION MATRIX**

*FEMA does not review mitigation actions for human-caused hazards; therefore, they are not included in the comprehensive list of mitigation actions in Table 21-1.

CITY OF LA FERIA: MITIGATION ACTION MATRIX				
Actions presented in this matrix represent a comprehensive range and minimum number of required mitigation actions per current State and FEMA Guidelines, including two actions per hazard, and of two different types.				
HAZARDS	**Types of Action:**			
	LOCAL PLANS/ REGULATIONS	**STRUCTURAL/ INFRASTRUCTURE**	**NATURAL SYSTEM PROTECTION**	**EDUCATION & AWARENESS**
Drought	XX		X	X
Extreme Heat		XX		XX
Flood	XX	XX		X
Wildfire	X	X	X	X
Tornado	XX	X		XX
Hurricane Wind	XX	X		XX
Lightning	X	X		
Extreme Wind	XX	X		XX
Hail	X	XX		
Dam Failure / Levee Break	X			XX
Winter Storm		X		X

CITY OF LA FERIA

	La Feria – Action #1
Proposed Action:	**Install rainwater harvesting systems at public buildings to water landscaping or groundwater recharge.**
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduces water use at public buildings and benefits groundwater recharge
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Natural System Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	Reduce impacts of drought on new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	TBD
Potential Funding Sources:	Texas Water Development Board; Region M Water Planning Group; HMGP; Local Budgets
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	Comprehensive Plan

COMMENTS
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

	La Feria – Action #2
Proposed Action:	**Educate citizens on the benefits of rainwater harvesting to water yards and landscaping.**
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduces water use at residential structures
Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	Reduce impacts of drought on existing structures
Priority (High, Moderate, Low):	Low
Estimated Cost:	$500
Potential Funding Sources:	Texas Water Development Board; Region M Water Planning Group; HMGP; Local Budgets
Lead Agency/Department Responsible:	Special Projects Department
Implementation Schedule:	Within 48 months of plan adoption pending funding
Incorporation into Existing Plans:	N/A

COMMENTS
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

	La Feria – Action #3
Proposed Action:	**Modify current regulations to include additional water restrictions during extreme drought.**
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Restrict water usage throughout the city during drought; protect water supply
Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	Reduce impacts of drought on new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000
Potential Funding Sources:	Texas Water Development Board; Region M Water Planning Group; HMGP; Local Budgets
Lead Agency/Department Responsible:	Code Enforcement
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	Comprehensive Plan

COMMENTS
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 4; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 4; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #4
	Proposed Action:	**Partner with local businesses and community organizations to collect and distribute fans to vulnerable populations during extreme heat events.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Protect vulnerable citizens by providing fans for relief from extreme heat events
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000
Potential Funding Sources:	Local businesses; Fund Drive; Local Budgets
Lead Agency/Department Responsible:	Special Projects Division
Implementation Schedule:	Within 12 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		La Feria – Action #5
	Proposed Action:	**Educate citizens regarding the dangers of extreme heat and the steps they can take to protect themselves when extreme heat events occur.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Protect health of citizens through education programs on extreme heat
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000
Potential Funding Sources:	Local businesses; Fund Drive; Local Budgets
Lead Agency/Department Responsible:	Special Projects Division
Implementation Schedule:	Within 12 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #6
	Proposed Action:	**Install canopy covers in public parks for shade and relief from heat during extreme temperatures.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide, public parks
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Protect health of citizens by providing shaded areas in public parks
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000
Potential Funding Sources:	HMGP; Local Budgets
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	Comprehensive Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 4; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 4; and Environmentally Sound = 4

		La Feria – Action #7
	Proposed Action:	**Upgrade drainage system throughout the city to reduce or eliminate repetitive flooding caused by undersized drainage system.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce or eliminate damages to structures and infrastructure due to flooding caused by undersized and inadequate drainage
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000,000
Potential Funding Sources:	HMGP; Local Budgets; Texas Water Development Board; Texas General Land Office
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 12 months of plan adoption pending funding
Incorporation into Existing Plans:	Master Drainage Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 4; Technically Feasible = 4; Administratively Possible = 5; Politically Acceptable = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 4

	La Feria – Action #8
Proposed Action:	**Partner with Cameron County to implement drainage improvements at city limit borders to prevent bottleneck flooding in the city from undersized drainage lines in the county.**
BACKGROUND INFORMATION	
Site and Location:	City-wide along limits; Cameron County along La Feria city limits
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce or eliminate damages to structures and infrastructure due to flooding caused by undersized and inadequate drainage or bottleneck, backwater flooding along city borders
Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Projects

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000,000
Potential Funding Sources:	HGMP; Local Budgets; Texas Water Development Board; Texas General Land Office; Cameron County
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 12 months of plan adoption pending funding
Incorporation into Existing Plans:	Master Drainage Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 4; Technically Feasible = 4; Administratively Possible = 5; Politically Acceptable = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 4

		La Feria – Action #9
	Proposed Action:	**Revise local flood damage prevention ordinance to include higher standards such as freeboard and floodplain development restrictions.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide floodplains
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce or eliminate damages to structures and infrastructure due to flooding through construction practices and development restrictions
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets
Lead Agency/Department Responsible:	Code Enforcement
Implementation Schedule:	Within 12 months of plan adoption pending funding
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 4; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 4; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #10
	Proposed Action:	**Educate citizens on mitigation measures they can take to protect residential structures from flood damages such as installation of backflow valves and elevating utilities.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce or eliminate damages to residential structures through education on implementing mitigation measures
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets; HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 12 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #11
	Proposed Action:	**Expand the fuels reduction and maintenance program to include the entire WUI including recently annexed areas.**
	BACKGROUND INFORMATION	
	Site and Location:	Annexed Areas; WUI
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce or eliminate wildfire threat in newly annexed areas of the city through fuels reduction
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000
Potential Funding Sources:	Local Budgets; HMGP; Texas Forestry Service
Lead Agency/Department Responsible:	Public Works; Fire Department
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	CWPP

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 5; Economically Sound = 5; and Environmentally Sound = 4

		La Feria – Action #12
	Proposed Action:	**Educate property owners on actions they can take to reduce risk to property, such as installation of sprinkler systems, disposal of combustibles, and defensible space.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce or eliminate wildfire threat in residential neighborhood through education
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets, HMGP; Texas Forestry Service
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	CWPP

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #13
	Proposed Action:	**Install ignition-resistant roofing materials at all critical facilities in or near the WUI.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide critical facilities in or near the WUI
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce or eliminate wildfire threat to critical facilities
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Low
Estimated Cost:	Varies per site
Potential Funding Sources:	Local Budgets; HMGP; Texas Forestry Service
Lead Agency/Department Responsible:	Fire Department; Public Works
Implementation Schedule:	Within 48 months of plan adoption pending funding
Incorporation into Existing Plans:	CWPP

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 4; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

	La Feria – Action #14
Proposed Action:	**Educate citizens about extreme wind event risks and how and when to take cover or evacuate.**
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to citizens through education
Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado; Extreme Wind; Hurricane Wind
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets; HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 48 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

