TRAVIS COUNTY

Hazard Mitigation Plan Update

Mitigating Risk for a Safe, Secure, and Sustainable Future

APA: August 29, 2017

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SECTION 1: INTRODUCTION

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BACKGROUND

Travis County is located in south central Texas, 150 miles inland from the Gulf of Mexico, and is the fifth-most populous county in Texas. Travis County was established in 1840 and is named in honor of William Barret Travis, the commander of the Republic of Texas forces at the Battle of the Alamo.

Travis County is surrounded by the following counties: Williamson County to the north, Bastrop County to the east, Caldwell County to the south, Hays County to the southwest, Blanco County to the west, and Burnet County to the northwest. The County seat is Austin, which is also the capital of Texas.

Texas is prone to extremely heavy rains and flooding, holding half of the world-record rainfall rates (48 hours or less).[1] While flooding is a well-known risk, Travis County is susceptible to a wide range of natural hazards, including but not limited to: extreme heat, tornadoes, hail, 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 an event from occurring, the effects from many hazards to people and property can be lessened. This concept is known as hazard mitigation, which is defined by the Federal Emergency Management Agency (FEMA) as *sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects.*[2] Communities participate in hazard mitigation by developing hazard mitigation plans. The Texas Division of Emergency Management (TDEM) and FEMA have the authority to review and approve hazard mitigation plans through the Disaster Mitigation Act of 2000.

In 2004, Travis County originally developed their Hazard Mitigation Plan (HMP) to assess all potential hazards that may affect the unincorporated areas of the County and to develop an action plan to address those hazards. The original Plan was completed in December 2004 and approved by FEMA in 2005. Then in 2011, the Travis County HMP update, titled "Travis County Texas, 2011 Hazard Mitigation Plan Update,"

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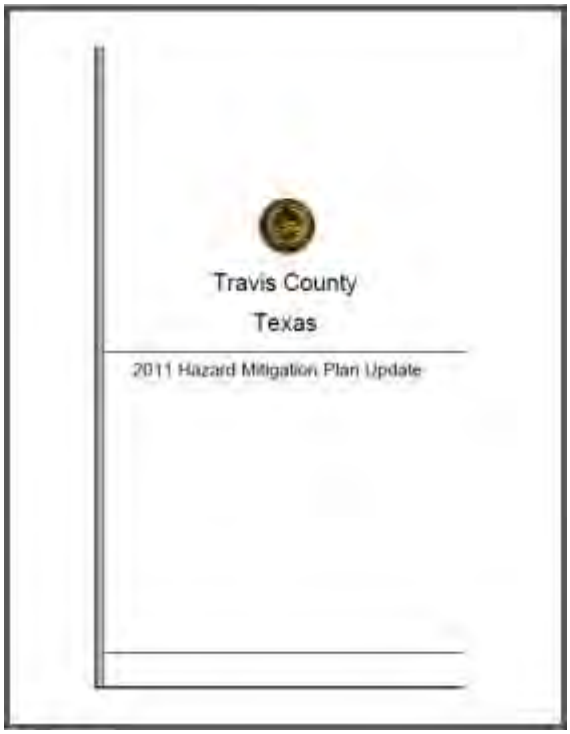
[1] http://floodsafety.com/texas/regional_info/regional_info/austin_zone.htm

[2] http://www.fema.gov/hazard-mitigation-planning-resources

included re-evaluating the original hazards, the risk assessment, mitigation goals, and mitigation priorities. This 2011 update was facilitated and prepared by consultants Jeffrey S. Ward & Associates and Vissering Pardue & Associates.



The Disaster Mitigation Act requires that hazard mitigation plans be reviewed and revised every 5 years to maintain eligibility for Hazard Mitigation Assistance (HMA) grant funding. Since FEMA originally approved the Travis County HMAP in 2005, and then approved an update in 2011, the County began the process of developing a HMAP Update in order to maintain eligibility for grant funding within the 5-year window. Travis County selected the consultant team of H2O Partners, Inc. to write and develop the HMAP Update for 2017; hereinafter titled: "Travis County Hazard Mitigation Plan Update 2017: Maintaining a Safe, Secure, and Sustainable Community" (Plan or Plan Update). The HMAP Update planning process provided an opportunity for Travis County to evaluate successful mitigation actions and explore opportunities to avoid future disaster loss.

Hazard mitigation activities are an investment in a community's safety and sustainability. It is widely accepted that the most effective hazard mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made. A comprehensive update to a hazard mitigation plan addresses hazard vulnerabilities that exist today and in the foreseeable future. Therefore, it is essential that a plan identifies projected patterns of how future development will increase or decrease a community's overall hazard vulnerability.

SCOPE AND PARTICIPATION

Travis County's 2017 Plan Update is a multi-jurisdictional plan. The participating jurisdictions include Travis County, the City of Pflugerville, the City of Sunset Valley, the City of Manor, the City of Lakeway, and the Village of the Hills. These jurisdictions provided valuable input into the planning process.

Travis County's originally approved 2005 Plan only included unincorporated Travis County. 3 jurisdictions (the Cities of Pflugerville, Sunset Valley, and Village of the Hills) requested that the County include them in the 2011 Travis County update. These jurisdictions have remained a part of the 2017 Plan Update, and have been joined by the Cities of Manor and Lakeway.

The focus of the 2017 Plan Update is to identify activities to mitigate hazards classified as "high" or "moderate" risk, as determined through a detailed hazard risk assessment conducted for Travis County and the participating jurisdictions. The hazard classification enables the County and participating

jurisdictions to prioritize mitigation actions based on hazards which can present the greatest risk to lives and property in the geographic scope (i.e. planning area).

PURPOSE

The 2017 Plan Update was prepared by Travis County, participating jurisdictions, and H2O Partners, Inc. The purpose of the Plan Update is to protect people and structures, and to minimize the costs of disaster response and recovery. The goal of the Plan Update is to minimize or eliminate long-term risks to human life and property from known hazards, by identifying and implementing cost-effective hazard mitigation actions. The planning process is an opportunity for Travis County, the participating jurisdictions, stakeholders, and the general public to evaluate and develop successful hazard mitigation actions, reducing the future risk of fatalities and property damage resulting from a disaster in the Travis County planning area.

The Mission Statement of the Plan Update is: *"Maintaining a secure and sustainable future through the revision and development of targeted hazard mitigation actions to protect life and property."*

Travis County, participating jurisdictions, and planning participants identified 11 natural hazards to be addressed by the Plan Update. The specific goals of the Plan Update are to:

- Provide a comprehensive update to the 2011 HMAP;
- Minimize disruption to Travis County and the participating jurisdictions following a disaster;
- Streamline disaster recovery by articulating actions to be taken before a disaster strikes in order to reduce or eliminate future damage;
- Demonstrate a firm local commitment to hazard mitigation principles;
- Serve as a basis for future funding that may become available through grant and technical assistance programs offered by the State or Federal government. The Plan Update will enable Travis County and participating jurisdictions to take advantage of rapidly developing mitigation grant opportunities as they arise; and
- Ensure that Travis County and participating jurisdictions maintain eligibility for the full range of future Federal disaster relief.

AUTHORITY

The Plan Update is tailored specifically for Travis County, participating jurisdictions, and plan participants including Planning Team members, stakeholders, and the general public who participated in the Plan Update development process. The Plan Update complies with all requirements promulgated by the Texas Division of Emergency Management (TDEM), 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). Additionally, the Plan complies with the Interim Final Rules for the Hazard Mitigation Planning

and Hazard Mitigation Grant Program (44 CFR, Part 201), which specify 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). Additionally, the Plan is 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 Update outline the Plan's purpose and development, including how Planning Team members, stakeholders, and members of the general public were involved in the planning process. Section 3 profiles the planning area's population and economy.

Sections 4 through 15 present a hazard overview and information on individual natural hazards in the planning area. The hazards generally appear in order of priority based on potential losses to life and property and other community concerns. For each hazard, the Plan Update presents a description of the hazard, a list of historical hazard events, and the results of the vulnerability and risk assessment process.

Section 16 presents hazard mitigation goals and objectives. Section 17 gives an analysis for the previous actions and Section 18 presents hazard mitigation actions for Travis County and the participating jurisdictions. Section 19 identifies Plan maintenance mechanisms.

A list of Planning Team members is located in Appendix A. Public survey results are analyzed and presented in Appendix B. Appendix C contains a detailed list of critical facilities for the planning area, and Appendix D provides a list of dam locations. Appendix E contains information regarding workshops, including meeting documentation. The Capability Assessment for Travis County and the participating jurisdictions is located in Appendix F.[3]

[3] Information contained in some of these appendices are exempt from public release under the Freedom of Information Act (FOIA).

SECTION 2: PLANNING PROCESS

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PLAN PREPARATION AND DEVELOPMENT

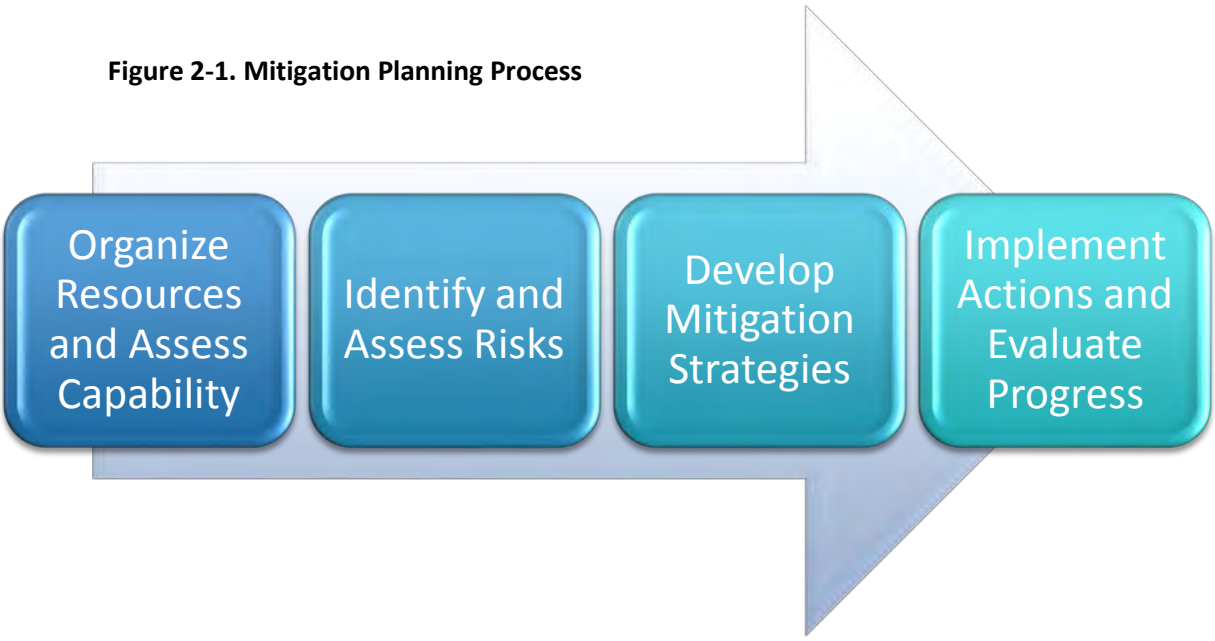
Hazard mitigation planning involves coordination with various constituents and stakeholders to develop a more disaster-resistant community. Section 2 provides an overview of the planning process, including the identification of key steps and a detailed description of how stakeholders and the public were involved.

OVERVIEW OF THE PLAN

Travis County hired H2O Partners, Inc. (Consultant Team), to provide technical support and oversee the development of the 2017 Plan Update. The Consultant Team used the Federal Emergency Management Agency's (FEMA) "Local Mitigation Plan Review Guide" (October 1, 2011) and the "Local Mitigation

Planning Handbook" (March 2013) to develop the Plan. The overall planning process is shown in Figure 2-1 below.

Figure 2-1. Mitigation Planning Process



Travis County, participating jurisdictions, and the Consultant Team met in December 2016 to begin organizing resources, identifying Planning Team members, and conducting a Capability Assessment.

PLANNING TEAM

Key members of H2O Partners, Inc. developed the Plan Update in conjunction with the Planning Team. The Planning Team was established using a direct representation model. Some of the responsibilities of the Planning Team included: completing Capability Assessment surveys, providing input regarding the identification of hazards, identifying mitigation goals, and developing mitigation strategies. As shown in Table 2-1, an Executive Planning Team consisting of key personnel from each of the participating jurisdictions, as well as Travis County, was formed to coordinate planning efforts and request input and participation in the planning process. Table 2-2 reflects the Advisory Planning Team, consisting of additional representatives from area organizations and departments from Travis County and the participating jurisdictions that participated throughout the planning process.

Table 2-1. Executive Planning Team

ORGANIZATION	TITLE
Travis County Office of Emergency Management	Assistant Emergency Management Coordinator
Lakeway Police Department	Captain
Manor Police Department	Lieutenant
Pflugerville	Assistant City Manager
Sunset Valley	Assistant City Administrator
Sunset Valley Police Department	Police Chief
Village of the Hills	Emergency Management Coordinator
Village of the Hills	Village Manager

Table 2-2. Advisory Planning Team

ORGANIZATION	TITLE
Travis County Office of Emergency Management	Emergency Management Coordinator
Travis County Office of Emergency Management	Senior Planner
Travis County Transportation and Natural Resources	Environmental Project Manager
Travis County Transportation and Natural Resources	Natural Resources Program Manager
Travis County Transportation and Natural Resources	Floodplain Administrator, Permits Program Manager
Travis County Transportation and Natural Resources	GIS Manager
Travis County Transportation and Natural Resources	Division Director of Development Services and Long Range Planning
Travis County Transportation and Natural Resources	Engineering Division Manager
Travis County Transportation and Natural Resources	Engineer Specialist
Travis County Transportation and Natural Resources	Public Works Director
Travis County Transportation and Natural Resources	Senior Planner
Travis County Transportation and Natural Resources	Compliance

ORGANIZATION	TITLE
Travis County Transportation and Natural Resources	Planning Program Manager
Travis County Fire Marshal's Office	Fire Marshal
Travis County Fire Marshal's Office	Deputy Fire Marshal
Travis County Fire Marshal's Office	Deputy Fire Marshal
Lakeway Police Department	Crime Scene Investigator
Lakeway Police Department	Chief of Police
Manor	City Manager
Manor	Director of Finance
Manor Police Department	Chief of Police
Manor Police Department	Police Captain
Manor Police Department	Police Lieutenant
Pflugerville Police Department	Police Dispatcher
Village of the Hills	Alderman
Pflugerville Police Department	Lieutenant

Additionally, a Stakeholder Group was invited to participate in the planning process via e-mail. The Consultant Team, Planning Team, and Stakeholder Group coordinated to identify mitigation goals and develop mitigation strategies and actions for the Plan Update. Appendix A provides a complete listing of all participating Planning Team members and stakeholders by organization and title.

Based on results of the completed Capability Assessment, Travis County and participating jurisdictions described methods for achieving future hazard mitigation measures by expanding existing capabilities. For example, only two of the jurisdictions have an Evacuation Plan in place, while the County has one under development. Other options for improving capabilities include the following:

- Establishing Planning Team members with the authority to monitor the Plan Update 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), and by monitoring classes and availability through preparetexas.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.

Sample hazard mitigation actions developed with similar hazard risk were shared at the meetings. These important discussions resulted in development of multiple mitigation actions that are included in the Plan Update to further mitigate risk from natural hazards in the future.

The Planning Team developed hazard mitigation actions for mitigating risk from potential flooding and wildfires; these actions included utilizing Geographic Information System (GIS) to create maps that identify and analyze high risk areas for floods, wildfires, and dam failure, which would lead to adopting land use restrictions in the identified high risk areas. The Plan Update also includes County-wide actions to purchase generators and install hardwire quick generator connections at critical facilities throughout the planning area, and to install covered parking facilities to protect critical County and City vehicles from damages and ensure continuity of operations after a hazard event.

PLANNING PROCESS

The process used to prepare the 2017 Plan Update followed the four major steps included in Figure 2-1. After the Planning Team was organized, a capability assessment 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 Travis County's identified vulnerabilities, specific mitigation strategies were discussed and developed at the Mitigation Strategy Workshop. Finally, Plan maintenance and implementation procedures were developed and are included in Section 19. Participation of Planning Team members, stakeholders, and the public at each of the workshops is documented in Appendix F.

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

- The nature and magnitude of risks currently affecting the community;
- Hazard mitigation goals to address current and expected conditions;
- Whether current resources will be sufficient for implementing the Plan Update;
- Implementation problems, such as technical, political, legal, and coordination issues that may hinder development;
- Anticipated outcomes; and
- How Travis County, participating jurisdictions, agencies, and partners will participate in implementing the Plan Update.

KICKOFF WORKSHOP

The Kickoff Workshop was held at the Travis County Emergency Operations Center on December 19, 2016. The initial workshop informed County officials and key department personnel about how the planning process pertained to their distinct roles and responsibilities, and engaged stakeholder groups such as the

City of Austin Office of Homeland Security and Emergency Management, the City of Austin Fire Department, Lake Travis Fire, and the surrounding counties' emergency management coordinators. 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 from high to low in terms of perceived level of risk, frequency of occurrence, and potential impact.

HAZARD IDENTIFICATION

At the Kickoff Workshop and through e-mail and phone correspondence, the Planning Team conducted preliminary hazard identification. In coordination with the Consultant Team, the Planning Team reviewed and considered a full range of natural hazards. Once identified, the teams narrowed the list to significant hazards by reviewing hazards affecting the area as a whole, the 2013 State of Texas Hazard Mitigation Plan Update, and initial study results from reputable sources such as federal and state agencies. Based on this initial analysis, the teams identified a total of 11 natural hazards which pose a significant threat to the planning area.

RISK ASSESSMENT

An initial risk assessment for Travis County and the participating jurisdictions was completed in February 2017 and results were presented to Planning Team members at the Risk Assessment Workshop held on March 9, 2017. At the workshop, the characteristics and consequences of each hazard were evaluated to determine the extent to which the planning area would be affected in terms of potential danger to property and citizens.

Potential dollar losses from each hazard were estimated using NOAA's National Centers for Environmental Information (NCEI). The damages given are for property and crop damage. 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 at the Risk Assessment Workshop was provided a risk ranking sheet that asked participants to rank hazards in terms of the probability or frequency of occurrence, extent of spatial impact, and the magnitude of impact. The results of the ranking sheets identified unique perspectives on varied risks throughout the planning area.

The assessments were also used to set priorities for hazard mitigation actions based on potential loss of life and dollar losses. A hazard profile and vulnerability analysis for each of the hazards can be found in Sections 4 through 15.

MITIGATION REVIEW AND DEVELOPMENT

Developing the Mitigation Strategy for the Plan Update involved identifying mitigation goals and new mitigation actions. A Mitigation Workshop was held at the Travis County Emergency Operations Center on March 9, 2017. In addition to the Planning Team, stakeholder groups were invited to attend the workshop. Regarding hazard mitigation actions, Workshop participants emphasized the desire for actions that addressed flood and wildfire hazards. Additionally, the County and participating jurisdictions were proactive in identifying mitigation actions to lessen the risk of all the identified hazards included in the Plan Update.

An inclusive and structured process was used to develop and prioritize new hazard mitigation actions for the 2017 Plan Update. The prioritization method was based on FEMA's STAPLE(E) criteria and included social, technical, administrative, political, legal, 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 18.

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 hazard mitigation actions. Information was collected, including the program name, authority, purpose of the program, types of assistance and eligible projects, conditions on funding, types of hazards covered, match requirements, application deadlines, and a 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 the Plan Update, Planning Team Members utilized economic evaluation as a 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. The draft 2017 Plan Update was posted on the Travis County's website and was made available to the general public for review.

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 A&M 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 5-15) 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 Center for Environmental Information (NCEI). Results of past hazard events were found through searching the NCEI. 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 projections. The State Demographer webpages were reviewed for population and other projections included in Section 3 of the Plan Update. Information from the Texas A&M 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 Update development requirements.

INCORPORATION OF EXISTING PLANS INTO THE HMAP PROCESS

A Capability Assessment was completed by key Travis County and participating jurisdictions' departments and provided information pertaining to existing plans, policies, ordinances, and regulations to be integrated into the goals and objectives of the Plan Update. 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 among Planning and Consultant Team members. For example, the Drainage Basin Study of 2009 had determined several low water crossing locations within the County that would benefit from mitigation actions. Therefore, actions were include to implement feasible, cost-effective mitigation actions for the identified locations. Additionally, the Lakeway Police Department and the City of Lakeway have recently revised the Emergency Operations Plan and begun a collaborative effort with nearby jurisdictions to establish an Emergency Operations Center. Other plans were reviewed, such as Community Wildfire Protection Plans, to identify any additional mitigation actions. 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 Travis County Plan Update.

INCORPORATION OF THE HMAP INTO OTHER PLANNING MECHANISMS

Planning Team members will integrate implementation of the Plan Update with other planning mechanisms for Travis County, such as the Emergency Operations Plan. Existing plans for Travis County will be reviewed and incorporated into the Plan Update as appropriate. This section discusses how the Plan Update will be implemented by Travis County and the participating jurisdictions. It also addresses how the Plan Update will be evaluated and improved over time, and how the public will continue to be involved in the hazard mitigation planning process.

Travis County and the participating jurisdictions will be responsible for implementing hazard mitigation actions contained in Section 18. Each hazard mitigation action has been assigned to a specific County and City department that is responsible for tracking and implementing the action.

A funding source has been listed for each identified hazard mitigation action and may be utilized to implement the action. An implementation time period has also been assigned to each hazard mitigation action as an incentive and to determine whether actions are implemented on a timely basis.

Travis County and the participating jurisdictions will integrate hazard mitigation actions contained in the Plan Update with existing planning mechanisms such as floodplain ordinances, Emergency Operation Plans, Evacuation Plans, and other local and area planning efforts. Travis County will work closely with area organizations to coordinate implementation of hazard mitigation actions that benefit the planning area financially and economically.

Upon formal adoption of the 2017 Plan Update, Planning Team members from Travis County and the participating jurisdictions will review existing plans along with building codes to guide development and ensure that hazard mitigation actions are implemented. Each of the jurisdictions will be responsible for coordinating periodic review of the Plan Update with members of the Planning Team 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 Update. Travis County and the participating jurisdictions will ensure that future long-term planning objectives will contribute to the goals of the Plan Update to reduce the long-term risk to life and property from moderate and high risk hazards. Within one year of formal adoption of the Plan Update, existing planning mechanisms will be reviewed and analyzed as they pertain to the Plan Update.

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 Update.

Furthermore, Travis County will work with neighboring jurisdictions to advance the goals of the Plan Update as it applies to ongoing, long-range planning goals and actions for mitigating risk from natural hazards throughout the planning area.

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

Table 2-3. Examples of Methods of Incorporation

Planning Mechanism	Incorporation of Plan
Grant Applications	The Plan Update will be evaluated by Travis County and participating jurisdictions when grant funding is sought for mitigation projects. If a project is not in the Plan Update, an amendment may be necessary to include the action in the Plan Update.
Annual Budget Review	Various departments and key personnel that participated in the planning process for Travis County and participating jurisdictions will review the Plan Update and mitigation actions therein when conducting their annual budget review. Allowances will be made in accordance with grant applications sought and mitigation actions that will be undertaken per the implementation schedule of the specific action.
Regulatory Plans	Currently, Travis County and participating jurisdictions have regulatory plans in place, such as Emergency Management Plans, Continuity of Operations Plans, Economic Development, and Evacuation Plans. The Plan Update will be consulted when County and 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	Travis County and participating jurisdictions have a Capital Improvement Plan (CIP) in place. Prior to any revisions to the CIP, County and City departments will review the risk assessment and mitigation strategy sections of the HMAP, as limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments.
Floodplain Management Plans	Floodplain management plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding and information found in Section 5 of this Plan Update discussing the people and property at risk to flood will be reviewed and revised when Travis

Planning Mechanism	Incorporation of Plan
	County updates their management plans or develops new plans.

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 jurisdiction intends to incorporate hazard mitigation actions into existing plans, 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

For the development of the Plan Update, Travis County will oversee the review and update process for relevance and to make necessary adjustments. At the beginning of each fiscal year, Planning Team Members will meet to evaluate the Plan Update and review other planning mechanisms to ensure consistency with long-range planning efforts. In addition, planning participants will also meet twice a year by conference call or presentation to re-evaluate prioritization of the hazard mitigation actions.

TIMELINE FOR IMPLEMENTING MITIGATION ACTIONS

The Executive Planning Team (Table A-1, Appendix A) will engage in discussions regarding a timeframe for how and when to implement each hazard 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; these goals will be based on prioritization of each action as identified on individual Hazard Mitigation Action worksheets included in the Plan Update for Travis County and participating jurisdictions.

The Executive Planning Team will evaluate and prioritize the most suitable hazard mitigation actions for the community to implement. The timeline for implementation of actions will partially be directed by Travis County's comprehensive planning process, budgetary constraints, and community needs. Travis County and the participating jurisdictions are committed to addressing and implementing hazard mitigation actions that may be aligned with and integrated into the Plan Update.

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

PUBLIC AND STAKEHOLDER INVOLVEMENT

An important component of hazard 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 hazard 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 risks that hazards may present in their community and take steps to reduce or mitigate their impact.

The public was involved in the development of Travis County's 2017 Plan Update at different stages prior to official Plan Update approval and adoption. Public input was sought using three methods: (1) open public meetings; (2) survey instruments; and (3) making the draft Plan Update available for public review at Travis County's website.

The draft 2017 Plan Update was made available to the general public for review and comment on the Travis County website. The public was notified at the public meetings and via social media posts that the draft Plan Update would be available for review. No feedback was received on the draft 2017 Plan Update available on the Travis County website; however, feedback was received from the public survey, and all relevant information was incorporated into the Plan Update.

The 2017 Plan Update will be advertised and posted on Travis County's website upon approval from FEMA.

STAKEHOLDER INVOLVEMENT

Stakeholder involvement is essential to hazard mitigation planning since a wide range of stakeholders can provide input on specific topics and input from various points of view. Throughout the planning process, members of community groups, local businesses, neighboring jurisdictions, schools, and hospitals were invited to participate in the development of the 2017 Plan Update. The Stakeholder Group (Appendix A, Table A-3, and Table 2-4, below), included a broad range of representatives from both the public and private sector and served as a key component in Travis County's outreach efforts for development of the Plan Update. Documentation of stakeholder meetings is found in Appendix E. A list of organizations invited to attend via e-mail is found in Table 2-4.

Table 2-4. Stakeholder Working Group

AGENCY	TITLE	PARTICIPATED
Travis County Emergency Services	Public Information Officer	
Travis County Emergency Services	County Executive	
Travis County Judge's Office	Chief of Staff	
Travis County Commissioners Court	Executive Assistant Commissioner Pct. 1	
Travis County Commissioners Court	Executive Assistant Commissioner Pct. 2	
Travis County Commissioners Court	Executive Assistant Commissioner Pct. 3	
Travis County Commissioners Court	Executive Assistant Commissioner Pct. 4	

AGENCY	TITLE	PARTICIPATED
Travis County Fire Rescue	Battalion Chief	X
Travis County Sheriff's Office	Captain	X
Travis County Sheriff's Office	Lieutenant	X
Travis County Sheriff's Office	Lieutenant	X
Travis County Transportation and Natural Resources	County Executive	
Travis County Health and Human Services	County Executive	
Pflugerville Independent School District	Emergency Management Coordinator	
City of Austin – Office of Homeland Security and Emergency Management	Senior Planner	
City of Austin – Office of Homeland Security and Emergency Management	Plans Officer	X
City of Austin – Fire Department	Planner	X
City of Austin – Fire Department	Division Chief	X
City of Austin – Wildfire Division	Wildfire Mitigation Division Program Manager	X
City of Austin – Water Utility	Emergency Management Coordinator	
Austin Independent School District	Emergency Management Coordinator	
Lake Travis Fire	Wildfire Prevention Specialist	X
Lake Travis Fire	Lieutenant Prevention	X
Lower Colorado River Authority	Resiliency Officer	
Central Texas Volunteers Active in Disaster (CTZVOAD)	President	
Hays County	Emergency Management Coordinator	
Williamson County	Emergency Management Coordinator	
Llano County	Emergency Management Coordinator	
Burnett County	Emergency Management Coordinator	
Bastrop County	Emergency Management Coordinator	
Caldwell County	Emergency Management Coordinator	
City of Round Rock	Emergency Management Coordinator	

AGENCY	TITLE	PARTICIPATED
Capital Area Council of Governments	Director of Homeland Security and Training	
Capital Area Trauma Regional Advisory Council	Executive Director	
KVUE	Reporter	X
Community Impact News	Editor	X
University of Texas, Austin	Fire Marshal, Emergency Management Coordinator	
National Weather Service	Warning Coordination Meteorologist	

Stakeholders and participants from neighboring communities that attended the Planning Team and public meetings played a key role in the planning process. For example, flooding and wildfire were major concerns to the stakeholders, so many of the participating jurisdictions included mitigation actions, such as drainage improvements and reducing vegetative fuels, to address these hazards. Additionally, thunderstorm wind was another concern to the stakeholders, so some of the participating jurisdictions included an action to complete a detailed structural/engineering survey to ensure soundness with respect to resisting the effects of thunderstorm wind, tornado, and hail. With information from the study, the jurisdictions have proposed mitigation actions to harden facilities, reduce damages, and ensure continuity of services among their public facilities.