	La Feria – Action #15
Proposed Action:	**Adopt newer building codes that include natural disaster resistant construction practices.**
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to structures and infrastructure through stronger disaster resistant construction techniques
Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Wind, Hurricane Wind, Flood, Hail, Wildfire, Drought, Lightning
Effect on new/existing buildings:	Reduce risk to new structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000
Potential Funding Sources:	Local Budgets; HGMP
Lead Agency/Department Responsible:	Code Enforcement
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:
New codes will include drought tolerant landscaping, hail resistant, flood resistant, wildfire resistant, lightning protection, and wind resistant construction techniques.
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 4; Technically Feasible = 5; Administratively Possible = 4; Politically Acceptable = 4; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #16
	Proposed Action:	**Create shelter for vulnerable populations during sever winter storms.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of injury or loss of life due to severe winter storms
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Local Budgets; HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 48 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		La Feria – Action #17
	Proposed Action:	**Adopt standards from International Code Council (ICC)-600 Standard for Residential Construction in High-Wind Regions.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to structures and infrastructure through stronger, disaster resistant building codes and construction techniques
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind; Extreme Wind; Tornado
Effect on new/existing buildings:	Reduce risk to new structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets
Lead Agency/Department Responsible:	Code Enforcement
Implementation Schedule:	Within 12 months of plan adoption pending funding
Incorporation into Existing Plans:	Local Building Codes, Ordinances

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 4; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 4; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

	La Feria – Action #18
Proposed Action:	**Harden Building Envelope at critical facilities.**
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk of damages to critical facilities and ensure continuity of emergency services and emergency response
Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind; Extreme Wind; Tornado
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Varies per site
Potential Funding Sources:	Local Budgets; HMGP; Council of Governments
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 4; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 4

		La Feria – Action #19
	Proposed Action:	**Educate homeowners on the benefits of wind retrofits such as shutters and hurricane clips.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of damages to residential structures through education on minimal mitigation techniques
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind; Extreme Wind; Tornado
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 12 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #20
	Proposed Action:	**Install Hail resistant materials at public buildings, with an emphasis on critical facilities.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide public buildings
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of hail damage to public buildings
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Varies per site
Potential Funding Sources:	Local Budgets; HMGP
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan; Comprehensive Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 4; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

	La Feria – Action #21
Proposed Action:	**Install covered parking at Police and Fire Stations to protect emergency vehicles from hail damages and vehicle equipment/computers from damages of extreme heat.**
BACKGROUND INFORMATION	
Site and Location:	Police and Fire Stations
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of repetitive damage to emergency vehicles
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail; Extreme Heat
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Varies per site
Potential Funding Sources:	Local Budgets; HMGP
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 12 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 4; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		La Feria – Action #22
	Proposed Action:	**Develop Dam Failure study and emergency action plan**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of injury or loss of life through planning, awareness and preparedness
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$25,000
Potential Funding Sources:	Local Budgets; HMGP; Texas Water Development Board
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan; Emergency Action Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #23
	Proposed Action:	**Educate citizens on the risk of dam failure and actions to take in the event of a failure**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of injury or loss of life through planning, awareness and preparedness
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets; HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan; Emergency Action Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #24
	Proposed Action:	**Educate citizens on the dangers of extreme cold and the steps they can take to protect themselves when extreme temperatures occur; Educate homeowners on how to protect their pipes during winter storms.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of injury or loss of life through planning, awareness and preparedness; reduce risk of damage from busted pipes
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets; HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan; Emergency Action Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #25
	Proposed Action:	**Develop dam inundation mapping to inform risk of dam failure**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of injury or loss of life through planning, awareness and preparedness
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$25,000
Potential Funding Sources:	Local Budgets; HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan; Emergency Action Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		La Feria – Action #26
	Proposed Action:	**Install surveillance cameras at strategic locations in town**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of terrorist activity through monitoring activities
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Terrorism
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Local Budgets
Lead Agency/Department Responsible:	Police Department
Implementation Schedule:	Within 12 months of plan adoption pending funding
Incorporation into Existing Plans:	Counter Terrorism

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 4; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

	La Feria – Action #27
Proposed Action:	**Conduct public education campaign to "See Something, Say Something" by distributing flyers and putting up signs.**
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk of terrorist activity through monitoring activities
Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Terrorism
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets
Lead Agency/Department Responsible:	Police Department
Implementation Schedule:	Within 48 months of plan adoption pending funding
Incorporation into Existing Plans:	Counter Terrorism

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #28
	Proposed Action:	**Train personnel on identifying the different hazardous materials and to inform public of dangers of different hazardous materials.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to first responders and residents through education
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hazardous Materials
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	$10,000
Potential Funding Sources:	Local Budgets
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 48 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #29
	Proposed Action:	**Provide education to residents of location of pipelines and emergency procedures to follow during a hazard event**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to residents during and after an event through education and awareness of the dangers of pipelines
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Pipeline Failure
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 48 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #30
	Proposed Action:	**Provide education to residents of the methods of transmitting infectious disease and ways to protect against infection.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to citizens through education
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Infectious Disease
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets
Lead Agency/Department Responsible:	Health Department
Implementation Schedule:	Within 48 months of plan adoption pending funding
Incorporation into Existing Plans:	N/A

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		La Feria – Action #31
	Proposed Action:	**Install surge protection on critical facilities to protect equipment.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide critical facilities
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of lightning damage to critical facilities and ensure continuity of services
	Type of Action: (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Effect on new/existing buildings:	Reduce risk to new and existing critical facilities
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets; HMGP
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24 months of plan adoption pending funding
Incorporation into Existing Plans:	Emergency Management Plan; Comprehensive Plan

COMMENTS:
Additional Considerations: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 5; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

SECTION 22: PLAN MAINTENANCE

PLAN MAINTENANCE PROCEDURES

The following is an explanation of how the City of La Feria will implement the Hazard Mitigation Action Plan (Plan) and continue to evaluate and enhance the Plan over time. To ensure the Plan remains current and relevant, the following Plan Maintenance procedures will be addressed:

- Incorporation
- Monitoring and Evaluation
- Updating
- Continued Public Involvement

INCORPORATION

The City of La Feria will be responsible for further development and implementation of mitigation actions. Each action has been assigned to a specific department within the City. The following describes the process by which La Feria will incorporate elements of the mitigation plan into other planning mechanisms.

PROCESS OF INCORPORATION

Once the Plan is adopted, the City will implement actions based on priority and the availability of funding. The City currently implements policies and programs to reduce loss to life and property from hazards. The mitigation actions developed for this Plan enhance this ongoing effort and will be implemented through other program mechanisms where possible.

The potential funding sources listed for each identified action may be used when the jurisdiction seeks funds to implement actions. An implementation time period or a specific implementation

date has been assigned to each action as an incentive for completing each task and gauging whether actions are implemented in a timely manner.

The City of La Feria will integrate implementation of their mitigation actions with other plans and policies such as construction standards and emergency management plans, and ensure that these actions, or proposed projects, are reflected in other planning efforts. Coordinating and integrating components of other plans and policies into goals and objectives of the Plan will further maximize funding and provide possible cost-sharing of key projects, thereby reducing loss of lives and property, and mitigating hazards affecting the area.

Upon formal adoption of the Plan, planning team members will work to integrate the hazard mitigation strategies into other plans and codes, as they are developed. Participating team members will conduct periodic review of plans and policies, once per year at a minimum, and analyze the need for amendments in light of the approved Plan. The planning team will review all comprehensive land use plans, capital improvement plans, annual budget reviews, emergency operations or management plans, transportation plans, and any building codes to guide and control development. The City will ensure that capital improvement planning in the future will also contribute to the goals of this hazard mitigation Plan to reduce the long-term risk to life and property from all hazards. Within one year of formal adoption of the hazard mitigation Plan, existing planning mechanisms will be reviewed by the City.

The City of La Feria planning team members will review and revise, as necessary, the long-range goals and objectives in strategic plan and budgets to ensure that they are consistent with this mitigation action plan. Additionally, the City will work to advance the goals of this hazard mitigation plan through its routine, ongoing, long-range planning, budgeting, and work processes.

TABLE 22-1. METHODS OF INCORPORATION OF THE PLAN

PLANNING MECHANISM	DEPARTMENT/TITLE RESPONSIBLE	INCORPORATION OF PLAN
Grant Applications	City Manager	The Plan will be evaluated by the City of La Feria when grant funding is sought for mitigation projects. If a project is not in the Plan, an amendment may be necessary to include the action in the Plan.
Annual Budget Review	City Secretary/Human Resource Director	Various departments and key personnel that participated in the planning process for the City of La Feria will review the Plan and mitigation actions therein when conducting their annual budget review. Allowances will be made in accordance with grant applications sought or mitigation actions that will be undertaken according to the

PLANNING MECHANISM	DEPARTMENT/TITLE RESPONSIBLE	INCORPORATION OF PLAN
		implementation schedule of the specific action.
Regulatory Plans	City Manager	Currently, the City of La Feria has regulatory plans in place, such as Emergency Management Plans, Continuity of Operations, Disaster Recovery Plans, Economic Development and Evacuation Plans. The Plan will be consulted when city departments review or revise their current regulatory planning mechanisms, or in the development of regulatory plans that are not currently in place.
Capital Improvement Plans	City Manager	The City of La Feria has a Capital Improvement Plan (CIP) in place. Prior to any revisions to the CIP, city departments will review the risk assessment and mitigation strategy sections of the Plan, as limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments.
Comprehensive Plans	City Manager	The City of La Feria has a Long-Term Comprehensive Development Plan in place. Since comprehensive plans involve developing a unified vision for a community, the mitigation vision and goals of the Plan will be reviewed in the development or revision of a Comprehensive Plan.
Floodplain Management and Fire Protection Plans	City Manager	Floodplain Management Plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding, and information found in Section 12 of this plan discussing the people and property at risk to flood, will be reviewed and revised when the City of La Feria updates their Management Plans or develop new plans.

MONITORING AND EVALUATION

Periodic revisions of the Plan are required to ensure that goals, objectives, and mitigation actions are kept current. Revisions may be required to ensure the Plan is in compliance with federal and state statutes and regulations. This section outlines the procedures for completing Plan revisions, updates, and review. Table 22-2 indicates the department and title responsible for Plan monitoring, updating and review of the Plan.

TABLE 22-2. TEAM MEMBERS RESPONSIBLE FOR PLAN MONITORING, UPDATING AND REVIEW OF THE PLAN

ORGANIZATION	TITLE
City of La Feria	City Secretary/Human Resources Director
City of La Feria	City Manager

MONITORING

Designated Planning Team members are responsible for monitoring, updating, and reviewing the Plan, as shown in Table 22-2. Individuals holding the title listed in Table 22-2 will be responsible for monitoring the Plan on an annual basis. Plan monitoring includes reviewing mitigation actions submitted, and coordinating with various City departments to determine if mitigation actions need to be re-evaluated and updated. The Planning Team will develop a brief report that identifies if changes to the Plan are needed, such as recommending an action for funding. A written summary of meeting notes will report the particulars involved in turning an action into a project.

EVAULATION

As part of the evaluation process, the Planning Team will assess changes in risk; determine whether the implementation of mitigation actions is on schedule; determine whether there are any implementation problems, such as technical, political, legal, or coordination issues; and identify changes in land development or programs that affect mitigation priorities for each respective department or organization.

The Planning Team will meet on an annual basis to evaluate the Plan and identify any needed changes. The annual evaluation process will help to determine if any changes are necessary.

UPDATING

PLAN AMENDMENTS

At any time, minor technical changes may be made to update the City of La Feria Hazard Mitigation Plan. Material changes to mitigation actions or major changes in the overall direction of the Plan or the policies contained within it, must be subject to formal adoption by the City.

The City will review proposed amendments and vote to accept, reject, or amend the proposed change. Upon ratification, the amendment will be transmitted to TDEM.

In determining whether to recommend approval or denial of a Plan amendment request, the City will consider the following factors:

- Errors or omissions made in the identification of issues or needs during the preparation of the Plan;
- New issues or needs that were not adequately addressed in the Plan; and
- Changes in information, data, or assumptions from those on which the Plan was based.

FIVE (5) YEAR REVIEW

The Plan will be thoroughly reviewed by the Planning Team at the end of three years from the approval date, to determine whether there have been significant changes in the planning area that necessitate changes in the types of mitigation actions proposed. Factors that may affect the content of the Plan include new development in identified hazard areas, increased exposure to hazards, disaster declarations, increase or decrease in capability to address hazards, and changes to federal or state legislation.

The Plan review process provides the City an opportunity to evaluate mitigation actions that have been successful, identify losses avoided due to the implementation of specific mitigation measures, and address mitigation actions that may not have been successfully implemented as assigned.

It is recommended that the full Advisory Committee and Planning Team (Section 2, Table 2-1 and Table 2-2) meet to review the Plan at the end of three years because grant funds may be necessary for the development of a five-year update. Planning grant options in advance of the five-year Plan update deadline is recommended considering the timelines for grant cycles.

Following the Plan review, any revisions deemed necessary will be summarized and implemented according to the reporting procedures and Plan amendment process outlined herein. Upon completion of the review, update, and amendment process the revised Plan will be submitted to TDEM for final review and approval in coordination with FEMA.

CONTINUED PUBLIC INVOLVEMENT

Public input was an integral part of the preparation of this Plan and will continue to be essential for Plan updates. Changes or suggestions to improve or update the Plan will provide opportunities for additional public input.

The public can review the Plan on the City of La Feria's website (www.cityoflaferia.com), where officials and the public are invited to provide ongoing feedback. Additionally, copies of the Plan will be kept in the offices of the City.

The Planning Team may also designate voluntary citizens from the City, or willing stakeholder members that were involved in the Plan's development, to provide feedback on an annual basis. It is important that stakeholders and the community maintain a vested interest in preserving the

functionality of the planning area as it pertains to the overall goals of the mitigation plan. The Planning Team is responsible for notifying stakeholders and community members on an annual basis, and maintaining the Plan as a part of their job description.

Media, including local newspaper and radio stations, will be used to notify the public of any maintenance or periodic review activities during the implementation, monitoring, and evaluation phases. Additionally, local news media will be contacted to cover information regarding Plan updates, status of grant applications, and project implementation. Local and social media outlets, such as Facebook and Twitter, will keep the public and stakeholders apprised of potential opportunities to fund and implement mitigation projects identified in the Plan.

APPENDIX A: PLANNING TEAM

PLANNING TEAM MEMBERS

The City of La Feria Hazard Mitigation Plan was organized using a direct representative model. An Advisory Committee from the City of La Feria, shown in Table A-1, was formed to coordinate planning efforts, and request input and participation in the planning process. Table A-2 reflects the Planning Team, consisting of the City's staff, commissioners, and the Planning & Community Development Department that participated throughout the planning process.

TABLE A-1. ADVISORY COMMITTEE

ORGANIZATION	TITLE
City of La Feria	City Manager
City of La Feria	City Secretary/Human Resource Director

TABLE A-2. PLANNING TEAM MEMBERS

ORGANIZATION	TITLE
City of La Feria	Administrative Assistant
City of La Feria	Commissioner
City of La Feria	Commissioner
City of La Feria	Commissioner
City of La Feria	Commissioner
City of La Feria	Mayor
City of La Feria	Mayor Pro-Tem
City of La Feria	Planning & Community Development Director

STAKEHOLDERS

The following groups listed in Table A-3 represent a list of organizations invited to stakeholder meetings, public meetings and workshops throughout the planning process and include: non-profit organizations; private businesses; and schools. The following list of persons were sent an e-

mail and contacted by phone requesting their input in the planning process, and sent an invitation to participate at each of the Stakeholder meetings. Many of the invited organizations and stakeholders participated and were integral to providing comments and data for the Plan. For a list of attendees at meetings, please see Appendix E[1].