PUBLIC MEETINGS

A series of public meetings were held throughout the planning area to collect public and stakeholder input. Topics of discussion included the purpose of hazard mitigation, discussion of the planning process, and types of natural hazards. Representatives from area neighborhood associations and area residents were invited to participate. Additionally, Travis County utilized social media sources including Facebook, Twitter, and the local media to increase public participation in the Plan Update development process. Documentation on the public meetings can be found in Appendix E.

Public meetings were held on the following dates and locations:

- January 23, 2017 – Lakeway City Hall
- January 26, 2017 – Pflugerville Justice Center
- January 26, 2017 – Manor City Hall
- January 30, 2017 – Sunset Valley City Hall
- February 2, 2017 – Elroy Library
- April 5, 2017 – Pflugerville City Hall
- April 6, 2017 – Manor City Hall
- April 10, 2017 – Sunset Valley City Hall
- April 13, 2017 – Lakeway City Hall

PUBLIC PARTICIPATION SURVEY

In addition to public meetings, the Planning and Consultant Teams developed a public survey designed to solicit public 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 to the survey was posted on Travis County's website. A total of 84 surveys were completed online and the results are analyzed in Appendix B. Travis County reviewed the input from the surveys and decided which information to incorporate into the Plan Update as hazard mitigation actions. For example, many citizens identified additional education on mitigation measures, including warnings and placement of signs, as potential steps the jurisdictions could take to reduce risk of future hazard damages in their neighborhoods. In response to public input, several education and awareness hazard mitigation actions were added to the Plan Update to include the hazards to which the public felt their neighborhoods were most vulnerable.

SECTION 3: COUNTY PROFILE

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OVERVIEW

Travis County was established on January 25, 1840, by an act of the Fourth Congress of the Republic of Texas, days after the community of Waterloo has been renamed "Austin" and designated as the capital city. The County was named after William Barret Travis, legendary commander of the Republic of Texas forces at the Battle of the Alamo.[1]

Travis County was created from Bastrop County, one of the original twenty-three counties formed in 1836. The encompassing area was known as the Travis District, which consisted of roughly 40,000 square miles. Travis County currently consists of 1,023 square miles, of which 990 square miles is land and 33 square miles (3.2 percent) is water.

The first election of County officials was held in February 1840, at which time the population was reported to be 856.[2] The first officially recognized courthouse was constructed in 1855. Since then, Travis County government has operated out of two additional Courthouses, including the ornate 1876 structure, and the current Courthouse building, which was constructed in 1930. Travis County and its government have

[1] *The Heman Marion Sweatt Travis County Courthouse, Austin, Texas: A Historical Perspective* (Austin, Texas, 2008).

[2] Handbook of Texas Online, Travis County.

grown rapidly since its formation. Over the years, numerous new offices and departments have been added; currently there are over 40 departments, including 48 elected offices, within the County.[3]

Travis County's geographic features are relatively diverse. The northern and western portions are characterized by the hilly and rugged topography of the Edwards Plateau and the Balcones Escarpment. The remainder of the County is characterized by the gently rolling hills and plains of the Blackland prairies to the east and the Gulf Coast Plains to the south. The hilly, karst topography of the far western part of the County limits new development, leading to greater activity in areas which contain more land that is subject to flooding.

Soils throughout the County reflect the geographic diversity. Calcareous stony clays and some clay loams are found in the Edwards Plateau region. Moving eastward into the southern plains, the soils grade into dark calcareous clays interspersed with acidic sandy loams.

The Onion Creek watershed encompasses approximately 343 square miles and is located primarily in southern Travis and northern Hays counties, with a minor percentage of the upper portion of the basis extending into eastern Blanco County. The longest stream length, from the headwaters to its confluence with the Colorado River, is approximately 78 river miles. Major tributaries on Onion Creek include Cottonmouth, Williamson, Marble, South Boggy, Slaughter, Rinard, Bear, and Little Bear Creeks.[4]

Figure 3-1 shows the general location of Travis County, along with the Cities that are located within the County.

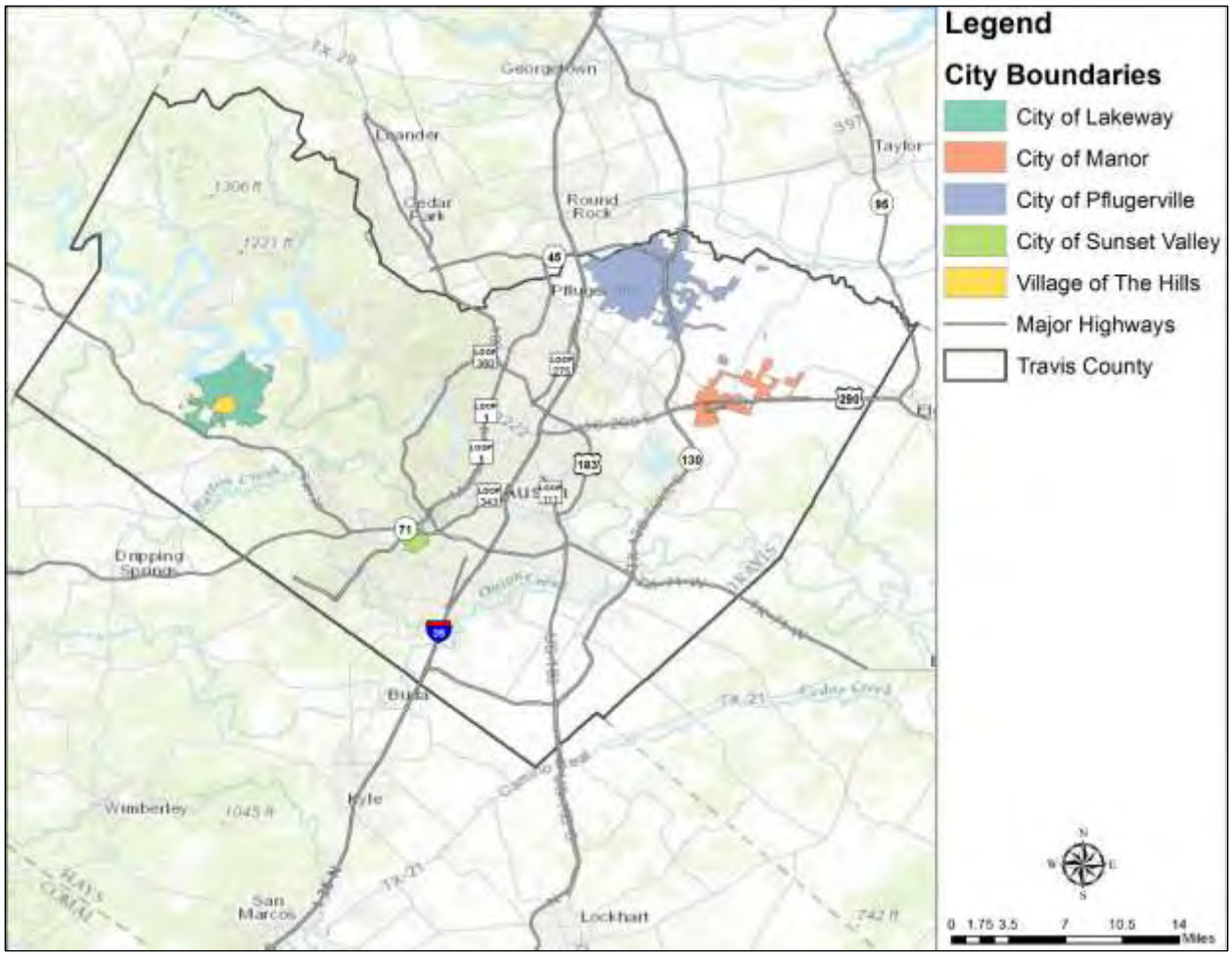
[3] Travis County. Travis County Archives, Austin, Texas. A Brief History of Travis County.

[4] United States Army Corps of Engineers (USACE) Onion Creek Interim Feasibility Study, October 2006.

Figure 3-1. Location of Travis County Planning Area

Figure 3-2 shows the Travis County Study Area, including the participating jurisdictions that are covered in the risk assessment analysis of the Plan.

Figure 3-2. Travis County Study Area



Provided in Table 3-1 below is a listing of the jurisdictions in Travis County that participated in the Hazard Mitigation Plan Update.

Table 3-1. Participation Jurisdictions

PARTICIPATING JURISDICTIONS
Travis County
City of Lakeway
City of Manor
City of Pflugerville
City of Sunset Valley
Village of the Hills

COUNTY ORGANIZATION

County government structure is spelled out in the Texas Constitution, which makes counties functional agents of the state. At the heart of each county is the commissioners court. Each Texas County has 4 precinct commissioners and a county judge who serve on this court. Although this body conducts the general business of the county and oversees financial matters, the Texas Constitution established a strong system of checks and balances by creating other elective offices in each county.[5]

The major elective offices found in most counties include county attorney, county and district clerk, county treasurer, sheriff, tax assessor-collector, justices of the peace, and constable. The county auditor is appointed by the district court. With respect to planning for and responding to natural hazard events, the key elements of the Travis County organization are:

- **Commissioners Court** is the governing body of Travis County. As a group, the county judge and the 4 commissioners are the chief policy-making and administrative branch of County government. Among their many functions, the Court is responsible for the County's budget, sets the tax rate, determines fees for many County services, and determines how the collected revenues will be distributed among County departments to provide services to the community.
- **Transportation & Natural Resources Department** (TNR) is a diverse department, responsible for the engineering, design, construction, and maintenance of Travis County roads, drainage, and bridges; fleet services for all County vehicles and equipment; natural resource and environmental quality protection; Texas Pollutant Discharge Elimination System (TPDES) Storm Water Management Program (SWMP); park system development and management; capital improvement projects; and land development review, including subdivision review, permits, and floodplain management regulations in Travis County.
- **Emergency Services** provides for the safety of Travis County residents through emergency preparedness and response. The Office of Emergency Management serves as the coordinating point of disaster preparedness, mitigation, response, and recovery capabilities for Travis County in cooperation with the County's various municipal governments. Travis County assists in staffing and sponsoring a joint City of Austin-Travis County Emergency Operations Center.
- **Facilities Management** coordinates the construction of new County facilities, implements and monitors how those facilities are used, coordinates the maintenance and renovation of existing County property, and negotiates contracts.

[5] https://county.org/texas-county-government/county-govt-structure/Pages/default.aspx

COUNTY DEPARTMENTS AND RESOURCES

The following is an overview of how the different entities that make up Travis County government address hazards:

Natural Resources and Environmental Quality Division

This office is charged with coordinating development of environmental policies and intra-departmental review of development proposals. It conducts compliance reviews of specific County capital projects (primarily new roads and bridges) and serves a key function in coordinating with State and Federal environmental programs. Identifying, applying for, and managing grants for a variety of projects are ongoing functions for this office.

This division is also responsible for managing the Balcones Canyonlands Preserve. Located in western Travis County, the Balcones Canyonlands Preserve contains 28,497 of the 30,428 acres set aside as protected habitat by the Balcones Canyonlands Conservation Plan (BCCP). The City of Austin and Travis County are the permit holders of the USFWS Section 10 (a)(1)(B) permit for the incidental take of 8 federally listed species. There are several partners that participate in the BCCP. As of June 2017, the BCP encompasses 31,849 acres. Although the permit requires the assemblage of 30,428 acres, additional land acquisition is still occurring to meet configuration, macrosite, and cave protection requirements and goals. For more information, please view https://www.traviscountytx.gov/tnr/bccp. Significant portions of the Preserve are uplands or steep canyons where the land is so steeply sloped that stream channels run in narrow valleys with little or no floodplain. The BCCP Managing Partners, in cooperation with non-profit conservations organization and private land owners, have assembled more than 31,780 acres of preserve lands in 2015, exceeding the minimum size of the BCCP as required by the permit. The BCCP partners still have some work in front of them, which includes strategic acquisitions to address the minimum acreage requirements for each of seven individual macrosites, the acquisition of key tracts to provide a preserve configuration essential to species recovery, and the protection of 62 named caves.

The Division is also responsible for the implementation and coordination of the Texas Pollutant Discharge Elimination System (TPDES) Phase II Storm Water Management Program (SWMP) for the Travis County Municipal Separate Storm Sewer System (MS4). The SWMP is a comprehensive long-range plan of on-going activities performed by the County to prevent and reduce storm water pollution as mandated by the Federal Clean Water Act. Travis County was issued an MS4 Permit from the Texas Commission on Environmental Quality (TCEQ) to perform the SWMP activities in the Travis County MS4, which includes all unincorporated areas. The SWMP includes six primary program areas, called Minimum Control Measures (MCMs), which include: Public Education/Outreach/Involvement, Illicit Discharge Detection and Elimination (pollution discharge control), Construction Site Runoff Controls, Post-Construction Storm Water Management, Pollution Prevention and Good Housekeeping for County Operations, and Authorization of County Construction Activities. Each MCM area consists of multiple specific Best Management Practices (BMPs) activities and tasks to be performed.

Development Services Division

This group processes applications for subdivisions, development permits, utility permits, driveway permits, and onsite sewerage permits. The TNR Development Services division addresses threats from natural hazards, particularly from flood hazards. Their responsibilities include processing proposals for development, onsite sewage systems, improvements of existing buildings, subdivision of land, and storm water management.

Development Services inspectors are charged with performing inspections of permitted activities, with particular emphasis on Class "B" development permits (activities that are affected by floodplain or drainage). A formal enforcement policy sets forth procedures to inform property owners of permit requirements, to encourage compliance, and to allow referral of unresolved situations for legal action. Inspectors routinely check for unpermitted activities, including building, fill, or dumping. If a permit is not produced during inspections, a "red tag" is issued and work is suspended until a permit is obtained.

Road & Bridge Maintenance Division

Primary functions of Road & Bridge Maintenance include rebuilding and maintaining County-owned roads, including mowing and cleaning drainage ditches. Maintenance includes debris removal within the County's right-of-way. If debris appears to pose an imminent threat, maintenance crews can go outside the right-of-way. As of 2011, there were approximately 10,000 culverts and 144 bridges (clear span of +20 feet) located within the County. Routine inspections are conducted to evaluate the structural conditions of bridges and culverts and to check for scour.

The County has roughly 110 low water crossings that are expected to flood even under minor increases in flow rates. Although originally installed on roads with low traffic volume, a number of these crossings now carry a considerably increased number of vehicles.

The Road & Bridge Maintenance staff has significant responsibilities related to flooding. When floods are predicted, emergency teams are organized, roads are closed (based on experience), and teams are prepared to respond to problems. While damage to roads has been minimal (primarily shifted asphalt), debris has been the biggest flood-related expense. After heavy rains, maintenance crews inspect areas that historically have had problems to check for debris and damage. With respect to non-flood hazards, Road & Bridge Maintenance stockpiles sand to use on roads and bridges during icy conditions, and has equipment used to assist in firefighting efforts.

Public Works Division

Planning, designing, and engineering of County roads are the primary responsibility of Public Works. Developers must build roads to County standards before the County takes ownership. Designs are based on traffic volume and road classification. Most waterway crossings and highway projects are funded by the County. The Texas Department of Transportation (TXDOT) periodically inspects every bridge with a clear span of more than 20 feet to examine structural integrity and look for evidence of scour. County bridges and culvert openings are generally sized to reduce floodway impacts, resulting in no more than 6-9 inches of water over the road surface during the Base Flood, minimize backwater increases to the water

surface of the Base Flood (typically 3-4 inches, but not more than 1-foot), and protect piers and abutments against erosion.

Parks Division

This division works to provide the citizens of Travis County a sustainable system of signature parks and nature preserves linked by greenbelts and riparian corridors that furnishes recreational and educational opportunities and protects endangered species and significant natural and cultural resources. The County's park system has 9,666 acres of parkland and 26 parks open to the public. Travis County Parks serves the entire Travis County population but is responsible for building and maintaining parks primarily in unincorporated Travis County. A comprehensive master plan for parks and recreation has been developed and revised several times by Travis County and includes an evaluation of population growth and trends in park usage and demand. The most recent master plan *…take it outside! The Next Ten Years, Travis County Parks Master Plan*, was adopted by the Travis County Commissioners Court in August 2016. The plan includes conservation priorities set in previous Travis County park master plans as well as a new one – Post Oak Savanna – that was set in the County's recently adopted Land, Water, and Transportation Plan.

Planning and GIS Program

The Geographical Information System (GIS) technology used by Planning and GIS allows the graphical representation of spatial information to provide an organized view of a community, its environment, and its development impacts. Analysis of the interrelationships among many types of information is a key function of the Travis County GIS. The Digital Floodplain Insurance Rate Map (DFIRM) was prepared by FEMA and was effective January 6, 2016.

Office of Emergency Management

The Travis County Office of Emergency Management (OEM) provides for the safety of residents through emergency preparedness and response. Founded in 1992 to comply with state and federal regulations, OEM maintains the County's Emergency Operations Plan (EOP), which covers the County and 17 cities and villages, and was last approved in 2015. The EOP provides general guidance for emergency management activities and an overview of methods of mitigation, preparedness, response, and recovery. The County operates a joint Emergency Operations Center with the City of Austin. The OEM coordinates mitigation and recovery in cooperation with other governmental units.

Public Safety Answering Program

The Public Safety Answering Program is a system that receives emergency calls and routes them to the appropriate police, fire, or EMS dispatcher. Outside the City of Austin, 13 Emergency Service Districts (ESDs) serve the County, providing fire and emergency medical services. The ESDs coordinate through the County if incidents require additional resources.

Facilities Management Department

The Facilities Management Department (FMD) manages and proves professional services for project management, planning, design, construction, maintenance, operations, and leases to meet economic and functional needs of Travis County. Over the past 10 years FMD has successfully managed over 260 new

construction and renovation projects. FMD currently manages operations of facilities totaling 2,214,681 square feet and includes 65 buildings.

SIGNIFICANT ACTIONS

Table 3-2 provides an overview of the significant actions for Travis County from the 2011 plan with progress made since the plan's adoption.

Table 3-2. Signification Actions from Travis County's 2011 Plan

ACTION DESCRIPTION	STATUS AS OF 2017
Complete acquisitions and demolitions in the Timber Creek area to remove all remaining flood-prone properties from the area.	A total of 141 properties were acquired and demolished in the area of Timber Creek that was more susceptible to flooding. Landowners of 16 properties located in the area of Timber Creek that are less likely to flood also applied for the flood buyout program. However, funding was not available for these additional properties. Buyouts were funded with a combination of FEMA grants, bond funds, general funds, and USACE grants from 1998 through 2017.
Continue to pursue acquisition and demolitions as the preferred mitigation alternative on Citation Avenue.	A total of 20 properties were acquired and demolished on Citation Avenue in Thoroughbred Farms. Voter-approved bond funds were used for the project, supplemented by FEMA grant funds through the Flood Mitigation Assistance Program.
Post information from the Elevation Mark Database on the County's website.	The database is on the City of Austin's website instead of the County's website.
Mitigate low-water crossing flooding at several locations.	This was completed with 2011 bond funds at the following locations: Big Sandy Drive at Long Hollow Creek; Jacobson Road at Maha Creek; Live Oak Drive at Sheep Hollow; and Navarro Creek Road at Navarro Creek.
Development of Ready, Set, Go flyers customized for Austin/Travis County.	National flyers were customized for use in Central Texas, Austin, and Travis County. The flyers are still in use.
Development of a Wildland Fire Task Force.	The Austin Travis County Wildfire Coalition was established to address wildfire risks on a coordinate, regional basis by the key agencies with a role in wildfire preparedness, response, mitigation, and recovery. This is an ongoing committee.

ACTION DESCRIPTION	STATUS AS OF 2017
Complete fuel reduction projects in the Balcones Canyon preserve. This will include clearing lower limbs, dead wood, ladder fuels, and preserving tight canopy to reduce grass growth. Also included will be outreach to property owners in the interface to highlight the importance of and recommendations for defensible space initiatives.	Fuel reduction treatments have been initiated and are conducted annually from September 1 through February 28. Follow-up treatments are needed every 5-6 years. There is political support for this project. The project is funded via FEMA grants and County funds. Fuel mitigation funds will be requested annually in the Travis County TNR Natural Resources Program budget. New treatment project funds may be requested through FEMA grants, if available.

POPULATION AND DEMOGRAPHICS

In the official Census population count, as of April 1, 2010, Travis County had a population of 1,024,266 residents. By July 2014, the number had grown to 1,092,810, and by July 2015, the population was 1,121,645. Table 3-3 provides the population distribution by jurisdiction within Travis County.[6]

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

Table 3-3. Population Distribution by Jurisdiction

JURISDICTION	TOTAL 2010 POPULATION	PERCENTAGE	ESTIMATED VULNERABLE OR SENSITIVE POPULATIONS	
			Elderly (Over 65)	Below Poverty Level
Lakeway	11,391	1.11%	2,039	480
Manor	5,037	0.49%	262	1,396
Pflugerville	46,936	4.58%	2,816	4,315
Sunset Valley	749	0.07%	85	12
Village of the Hills	2,472	0.24%	502	29
Austin[7]	790,390	77.17%	55,327	156,161

[6] http://www.census.gov/quickfacts/table/PST045215/48453,00

[7] The City of Austin is not participating in the Travis County Hazard Mitigation Plan Update, but has been included on the *Population Distributed by Jurisdiction* table.

JURISDICTION	TOTAL 2010 POPULATION	PERCENTAGE	ESTIMATED VULNERABLE OR SENSITIVE POPULATIONS	
			Elderly (Over 65)	Below Poverty Level
Unincorporated Travis County	167,291	16.33%	13,740	17,827
TRAVIS COUNTY TOTAL	**1,024,266**	**100**	**74,771**	**180,220**

POPULATION GROWTH

The official 2010 Travis County population is 1,024,266. Overall, Travis County experienced an increase in population between 1980 and 2010 by 144 percent, or an increase by 604,693 people. All of the jurisdictions experienced a population growth between 1980 and 2010, as well as a population growth between 2000 and 2010. Table 3-4 provides historic growth rates in Travis County.

Table 3-4. Population for Travis County, 1980-2010

JURISDICTIONS	1980	1990	2000	2010	POP CHANGE 1980-2010	PERCENT OF CHANGE	POP CHANGE 2000-2010	PERCENT OF CHANGE
Lakeway	790	4,044	8,002	11,391	10,601	1,342%	3,389	42%
Manor	1,044	1,041	1,204	5,037	3,993	383%	3,833	318%
Pflugerville	745	4,444	16,335	46,936	46,191	6,200%	30,601	187%
Sunset Valley	420	327	365	749	329	78%	384	105%
Village of the Hills	-	-	1,492	2,472	-	-	980	66%
Austin[8]	345,503	463,178	644,752	790,390	444,887	129%	145,638	23%
Unincorporated Travis County	71,071	103,373	140,130	167,291	96,220	135%	27,161	19%
COUNTY TOTAL	**419,573**	**576,407**	**812,280**	**1,024,266**	**602,221**	**144%**	**211,986**	**26%**

FUTURE DEVELOPMENT

To better understand how future growth and development in the County might affect hazard vulnerability, it is useful to consider population growth, occupied and vacant land, the potential for future

[8] The City of Austin is not participating in the Travis County Hazard Mitigation Plan Update, but has been included on the *Population for Travis County, 1980-2010* table.

development in hazard areas, and current planning and growth management efforts. This section includes an analysis of the projected population change and economic impacts.

Population projections from 2010 to 2040 are listed in Table 3-5, 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 County.

Table 3-5. Travis 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)
Travis	1,023	1,024,266	1,001	1,198,485	1,172	1,342,829	1,313	1,474,822	1,442

ECONOMIC IMPACT

The Travis County Office of Economic Development & Strategic Investments (EDSI) manages the County's economic development programs, County Corporations, real estate redevelopment opportunities, facilities and strategic planning, investment portfolio, and depository contract. EDSI seeks to create conditions for economic growth to improve quality of life and affordability, and address economic equity through the use of financing mechanisms beyond ad valorem taxes.

In January 2014, Commissioners Court updated the Economic Development Policy for Travis County. The purpose of the policy is as follows:

- To encourage economic stimulation and prosperity by attracting new businesses to the County;
- To enhance the County tax base by attracting new businesses that will make significant investments in new construction;
- To assist with workforce development in the County by attracting companies that offer significant numbers of new jobs and/or training to current residents who are unemployed or under-employed;
- To encourage diversity of the County's economy by attracting businesses that will contribute to the economy by broadening the scope of business and industry within the County; and
- To attract significant new businesses that also help promote the growth of other new businesses needed to provide supporting services or supplies, particularly small companies.

EXISTING AND FUTURE LAND USE AND DEVELOPMENT TRENDS

Travis County has experienced a significant amount of change to its rural landscape due to population growth and development. The once rural communities are rapidly evolving into suburban subdivisions. Agricultural and rural lands are being developed into housing subdivisions because of the pressures created by growth, which points to a future of relatively dense development for a once relatively isolated and stable rural county.

Travis County approved the Land, Water, and Transportation Plan (LWTP) and it was adopted by the Commissioners Court in 2014. The LWTP was completed by the Travis County Transportation and Natural Resources (TNR) department as a framework for protecting land and water resources, building a comprehensive transportation system, and efficiently delivering related services in unincorporated Travis County. Additionally, a local transportation plan for the County is under development. The Travis County Transportation Plan will further define the transportation component of the LWTP which provides guidelines for balancing development and transportation planning with conservation.

The City of Lakeway adopted their first Comprehensive Plan in 1999 and it was last updated in 2006. Lakeway's popularity among new residents will continue to grow, and careful planning is require to assure that the culture and character of the community are preserved. Additionally, the City of Pflugerville adopted its first Comprehensive Plan in 1998 and amended it in 2004 and 2007. The City adopted the Pflugerville 2030 Comprehensive Plan in 2010, which updates and supersedes the 2004 Land Use and Transportation Plans. The City intends to minimize development in the unincorporated areas, which will promote open space preservation and allow for the continuation of viable agricultural enterprises, as appropriate.

The City of Manor, the City of Sunset Valley, and the Village of The Hills do not have an adopted Comprehensive Plan for their communities.

The Travis County Parks system-wide parks master plan provides a framework for realizing their mission as the County population continues to grow over the next decade. The mission of Travis County Parks is to provide places where people and generations to come can: recreate outdoors for their health and wellbeing; relax and enjoy family and friends; engage with their community; challenge themselves and play hard regardless of their age and abilities; and enjoy the many wonderful natural and cultural resources of Travis County. The plan identifies land acquisition priorities, types of parks to be built, and recreational facilities to be provided. It establishes capital improvement priorities that are to be implemented primarily with voter-approved bonds.

BUILDING PERMITS

Building permits indicate what types of buildings are being constructed and their relative uses. Table 3-6 lists the number of residential building permits for Travis County that have been granted between 2000 and 2016. 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 assessed in the

HMAP 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 and the data includes that for the years of 2012 and 2016 to demonstrate growth.