TABLE A-3. STAKEHOLDER WORKING GROUP

ORGANIZATION	TITLE
Aaron's Brake & Alignment	Owner
All Star Family Dentistry	Dentist
American Legion Post #439	Commander
Animal Control	Advisory
Apostolic Faith Tabernacle	Pastor
Assembly Hall of Jehovah's Witnesses	Elder
BBVA Compass Bank	Branch Manager
Christ In Our Midst Church	Pastor
Dios Es Amor United Methodist Church	Pastor
El Centro Foods	Owner
Faith Vision Church	Pastor
First Baptist Church	Pastor
First United Methodist Church	Pastor
The Hair Shoppe I	Owner
Iglesia Apostolica De La Fe En Cristo Jesus	Pastor
Innovative Block of South Texas	Manager
JC Wing Co.	Principal
Kenwood RV Park	Manager
La Feria Chamber of Commerce	President
La Feria Christian Center	Bishop
La Feria Church of Christ	Minister

[1] Information contained in Appendix E is exempt from public release under the Freedom of Information Act (FOIA).

ORGANIZATION	TITLE
La Feria Economic Development Corporation	Director
La Feria Economic Development Corporation	President
La Feria Economic Development Corporation	Vice President
La Feria Family Dentistry, P.A.	Dentist
La Feria Independent School District	Principals
La Feria Independent School District	School Board Members
La Feria Independent School District	School Board President
La Feria Independent School District	School Board Secretary
La Feria Independent School District	School Board Vice President
La Feria Independent School District	Superintendent
La Feria Industrial Development Corporation	Members
La Feria Industrial Development Corporation	Vice President
La Feria Irrigation District	Director
La Feria Library Board	Board Members
La Feria Library Board	Secretary/Treasurer
La Feria Library Board	Vice President
La Feria News	Editor
La Feria Planning & Zoning Commission	Board Chairman
La Feria Planning & Zoning Commission	Board Members
La Feria Utilities Board	Board Chairman
La Feria Utilities Board	Board Members
La Feria Zoning Board of Adjustments	Board Chairman
La Feria Zoning Board of Adjustments	Board Members
Linebarger Goggan Blair & Sampson, LLP	Partner
Los Amigos Restaurant	Principal
Lower Rio Grande Valley Development Council	Deputy Executive Director
Lower Rio Grande Valley Development Council	Economic Development Director

ORGANIZATION	TITLE
Lower Rio Grande Valley Development Council	Executive Director
Lulu's Flower & Gift Shop	Owner
Marod Engineering	Engineer
Megamorphosis, Inc.	Architectural Intern
New Hope Presbyterian Church	Pastor
Our Lady of the Lake University	Rio Grande Valley Director
Pentecostal Church	Pastor
Primera Iglesia Bautista	Pastor
Rio Grande Valley Shrine Club	Treasurer
Septic Services by R&R	Owner
South Texas Collaborative Housing Development	Directors
South Texas Collaborative Housing Development	Secretary/Treasurer
South Texas Collaborative Housing Development	Vice President
South Texas Emerging Markets Development Fund, Inc.	Directors
South Texas Emerging Markets Development Fund, Inc.	President
South Texas Emerging Markets Development Fund, Inc.	Secretary/Treasurer
South Texas Emerging Markets Development Fund, Inc.	Vice President
St. Francis Xavier Catholic Church	Reverend
State Farm Insurance	Agent
Stewart Planning	Owner
SWG Engineering, LLC	Associate
SWG Engineering, LLC	Project Engineer
SWG Engineering, LLC	Vice President, P.E.
Tax Increment Reinvestment Zone	Board Member
Tax Increment Reinvestment Zone	Chairman
Tax Increment Reinvestment Zone	Vice Chairman
Texas Department of Transportation	Carrier

ORGANIZATION	TITLE
Texas House of Representatives	State Representatives
Texas Senate	State Senator
Tonie's Flower Shop	Owner
VIP/La Feria RV Park	Managers
Volunteer Committee Member	Volunteer
Way of the Cross Baptist Church	Pastor
Yellow Rose Mobile Home Park	Manager

APPENDIX B: PUBLIC SURVEY RESULTS

OVERVIEW

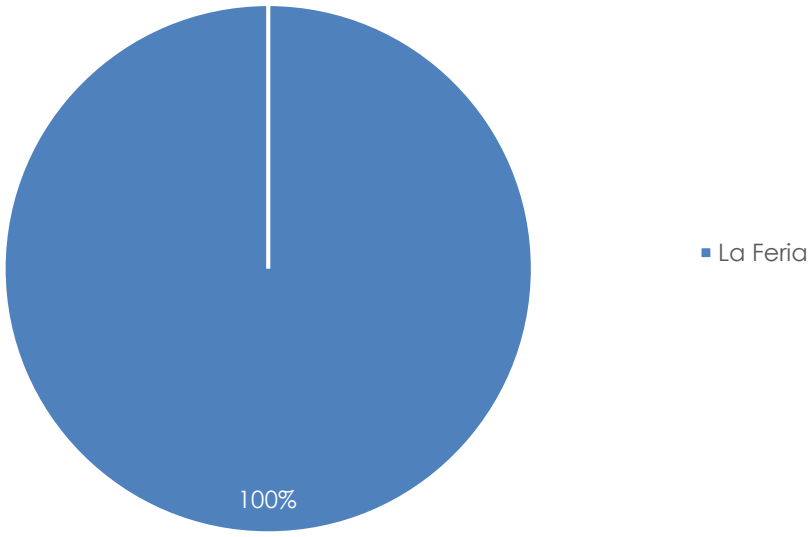
The City of La Feria prepared a public survey that requested public opinion on a wide range of questions relating to natural and man-caused hazards. The survey was made available on the City of La Feria's website. This survey link was also distributed at public meetings throughout the planning process.

A total of nine surveys were collected, the results of which are analyzed in Appendix B. The purpose of the survey was twofold: 1) to solicit public input during the planning process, and 2) to help the jurisdiction identify any potential actions or problem areas.

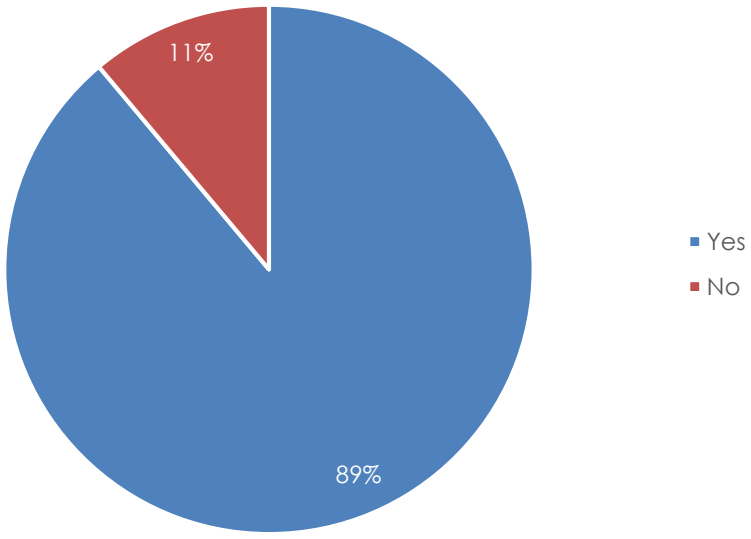
The following survey results depict the percentage of responses for each answer. Similar responses have been summarized for questions that did not provide a multiple-choice answer or that required an explanation.