Table 3-6. County Residential Building Permits[9]

Travis County			
Year	**Buildings**	**Units**	**Construction Cost**
2000	7,884	14,102	$1,327,684,146
2005	9,866	14,206	$1,606,645,739
2010	3,154	4,318	$649,128,083
2012	4,423	12,275	$1,356,978,040
2013	4,717	13,670	$1,642,561,206
2014	6,037	12,611	$1,394,187,632
2015	5,784	13,484	$2,020,567,734
2016	7,092	13,189	$2,122,490,057

[9] https://www.census.gov/construction/bps/

SECTION 4: RISK OVERVIEW

Hazard Description 1

Natural Hazards and Climate Change 4

Overview of Hazard Analysis 4

Hazard Ranking 6

HAZARD DESCRIPTION

Section 4 is the first phase of the Risk Assessment and provides background information for the hazard identification process and descriptions for the hazards identified. The Risk Assessment continues with Sections 5 through 15, which include hazard descriptions and vulnerability assessments.

Upon a review of the full range of natural hazards suggested under the Federal Emergency Management Agency (FEMA) planning guidance, Travis County and the participating jurisdictions identified 11 natural hazards that are addressed in the 2017 Hazard Mitigation Plan Update. Of the hazards identified, 10 natural hazards and 1 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 3 main categories of hazards including: atmospheric, hydrologic, and technological. Atmospheric hazards are events or incidents associated with weather generated phenomenon. Atmospheric hazards that have been identified as significant for the Travis County Planning area include: extreme heat, hail, lightning, thunderstorm wind, tornado, 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 for the planning area include drought and flood.

For the Risk Assessment, the wildfire and expansive soils hazards are considered “other,” since a wildfire may be natural or human-caused and is not considered atmospheric or hydrologic.

Technological hazards refers 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 because they originate from human activity. Whereas the risks presented by natural hazards may be increased or decreased as a result of human activity, they are not inherently human-induced. Therefore, dam failure is classified as a quasi-technological hazard, and referred to as “technological” in Table 4-1 for purposes of description.

Table 4-1 Descriptions

HAZARD	DESCRIPTION
ATMOSPHERIC	
Extreme Heat	Extreme heat is the condition whereby temperatures hover 10 degrees or more above the average high temperature in a region for an extended period of time.
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.
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	A thunderstorm occurs when an observer hears thunder. Radar observers use the intensity of the radar echo to distinguish between rain showers and thunderstorms. Lightning detection networks routinely track cloud-to-ground flashes, and therefore thunderstorms.
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 location, 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 failure, water supply shortages, and fish and wildlife mortality.

HAZARD	DESCRIPTION
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, and 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.
Expansive Soils	Expansive soils are soils and soft rock that tend to swell or shrink due to changes in moisture content. Changes in soil volume present a hazard primarily to structures built on top of expansive soils.
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.

Hazards that were not 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 planning area is not located on the coast, therefore coastal erosion does not pose a risk.

HAZARD CONSIDERED	REASON FOR DETERMINATION
Earthquakes	According to the State Plan, an earthquake occurrence for the planning area is considered exceedingly rare. Earthquake events are not considered to pose a risk to the planning area. There is no history of impact to critical structures, systems, populations or other community assets or vital services as a result of earthquakes and impact is not expected in the future.
Land Subsidence	There are no historical occurrences of land subsidence for the planning area and it is located in an area where occurrences are considered rare. There is no history of impact to critical structures, systems, populations, or other community assets or vital services as a result of land subsidence and impact is not expected in the future.

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. It directly endangers property and biological organisms due to sea level rise and habitat destruction.

Global climate change is expected to exacerbate the risks of certain types of natural hazards impacted by 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 in the past 200 years, from 0.5 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. 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 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.

OVERVIEW OF HAZARD ANALYSIS

The methodologies utilized to develop the Risk Assessment are a historical analysis and 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 the National Center for Environmental Information (NCEI) and National Oceanic and Atmospheric Administration (NOAA) were reported for the Travis County Planning Area, including the participating jurisdictions. Remaining records identifying the occurrence 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 Travis County planning area, and evaluate community assets and their vulnerability to the hazards.

The 4 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 three years.
Occasional	Event is probable in the next five years.
Unlikely	Event is probable in the next ten 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 illnesses resulting in permanent disability. Complete shutdown of critical facilities for at least 2 weeks. More than 25 percent of property destroyed or with major damage.
Minor	Injuries and illnesses do not result in permanent disability. Complete shutdown of critical facilities for more than 1 week. More than 10 percent of property destroyed or with major damage.

POTENTIAL SEVERITY	DESCRIPTION
Limited	Injuries and illnesses are treatable with first aid. 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 to determine the percentage of damage that each hazard can cause to the community.

To better understand how future growth and development in the County 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. Hazard vulnerability for Travis County was reviewed based on recent development changes that occurred throughout the planning area. Travis County grew by 17 percent between 2010 and 2016 according to the U.S. Census Bureau, therefore the vulnerability to the population, infrastructure, and buildings has increased for hazards that do not have a geographical boundary. Travis County has participated in multiple activities to reduce flood losses and protect citizens and property. The County and all participating jurisdictions participate in the National Flood Insurance Program and regulations apply for buildings in the 25 year and 100 year floodplains. Therefore, vulnerability has not increased for flood.

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 County'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
Flood	Highly Likely	Substantial[1]	High
Wildfire	Highly Likely	Minor[2]	Moderate
Drought	Highly Likely	Limited	Moderate
Tornado	Highly Likely	Major	Moderate
Thunderstorm Wind	Highly Likely	Substantial	Moderate
Extreme Heat	Highly Likely	Substantial	Moderate
Expansive Soils	Highly Likely	Limited	Moderate
Hail	Highly Likely	Minor	Moderate
Lightning	Highly Likely	Limited	Moderate
Winter Storm	Highly Likely	Limited	Moderate
Dam Failure	Unlikely	Substantial	Low

[1] The Potential Severity of Impact is considered Limited for all jurisdictions, except for Travis County, whose Potential Severity of Impact is considered Substantial, due to the historical loss of life.

[2] The Potential Severity of Impact is considered Minor for all jurisdictions, except for the Village of the Hills, whose Potential Severity of Impact is considered Limited.

SECTION 5: FLOOD

Hazard Description 1
Location 1
Extent 12
Historical Occurrences 15
Significant Events 19
Probability of Future Events 20
Vulnerability and Impact 20
Assessment of Impacts 22
National Flood Insurance Program (NFIP) Participation 24
NFIP Compliance and Maintenance 26
Repetitive Loss 27

HAZARD DESCRIPTION

Floods generally result from excessive precipitation. 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 surfaces. Typically, floods are long-term events that may last for several days.

The primary types of general flooding are inland and coastal flooding. Due to Travis County's inland location, only inland flooding is profiled in this section. 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. Therefore, 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.

LOCATION

The Flood Insurance Rate Maps (FIRMs) prepared by FEMA provide an overview of flood risk but can also be used to identify the areas of the County that are vulnerable to flooding. FIRMs are used to regulate new development and to control the substantial improvement and repair of substantially damaged buildings. Flood Insurance Studies (FIS) are often developed in conjunction with FIRMs. The FIS typically

contains a narrative of the flood history of a community and discusses the engineering methods used to develop the FIRMs. The FIS also contains flood profiles for studied flooding sources and can be used to determine Base Flood Elevations (BFEs) for some areas.

The revised FIS for Travis County is dated January 6, 2016. This FIS compiles all previous flood information and includes data collected on numerous waterways. The current FIS indicates that the stream channels along the north and west of the Balcones Escarpment tend to be narrow, with rock beds and banks of high relief. Because soils in these areas are relatively nonporous, there is considerable runoff and a possibility of flash flooding. As the soils change into clay and sand toward the south and east, the stream channels widen, increasing the area of floodplain.[1]

The Digital Flood Insurance Rate Map (DFIRM) data provided by FEMA for Travis County 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 AE: Areas subject to inundation by 1-percent-annual-chance shallow flooding. It is the base floodplain where BFEs are provided. AE zones are now used on new format FIRMs instead of A1-30 zones.
- Zone AO: Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone.
- 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 Travis County based on the Digital Flood Insurance Rate Map (DFIRM) from FEMA are illustrated in Figures 5-1 to 5-9.

[1] Flood Insurance Study (FIS) Travis County, Texas and Incorporated Areas, January 6, 2016, page 17.

Figure 5-1. Estimated Flood Zones in Northwest Travis County

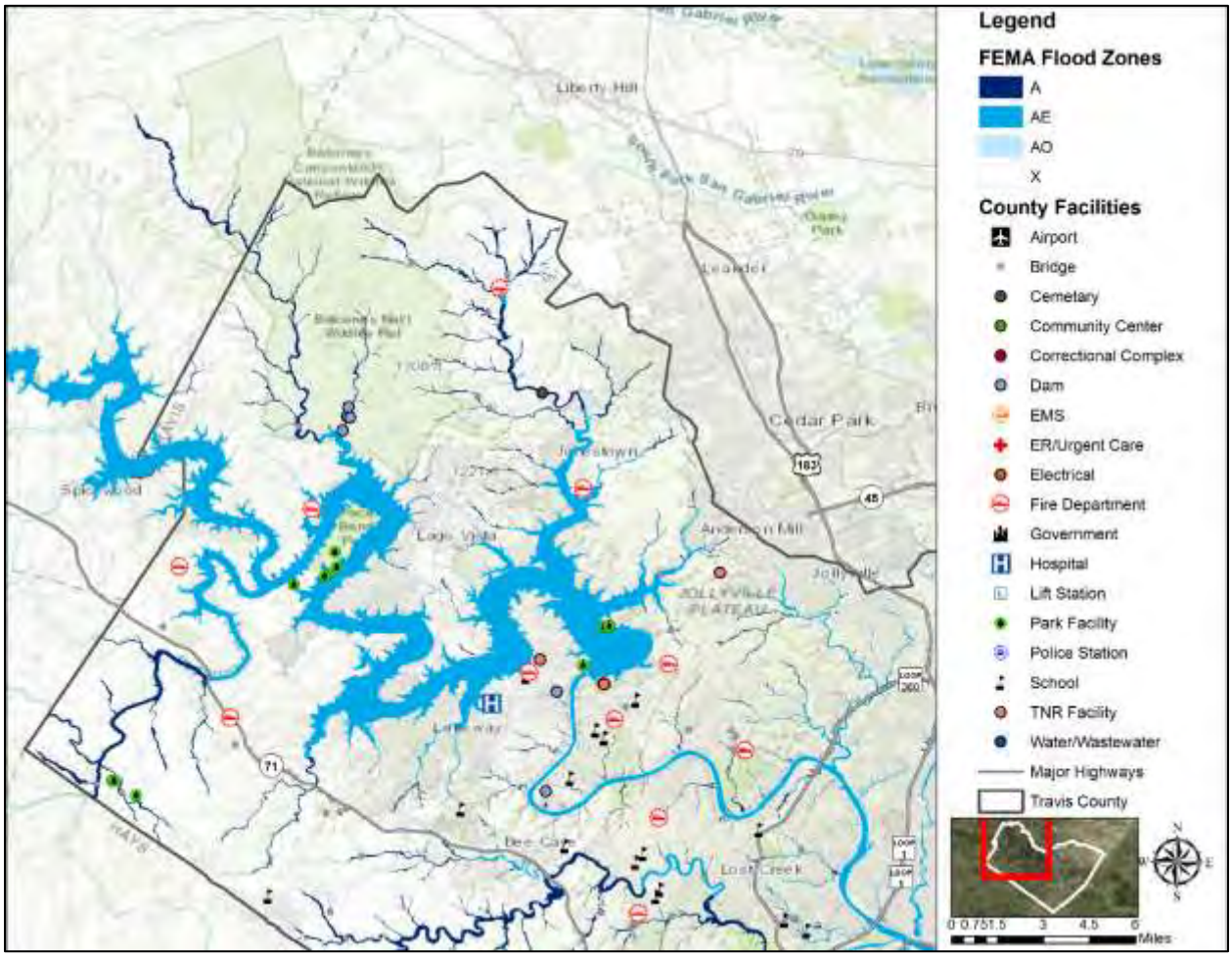

Legend
FEMA Flood Zones
A
AE
AO
X
County Facilities
Airport
Bridge
Cemetary
Community Center
Correctional Complex
Dam
EMS
ER/Urgent Care
Electrical
Fire Department
Government
Hospital
Lift Station
Park Facility
Police Station
School
TNR Facility
Water/Wastewater
Major Highways
Travis County
Liberty Hill
Leander
Cedar Park
Jonestown
Lake Travis
Spicewood
Lakeway
Bee Cave
Lost Creek
Anderson Mill
Jollyville
JOLLYVILLE PLATEAU
Balcones Canyonlands National Wildlife Refuge
Balcones Nature Study Area
Cypress Park
Bonny Park
Bonny Park
Bonny