PUBLIC SURVEY RESULTS

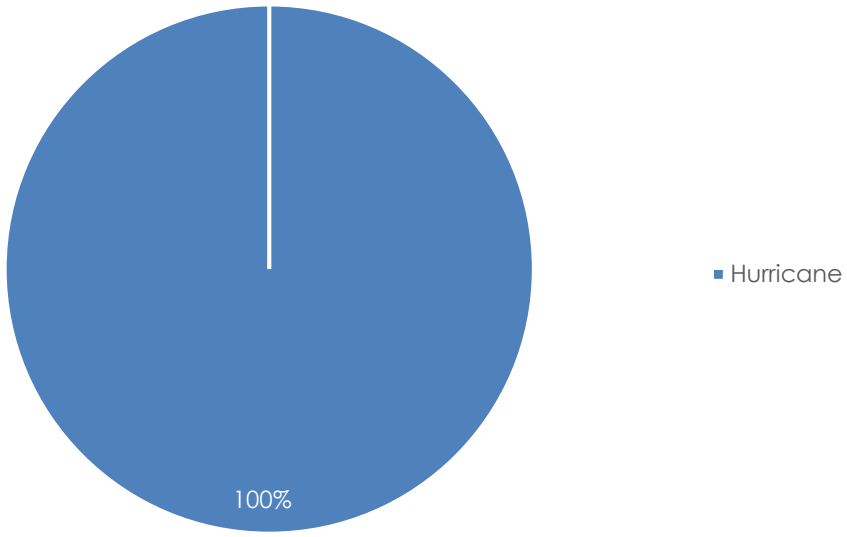
1. Please state the jurisdiction (city and community) where you reside.



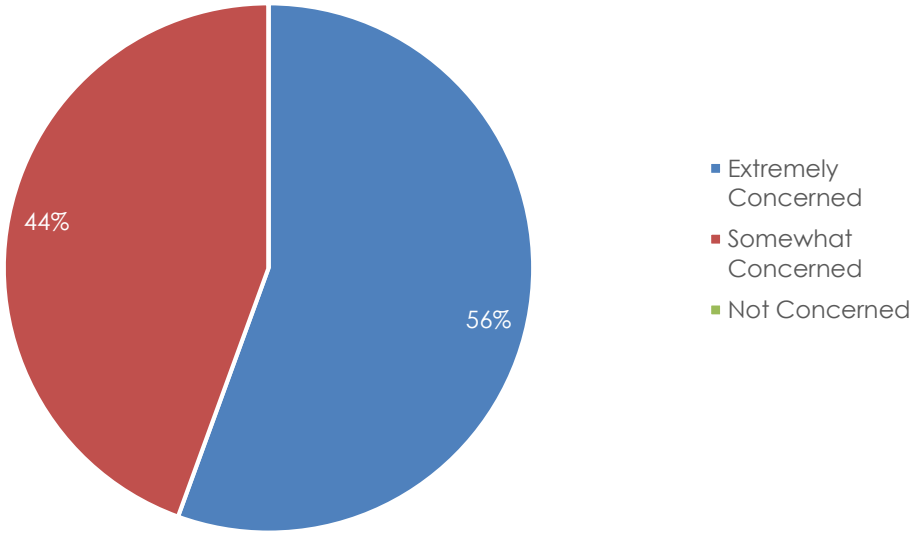
2. A. Have you ever experienced or been impacted by a disaster?



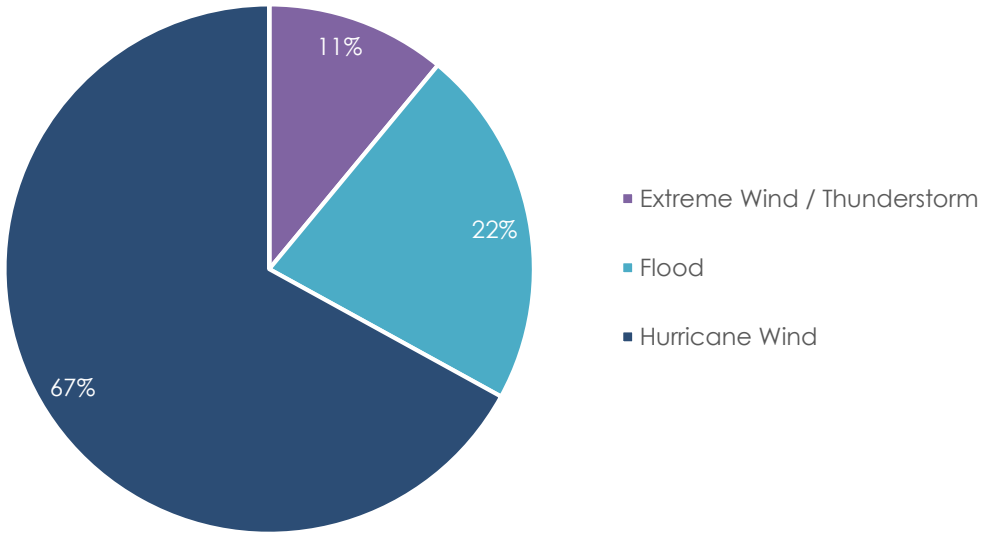
2. B. If "yes", please explain:



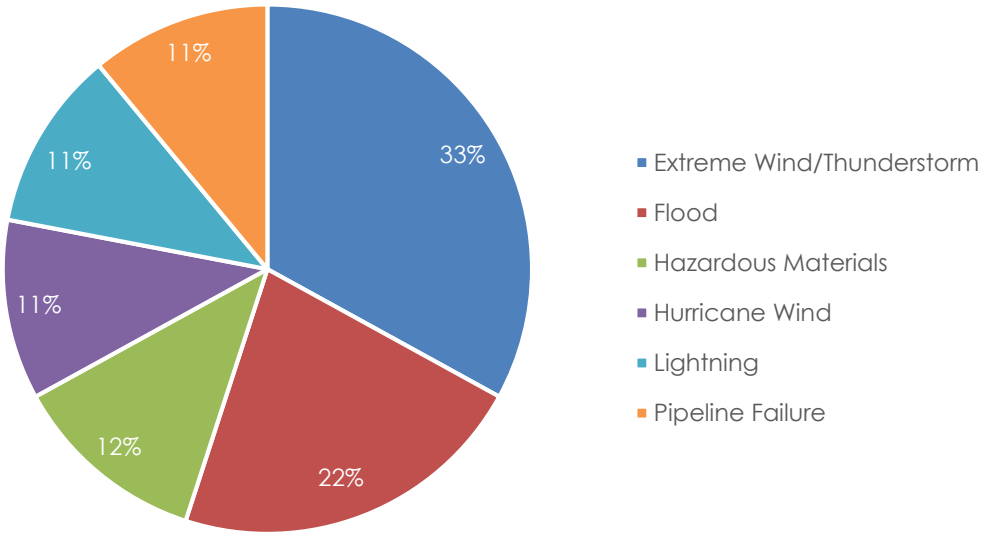
3. How concerned are you about the possibility of your community being impacted by a disaster?