Figure 5-2. Estimated Flood Zones in Northeast Travis County

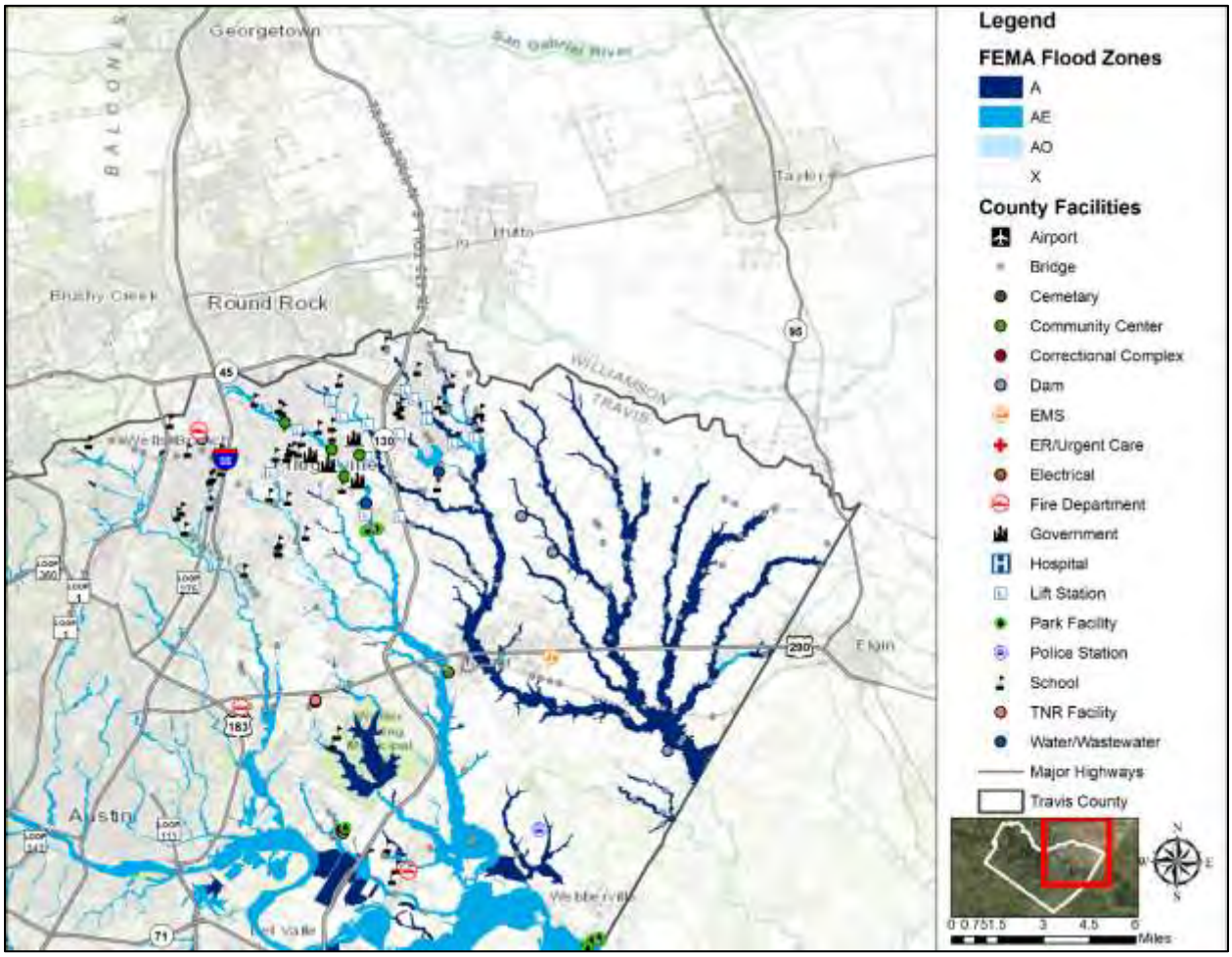


Figure 5-3. Estimated Flood Zones in Southeast Travis County

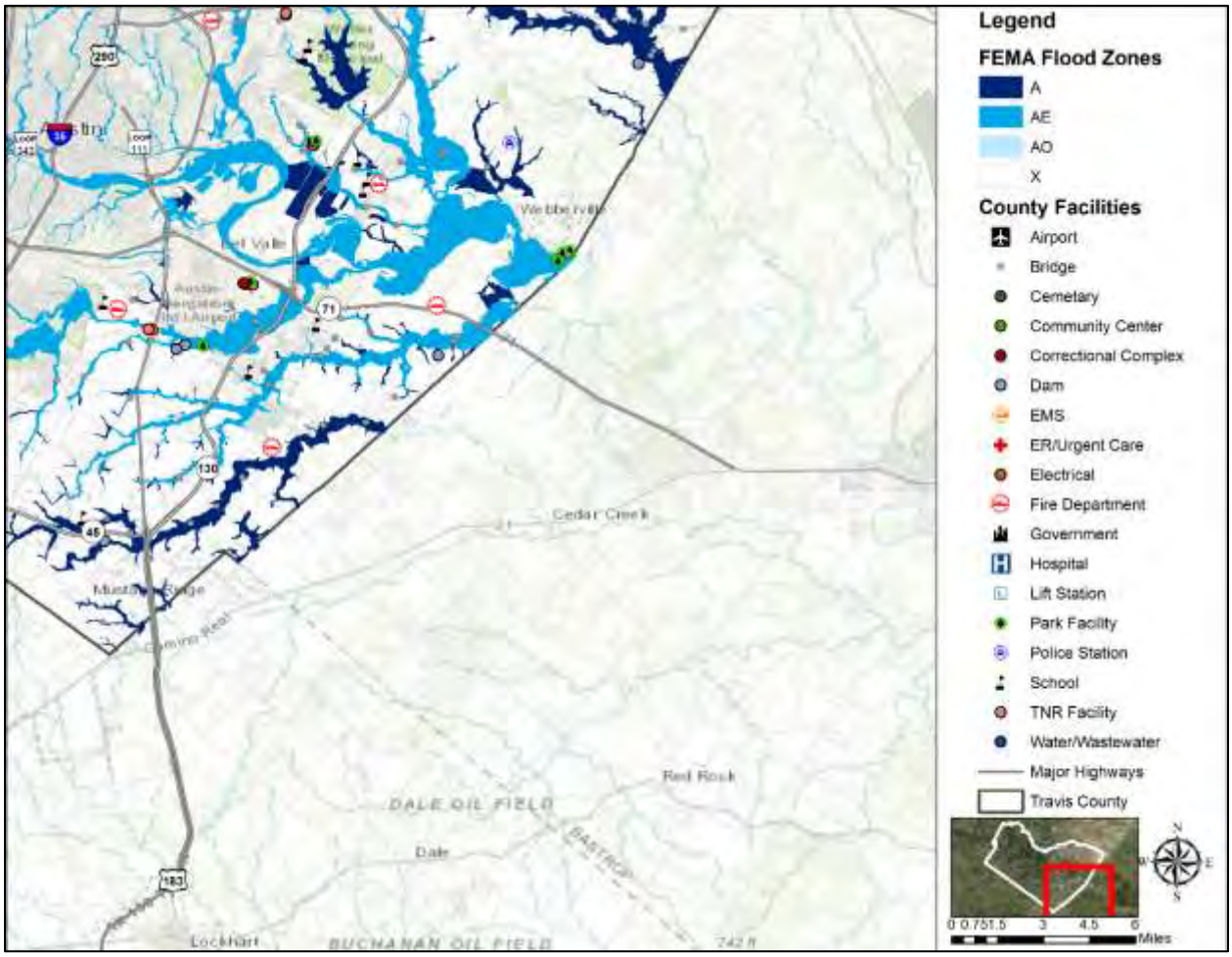


Figure 5-4. Estimated Flood Zones in Southwest Travis County

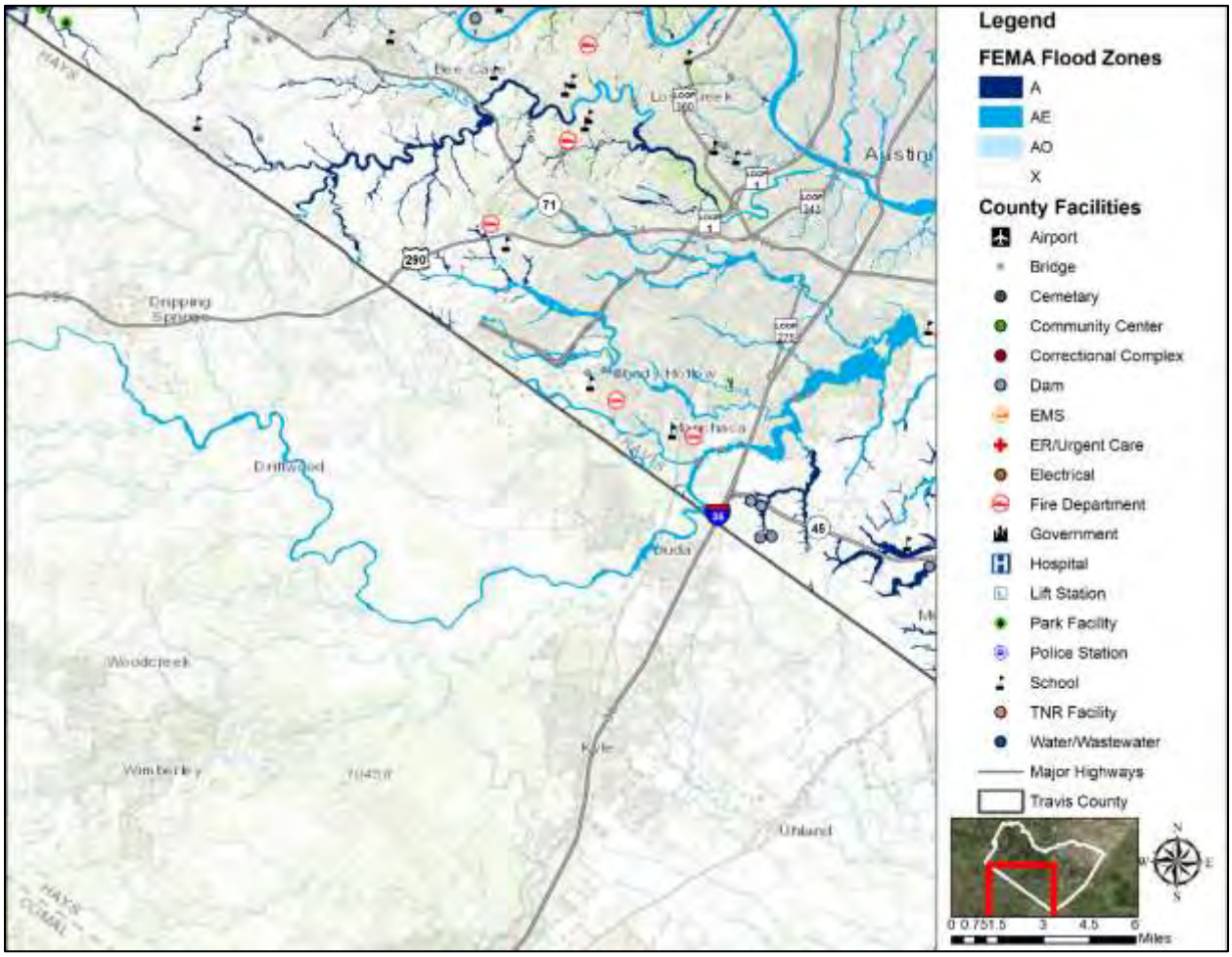


Figure 5-5. Estimated Flood Zones in the City of Lakeway

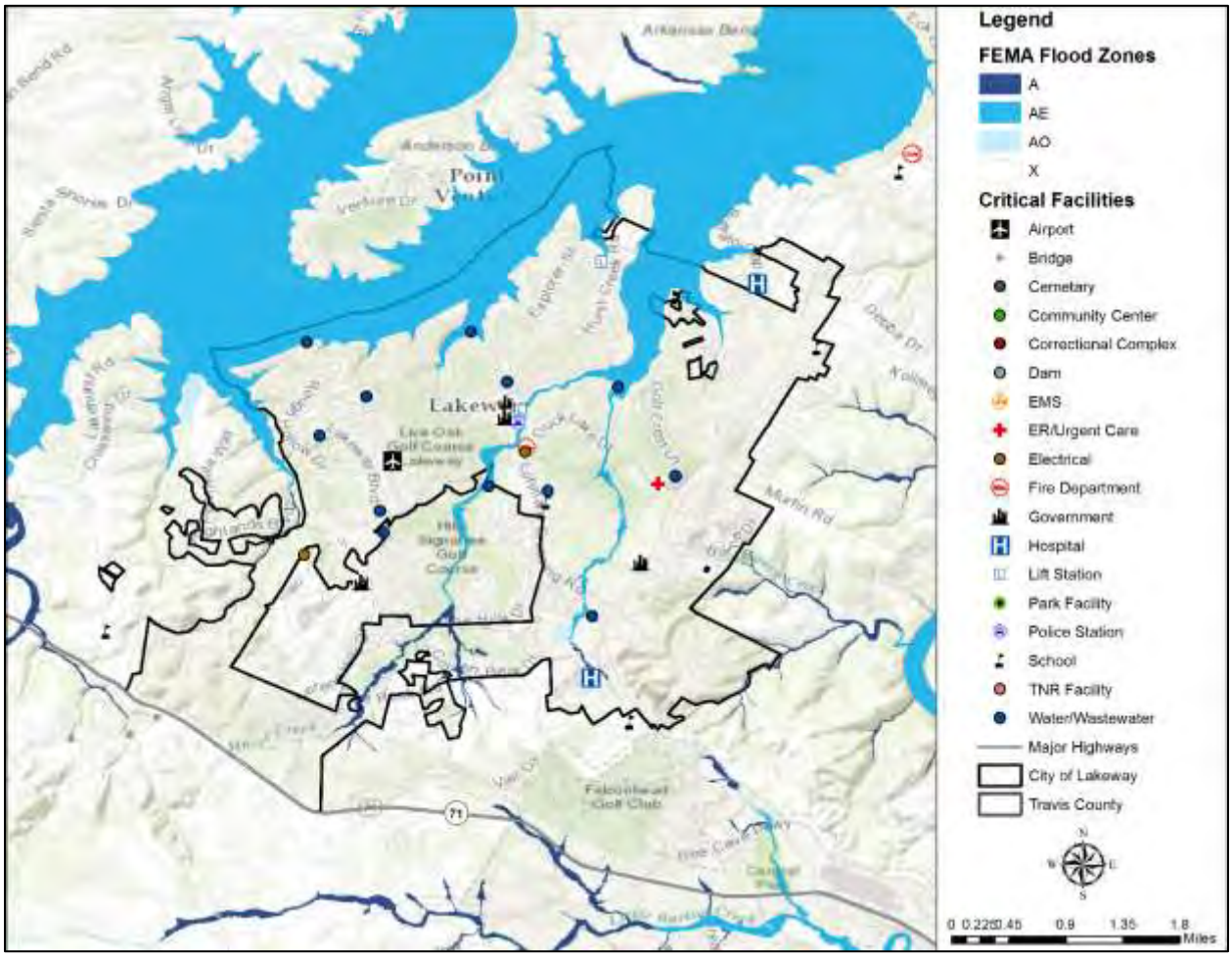


Figure 5-6. Estimated Flood Zones in the City of Manor

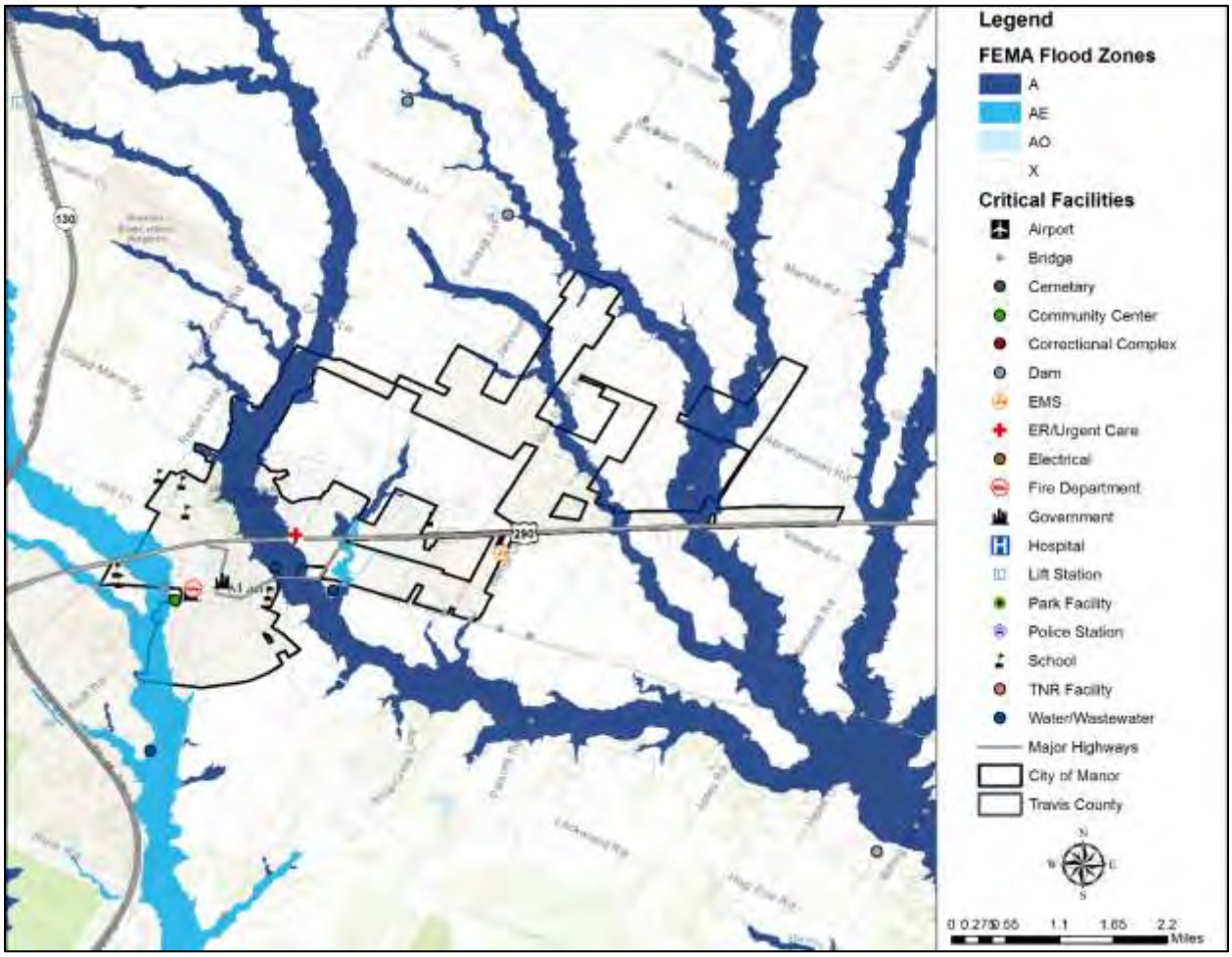


Figure 5-7. Estimated Flood Zones in the City of Pflugerville

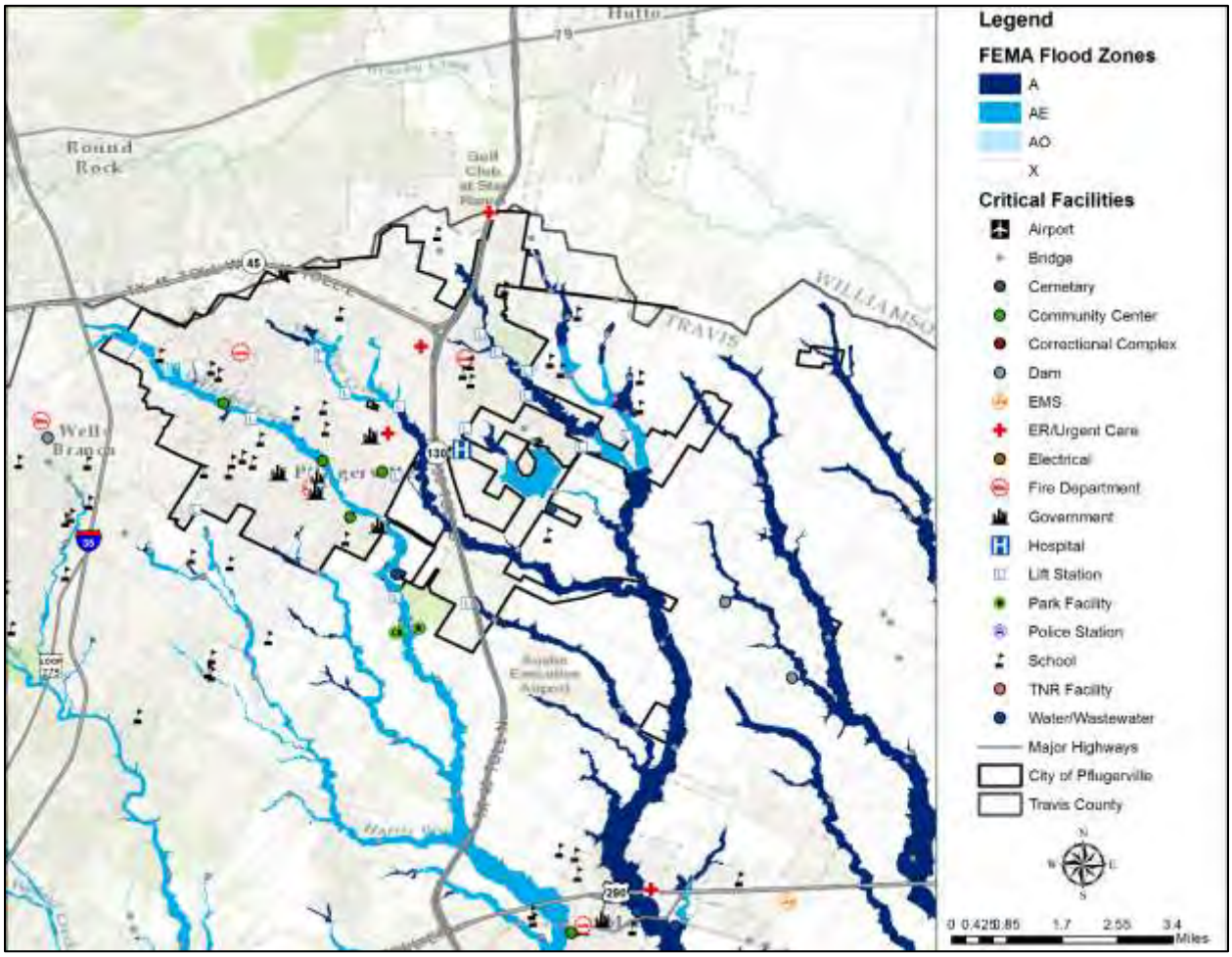


Figure 5-8. Estimated Flood Zones in the City of Sunset Valley

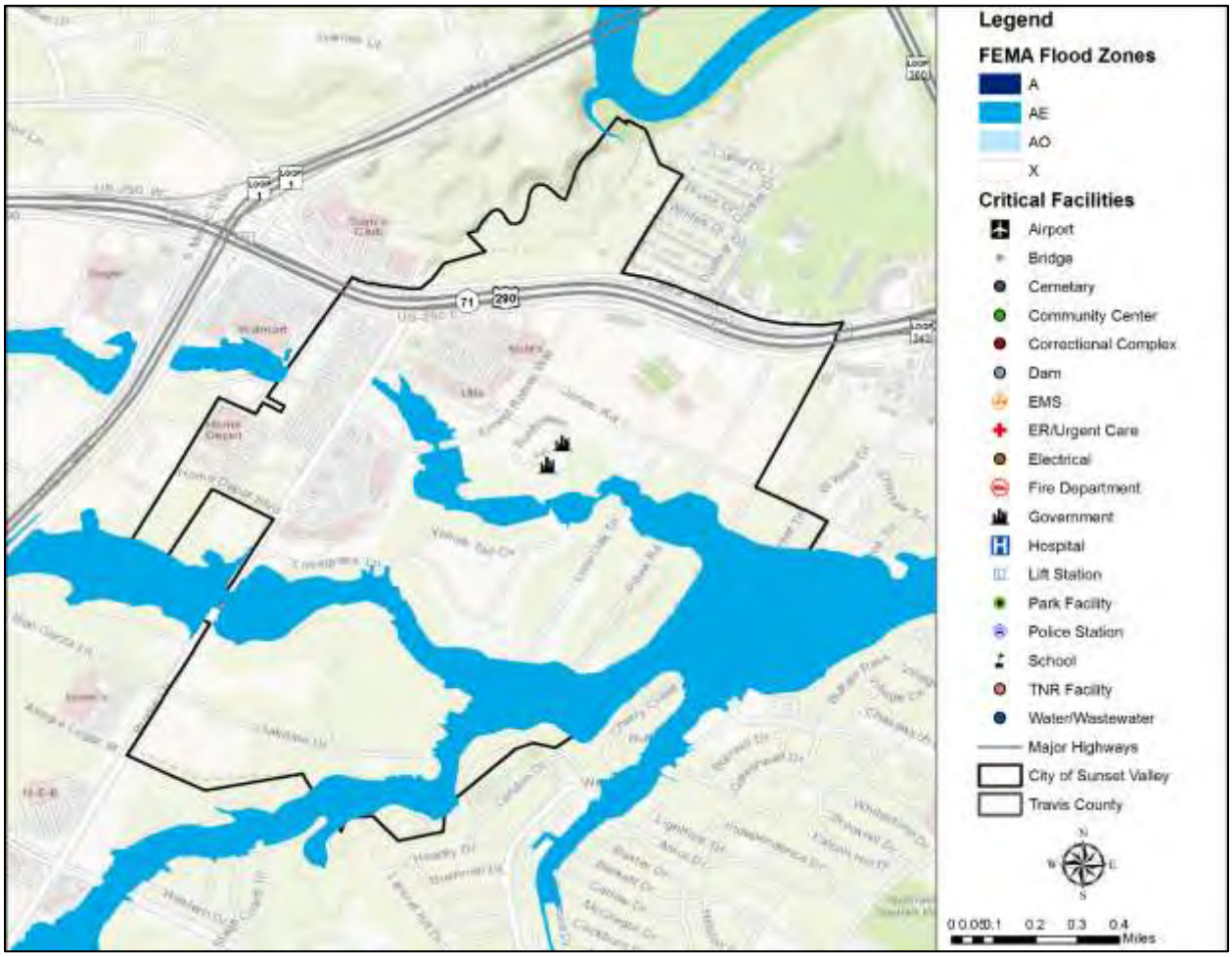
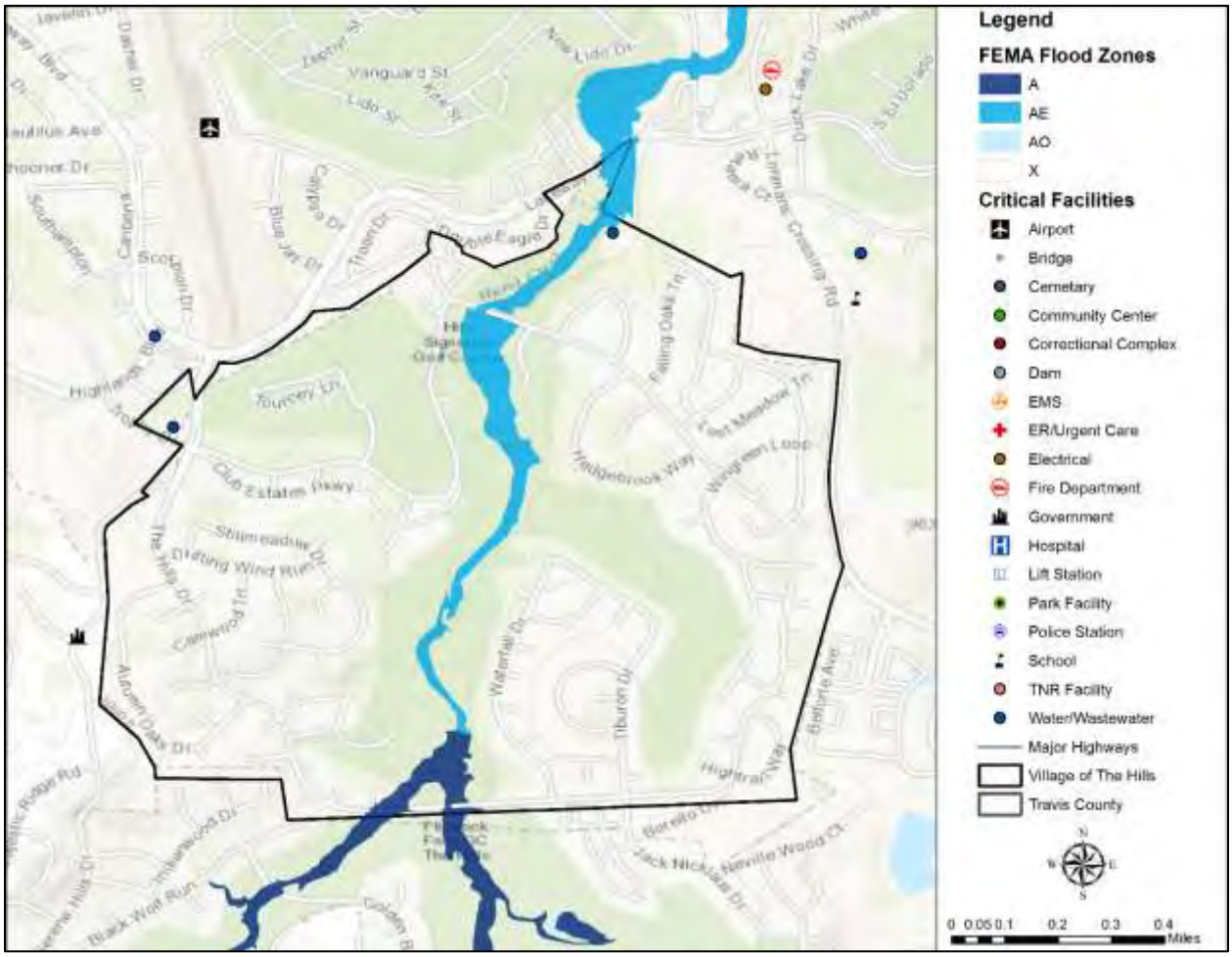


Figure 5-9. Estimated Flood Zones in the Village of the Hills



Major flood protection for the planning area is provided by a system of dams and reservoirs developed along the Colorado River, stretching from Lake Buchanan in Llano and Burnet Counties to Lake Austin, the site of the Tom Miller Dam (formerly Lake Austin Dam). Six dams comprise the system, extending like massive steps down the length of the lower Colorado River. The six dams are maintained by the Lower Colorado River Authority. Below this chain lies the smaller channel lake, Lady Bird Lake, which is impounded by Longhorn Dam, built and maintained by the City of Austin. Travis County has adopted ordinances for subdivision design and drainage, and floodplain management regulations.[2]

[2] Flood Insurance Study (FIS) Travis County, Texas and Incorporated Areas, January 6, 2016.

EXTENT

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 surfaces. 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 the depths of flood waters. The 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 FIRMs. Table 5-1 provides a description of FEMA flood zones and the flood impact in terms of severity or potential harm. Flood Zones A, AE, AO and X are the hazard areas mapped in the region. Figures 5-1 through 5-9 (above) should be read in conjunction with the extent for flooding in Tables 5-1, 5-2, and 5-3 to determine the intensity of a potential flood event.

Table 5-1 Flood Zones

INTENSITY	ZONE	DESCRIPTION
HIGH	ZONE A	Areas with a 1-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 BFEs 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 1-percent-annual-chance or greater of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 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 1-percent-annual-chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. BFEs derived from detailed analyses are shown at selected intervals within these zones.

INTENSITY	ZONE	DESCRIPTION
	ZONE A99	Areas with a 1-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 BFEs 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 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 100-year flooding.

Zone A is interchangeably referred to as the 100-year flood, the 1-percent-annual-chance flood, 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. If not elevated above Base Flood Elevation, utility systems, such as heating, ventilation, air conditioning, fuel, electrical systems, sewage maintenance systems and water systems, may also be damaged.

The intensity and magnitude of a flood event is also determined by the depth of flood waters. Table 5-2 below describes the category of risk and potential magnitude of an event in correlation to water depth. The water depths depicted in Table 5-2 are an approximation based on elevation data. Table 5-3 describes the extent associated with stream gauge data provided by the United States Geological Survey (USGS).

Table 5-2. Extent Scale – Water Depth

SEVERITY	DEPTH (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 5-3. Extent for Travis County[3]

JURISDICTION[4]	ESTIMATED SEVERITY PER FLOOD EVENT[5]	PEAK FLOOD EVENT
Travis County	Below Flood Stage, 0 to 15 feet	Major Flood Stage: Colorado River in Austin reached an overflow elevation of 46 feet in July 1869, 41.2 feet in June 1935, and 34.1 feet in May 2015.
Travis County	Below Flood Stage, 0 to 15 feet	Below Flood Stage: Slaughter Creek at FM 1826 reached an overflow elevation of 11.48 feet in October 2013.

[3] Severity estimated by averaging floods at certain stage level over the history of flood events. Severity and peak events are based on USGS data.

[4] Severity is provided where peak data was provided throughout for the County but unavailable for individual jurisdictions.

[5] Severity estimated by averaging floods at certain stage level over the history of flood events.

JURISDICTION[4]	ESTIMATED SEVERITY PER FLOOD EVENT[5]	PEAK FLOOD EVENT
Travis County	Below Flood Stage, 0 to 15 feet	Below Flood Stage: Bull Creek at Loop 360 reached an overflow elevation of 14.97 feet in September 2010.
Travis County	Below Flood Stage, 0 to 15 feet	Flood Stage: Barton Creek at State Highway 71 near Oak Hill reached an overflow elevation of 23.93 feet in October 2015.
Travis County	Below Flood Stage, 0 to 15 feet	Action Stage: Shoal Creek at West 12th Street reached an overflow elevation of 23.22 feet in May 1981.
Travis County	Below Flood Stage, 0 to 15 feet	Action Stage: Williamson Creek at Manchaca Road reached an overflow elevation of 20.62 feet in October 2013.
Travis County	Below Flood Stage, 0 to 15 feet	Flood Stage: Walton Creek at Dessau Road reached an overflow elevation of 27.55 feet in May 2015.
Travis County	Action Stage, 16 to 23 feet	Major Flood Stage: Onion Creek at Twin Creeks Road near Manchaca reached an overflow elevation of 36.88 feet in October 2013.

The degree 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 planning area at the average extent of "Below Flood Stage" as shown in Tables 5-2 and 5-3. However, the Travis County planning area has experienced flooding over 33 feet. Based on historical occurrences, the planning area could expect to experience from 8 to 12 inches of water within a 24 hour period due to flooding.

The data described in Tables 5-1 through 5-3, together with Figures 5-1 through 5-9 and historical occurrences for the area, provides an estimated potential magnitude and severity for the County. For example, the City of Pflugerville, as shown in Figure 5-7, has areas designated as Zone A and Zone AE. Reading this figure in conjunction with Table 5-1 means the area is 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 5-4 identifies historical flood events that resulted in damages, injuries, or fatalities within the Travis County planning area. Table 5-5 provides the historical flood event summary by jurisdiction. Historical Data is provided by the Storm Prediction Center

(NOAA), National Centers for Environmental Information (NCEI) database for Travis County, and the participating jurisdictions.

Table 5-4. Historical Flood Events, 1991-2016[6][7]

JURISDICTION	DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Sunset Valley	12/21/1991	-	-	-	$47,042	$0
Sunset Valley	10/7/1994	-	-	-	$30,465	$0
Travis County	8/24/1996	10:30 AM	0	0	$15,603	$0
Travis County	8/24/1996	11:30 AM	0	0	$46,808	$0
Travis County	9/18/1996	7:15 PM	0	0	$4,681	$0
Travis County	10/28/1996	6:00 PM	0	0	$78,014	$15,603
Travis County	4/4/1997	6:30 AM	0	0	$22,879	$0
Travis County	4/25/1997	2:30 PM	0	0	$7,626	$0
Travis County	4/26/1997	4:30 AM	0	0	$7,626	$0
Travis County	5/23/1997	5:00 PM	0	0	$76,264	$0
Sunset Valley	5/23/1997	-	-	-	$16,360	$0
Travis County	5/27/1997	4:00 PM	1	0	$7,626	$0
Travis County	6/6/1997	4:00 PM	0	0	$22,879	$0
Travis County	6/8/1997	11:30 PM	1	10	$152,528	$0
Travis County	6/17/1997	4:30 AM	0	0	$15,253	$0
Travis County	6/22/1997	1:00 PM	0	0	$1,525,278	$76,264
Travis County	7/30/1997	6:00 PM	0	0	$76,264	$0
Travis County	12/20/1997	8:45 PM	1	0	$76,264	$0
Travis County	2/21/1998	6:00 PM	0	0	$15,019	$0
Travis County	10/17/1998	8:30 AM	1	50	$2,252,826	$150,188

[6] Only recorded events with fatalities, injuries, and/or damages are listed; values are in 2017 dollars.

[7] Time of event, deaths, and injuries for Sunset Valley events were not available.

JURISDICTION	DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	10/17/1998	10:00 AM	0	50	$1,501,884	$75,094
Sunset Valley	10/17/1998	-	-	-	$84,239	$0
Travis County	6/21/1999	2:00 PM	0	0	$14,694	$0
Travis County	7/10/1999	6:30 PM	0	0	$7,347	$0
Travis County	6/9/2000	12:30 PM	0	0	$42,649	$0
Travis County	11/2/2000	3:30 PM	0	0	$28,433	$0
Travis County	11/3/2000	10:30 AM	0	0	$28,433	$0
Travis County	11/23/2000	10:30 PM	0	0	$21,325	$0
Travis County	5/6/2001	7:00 PM	0	0	$13,823	$0
Travis County	5/6/2001	10:00 PM	0	0	$27,646	$0
Travis County	5/20/2001	8:30 PM	0	5	$82,939	$0
Travis County	8/26/2001	7:15 PM	0	0	$41,469	$0
Sunset Valley	8/26/2001	-	-	-	$27,659	$0
Travis County	8/31/2001	9:00 PM	0	0	$27,646	$0
Travis County	11/15/2001	10:00 AM	2	50	$391,155	$0
Sunset Valley	11/15/2001	-	-	-	$55,178	$0
Travis County	7/2/2002	3:33 PM	1	0	$0	$0
Travis County	9/8/2002	9:15 AM	0	2	$40,824	$0
Travis County	11/4/2002	1:15 PM	0	0	$13,608	$0
Travis County	2/20/2003	8:30 AM	0	0	$19,957	$0
Travis County	1/16/2004	6:00 PM	0	0	$12,960	$0
Travis County	4/6/2004	5:30 AM	0	4	$0	$0
Sunset Valley	6/9/2004	-	-	-	$26,834	$0
Sunset Valley	11/16/2004	-	-	-	$21,345	$0
Travis County	6/3/2007	8:50 PM	0	0	$59,035	$0
Pflugerville	6/25/2007	1:00 PM	0	0	$35,421	$0

JURISDICTION	DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Pflugerville	6/28/2007	12:00 AM	0	0	$59,035	$0
Travis County	7/6/2007	7:00 PM	1	0	$0	$0
Travis County	6/11/2009	9:00 PM	0	0	$2,282,190	$0
Travis County	10/22/2009	10:31 AM	0	0	$570,548	$0
Travis County	9/7/2010	11:00 PM	1	0	$0	$0
Travis County	9/13/2012	5:11 PM	0	0	$106,626	$0
Travis County	10/13/2013	5:31 AM	1	0	$2,101,737	$0
Sunset Valley	10/13/2013	-	-	-	$173,041	$0
Travis County	10/31/2013	2:00 AM	4	0	$105,086,836	$0
Travis County	11/22/2013	11:30 AM	1	0	$0	$0
Travis County	9/18/2014	1:00 AM	1	0	$0	$0
Travis County	5/25/2015	3:52 PM	1	0	$10,328,674	$0
Travis County	10/30/2015	9:00 AM	3	0	$10,328,674	$0
Travis County	5/27/2016	1:30 AM	1	0	$0	$0
Travis County	6/3/2016	11:00 PM	1	0	$0	$0

Table 5-5. Summary of Historical Flood Events, 1991-2016

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	196	22	171	$137,584,550	$317,149
Lakeway	1	0	0	$0	$0
Manor	1	0	0	$0	$0
Pflugerville	7	0	0	$94,456	$0
Sunset Valley	10	0	0	$482,163	$0
Village of the Hills	0	0	0	$0	$0
Total Losses	**215**	**22**	**171**	**$138,478,318**	

Based on the list of historical flood events for the Travis County planning area and including all participating jurisdictions, 115 of the 215 events have occurred since the 2011 Plan.

SIGNIFICANT EVENTS

Flash Flood on June 8, 1997 – Travis County

Rainfall of approximately 2 to 3 inches fell over 4 counties, with isolated totals nearing 5 inches. Widespread flash flooding was reported. Some 90 residents of a mobile home park in Travis County were evacuated as Walnut Creek flooded the area. Severe flooding took place along Onion Creek and Barton Creek as well. Water was reported over the I-35 Bridge in Georgetown. Numerous rescues were performed in Comal and Travis Counties. Two young ladies in Austin were trying to cross an old road across Slaughter Creek around noon when their vehicle was swept into the creek. One managed to scramble to safety and go for help. She called in an EMS team who tied ropes around themselves to reach the second young lady. Several families were evacuated from their homes in Del Valle in Travis County as waters rose rapidly. In the evening, a young woman was walking along Williamson Creek near 1st street and William Cannon when she slipped on debris left from the flooding. She fell into the flood waters and was drowned.

Flash Flood on October 17, 1998 – Travis County

Severe storm systems crossing the region dropped record rainfall. All rivers, creeks, and streams along and east of a San Antonio to Austin line remained at or above flood stage from Saturday, October 17 through Sunday, October 18, with a majority continuing to flood through Monday, October 19. This event broke rainfall records across South Central Texas, producing 18 floods of record in South Central Texas streams. October became the wettest month in climate records for the region since 1885. 1 death and 50 injuries were directly attributed to the flooding in the Travis County planning area.

Flash Flood on October 15, 2001 – Travis County

Flash flooding developed early in the day, causing power outages for several hours to almost 40,000 homes. Most low water crossings flooded and dozens of rescues were required. More than 80 people were evacuated from around the Onion Creek area south of Austin. 2 firefighters had to be rescued when their rescue boat overturned. They clung to tree branches until fellow firefighters could get to them. A woman in a flood-prone area drove long nails into a tree and used the nails to climb to the top of the tree for shelter until the flood waters receded. Several area schools delayed sending students home on school buses due to high water. A 17-year old male died after his car stalled in a low water crossing. He tried to walk thru 3 to 4-foot deep water, but was washed off his feet and beneath his vehicle. In another death, a 51-year old woman drowned after her car stalled in a low water crossing in the Mustang Ridge area. Apparently, she had left the vehicle and called to say that she was on her way home. Her body was found 1/4 mile downstream.

Flash Flood on May 25, 2015 – Travis County

Thunderstorms produced heavy rain that caused flash flooding in Austin. There were multiple water rescues around the city including 1 along Shoal Creek at House Park. Little Walnut Creek was out of its banks at Dottie Jordan Park, where the swimming pool overflowed and water knocked down fences. The Loyola Lane bridge over Walnut Creek was closed with water covering it. A 23 year old man died when his

vehicle was swept away on Jesse Bohls Drive near Pflugerville. 20 homes sustained major damage across Travis County for this event, while 14 businesses saw minor flood impacts.