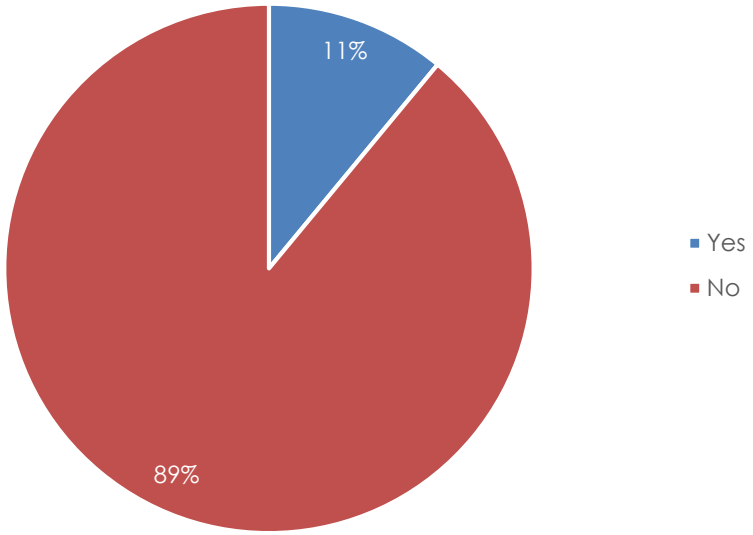
4. Please select the one hazard you think is the highest threat to your neighborhood:



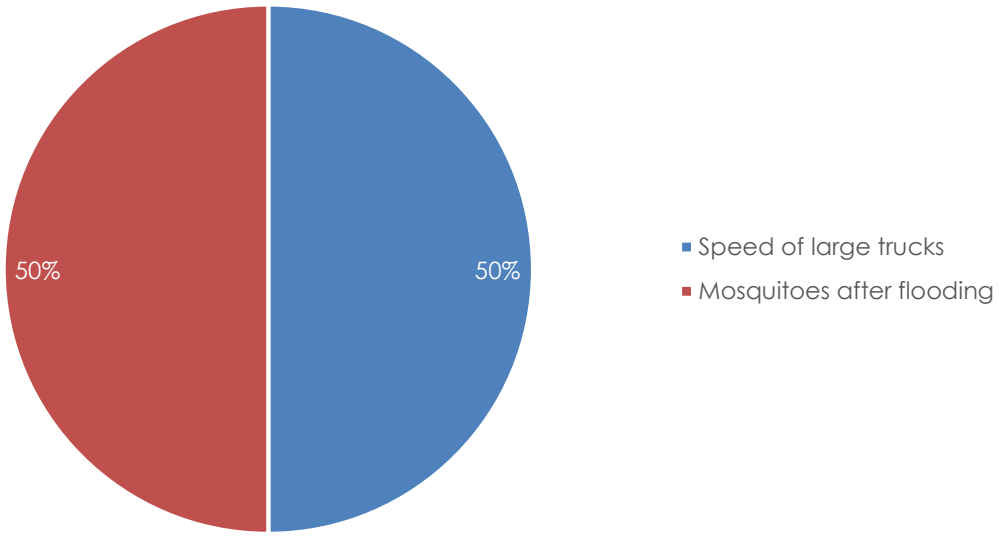
5. Please select the one hazard you think is the second highest threat to your neighborhood:



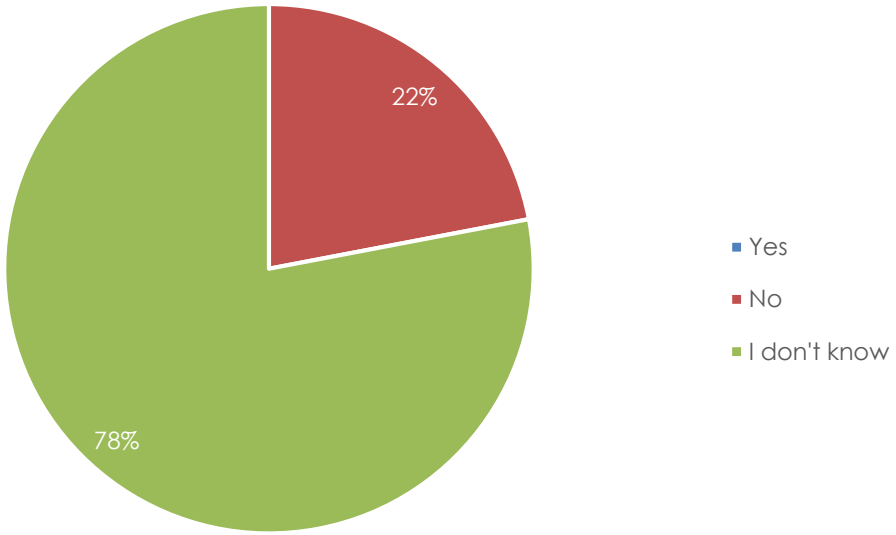
6. A. Are there hazards not listed above that you think is a wide-scale threat to your neighborhood?



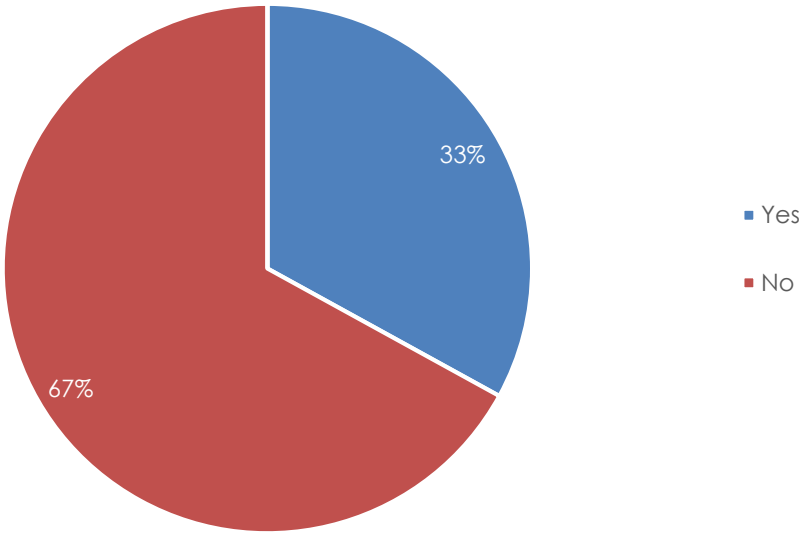
6. B. If "yes", please explain.



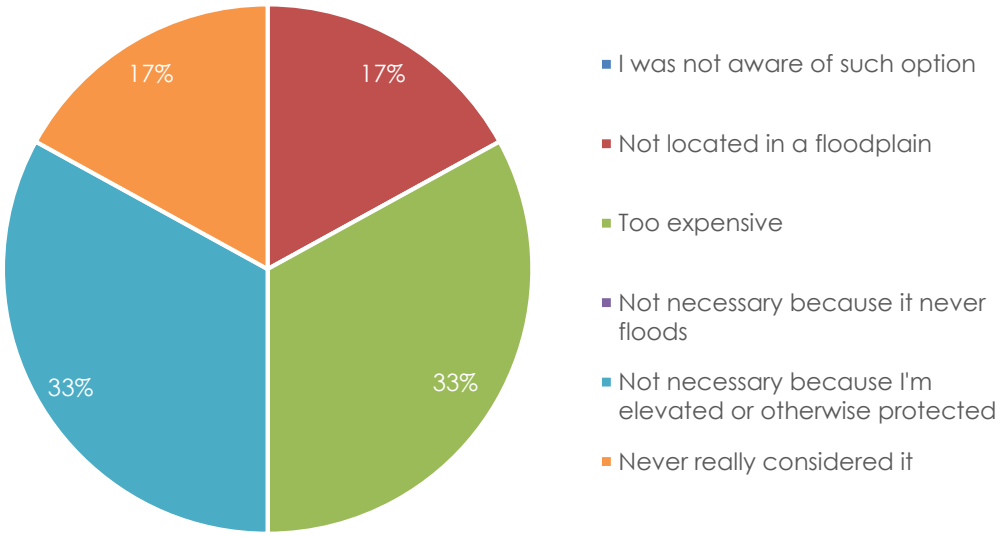
7. Is your home located in a floodplain?