Flash Flood on October 30, 2015 – Travis County

A warm front combined with an upper level trough and deep moisture produced heavy rainfall and severe thunderstorms across much of South Central Texas on October 30 and 31. Damage surveys confirmed 4 tornadoes. Along with the severe weather, excessive rainfall resulted in widespread flash flooding along the Interstate 35 corridor Friday morning. Historic rainfall totals fell at the Austin Airport where over 1 foot of rain fell within a few hours. A record of 12.49 inches of rain for October 30 was recorded, the most ever in one day for the Austin area. Other daily rainfall totals exceeded 15 inches. Record flooding occurred in southern Travis County and portions of Hays County. Reports indicate more than 2,000 homes were flooded in or near this I-35 corridor, and many of them were destroyed or sustained Major damage. A man drowned when his vehicle was flooded and he was swept downstream on Dry Creek just west of Highway 183 in southern Travis County. A woman was swept out of her house and drowned when Dry Creek flooded due to heavy rainfall. Her husband was also swept out of the house but survived. A man was stranded in his car near Toll 130 and FM 812; he was swept away and his body was recovered the next day near McAngus Road.

Flash Flood on May 27, 2016 – Travis County

An upper level trough moved out of the southern Rockies and provided sufficient lift to form thunderstorms along a dry-line in west Texas. These storms moved into South Central Texas and were further enhanced by an outflow boundary that moved out of north Texas. Some of these storms produced large hail, damaging wind gusts, and heavy rain that led to flash flooding. A car was swept away near the intersection of the Toll Road 130 and FM812 due to high water. The driver's body was recovered several days later in a nearby retention pond.

Flash Flood on June 3, 2016 – Travis County

An upper level trough moved across Texas and interacted with a moist boundary layer to generate thunderstorms across South Central Texas. Some of these storms produced heavy rain that led to flash flooding. The body of a man was discovered in Bull Creek just downstream from a low water crossing. A flooded pickup was found nearby. Time of the incident is estimated since there are no witnesses to the event. The cause of death was ruled as drowning by the medical examiner.

PROBABILITY OF FUTURE EVENTS

Based on recorded historical occurrences and extent within the Travis County planning area, including all participating jurisdictions, flooding is highly likely and an event will occur 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.

All participating jurisdictions encourage development outside of the floodplain, although there are some critical facilities, homes, and businesses already located in the floodplain. Table 5-6 includes critical facilities in the planning area that are located in the floodplain and are vulnerable to flooding. While some jurisdictions may not have critical facilities in the floodplain, critical infrastructure such as roads, bridges, and utilities may be subject to flooding.

Table 5-6. Critical Facilities in the Floodplain by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Travis County	18 Park Facilities, 154 Bridges, 1 EMS, 1 Cemetery, 1 Fire Station
Lakeway	3 Water/Waste Water Facilities
Manor	1 Water/Waste Water Facility
Pflugerville	5 Lift Stations, 2 Community Centers
Sunset Valley	None
Village of the Hills	None

Historic loss estimates due to flood events are presented in Table 5-7 below. Considering 215 flood events over a 26-year period, frequency is approximately 8-9 events every year.

Table 5-7. Potential Annualized Losses by Jurisdiction, 1991-2016

JURISDICTION	NUMBER OF EVENTS	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Travis County	196	$137,901,699	$5,303,912
Lakeway	1	$0	$0
Manor	1	$0	$0
Pflugerville	7	$94,456	$3,633
Sunset Valley	10	$482,163	$18,545
Village of the Hills	0	$0	$0
PLANNING AREA	**215**	**$138,478,318**	**$5,326,090**

The severity of a flooding event varies depending on the relative risk to citizens and structures located within each city. Table 5-8 depicts the level of impact for Travis County and each participating jurisdiction.

Table 5-8. Impact by Jurisdiction

JURISDICTION	IMPACT	DESCRIPTION
Travis County	Substantial	While Travis County would typically have limited *property* damages resulting from flood events (critical facilities would be shut down for 24 hours or less, and less than 10 percent of property would be destroyed or damaged), the historical loss of life and number of injuries indicates a potential "substantial" impact, resulting in potentially multiple deaths and injuries.
Lakeway	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged in the city.
Manor	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged in the city.
Pflugerville	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged in the city.
Sunset Valley	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged in the city.
Village of the Hills	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged in the city.

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 Travis County 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 outages 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 be impacted by a flood event and be 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.
- 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 impacting economic recovery.
- Flooding may cause significant disruptions of clean water and sewer services, elevating health risks and delaying recovery efforts.
- The psychosocial 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, in addition to 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. All of the participating jurisdictions in the planning area participate 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, 2 of the participating communities in the planning area participate in CRS, including Pflugerville (CR 9) and Sunset Valley (CR 7).

Travis County and participating jurisdictions in the NFIP currently have in place, at minimum, the NFIP standards for new construction and substantial Improvements of structures. The Travis County Commissioners Court initially approved Floodplain Management Regulations for Travis County on December 15, 1975. The regulations adopted by the Court were stricter and continue to be more stringent than those required to participate in the NFIP. The current Travis County floodplain management regulations:

- Restrict or prohibit land uses that are dangerous to health, safety, or property in times of flood, or cause excessive increases in erosion, 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;
- Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
- Control filling, grading, dredging, and other development which may increase flood damage; and
- Regulate, including prohibiting, the construction of flood barriers.

The City of Pflugerville and Sunset Valley have also adopted additional floodplain standards above the minimum requirement in their respective flood damage prevention ordinances, further reducing risk to structures and reducing flood insurance costs to residents. The City of Manor has a very small SFHA. The City does not issue permits for development for any property located in a SFHA. All jurisdictions are considering adopting additional higher regulatory NFIP standards to limit floodplain development.

The flood hazard areas throughout Travis County are subject to periodic inundation, which may adversely affect public safety, resulting 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. Travis County has aggressively worked towards mitigating floods throughout the county since joining the NFIP. After the October 1998 flood, the Travis County Commissioners Court began to buy-out flood prone properties mostly along Onion Creek in Southeastern Travis County. In 2001, the Court partnered with the City of Austin, LCRA, the City of Sunset Valley, and the United States Army Corps of Engineers (USACE) to find cost effective solutions to flood events along Onion and Walnut Creeks and the Colorado River, including Lake Travis. As a result of the studies, the Court has cost shared a flood evacuation and park project in the Timber Creek neighborhood along Onion Creek.

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 Travis County and NFIP jurisdictions participating in the Hazard Mitigation plan to continue to promote the public health, safety, and general welfare by minimizing public and private losses due to flood conditions in specific areas with flood mitigation projects similar to the Onion Creek acquisition and park project.

Each of the NFIP participating jurisdictions in the Plan are guided by their local Flood Damage Prevention Ordinance. These communities will continue to comply with NFIP requirements through their local permitting, inspection, and record-keeping requirements for new and substantially developed construction. As active members of the Texas Floodplain Management Association (TFMA), the Travis County Environmental Health office has positioned itself to effectively manage the county NFIP Program and maintain their Certified Floodplain Manager (CFM) status through continuing education.

Furthermore, the NFIP program for each of the participating jurisdictions 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, Travis County and participating NFIP jurisdictions seek to observe the following guidelines in order to achieve flood mitigation:

- 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, Travis County has participated in multiple mitigation activities to reduce flood losses and protect citizens and property. The County continues to partner with local communities to identify and implement sound mitigation actions. After the devastating October 31, 2015 flood, Travis County began a post-flood analysis and mitigation study for Dry Creek East and Onion, Bear, and Little Bear Creeks in Southeastern Travis County. The study will attempt to find root causes of the flood and seek to find cost effective mitigation alternatives for the Arroyo Doble/Twin Creeks Subdivisions, Thoroughbred Farms Subdivision, and the Bluff Springs Road Areas. Similarly in 2017, Travis County will begin a study of Maha Creek in Southeastern Travis County. This study will not only look for mitigation alternatives in the Swiss Alpine Village and Plover Place neighborhoods, but will also develop a regulatory flood model of Maha Creek which is currently an unstudied "A" zone of the FIRM. Travis County continues buy-out properties on Onion, Bear, Dry, and Maha Creeks based on damage assessments from the October 2013 flood.

The Village of the Hills recently received preliminary FIRMS with a wider SFHA. The Village has initiated contact with the 4 homeowners now located in a SFHA to identify viable mitigation actions to reduce future flood losses.

Travis County and participating jurisdictions have developed additional mitigation actions that relate to either NFIP maintenance or compliance. Compliance and maintenance actions can be found in Section 19.

Flooding was identified by the majority of the communities as a moderate 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. County-wide, communities recognize the need and are working towards adopting higher NFIP regulatory standards to further minimize flood risk in their community. Smaller no-growth communities that typically do not have personnel or funds to implement more stringent NFIP compliance measures are focusing on NFIP public awareness activities. This includes promoting the availability of flood insurance by placing NFIP brochures and flyers in public libraries or public meeting places.

Each jurisdiction participating in this planning process is a NFIP participant and has a designated floodplain administrator. All floodplain administrators in the planning area will continue to maintain compliance with the NFIP, including continued floodplain administration, zoning ordinances, and development regulation. The floodplain ordinance adopted by each participating jurisdiction outlines the minimum requirements for development in Special Flood Hazard Areas.

REPETITIVE LOSS

The Flood Mitigation Assistance (FMA) 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 buildings that are insured under the National Flood Insurance Program. The Texas Water Development Board (TWDB) administers the FMA grant program for the State of Texas. One of the goals of the FMA program is to reduce the burden of repetitive loss and severe repetitive loss properties on the NFIP through mitigation activities that significantly reduce or eliminate the threat of future flood damages.

Repetitive Loss properties are defined as structures that are:

- Any insurable building for which 2 or more claims of more than $1,000 each, paid by the National Flood Insurance Program (NFIP) within any 10-year period, since 1978;
- May or may not be currently insured under the NFIP.

Severe Repetitive Loss properties are defined as structures that are:

- Covered under the NFIP and have at least 4 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 2 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 2 of the referenced claims must have occurred within any 10-year period, and must be greater than 10 days apart.[8] Table 5-9 shows repetitive loss and severe repetitive loss properties for Travis County, including all participating jurisdictions. There are no repetitive/severe repetitive loss properties reported for the following jurisdictions: City of Manor, City of Sunset Valley, and the Village of the Hills.

Table 5-9. Repetitive Loss and Severe Repetitive Loss Properties

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Austin	0242795	Yes	Othr-Nonres	2	$11,742	-
Austin	0121978	No	Single Fmly	4	$24,332	-
Austin	0255140	Yes	Single Fmly	2	$20,326	-
Austin	0117266	No	Single Fmly	2	$98,125	-
Austin	0117118	No	Single Fmly	2	$21,332	-
Austin	0068360	No	Single Fmly	3	$17,573	-
Austin	0098519	No	Single Fmly	3	$33,840	-
Austin	0117258	No	Assmd Condo	2	$50,403	-
Austin	0254773	Yes	Othr-Nonres	2	$24,873	-
Austin	0050833	No	Single Fmly	2	$9,539	-
Austin	0242794	No	Othr-Nonres	2	$103,257	-
Austin	0244157	No	Single Fmly	2	$86,070	-
Austin	0244451	No	Single Fmly	2	$59,584	-
Austin	0244204	Yes	Single Fmly	2	$72,510	-
Austin	0164009	No	Single Fmly	2	$39,170	-

[8] Source: Texas Water Development Board.

[9] 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".

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Austin	0237880	No	Single Fmly	3	$174,163	-
Austin	0243055	Yes	Single Fmly	2	$5,186	-
Austin	0117292	No	Single Fmly	2	$94,253	-
Austin	0244947	No	Single Fmly	2	$78,270	-
Austin	0238373	No	Single Fmly	2	$42,338	-
Austin	0237961	Yes	Single Fmly	3	$42,929	-
Austin	0245338	No	Single Fmly	2	$27,839	-
Austin	0212435	Yes	Othr-Nonres	2	$29,058	-
Austin	0169351	No	Single Fmly	2	$39,473	-
Austin	0137098	Yes	Single Fmly	3	$41,696	-
Austin	0137099	No	Single Fmly	2	$42,613	-
Austin	0119229	No	Single Fmly	2	$221,766	-
Austin	0240677	Yes	2-4 Family	3	$46,460	-
Austin	0132888	No	Single Fmly	4	$21,966	-
Austin	0100248	No	Single Fmly	2	$5,275	-
Austin	0117155	No	Single Fmly	2	$71,378	-
Austin	0122442	No	Single Fmly	2	$11,712	-
Austin	0237720	No	2-4 Family	2	$15,209	-
Austin	0117340	Yes	Single Fmly	4	$15,406	-
Austin	0242117	No	Single Fmly	2	$27,093	-
Austin	0245056	Yes	Single Fmly	2	$162,620	-
Austin	0116927	No	Single Fmly	2	$28,868	-
Austin	0117375	No	Single Fmly	2	$58,184	-
Austin	0240296	Yes	Single Fmly	2	$127,088	-
Austin	0243415	No	Single Fmly	2	$18,994	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Austin	0244862	Yes	Single Fmly	2	$204,668	-
Austin	0172686	No	Single Fmly	2	$42,135	-
Austin	0244538	No	Single Fmly	2	$44,322	-
Austin	0244436	No	Single Fmly	2	$80,090	-
Austin	0073496	No	Single Fmly	3	$35,792	-
Austin	0237726	No	Single Fmly	2	$5,936	-
Austin	0103555	No	Single Fmly	2	$7,284	-
Austin	0101012	No	Single Fmly	2	$15,832	-
Austin	0097238	No	Single Fmly	2	$22,399	-
Austin	0100242	No	Single Fmly	2	$3,676	-
Austin	0099462	No	Single Fmly	3	$58,227	-
Austin	0117087	No	Single Fmly	2	$36,863	-
Austin	0117347	No	Single Fmly	2	$28,038	-
Austin	0098972	No	Single Fmly	3	$68,307	-
Austin	0117333	No	Single Fmly	2	$20,422	-
Austin	0117427	No	Single Fmly	2	$41,200	-
Austin	0117123	No	Single Fmly	2	$53,321	-
Austin	0117367	No	Single Fmly	2	$20,434	-
Austin	0237735	Yes	Other Resid	2	$24,072	-
Austin	0212666	Yes	Single Fmly	3	$14,610	-
Austin	0237832	Yes	Single Fmly	2	$14,084	-
Austin	0117298	No	Single Fmly	2	$69,005	-
Austin	0213564	No	Single Fmly	4	$204,562	-
Austin	0249761	No	Single Fmly	2	$73,482	-
Austin	0239629	Yes	Single Fmly	3	$31,445	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Austin	0245295	No	Single Fmly	2	$75,539	-
Austin	0135634	Yes	Single Fmly	2	$136,428	-
Austin	0246420	Yes	Single Fmly	2	$14,477	-
Austin	0245105	No	Single Fmly	2	$116,589	-
Austin	0245085	No	Single Fmly	2	$86,417	-
Austin	0050551	Yes	Single Fmly	3	$5,947	-
Austin	0132887	No	Single Fmly	2	$8,959	-
Austin	0050479	No	Other Resid	2	$6,698	-
Austin	0237829	Yes	Single Fmly	2	$9,415	-
Austin	0242981	Yes	Single Fmly	2	$154,597	-
Austin	0068347	No	Single Fmly	3	$53,537	-
Austin	0242114	Yes	Single Fmly	3	$16,525	-
Austin	0117079	No	Single Fmly	3	$7,725	-
Austin	0237711	No	Single Fmly	2	$21,565	-
Austin	0245030	No	Single Fmly	2	$10,068	-
Austin	0244613	No	Single Fmly	2	$47,185	-
Austin	0245126	Yes	Single Fmly	2	$116,097	-
Austin	0245287	Yes	Single Fmly	2	$71,935	-
Austin	0246417	Yes	Single Fmly	2	$69,281	-
Austin	0244851	Yes	Single Fmly	2	$62,451	-
Austin	0244052	No	Single Fmly	2	$60,101	-
Austin	0245070	Yes	Single Fmly	2	$79,548	-
Austin	0244852	No	Single Fmly	2	$72,730	-
Austin	0117119	Yes	Single Fmly	4	$98,842	-
Austin	0240539	No	2-4 Family	2	$21,907	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Austin	0240584	Yes	2-4 Family	2	$35,455	-
Austin	0237837	No	Single Fmly	3	$126,171	-
Austin	0244562	No	Single Fmly	2	$135,255	-
Austin	0245581	No	Single Fmly	2	$97,611	-
Austin	0237838	No	Single Fmly	3	$202,619	-
Austin	0237979	No	Single Fmly	3	$169,381	-
Austin	0250401	No	Single Fmly	2	$94,656	-
Austin	0237839	No	Single Fmly	3	$89,476	-
Austin	0244863	No	Single Fmly	2	$184,155	-
Austin	0244144	No	Single Fmly	2	$83,449	-
Austin	0238222	Yes	Single Fmly	3	$140,025	-
Austin	0244447	No	Single Fmly	2	$124,334	-
Austin	0245129	No	Single Fmly	2	$91,603	-
Austin	0244619	No	Single Fmly	2	$70,511	-
Austin	0244868	No	Single Fmly	2	$46,826	-
Austin	0245347	No	Single Fmly	2	$60,477	-
Austin	0245342	No	Single Fmly	2	$93,321	-
Austin	0245626	No	Single Fmly	2	$99,445	-
Austin	0244668	No	Single Fmly	2	$131,382	-
Austin	0244661	No	Single Fmly	2	$117,421	-
Austin	0244867	No	Single Fmly	2	$80,469	-
Austin	0244660	No	Single Fmly	2	$94,623	-
Austin	0244608	No	Single Fmly	2	$87,157	-
Austin	0245375	No	Single Fmly	2	$51,173	-
Austin	0244398	No	Single Fmly	2	$86,682	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Austin	0244129	Yes	Single Fmly	2	$145,702	-
Austin	0244536	Yes	Single Fmly	2	$17,232	-
Austin	0169628	Yes	Single Fmly	2	$29,997	-
Austin	0117387	No	Single Fmly	2	$10,283	-
Austin	0117796	Yes	Single Fmly	2	$17,155	-
Austin	0117247	Yes	Assmd Condo	3	$766,053	-
Austin	0003594	No	Othr-Nonres	2	$15,547	-
Austin	0117602	Yes	Othr-Nonres	4	$134,491	-
Austin	0068355	No	Othr-Nonres	4	$121,789	-
Austin	0244632	No	Othr-Nonres	2	$275,852	-
Austin	0025898	No	Single Fmly	6	$36,545	-
Austin	0106759	No	Single Fmly	3	$28,768	-
Austin	0244131	No	Single Fmly	2	$140,828	-
Austin	0244611	Yes	Single Fmly	2	$145,093	-
Austin	0176771	No	Single Fmly	3	$78,757	-
Austin	0117151	No	Single Fmly	2	$11,331	-
Austin	0244683	No	Single Fmly	2	$82,127	-
Austin	0241953	Yes	Othr-Nonres	2	$45,364	-
Austin	0117086	No	Single Fmly	2	$11,116	-
Austin	0244857	Yes	Single Fmly	3	$8,154	-
Austin	0245588	No	Single Fmly	2	$48,191	-
Austin	0244621	No	Single Fmly	2	$113,479	-
Austin	0244567	Yes	Single Fmly	2	$50,000	-
Austin	0246131	No	Single Fmly	2	$100,679	-
Austin	0237833	No	Single Fmly	3	$118,826	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Austin	0237970	Yes	Single Fmly	3	$76,640	-
Austin	0244620	No	Single Fmly	2	$87,170	-
Austin	0244970	No	Single Fmly	2	$88,011	-
Austin	0244859	No	Single Fmly	2	$141,596	-
Austin	0244860	No	Single Fmly	2	$78,394	-
Austin	0237835	No	Single Fmly	3	$89,889	-
Austin	0245086	No	Single Fmly	2	$56,441	-
Austin	0245617	No	Single Fmly	2	$64,067	-
Austin	0244861	No	Single Fmly	2	$106,852	-
Austin	0244161	No	Single Fmly	2	$83,898	-
Austin	0245293	No	Single Fmly	2	$83,982	-
Austin	0245294	Yes	Single Fmly	2	$88,881	-
Austin	0245067	No	Single Fmly	2	$44,730	-
Austin	0244397	No	Single Fmly	2	$44,163	-
Austin	0245652	Yes	Single Fmly	2	$143,673	-
Austin	0244865	Yes	2-4 Family	2	$89,560	-
Austin	0245057	No	2-4 Family	2	$140,217	-
Austin	0244866	Yes	2-4 Family	2	$129,178	-
Austin	0243865	No	Other Resid	2	$5,041	-
Austin	0237689	Yes	Single Fmly	3	$23,773	-
Austin	0098425	No	Single Fmly	3	$16,805	-
Austin	0245466	No	Single Fmly	2	$502,395	-
Austin	0247772	Yes	Othr-Nonres	2	$240,680	-
Austin	0244561	Yes	Single Fmly	2	$345,105	-
Austin	0247773	Yes	Single Fmly	2	$104,680	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Austin	0025680	No	Single Fmly	2	$16,061	-
Austin	0245597	Yes	Single Fmly	2	$139,990	-
Austin	0068350	No	Single Fmly	3	$59,491	-
Austin	0134836	No	Single Fmly	2	$3,014	-
Austin	0025468	Yes	Single Fmly	2	$13,227	-
Austin	0240814	Yes	Othr-Nonres	3	$119,304	-
Austin	0133511	Yes	Single Fmly	3	$217,757	-
Austin	0117426	No	Single Fmly	3	$267,350	-
Austin	0096807	No	Single Fmly	4	$197,475	-
Austin	0026774	No	Other Resid	2	$2,421	-
Austin	0196379	Yes	Single Fmly	3	$62,994	-
Austin	0244610	No	Single Fmly	2	$87,380	-
Austin	0244595	No	Single Fmly	2	$65,500	-
Austin	0118851	No	Single Fmly	2	$39,734	-
Austin	0249388	Yes	Single Fmly	2	$7,156	-
Austin	0253542	Yes	Single Fmly	2	$4,546	-
Austin	0244421	No	Single Fmly	2	$38,087	-
Austin	0240812	Yes	Single Fmly	2	$61,498	-
Austin	0137453	No	Single Fmly	2	$38,055	-
Austin	0139837	No	Single Fmly	2	$184,808	-
Austin	0244850	No	Single Fmly	2	$27,787	-
Austin	0245289	Yes	Single Fmly	2	$189,345	-
Austin	0025179	No	Othr-Nonres	3	$130,075	-
Austin	0237828	Yes	Single Fmly	3	$79,926	-
Austin	0038166	No	Single Fmly	5	$23,398	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Austin	0240349	No	Single Fmly	3	$14,099	-
Austin	0237960	Yes	Single Fmly	3	$10,708	-
Austin	0238109	No	Single Fmly	3	$89,451	-
Austin	0238220	No	Single Fmly	3	$112,419	-
Austin	0237706	No	Single Fmly	3	$124,723	-
Austin	0245291	No	Single Fmly	2	$59,222	-
Austin	0237826	No	Single Fmly	3	$149,300	-
Austin	0246145	No	Single Fmly	2	$61,018	-
Austin	0244599	No	Single Fmly	2	$81,617	-
Austin	0244394	No	Single Fmly	2	$78,543	-
Austin	0244588	No	Single Fmly	2	$79,961	-
Austin	0136035	No	Single Fmly	2	$13,213	-
Austin	0237989	Yes	Othr-Nonres	3	$103,823	-
Austin	0117248	No	Othr-Nonres	2	$27,500	-
Austin	0068359	No	Othr-Nonres	2	$47,943	-
Austin	0100249	Yes	Othr-Nonres	4	$9,954	-
Austin	0043590	No	Single Fmly	2	$11,481	-
Austin	0244618	Yes	Single Fmly	2	$73,302	-
Austin	0240287	Yes	Single Fmly	2	$35,013	-
Austin	0137257	No	2-4 Family	2	$74,095	-
Austin	0240561	Yes	Other Resid	3	$12,579	-
Austin	0237988	Yes	Single Fmly	2	$18,802	-
Austin	0117262	No	Othr-Nonres	2	$8,091	-
Austin	0003548	No	Single Fmly	2	$3,722	-
Austin	0099467	No	Othr-Nonres	2	$6,736	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Austin	0099387	No	Single Fmly	2	$24,297	-
Austin	0097471	No	Single Fmly	3	$58,877	-
Austin	0099388	No	Single Fmly	3	$23,984	-
Austin	0068345	No	Single Fmly	3	$79,715	-
Austin	0100241	No	Single Fmly	2	$65,891	-
Austin	0068361	No	Assmd Condo	2	$122,231	-
Austin	0049049	No	2-4 Family	2	$6,436	-
Austin	0100244	No	Single Fmly	2	$38,036	-
Austin	0049050	No	Single Fmly	4	$18,969	-
Austin	0050424	No	Othr-Nonres	2	$29,307	-
Austin	0050425	No	Othr-Nonres	2	$11,800	-
Austin	0050399	No	Othr-Nonres	2	$79,366	-
Austin	0025371	No	Othr-Nonres	2	$42,124	-
Austin	0025370	No	Othr-Nonres	3	$158,416	-
Austin	0013093	No	Single Fmly	3	$7,039	-
Austin	0057578	Yes	Assmd Condo	3	$105,937	-
Austin	0050443	Yes	Single Fmly	2	$4,093	-
Austin	0012972	Yes	Single Fmly	4	$64,804	-
Austin	0025716	No	Single Fmly	2	$22,141	-
Austin	0050380	No	Single Fmly	2	$18,363	-
Austin	0025566	No	Single Fmly	2	$10,788	-
Austin	0050022	No	Single Fmly	3	$4,501	-
Travis County	0249980	Yes	Busi-Nonres	2	$43,017	-
Travis County	0093895	No	Single Fmly	2	$65,287	-
Travis County	0089998	No	Single Fmly	3	$56,462	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Travis County	0013124	Yes	Single Fmly	4	$52,466	-
Travis County	0249996	Yes	Single Fmly	2	$396,598	-
Travis County	0094947	Yes	Single Fmly	3	$54,625	-
Travis County	0068348	Yes	Single Fmly	2	$4,700	-
Travis County	0245296	Yes	Single Fmly	2	$69,890	-
Travis County	0245854	Yes	Single Fmly	2	$175,501	-
Travis County	0245297	Yes	Single Fmly	2	$109,124	-
Travis County	0244864	Yes	Single Fmly	2	$87,271	-
Travis County	0245298	Yes	Single Fmly	2	$134,692	-
Travis County	0237984	Yes	Single Fmly	3	$232,724	-
Travis County	0117267	No	Single Fmly	3	$210,174	-
Travis County	0117125	No	Single Fmly	4	$103,306	-
Travis County	0238110	Yes	Single Fmly	3	$174,990	-
Travis County	0237987	Yes	Othr-Nonres	3	$203,987	-
Travis County	0173069	No	Single Fmly	2	$73,737	-
Travis County	0136305	Yes	Single Fmly	2	$36,044	-
Travis County	0173090	No	Single Fmly	2	$219,583	-
Travis County	0100247	No	2-4 Family	2	$26,124	-
Travis County	0244396	Yes	Single Fmly	2	$90,234	-
Travis County	0245853	Yes	Single Fmly	2	$87,009	-
Travis County	0237891	Yes	Single Fmly	3	$137,485	-
Travis County	0096799	No	Other Resid	2	$179,500	-
Travis County	0096798	No	Assmd Condo	2	$357,066	-
Travis County	0089412	No	Single Fmly	2	$60,610	-
Travis County	0241848	Yes	Single Fmly	2	$67,958	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Travis County	0089806	No	Single Fmly	3	$151,557	-
Travis County	0068938	No	Single Fmly	3	$86,726	-
Travis County	0089407	Yes	Single Fmly	2	$24,351	-
Travis County	0088556	Yes	Single Fmly	2	$27,627	-
Travis County	0068352	Yes	Single Fmly	2	$43,265	-
Travis County	0249986	Yes	Single Fmly	2	$61,894	-
Travis County	0133510	No	Single Fmly	3	$226,123	-
Travis County	0137618	No	Single Fmly	2	$53,257	-
Travis County	0253554	Yes	Single Fmly	2	$133,138	-
Travis County	0251260	Yes	Single Fmly	2	$45,642	-
Travis County	0242213	Yes	Single Fmly	2	$24,279	-
Travis County	0237966	Yes	Single Fmly	3	$270,284	-
Travis County	0055580	No	Single Fmly	2	$103,475	-
Travis County	0239732	No	Single Fmly	3	$9,878	-
Travis County	0173033	No	Single Fmly	2	$94,917	-
Travis County	0118654	Yes	Single Fmly	4	$93,235	-
Travis County	0135075	Yes	Single Fmly	3	$47,536	-
Travis County	0135046	Yes	Single Fmly	3	$58,322	-
Travis County	0055135	No	Single Fmly	2	$51,094	-
Travis County	0242972	No	Othr-Nonres	2	$202,297	-
Travis County	0091013	No	Single Fmly	3	$24,184	-
Travis County	0172933	No	Single Fmly	2	$25,937	-
Travis County	0090234	Yes	Single Fmly	3	$75,631	-
Travis County	0241610	Yes	Single Fmly	2	$13,313	-
Travis County	0135370	Yes	Assmd Condo	3	$146,602	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Travis County	0122385	Yes	Single Fmly	3	$79,435	-
Travis County	0164987	No	Single Fmly	2	$6,998	-
Travis County	0238665	No	Single Fmly	2	$125,686	-
Travis County	0249185	Yes	Single Fmly	2	$44,969	-
Travis County	0197066	Yes	Single Fmly	3	$80,012	-
Travis County	0089409	Yes	Single Fmly	2	$40,800	-
Travis County	0244591	No	Single Fmly	2	$64,937	-
Travis County	0005545	No	Single Fmly	2	$18,928	-
Travis County	0242377	Yes	Single Fmly	2	$65,641	-
Travis County	0089420	No	Single Fmly	3	$50,872	-
Travis County	0245074	Yes	Single Fmly	2	$30,214	-
Travis County	0244145	Yes	Single Fmly	2	$209,210	-
Travis County	0244395	Yes	Single Fmly	2	$260,350	-
Travis County	0244854	No	Single Fmly	2	$388,837	-
Travis County	0244914	Yes	Single Fmly	2	$181,040	-
Travis County	0246927	Yes	Single Fmly	2	$422,680	-
Travis County	0244855	Yes	Single Fmly	2	$233,995	-
Travis County	0245122	Yes	Single Fmly	2	$449,871	-
Travis County	0244856	Yes	Single Fmly	2	$165,259	-
Travis County	0245852	Yes	Single Fmly	2	$377,313	-
Travis County	0245062	Yes	Single Fmly	2	$192,125	-
Travis County	0245350	No	Single Fmly	2	$204,197	-
Travis County	0245121	No	Single Fmly	2	$470,678	-
Travis County	0245066	Yes	Single Fmly	2	$234,231	-
Travis County	0244196	No	Single Fmly	2	$99,939	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Travis County	0244910	No	Single Fmly	2	$241,116	-
Travis County	0241947	No	Single Fmly	2	$21,744	-
Travis County	0090108	Yes	Single Fmly	3	$96,212	-
Travis County	0089541	Yes	Single Fmly	3	$152,331	-
Travis County	0172665	No	Single Fmly	2	$65,684	-
Travis County	0172934	No	Single Fmly	2	$77,151	-
Travis County	0172935	No	Single Fmly	2	$117,001	-
Travis County	0250442	Yes	Single Fmly	2	$6,637	-
Travis County	0004573	Yes	Single Fmly	3	$57,615	-
Travis County	0245321	Yes	Single Fmly	2	$457,813	-
Travis County	0089801	No	Single Fmly	3	$20,140	-
Travis County	0089422	Yes	Single Fmly	2	$29,641	-
Travis County	0167746	Yes	Single Fmly	2	$45,396	-
Travis County	0252071	Yes	Single Fmly	2	$80,957	-
Travis County	0237679	Yes	Single Fmly	3	$217,591	-
Travis County	0245077	Yes	Single Fmly	2	$206,827	-
Travis County	0245582	Yes	Single Fmly	2	$243,430	-
Travis County	0025194	No	Othr-Nonres	2	$86,284	-
Travis County	0237896	No	Single Fmly	2	$76,739	-
Travis County	0245288	No	Single Fmly	2	$256,582	-
Travis County	0244137	Yes	Single Fmly	2	$233,739	-
Travis County	0245977	Yes	Single Fmly	2	$273,973	-
Travis County	0246419	Yes	Single Fmly	2	$296,253	-
Travis County	0245688	Yes	Single Fmly	2	$604,660	-
Travis County	0244219	Yes	Single Fmly	2	$23,656	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Travis County	0244430	No	Single Fmly	2	$350,953	-
Travis County	0245135	Yes	Single Fmly	2	$286,674	-
Travis County	0245292	Yes	Single Fmly	2	$230,634	-
Travis County	0245340	Yes	Single Fmly	2	$338,658	-
Travis County	0244912	No	Single Fmly	2	$299,126	-
Travis County	0244853	Yes	Single Fmly	2	$33,148	-
Travis County	0244657	Yes	Single Fmly	2	$545,358	-
Travis County	0245290	Yes	Single Fmly	2	$171,717	-
Travis County	0245687	No	Single Fmly	2	$444,058	-
Travis County	0238219	Yes	Single Fmly	3	$329,488	-
Travis County	0237963	Yes	Single Fmly	3	$491,135	-
Travis County	0046882	No	Single Fmly	2	$14,350	-
Travis County	0050370	No	Single Fmly	2	$62,042	-
Travis County	0055134	No	Single Fmly	2	$23,629	-
Travis County	0001899	No	Single Fmly	4	$188,517	-
Travis County	0090100	No	Single Fmly	2	$73,308	-
Travis County	0117758	No	2-4 Family	3	$47,526	-
Travis County	0117100	No	Single Fmly	2	$17,190	-
Travis County	0097230	No	Single Fmly	3	$62,093	-
Travis County	0196537	No	Single Fmly	2	$128,555	-
Travis County	0136047	No	Single Fmly	2	$62,150	-
Travis County	0136024	No	Single Fmly	2	$42,787	-
Pflugerville	0242195	Yes	Single Fmly	2	$9,930	-
Rollingwood	0247040	Yes	Single Fmly	2	$9,106	-
Rollingwood	0212434	No	Single Fmly	2	$8,563	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
West Lake Hills	0237872	Yes	Othr-Nonres	2	$23,959	-
West Lake Hills	0049815	No	Single Fmly	3	$42,732	-
Round Rock	0052406	No	Single Fmly	2	$14,279	-
Round Rock	0242194	No	Single Fmly	2	$39,574	-
Round Rock	0242039	Yes	Single Fmly	2	$64,965	-
Round Rock	0050514	No	Single Fmly	3	$38,736	-
Round Rock	0052262	Yes	Single Fmly	3	$97,458	-
Round Rock	0238171	No	2-4 Family	3	$118,100	-
Round Rock	0237908	Yes	2-4 Family	3	$199,133	-
Round Rock	0026816	Yes	Single Fmly	2	$15,709	-
Round Rock	0050485	Yes	Single Fmly	3	$145,138	-
Round Rock	0050365	Yes	Single Fmly	3	$86,579	-
Round Rock	0050387	Yes	Single Fmly	2	$53,248	-
Round Rock	0050407	Yes	Single Fmly	4	$100,947	-
Round Rock	0050454	Yes	Single Fmly	4	$10,719	-
Round Rock	0241892	No	Single Fmly	2	$14,253	-
Round Rock	0237995	Yes	Other Resid	3	$55,786	-
Round Rock	0052420	No	Single Fmly	5	$19,660	-
Round Rock	0050388	No	Single Fmly	3	$267,447	-
Round Rock	0026811	Yes	Single Fmly	4	$102,446	-
Round Rock	0050419	Yes	Single Fmly	2	$47,410	-
Cedar Park	0196276	No	Single Fmly	2	$60,974	-
Cedar Park	0187984	No	Single Fmly	2	$3,659	-
Cedar Park	0051119	No	Single Fmly	3	$64,575	-
Cedar Park	0050427	No	Single Fmly	2	$4,920	-