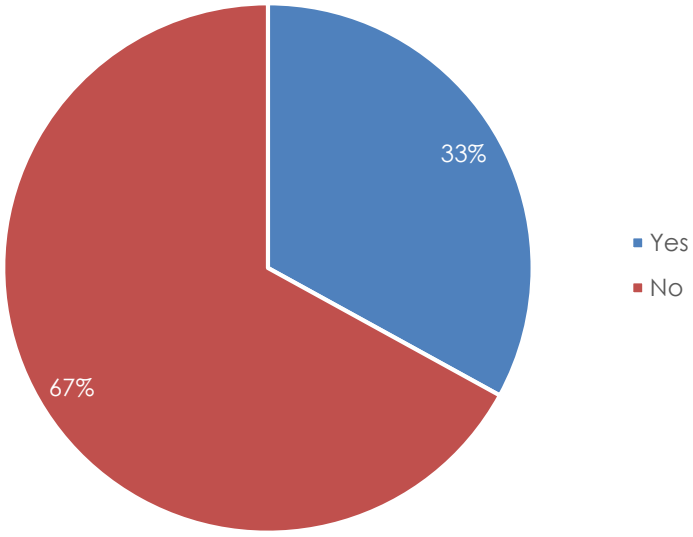
8. Do you have flood insurance?



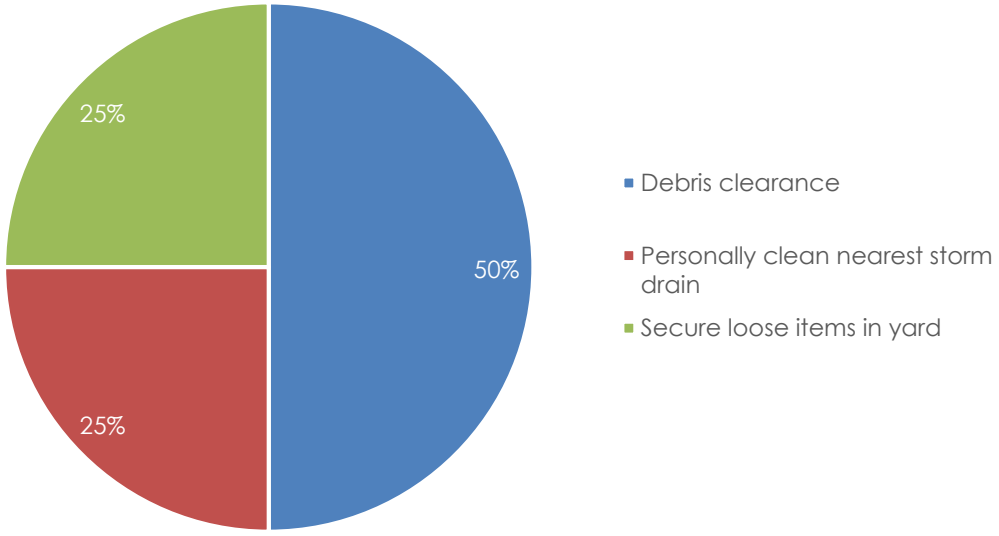
9. If you do not have flood insurance, why not?



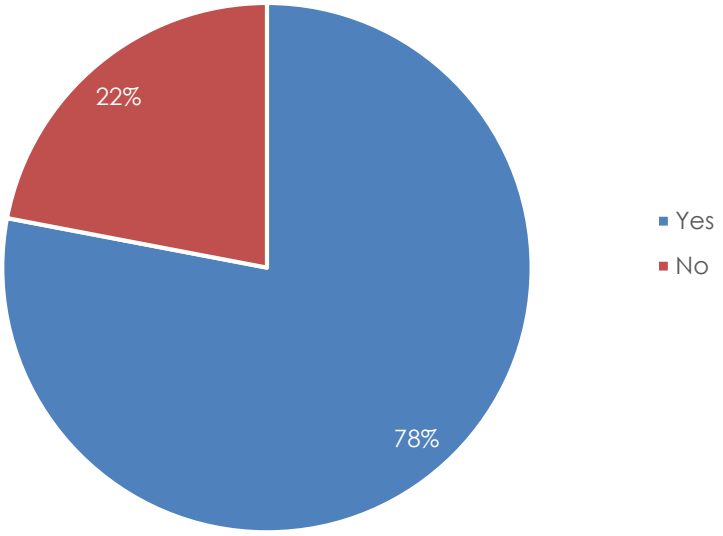
10. A. Have you taken any actions to make your home or neighborhood more resistant to hazards?



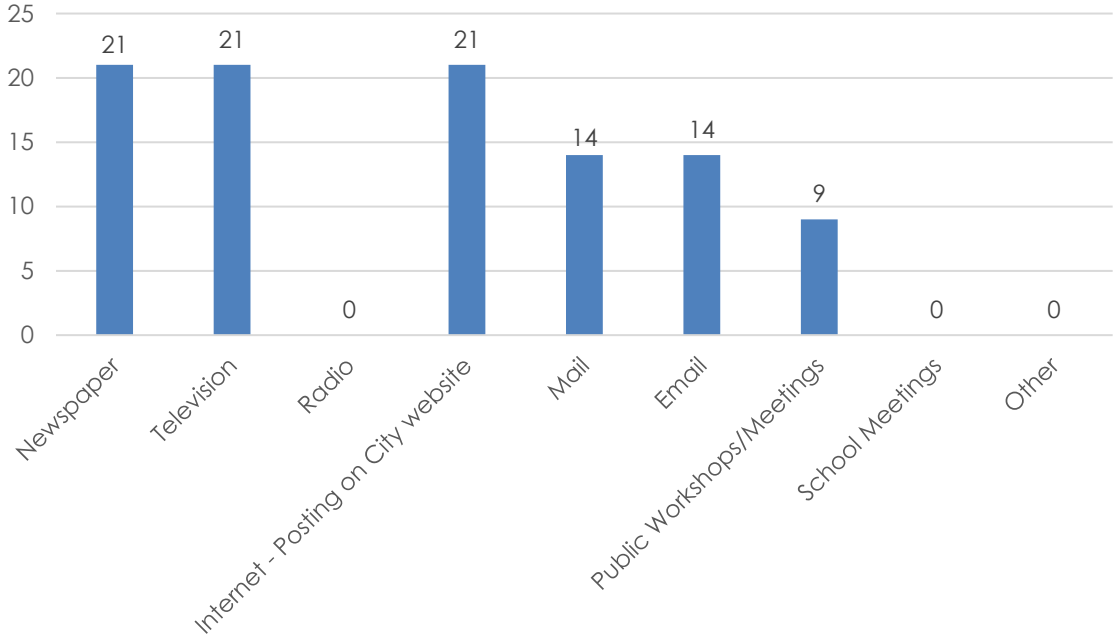
10. B. What have you done?



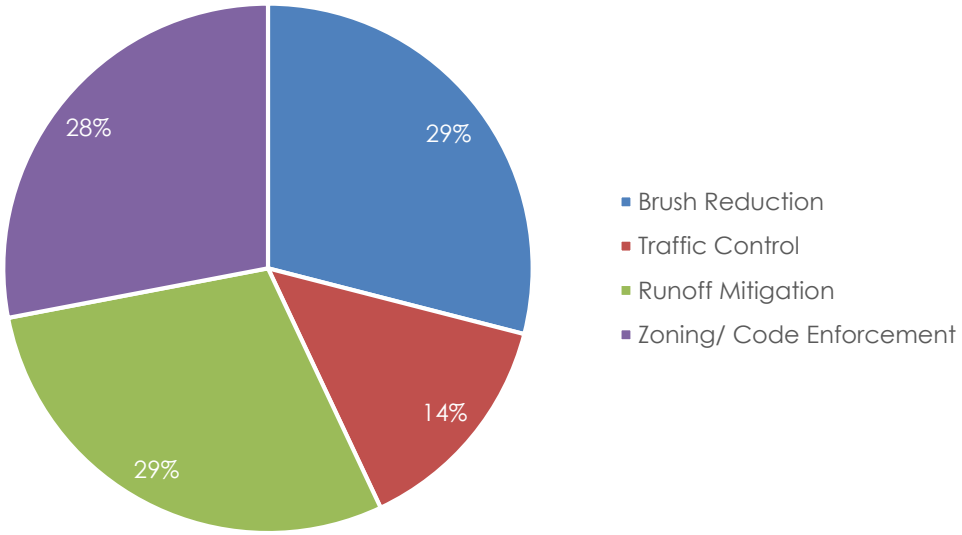
11. Are you interested in making your home or neighborhood more resistant to hazards?