JURISDICTION	PROPERTY #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SRL INDICATOR[9]
Cedar Park	0003123	No	Single Fmly	2	$59,992	-
Cedar Park	0244870	Yes	Single Fmly	2	$38,740	-
Cedar Park	0013190	No	Single Fmly	2	$9,551	-
Lakeway	0173772	Yes	Single Fmly	2	$79,275	-
Leander	0136783	No	Single Fmly	2	$40,909	-
Lago Vista	0134857	Yes	Single Fmly	3	$209,353	-
Lago Vista	0090236	No	Single Fmly	2	$3,000	-
Lago Vista	0103225	No	Single Fmly	2	$52,739	-
Lago Vista	0091029	Yes	Single Fmly	3	$87,990	-
Jonestown	0172815	Yes	Single Fmly	2	$16,840	-
Jonestown	0089429	No	Single Fmly	3	$31,875	-
Jonestown	0174249	Yes	Single Fmly	2	$173,827	-

SECTION 6: WILDFIRE

Hazard Description 1
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Extent 13
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Vulnerability and Impact 23
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HAZARD DESCRIPTION

A wildfire event can rapidly spread out of control and occurs most often during dry periods, when fuel moistures are low, 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, a 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 fires are fueled almost exclusively by natural vegetation, while interface or intermix fires are urban/wildland fires in which vegetation and the built-environment provide the fuel.

The Austin-Travis County Community Wildfire Protection Plan (CWPP) was developed and adopted in 2014. This document provides a comprehensive and in-depth analysis of the wildfire risk throughout the planning area. The planning team relied heavily on the CWPP when analyzing wildfire for the purpose of the HMAP. Analytical language and data taken from the CWPP is referenced throughout this section. The full CWPP document can be accessed at: https://www.austintexas.gov/wildfireprotectionplan.

The Austin-Travis County Wildfire Coalition (ATCWCF) was established through the adoption of the CWPP for the purpose of addressing wildfire risk on a regional basis. The mission of the ATCWCF is to empower public servants and those they serve to protect communities and natural resources from wildfire and help

them become resilient to wildfire through collaborative partnerships, outreach and strategic planning. In addition, the ATCWCF[1]:

- Advise matters related to Wildland Urban Interface within the Austin/Travis County region.
- Organize task groups centered on implementation recommendations, identified within or consistent with the goals of the Austin-Travis County CWPP.
- Develop plans and support actions for management of identified issues and make recommendations to appropriate levels of government and other related agencies.
- Raise public awareness of risks, emergency procedures and evacuation guidelines.
- Provide a quarterly report on Collaborative activities and progress.
- Engage with private landowners and affected individuals, groups or organizations to plan and implement fuel reduction projects as individual homes, as neighborhoods and across landscapes.
- Identify and implement projects that will help resource agencies better manage fires and minimize risk to human life (including residents, firefighters and emergency personnel).
- Provide assistance and advise residents on strategic fuels reduction and mitigation projects that may be undertaken to reduce high intensity hazardous fire risk to, with an emphasis on enhancing ecosystem resiliency to wildfire.
- Identify, prioritize and guide management of practices in the Wildland Urban Interface ("WUI") in Austin and Travis County.

LOCATION

A wildfire event can be a potentially damaging consequence of drought. Wildfires can vary greatly in terms of size, location, intensity, and duration. Wildfires are not confined to any specific geographic location. The ongoing trends of agricultural lands converted to other uses, coupled with the availability of undeveloped land in the planning area, equates to an increasing number of Travis County residents live in the Wildland Urban Interface (WUI) and this increases the potential risk to life and property from a wildfire.

While wildfires can and do occur any month of the year, January, July, and August have the highest occurrence. The greater number of January fires is likely due to high winds associated with dry, gusty cold fronts. July and August fires are likely because of increased fuel loads from high vegetation production during the preceding spring growth period. Low humidity, which contributes to fuel drying, and low precipitation are typical for these high-fire months.[2]

Located in western Travis County, the Balcones Canyonlands Preserve contains 30,428 acres set aside as protected habitat by the Balcones Canyonlands Conservation Plan. This area of the County is one of the

[1] Austin-Travis County Wildfire Coalition Structure, Policy and Procedures, December 15, 2014, https://fireadapted.bloomfire.com/groups/31541/posts/1010756-austin-travis-county-wildfire-coalition-structure-policy-procedures

[2] Austin-Travis County CWPP, 2014

areas considered susceptible to damage from wildfires. While there have been considerable mitigation activities conducted at the preserve, a wildfire in the area could threaten thousands of acres of forest and many endangered species. There are many additional areas of the County considered highly vulnerable to wildfire. The Austin-Travis County CWPP identifies community planning units to assist local jurisdictions in developing individual CWPPs. The planning units considered to be at greatest risk for structure combustion include: Mustang Ridge, Lime Creek, Manchaca, Honeycomb Hills, Lewis Mountain, Richard Moya Park, Pedernales, Barkley Meadows, Daffan, and Singleton Bend. In-depth analysis and hazard rankings for all planning units in the Travis County planning area can be found in the Austin-Travis County CWPP.

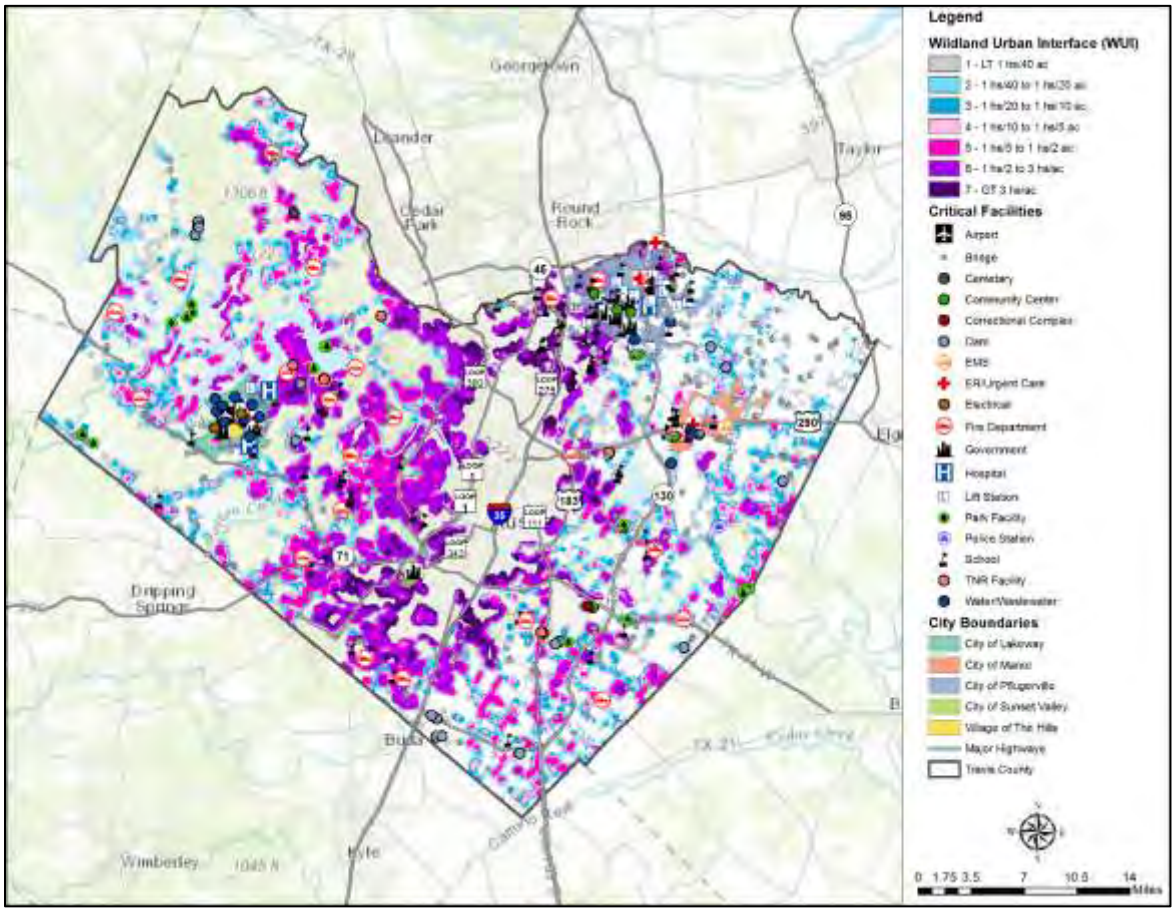
Developed and incorporated areas (such as Pflugerville, Sunset Valley, and Village of the Hills) also have ignition sources that could fuel a wildfire such as greenbelts, landscaping, forested areas and structures. Under the right conditions, a wildfire anywhere in the County (unincorporated and incorporated areas) could cause hundreds to thousands of acres to burn, endangering structures and infrastructure.

Under most conditions, when there is sufficient fuel moisture in the trees, low to moderate drought conditions, and normal winds, fires that start in developed areas will generally put themselves out when they reach the forest mat or tight canopy. Shaded fuel breaks are a proven method for keeping grasses down and cultivating dense canopies that prevent or deter the spread of wildfire, especially grass fires. Preserve areas are much slower to ignite, but once ignited under extreme conditions, embers lofting from a crown fire in juniper trees can reach 400-500 feet – endangering all of Western Travis County.

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; see Figures 6-1 through 6-6[3]. Those who live next to wildland actually present a greater fire threat to the wildland than vice versa since humans start most wildfires. A goal of Travis County is to help residents recognize that the best place to start wildfire protection is on their own property. The WUI dataset is derived using advanced modeling techniques combining several reliable datasets including information provided by Homeland Security. Populated areas surrounded by sufficient non-burnable areas (interior urban areas) are not included in the dataset, as these areas are not expected to be directly impacted by a wildfire. It is estimated that 45.1 percent of the total population in Travis County live within the WUI. However, the entire Travis County planning area is at risk for wildfires.

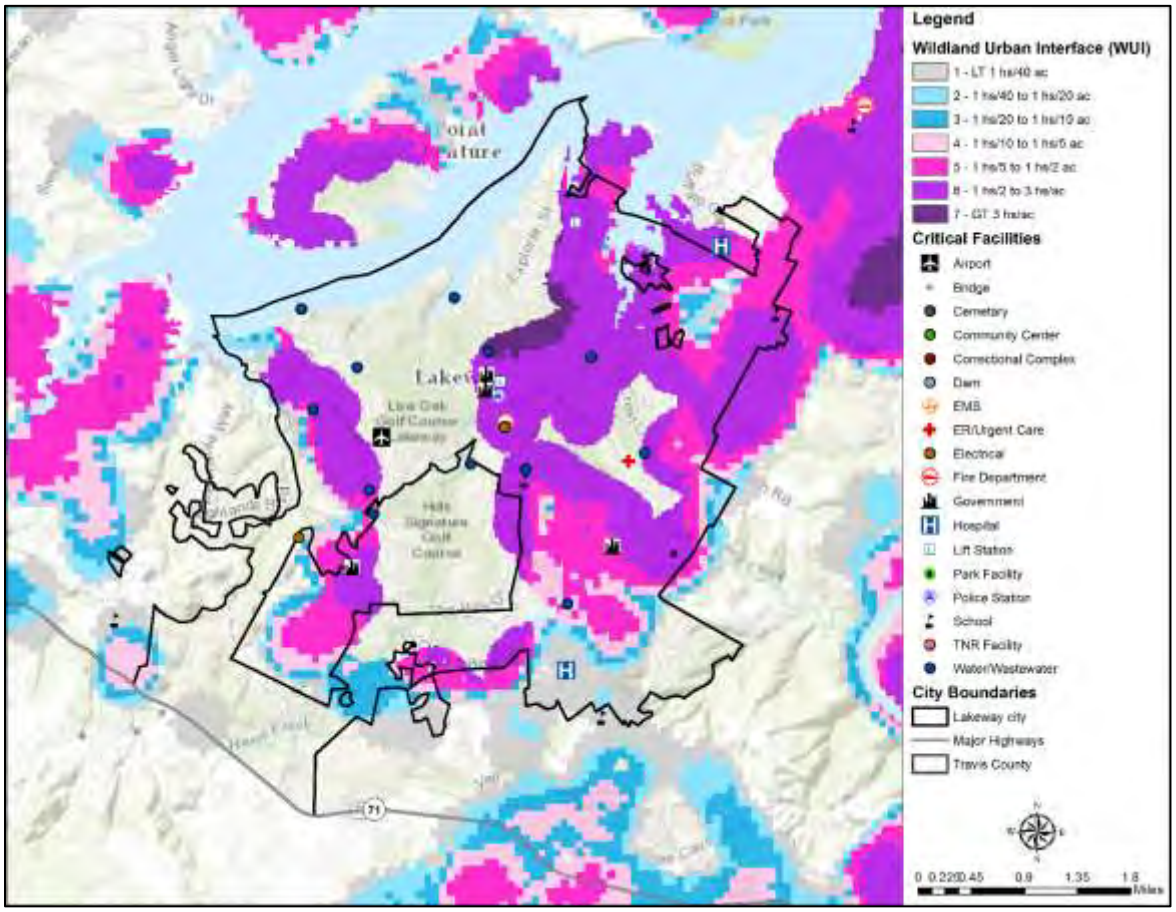
[3] Figures and data provided by Texas A&M Forest Service (TAMFS), June 2017.

Figure 6-1. Wildland Urban Interface Map – Travis County



	Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
	LT 1hs/40ac	954	0.2 %	46,231	15.0 %
	1hs/40ac to 1hs/20ac	2,040	0.4 %	37,472	12.2 %
	1hs/20ac to 1hs/10ac	5,463	1.2 %	41,261	13.4 %
	1hs/10ac to 1hs/5ac	11,600	2.5 %	43,011	14.0 %
	1hs/5ac to 1hs/2ac	30,433	6.6 %	48,675	15.8 %
	1hs/2ac to 3hs/1ac	210,255	45.4 %	73,766	24.0 %
	GT 3hs/1ac	202,283	43.7 %	17,142	5.6 %
	Total	**463,028**	**100.0 %**	**307,558**	**100.0 %**

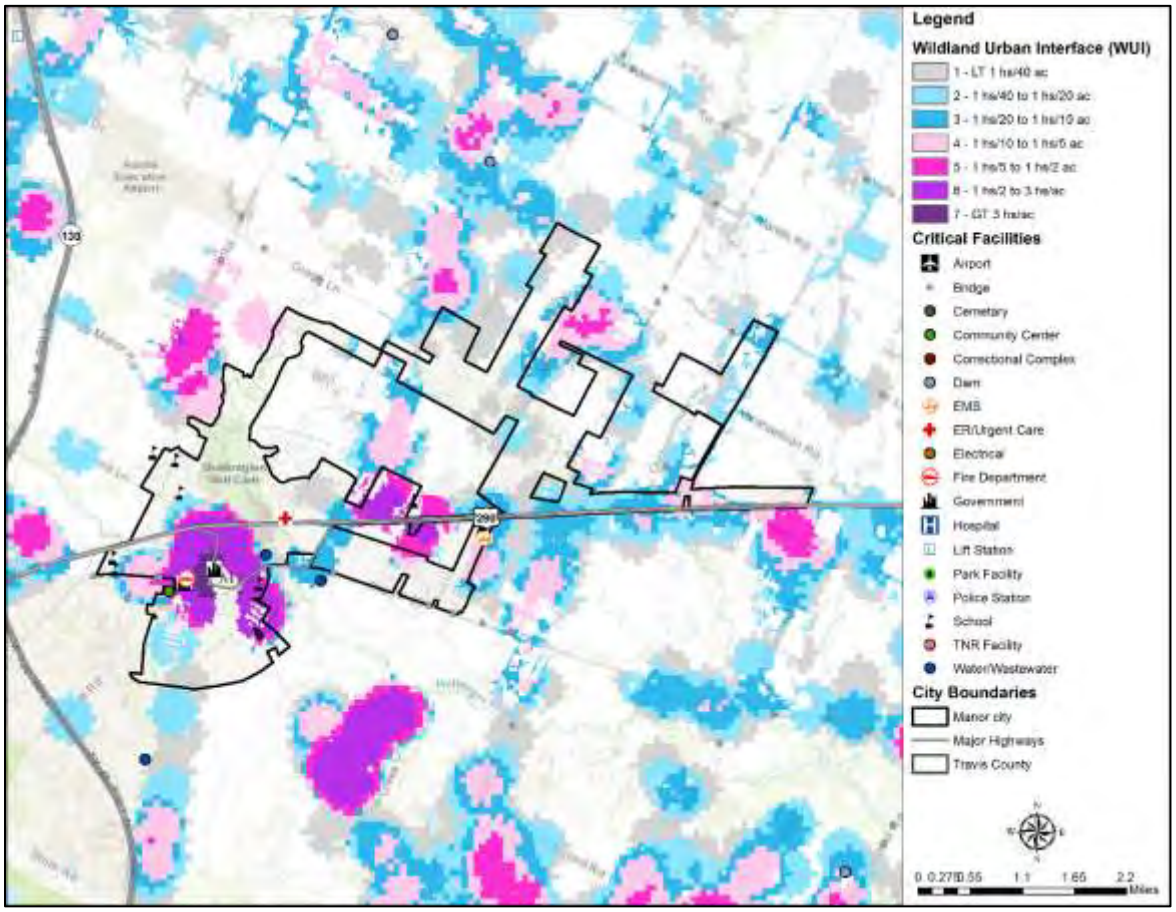
Figure 6-2. Wildland Urban Interface Map – Lakeway



Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
LT 1hs/40ac	10	0.2 %	364	9.9%
1hs/40ac to 1hs/20ac	5	0.1%	125	3.4%
1hs/20ac to 1hs/10ac	18	0.3%	216	5.8%
1hs/10ac to 1hs/5ac	74	1.1%	303	8.2%
1hs/5ac to 1hs/2ac	408	6.2%	768	20.8%
1hs/2ac to 3hs/1ac	5,086	76.8%	1,813	49.1%
GT 3hs/1ac	1,022	15.4%	102	2.8%
Total	**6,623**	**100.0 %**	**3,691**	**100.0 %**

It is estimated that 54.2 percent of the total population in Lakeway live within the WUI. However, the entire City of Lakeway is at risk for wildfires.

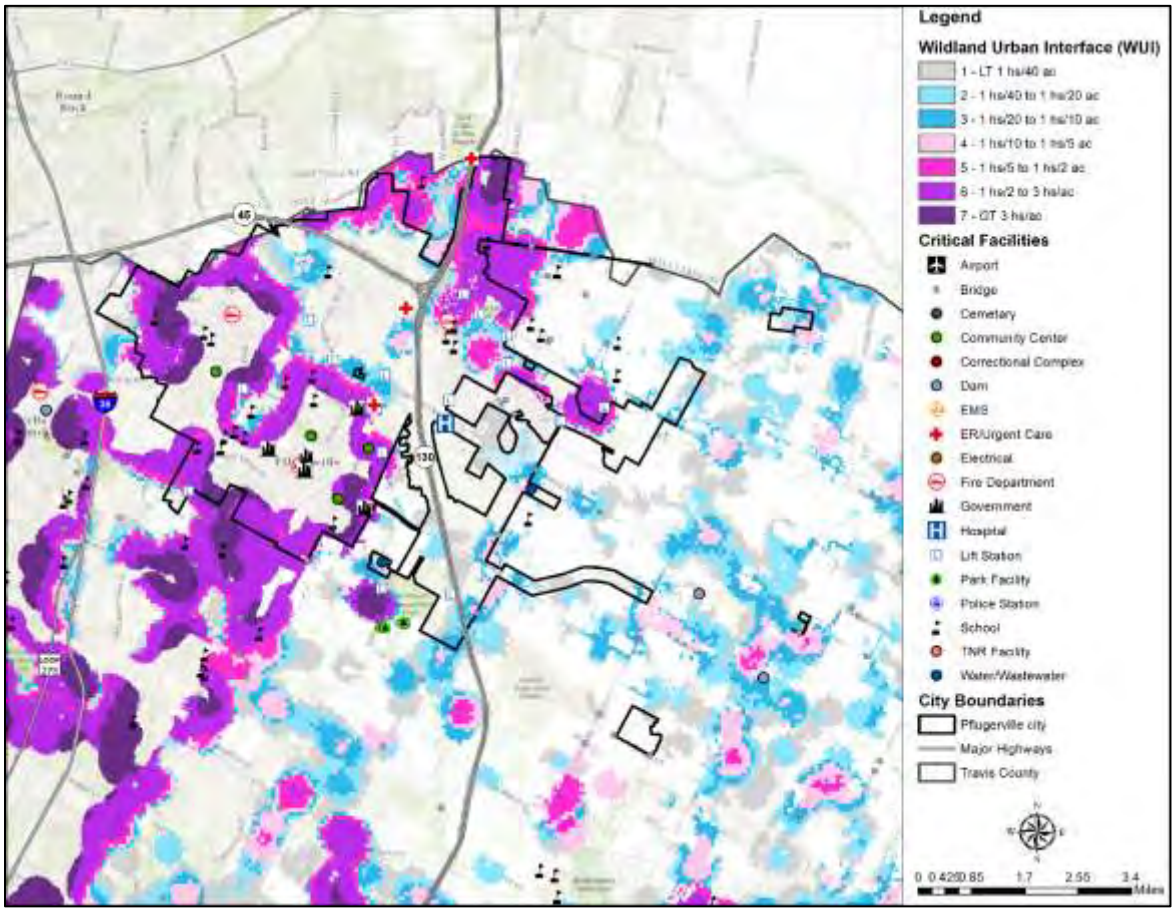
Figure 6-3. Wildland Urban Interface Map – Manor



Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
LT 1hs/40ac	12	0.6%	473	24.2%
1hs/40ac to 1hs/20ac	24	1.2%	386	19.7%
1hs/20ac to 1hs/10ac	31	1.5%	338	17.2%
1hs/10ac to 1hs/5ac	13	0.6%	197	10.1%
1hs/5ac to 1hs/2ac	10	0.5%	100	5.1%
1hs/2ac to 3hs/1ac	1,561	76.4%	415	21.2%
GT 3hs/1ac	392	19.2%	50	2.5%
Total	**2,043**	**100.0 %**	**1,959**	**100.0 %**

It is estimated that 73.4 percent of the total population in Manor live within the WUI. However, the entire City of Manor is at risk for wildfires.

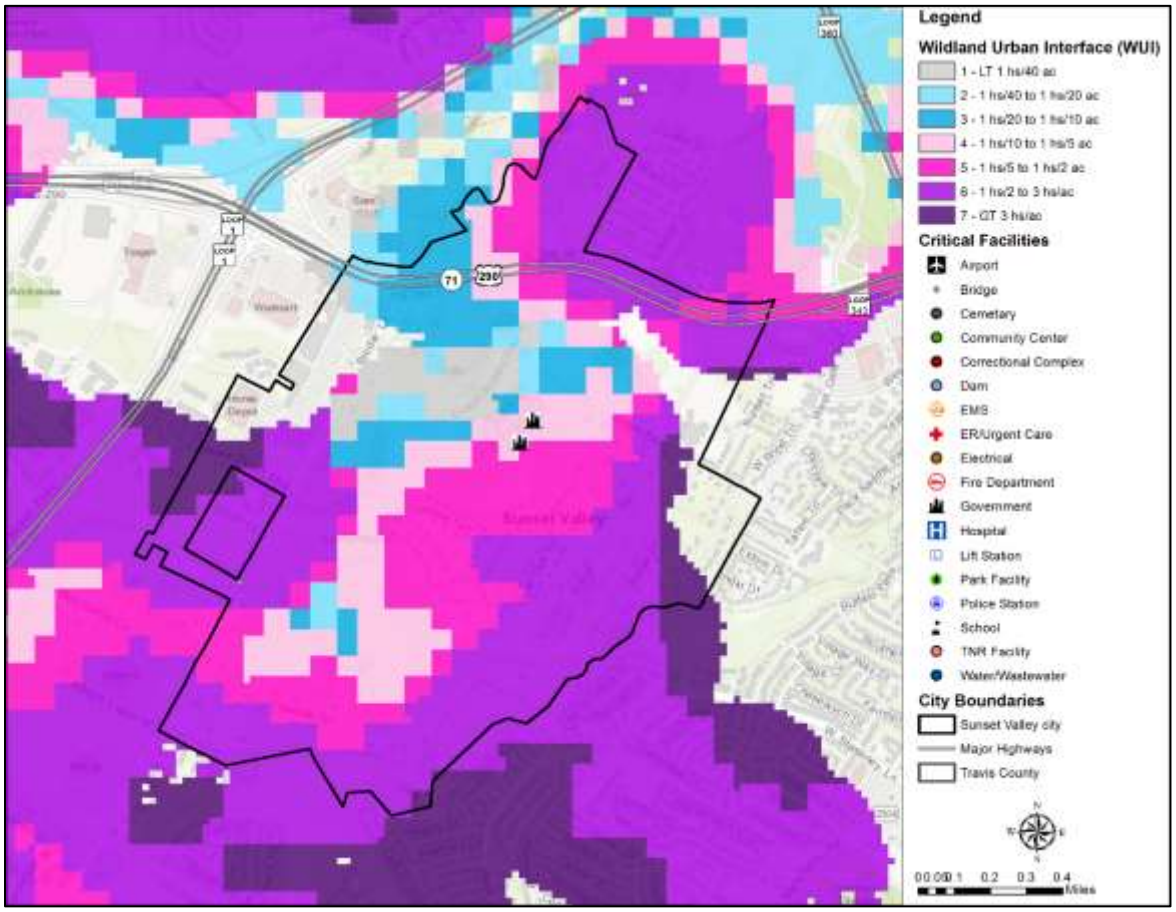
Figure 6-4. Wildland Urban Interface Map – Pflugerville



	Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
	LT 1hs/40ac	29	0.2 %	902	12.6%
	1hs/40ac to 1hs/20ac	19	0.1%	586	8.2%
	1hs/20ac to 1hs/10ac	76	0.4%	732	10.2%
	1hs/10ac to 1hs/5ac	64	0.3%	504	7.0%
	1hs/5ac to 1hs/2ac	366	2.0%	865	12.1%
	1hs/2ac to 3hs/1ac	7,713	42.1%	2,746	38.3%
	GT 3hs/1ac	10,067	54.9%	835	11.6%
	Total	**18,334**	**100.0 %**	**7,171**	**100.0 %**

It is estimated that 48.2 percent of the total population in Pflugerville live within the WUI. However, the entire City of Pflugerville is at risk for wildfires.

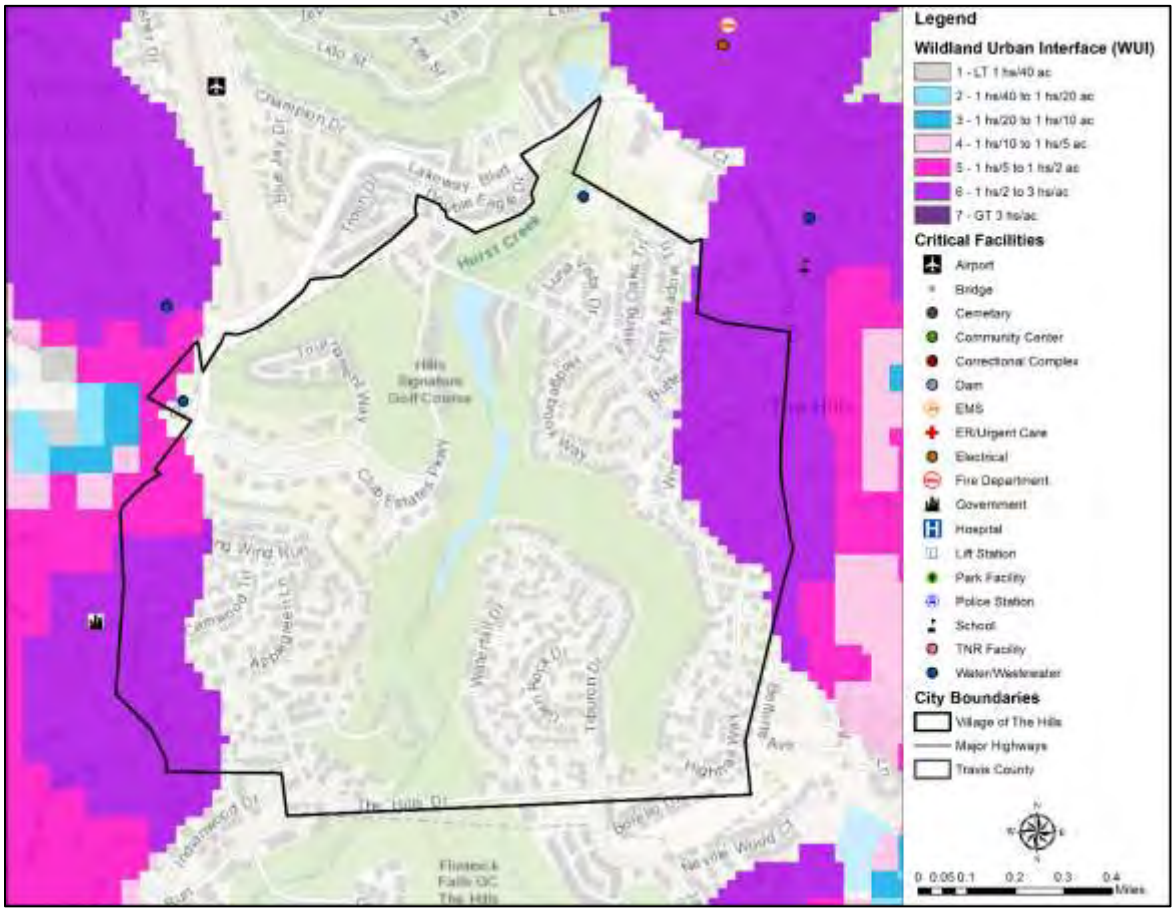
Figure 6-5. Wildland Urban Interface Map – Sunset Valley



Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
LT 1hs/40ac	1	0.2 %	43	5.3%
1hs/40ac to 1hs/20ac	0	0.0%	26	3.3%
1hs/20ac to 1hs/10ac	6	1.3%	71	8.9%
1hs/10ac to 1hs/5ac	13	2.8%	125	15.5%
1hs/5ac to 1hs/2ac	142	30.9%	187	23.3%
1hs/2ac to 3hs/1ac	263	57.2%	317	39.5%
GT 3hs/1ac	35	7.6%	34	4.2%
Total	**460**	**100.0 %**	**804**	**100.0 %**

It is estimated that 79.3 percent of the total population in Sunset Valley live within the WUI. However, the entire City of Sunset Valley is at risk for wildfires.

Figure 6-6. Wildland Urban Interface Map – Village of the Hills



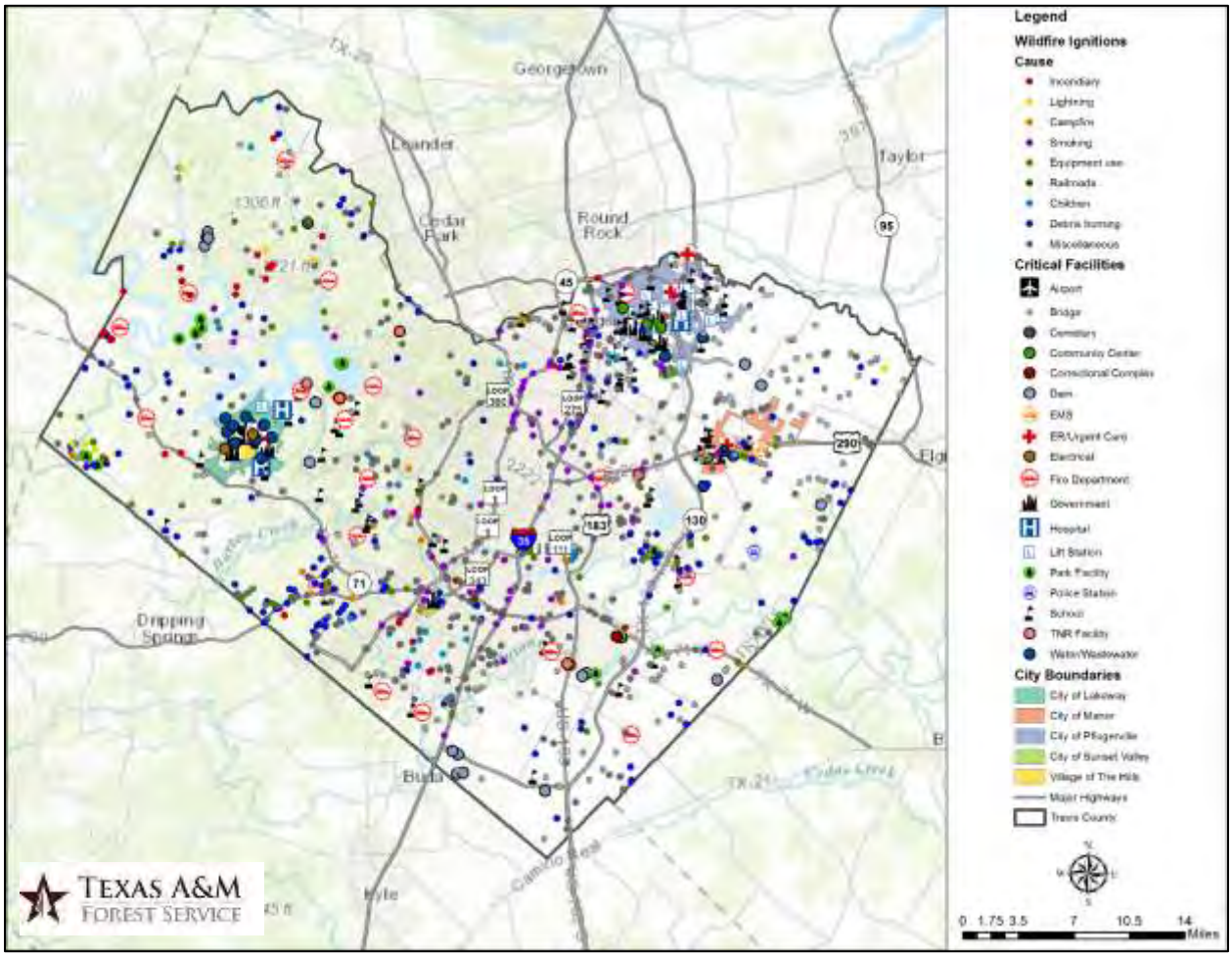
Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
LT 1hs/40ac	0	0.0%	0	0.0%
1hs/40ac to 1hs/20ac	0	0.0%	0	0.0%
1hs/20ac to 1hs/10ac	0	0.0%	0	0.0%
1hs/10ac to 1hs/5ac	0	0.0%	0	0.2%
1hs/5ac to 1hs/2ac	0	0.0%	15	15.2%
1hs/2ac to 3hs/1ac	414	100.0%	82	84.6%
GT 3hs/1ac	0	0.0%	0	0.0%
Total	**414**	**100.0 %**	**97**	**100.0 %**

It is estimated that 17.8 percent of the total population in the Village of the Hills live within the WUI. However, the entire Village of the Hills is at risk for wildfires.

HISTORICAL OCCURRENCES

The Texas A&M Forest Service (TAMFS) reported 768 wildfire events between 2005 and 2015. The National Centers for Environmental Information (NCEI) included 3 reported events from 2005 through January 2017, which are accounted for in the TAMFS reporting. The TAMFS started collecting wildfire data in 1985 and volunteer fire departments started reporting events in 2005. Due to a shortage of recorded data for wildfire events prior to 2005, frequency calculations are based on an eleven-year period, using only data from recorded years. The map below shows approximate locations of wildfires, which can be grass or brushfires of any size (Figure 6-7). Table 6-1 identifies the number of wildfires by jurisdiction, and total acreage burned.[4]

Figure 6-7. Location and Historic Wildfire Events for Travis County



[4] Event data, WUI, Fire Intensity Scale (FIS), and Ignition Density data provided by Texas A&M Forest Service Wildfire Risk Assessment Portal (TxWRAP).

Table 6-1. Historical Wildfire Events Summary

JURISDICTION	NUMBER OF EVENTS	ACRES BURNED
Travis County	768	14,729
Lakeway	0	0
Manor	6	21
Pflugerville	20	753
Sunset Valley	3	3
Village of the Hills	0	0

Table 6-2. Acreage of Suppressed Wildfire by Year

JURISDICTION	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Travis County	927	619	571	712	99	182	10,027	97	109	180	1,206
Lakeway	0	0	0	0	0	0	0	0	0	0	0
Manor	15	5	0	1	0	0	0	0	0	0	0
Pflugerville	551	15	0	7	0	172	0	0	0	5	3
Sunset Valley	0	0	0	1	0	0	0	1	1	0	0
Village of the Hills	0	0	0	0	0	0	0	0	0	0	0

SIGNIFICANT PAST EVENTS

September 4-7, 2011 – Travis County

During the first week of September 2011, Tropical Storm Lee made landfall along the Louisiana coast, causing strong winds to move across Texas. Those winds, combined with record heat, severe drought, low humidity and continued lack of rain sparked numerous wildfires in Texas. The Bastrop Complex Wildfire ignited on Sept. 4, in a small community 30 miles southeast of Austin. The fire burned rapidly out of control, scorching 32,400 acres (13,112 hectares) and destroying 1,696 residential and commercial structures. A second ignition, the Union Chapel Fire, ignited on Sept. 5, burning 720 acres (291 hectares) and destroying an additional 27 residential and commercial structures for a total loss of 1,723 structures. The fire was declared extinguished on Oct. 9, 2011. The Bastrop Complex Wildfire would go on record as the most destructive wildland urban interface wildfire event in Texas history, resulting in the loss of two lives on Sept.

5; it was the third largest wildland urban interface home loss fire to date in the nation preceded only by the Oakland Fire and the Cedar Fire, both in California.[5]

September 5, 2011 – Travis County

The Steiner Ranch Fire destroyed 24 homes in early September 2011. According to the Travis County Fire Marshal's Office, the fire was likely started by electrical lines that touched each other, causing them to spark and ignite the grass. The exceptional drought conditions, low humidity, high winds, and high temperatures all contributed to the ignition and spread of the wildfire. The Steiner Ranch Fire resulted in a FEMA Fire Management Assistance Declaration (FM-2960), which provided more than $235,000 in Federal fire suppression assistance.

September 4, 2011 – Travis & Burnet County

The 2011 Pedernales Bend wildfire, also known as the Spicewood Fire, destroyed more than 60 structures and burned more than 6,500 acres in western Travis County and eastern Burnet County. According to the Travis County Fire Marshal's Office, the fire was likely started by arcing electrical lines that touched each other, causing them to spark and ignite the grass. The exceptional drought conditions, low humidity, high winds, and high temperatures all contributed to the ignition and spread of the wildfire. The fire burned for 11 days. The wildfire resulted in a FEMA Fire Management Assistance Declaration (FM-2959), which provided more than $450,000 in Federal fire suppression assistance.

September 4, 2011 – City of Pflugerville & Travis County

The 2011 Hodde Fire destroyed 2 homes in the City of Pflugerville and burned 300-500 acres. According to the Travis County Fire Marshal's Office, the fire was likely started by arcing electrical lines that touched each other, causing them to spark and ignite the grass. The exceptional drought conditions, low humidity, high winds, and high temperatures all contributed to the ignition and spread of the wildfire. The wildfire resulted in a FEMA Fire Management Assistance Declaration (FM-2957), which provided more than $25,000 in Federal fire suppression assistance.

[5] Source: Ridenour, Karen, Sean Rissel, Wade Powell, Rich Gray, Mike Fisher, and Julie Sommerfeld. Bastrop Complex Wildfire Case Study. Texas Forest Service and Bastrop County Office of Emergency Management, 2012. http://www.co.bastrop.tx.us/upload/page/0019/docs/Bastrop%20case%20study05212012%20FinalVersion.pdf.

November 15, 2006 – Travis & Hays County

A home builder burning trash and construction debris started a wildfire that burned approximately 1,200 acres in Southern Travis County and Hays County. The fire burned overnight and required evacuations and road closures.

EXTENT

John L. Keetch and George Byram designed the Keetch-Byram Drought Index (KBDI) specifically as a tool in fire potential assessment. 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 drier and hotter conditions.

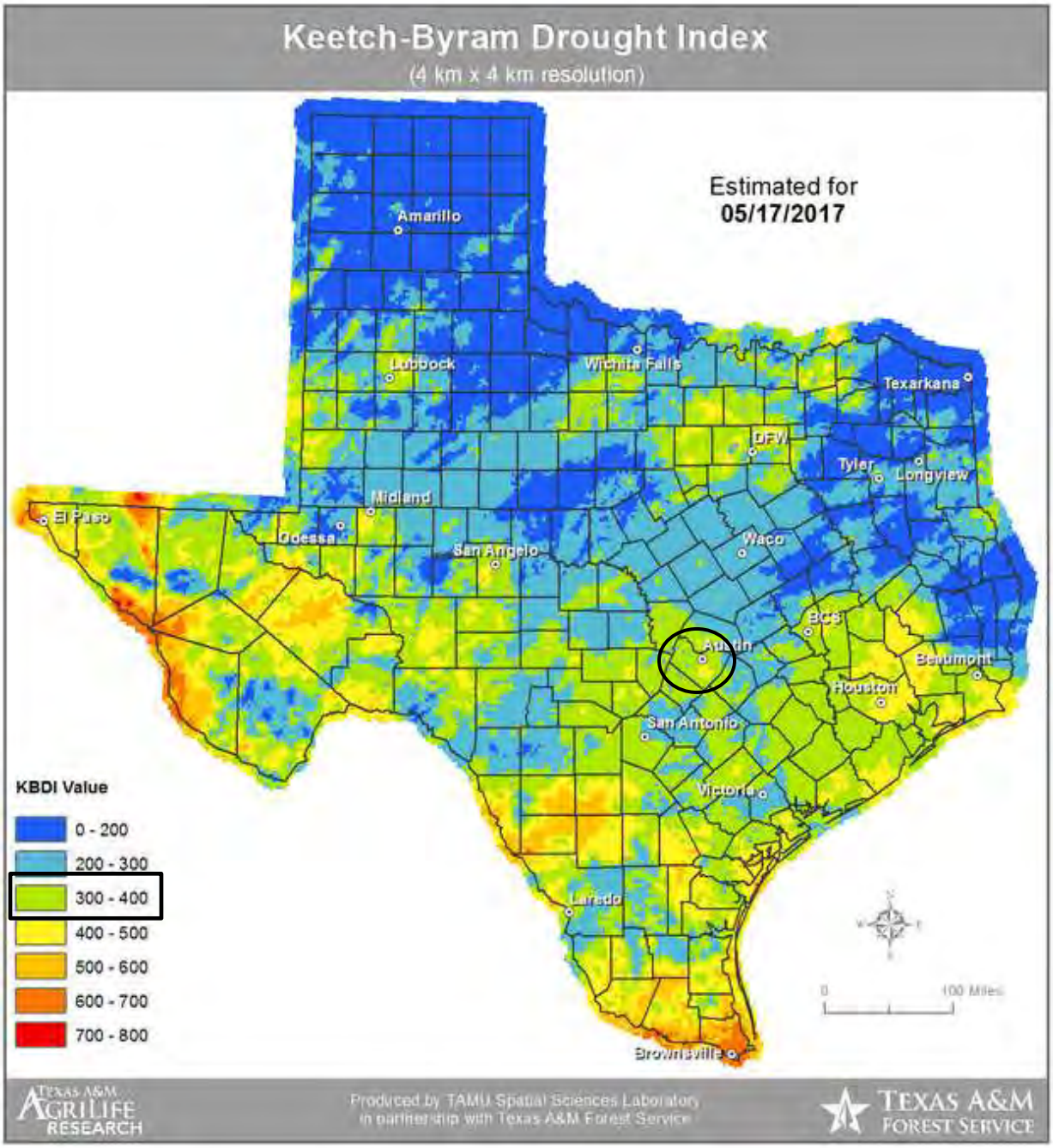
The KBDI is a number representing the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency in deep duff and upper soil layers. It is a continuous index, relating to the flammability of organic material in the ground.[6] High values of the KBDI are an indication that conditions are favorable for the occurrence and spread of wildfires, but drought is not by itself a prerequisite for wildfires.[7]

Each color in Figure 6-8 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. The drought index in Travis County can vary greatly, as shown below. The planning area is currently predominately at the range of intensity of 300 to 400 (Figure 6-8); however, the planning area has experienced ranges of 700 to 800 over the last ten years (Figure 6-9).

[6] http://ticc.tamu.edu/Documents/PredictiveServices/Drought/KBDI_Fact_Sheet.pdf

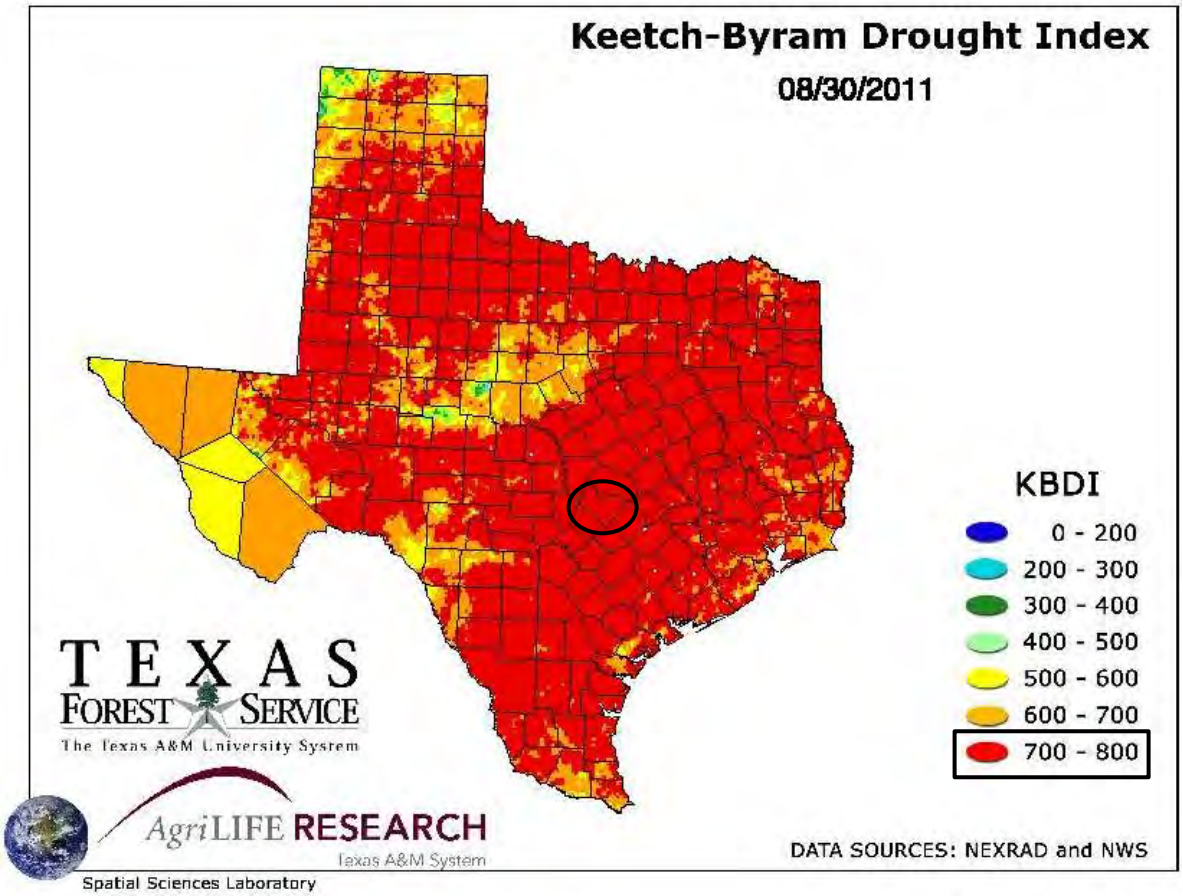
[7] http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Wildland-Fire/Keetch-Byram-Drought-Index-KBDI

Figure 6-8. Keetch-Byram Drought Index (KBDI) for the State of Texas, 2017[8]



[8] Travis County is located within the black circle.

Figure 6-9. Keetch-Byram Drought Index (KBDI) for the State of Texas, 2011[9]



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.

[9] Travis County is located within the black circle.

The range of intensity for Travis County in a wildfire event is within 600 to 700. At a KBDI of 550 or greater, the Travis County planning area is considered at risk for potential wildfires. When wildfire risk is elevated, the planning area utilizes additional methods to determine wildfire potential. Other indicators employed to determine risk and potential employment of mitigation measures at an elevated KBDI level include:

- Relative Humidity - The amount of water vapor present in air expressed as a percentage of the amount needed for saturation at the same temperature.
- Fuel Moisture - A measure of the amount of water in a fuel (vegetation) available to a fire, and is expressed as a percent of the dry weight of that specific fuel.
- Ignition Component - The number that relates the probability that a fire will result if a firebrand is introduced into a fine fuel complex. The ignition component can range from zero, when conditions are cool and damp, to 100 on days when the weather is dry and windy. Theoretically, on a day when the ignition component registers a 60 approximately 60% of all firebrands that encounter wildland fuels will require suppression action.
- The Spread Component - A numerical value derived from a mathematical model that integrates the effects of wind and slope with fuel bed and fuel particle properties to compute the forward rate of spread at the head of the fire.
- Haines Index - A weather index that measures the potential for dry, unstable air to contribute to the development of large or erratic wildland fires.
- Energy Release Component (ERC) - A number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire. Daily variations in ERC are due to changes in moisture content of the various fuels present, both live and dead.