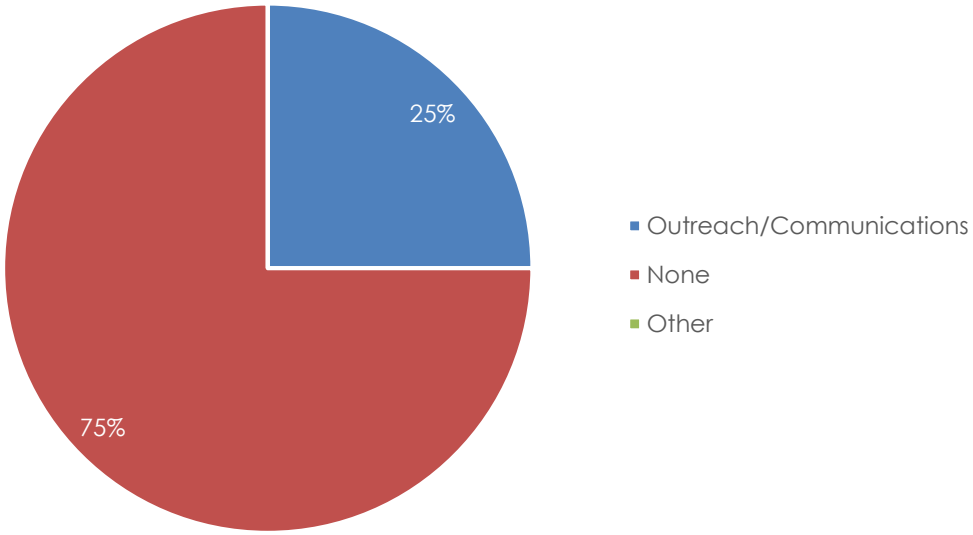
12. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?



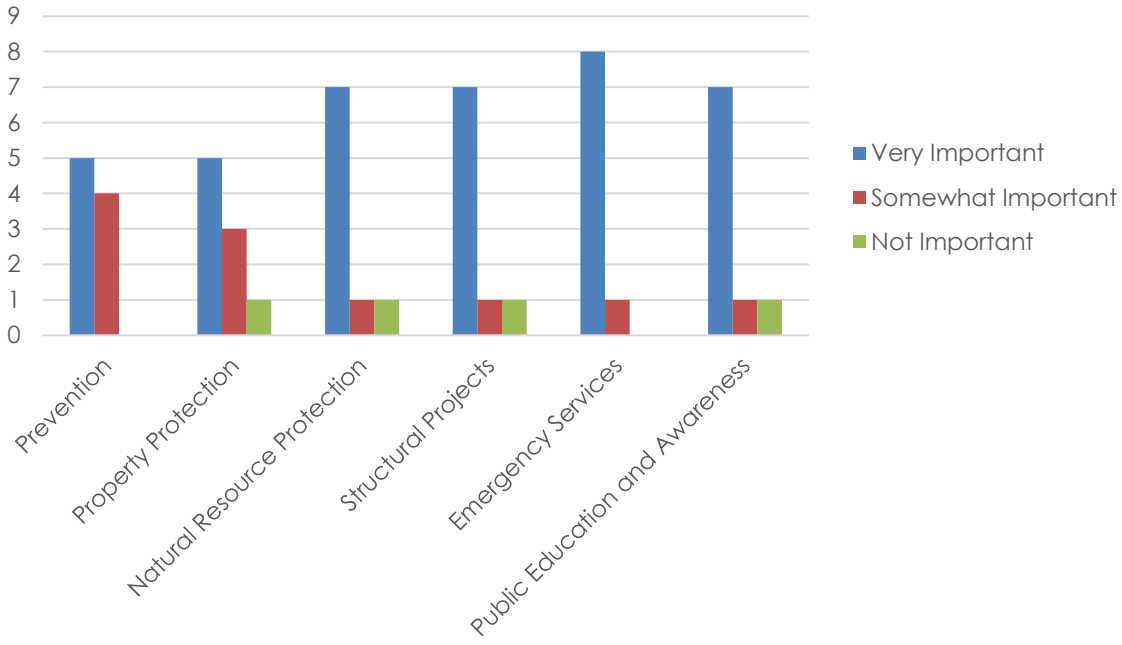
13. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?



14. Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?



15. A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.



Prevention / Local Plans & Regulations - Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.

Property Protection - Actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevation, structural retrofits, and storm shutters.

Natural Resource Protection - Actions that in addition to minimizing hazard losses also preserve or restore the functions of natural systems. Examples include: floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.

Structural Projects - Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, seawalls detention / retention basins, channel modification, retaining walls and storm sewers.

Emergency Services - Actions that protect people and property during and immediately after a hazard event. Examples include warning systems, evacuation planning, emergency response training, and protection of critical facilities or systems.

Public Education and Awareness - Actions to inform citizens about hazards and techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials and demonstration events.

APPENDIX C: CRITICAL FACILITIES

This Appendix is **For Official Use Only (FOUO)** and may be exempt from public release under Freedom of Information Act (FOIA).

APPENDIX D: DAM LOCATION

Appendix D is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

APPENDIX E: MEETING DOCUMENTATION

Appendix E is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

APPENDIX F: CAPABILITY ASSESSMENT

OVERVIEW

The Planning Team completed a Capability Assessment Survey. The completed Capability Assessment Checklist, included in Appendix F, provides information on existing policies, plans, and regulations for the City of La Feria.

A Capability Assessment is an integral component of the Plan development process. The Capability Assessment serves to evaluate a community's existing planning and regulatory capabilities to support implementation of the Plan's Mitigation Strategy Objectives.

Each community has a unique set of capabilities including policies, programs, staff, funding, and other resources available to accomplish hazard mitigation objectives and reduce long-term vulnerability. The Planning Team identified existing capabilities in each jurisdiction that currently reduce disaster losses or could be used to reduce losses in the future, and capabilities that inadvertently increase risks in the community.

CITY OF LA FERIA CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST		
Planning/Regulatory Tool	**In Place**	**Under Development**
Hazard Mitigation Plan		X
Comprehensive Land Use Plan	X	
Stormwater Management Plan/Ordinance	X	
Emergency Operations Plan	X	
Capital Improvements Plan	X	
Floodplain Management Plan	X	
Flood Response Plan	X	
Historic Preservation Plan		
Continuity of Operations Plan	X	
Evacuation Plan	X	
National Flood Insurance Program (NFIP)	X	
NFIP Community Rating System		
NFIP Floodplain Ordinance	X	
Building Code	X	
Fire Code	X	
Other Plans		
Administrative and Technical Capability	**Yes**	**No**
Planners	X	
Engineers	X	
Emergency Manager	X	

COMMUNITY CAPABILITY CHECKLIST		
Floodplain Manager	X	
Personnel skilled in Geographic Information Systems (GIS)		
Resource development staff or grant writers	X	
Financial Resources	**Yes**	**No**
Capital Improvement Programming	X	
Financial Resources	**Yes**	**No**
Community Development Block Grants (CDBG)	X	
Stormwater Utility Fees		
Development Impact Fees		
Partnering Agreements or Intergovernmental Agreements	X	
Other		