All of these indicators are taken into account when determining the fire danger for a specific area throughout the planning area.

The Texas Forest Service's Fire Intensity Scale (FIS) identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist, based on the weighted average of four percentile weather categories. FIS provides a standard scale to measure potential wildfire intensity. FIS consist of 5 classes where the order of magnitude between classes is ten-fold. The minimum class, Class 1, represents very low wildfire intensities and the maximum class, Class 5, represents very high wildfire intensities. Table 6-3 provides each FIS class along with a description.

Table 6-3. Fire Intensity Scale (FIS)[10]

CLASS	MAGNITUDE	DESCRIPTION
Class 1	Very Low	Very small, discontinuous flames, usually less than 1 foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and non-specialized equipment.
Class 2	Low	Small flames, usually less than two feet long; small amount of very short range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.
Class 3	Moderate	Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.
Class 4	High	Large Flames, up to 30 feet in length; short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property.
Class 5	Very High	Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

Travis County is between potential moderate to high wildfire intensities. Figures 6-10 through 6-15[11] identify the wildfire intensity for the Travis County planning area. The FIS provides a standard scale to measure potential wildfire intensity based on generalized landscape characteristics, which may not reflect the level of detail on local conditions typically found in a Community Wildfire Protection Plan. A more in-depth analysis of fire risk in the planning area is provided in Section 4 of the Austin-Travis County CWPP.

[10] Texas A&M Forest Service, TxWRAP User Manual October 2012

[11] Event data, WUI, Fire Intensity Scale (FIS), and Ignition Density data provided by Texas A&M Forest Service Wildfire Risk Assessment Portal (TxWRAP).

Figure 6-10. Fire Intensity Scale Map – Travis County

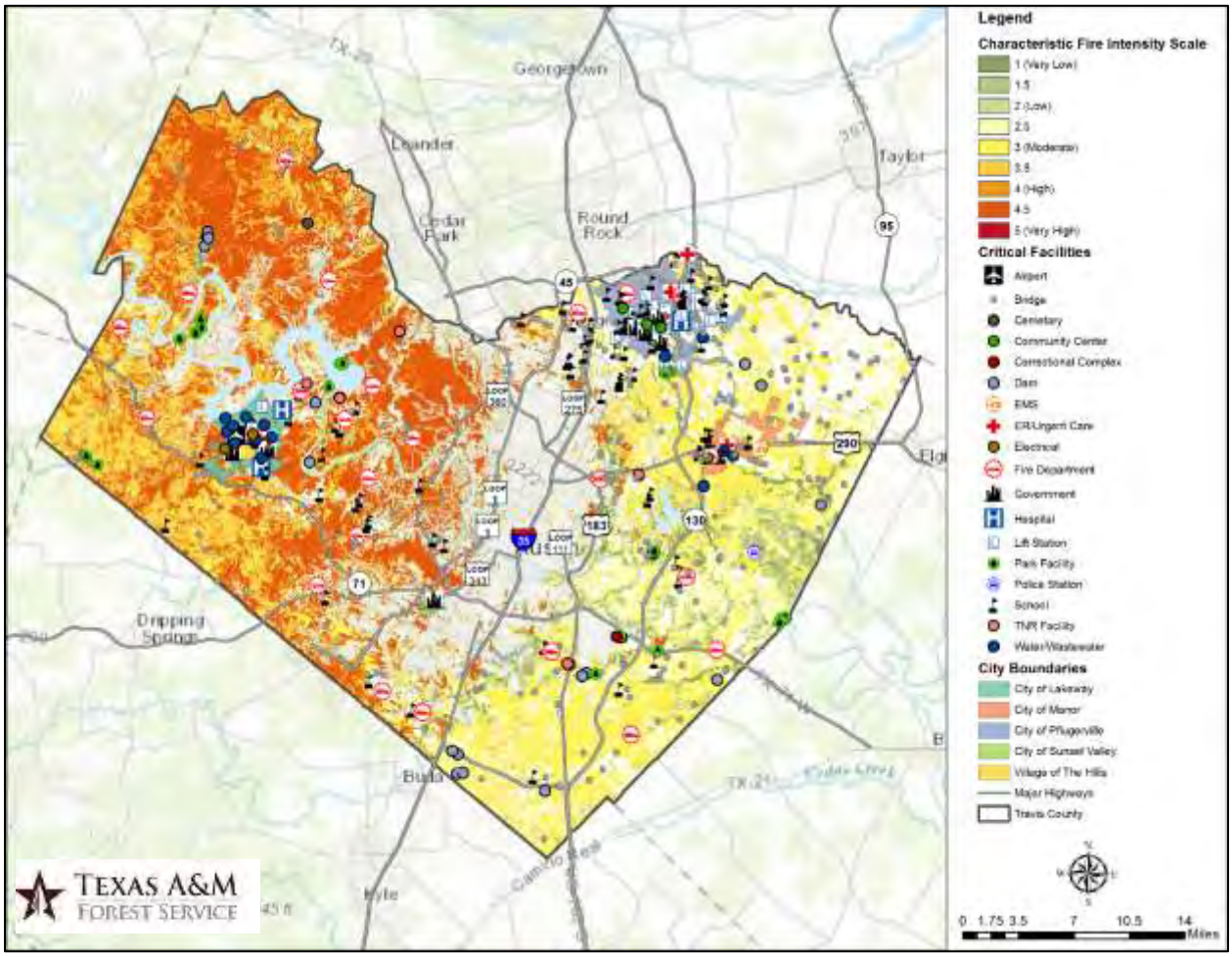


Figure 6-11. Fire Intensity Scale Map – Lakeway

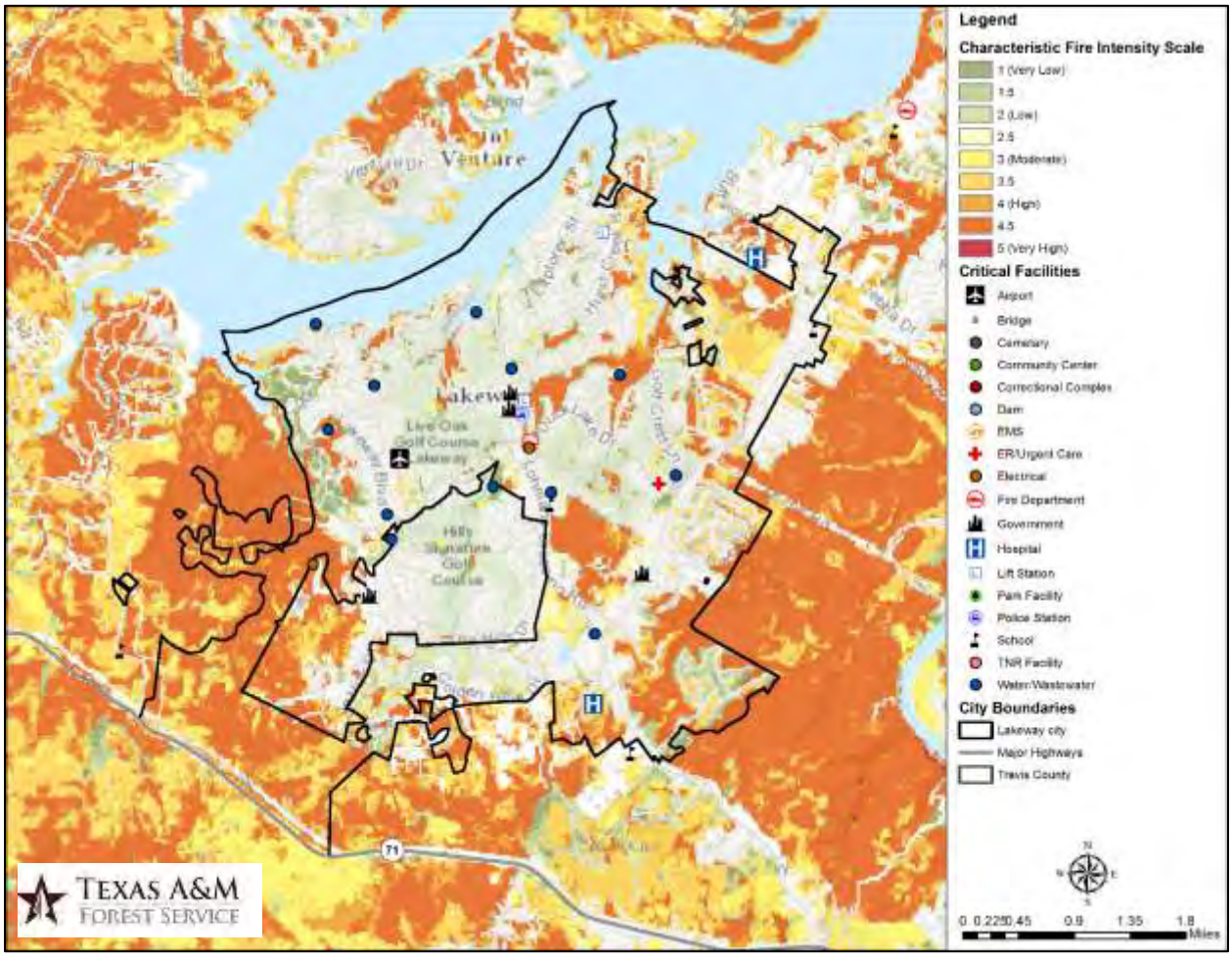


Figure 6-12. Fire Intensity Scale Map – Manor

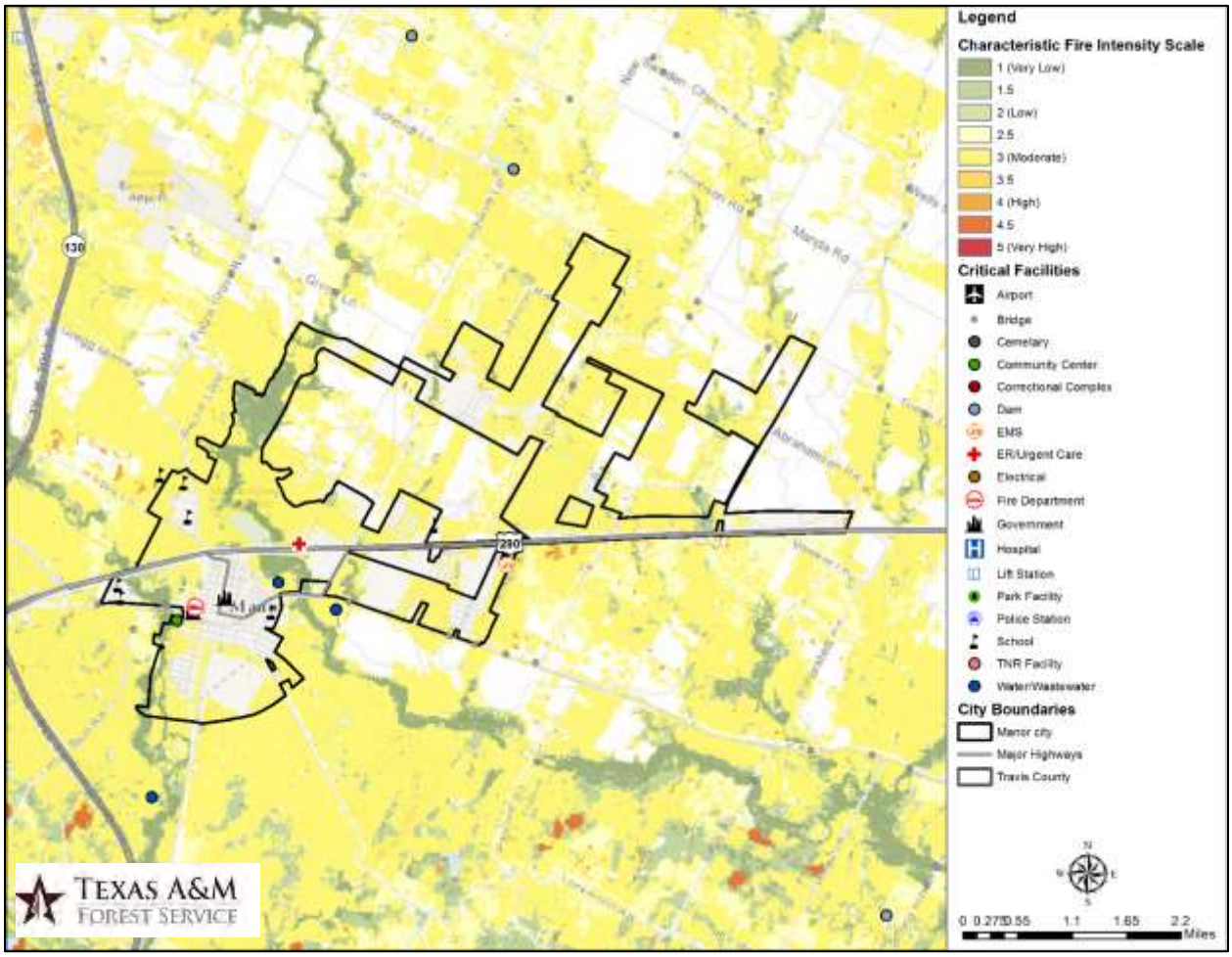


Figure 6-13. Fire Intensity Scale Map – Pflugerville

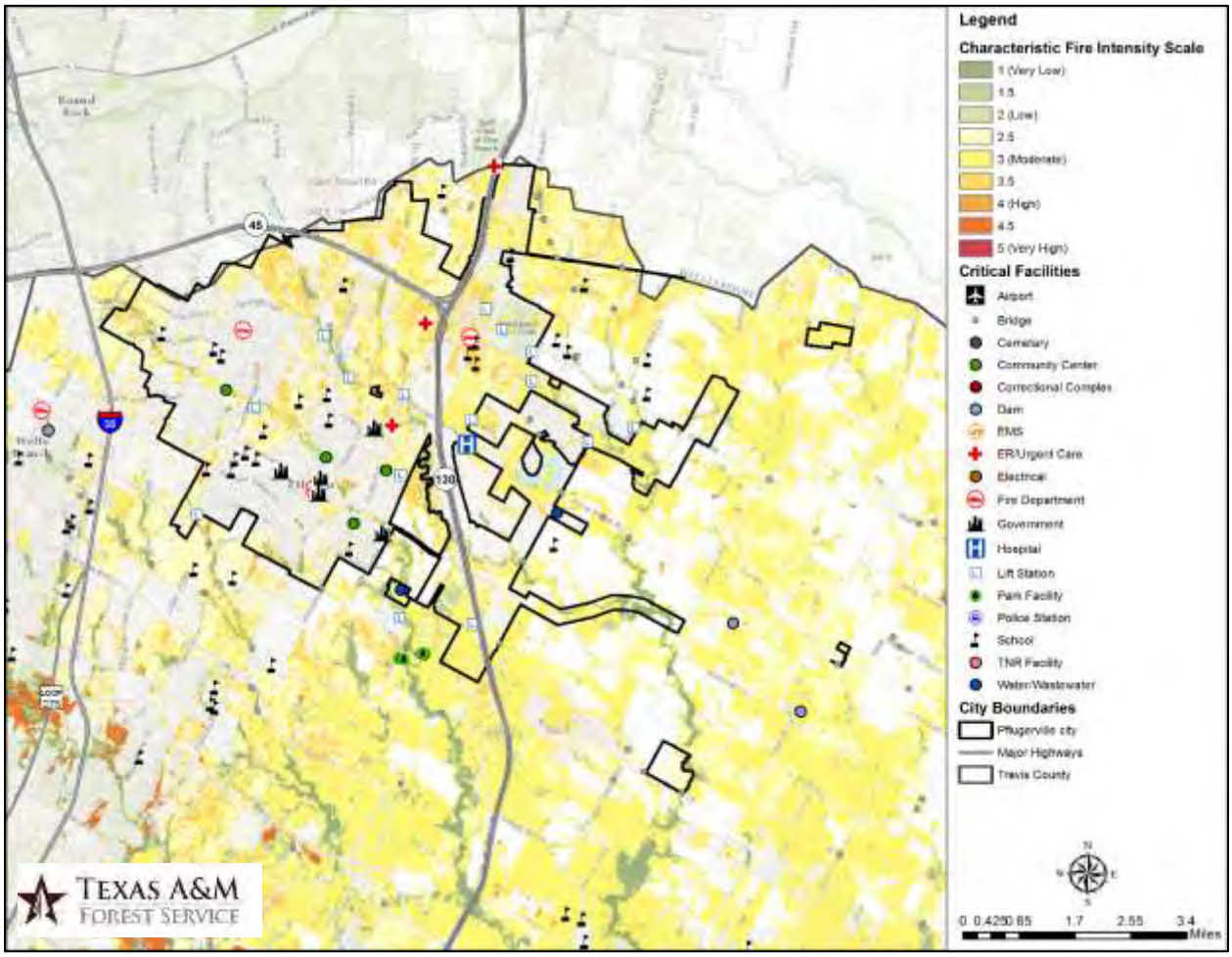


Figure 6-14. Fire Intensity Scale Map – Sunset Valley

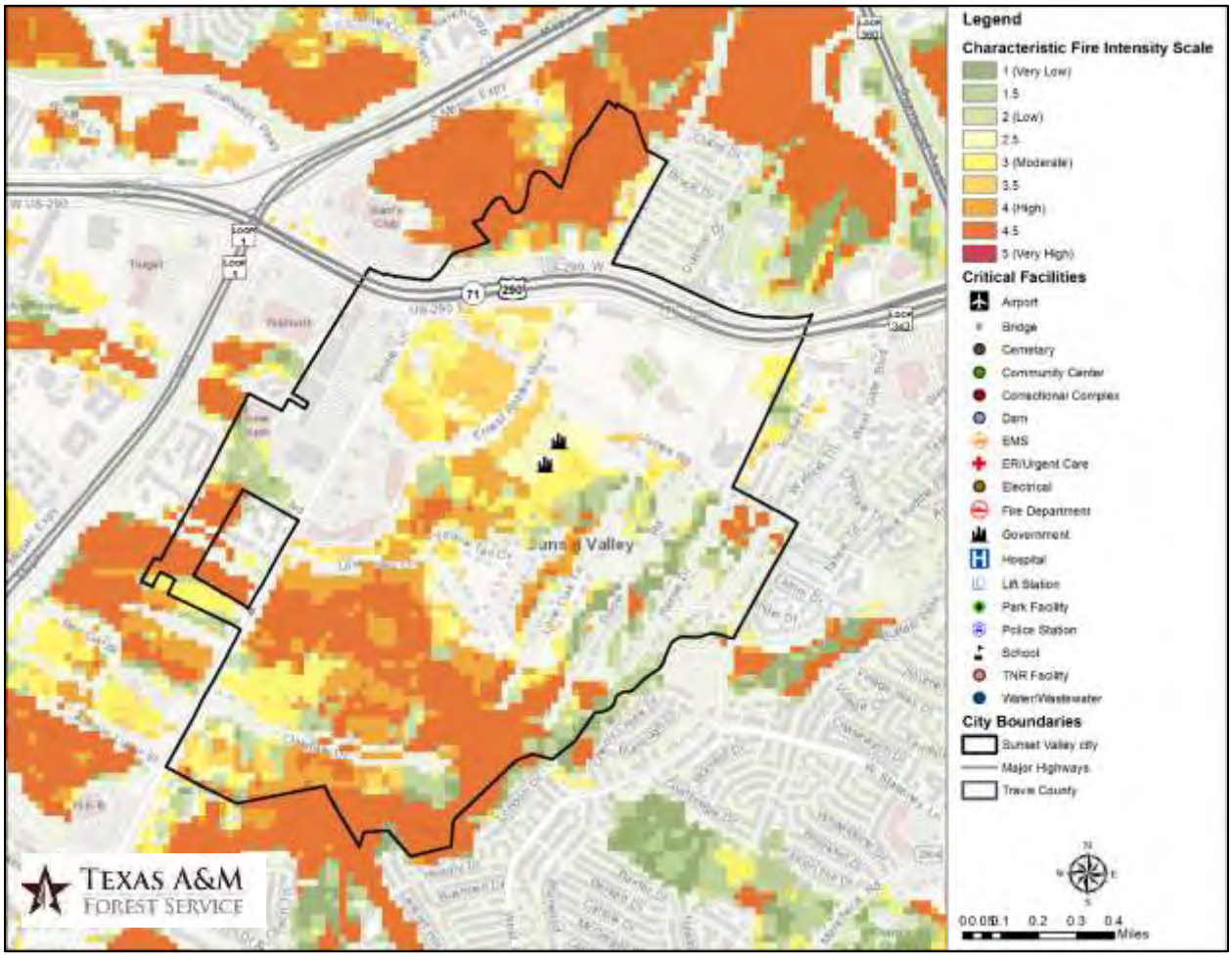
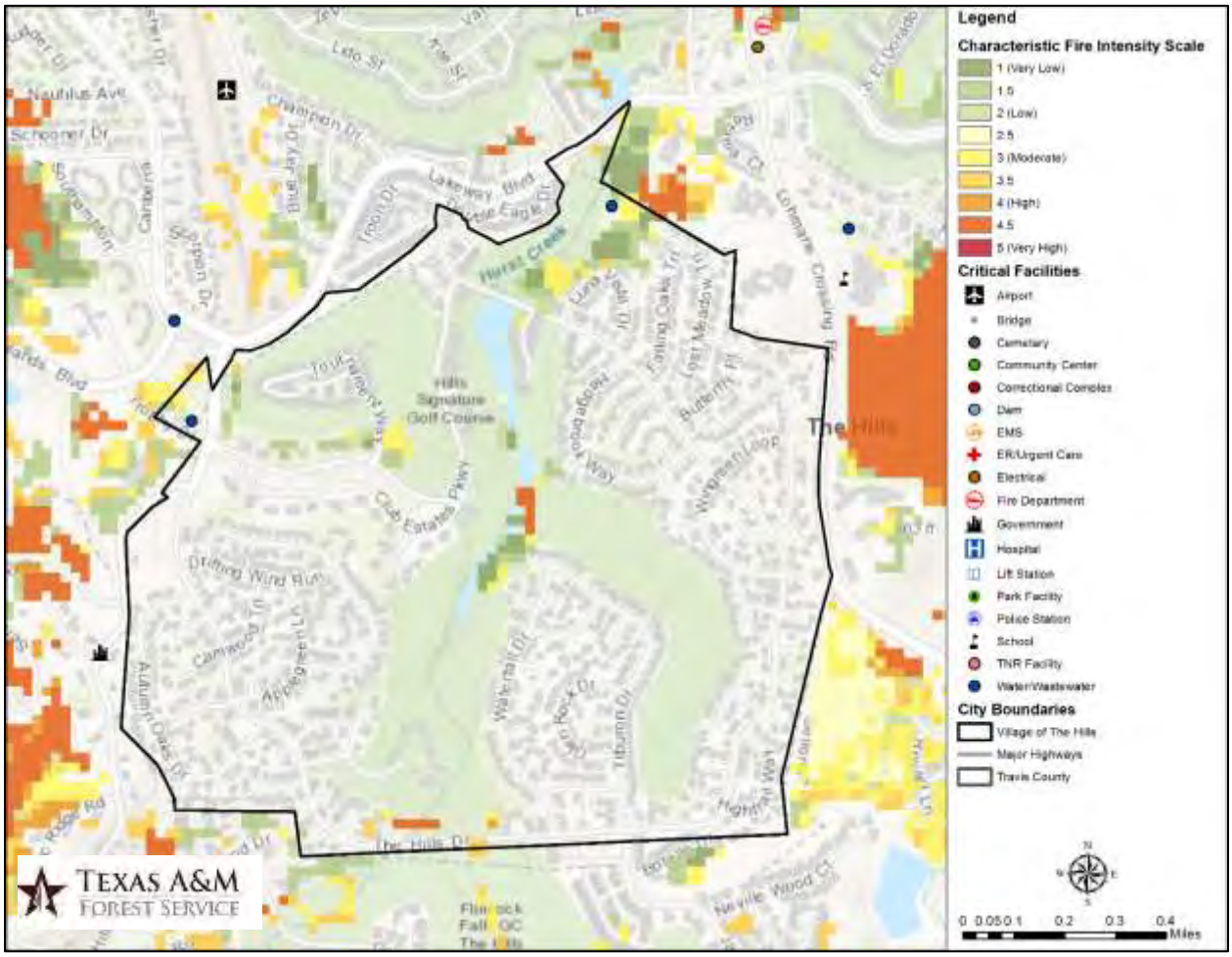


Figure 6-15. Fire Intensity Scale Map – Village of the Hills



PROBABILITY OF FUTURE EVENTS

Wildfires can occur at any time of the year. As the jurisdictions within the County move into wildland, the potential area of occurrence of wildfire increases. With 792 events in an 11 year period, an event within Travis County, including all participating jurisdictions, is highly likely - meaning an event is probable within the next year.

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. Key to a building's survival in a wildfire is the ignitability of its building materials including roof and siding, and its surrounding environment, including trees and other vegetation growing nearby. An area up to 200 feet around a home is known as the Home Ignition Zone (HIZ). It's the space most vulnerable to a wildfire approaching the structure. This 200-foot zone is the area within the WUI where fuels mitigation pays the biggest dividends. The first 30 feet around

the home within this HIZ, called the Defensible Space, is the most important because the fuel here can catch your house on fire.[12]

The heavily populated, urban areas of Travis County are not likely to experience large sweeping fires. More rural areas, typically outside of the city limits and in the unincorporated areas of Travis 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. While a number of neighborhoods, organizations, and communities throughout the planning area are making strides towards becoming fire adapted through the development of local CWPPs, achieving Firewise Communities recognition status, and/or participating in the Ready, Set, Go! Program, many areas remain vulnerable. Figures 6-1 through 6-6[13] illustrate the areas that are the most vulnerable to wildfire throughout the County.

The sparsely populated participating jurisdictions and rural areas of Travis County are capable of experiencing large sweeping fires, especially where areas of vegetation are not maintained. Areas along major highways have an increased vulnerability where empty lots and unoccupied areas are located.

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

Table 6-4. Critical Facilities Located in WUI by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Travis County	1 Hospital, 28 Public Schools, 4 EMS Stations, 1 Public Safety Training Center, 1 AFD Training Center, 17 Fire Departments, 6 Private Schools, 2 Community Centers, 22 TNR Facilities, 22 TNR Park Facilities, 2 ER/Urgent Care Facilities, 1 Cemetery, 30 Correctional Complexes, 160 Bridges
Lakeway	1 Electrical Substation, 2 Fire Departments, 3 Government Facilities, 1 Hospital, 2 Lift Stations, 1 Police Station, 3 Schools, 7 Water/Waste Water Facilities
Manor	1 Community Center, 1 Fire Department, 2 Government Facilities, 3 Schools, 2 Water/Waste Water Facilities
Pflugerville	2 ER/Urgent Care Facilities, 1 Fire Department, 15 Schools, 11 Lift Stations, 2 Community Centers, 2 Government Facilities
Sunset Valley	3 Government Facilities, 1 Police Station
Village of the Hills	1 Government Facility

[12] Travis County CWPP

[13] Figures and data provided by Texas A&M Forest Service (TAMFS).

Additional facilities of concern within the Travis county planning area include those facilities with populations who require additional considerations in the event of a wildfire. A summary of these facilities are found in Table 6-5.

Table 6-5. Facilities of Concern in the entire Planning Area[14]

FACILITY TYPE	SUMMARY
Schools	There are 174 public, private, and charter schools for kindergarten through high school and 15 school districts in Travis County (Texas Education Agency 2012; Texas Private School Accreditation Commission 2012). Travis County is also home to six major universities and colleges including the University of Texas at Austin and Austin Community College, two of the largest in the U.S. (U.S. Department of Education 2012).
Hospitals / Nursing Homes	According to the Texas Department of State Health Services (2013), there are 23 acute care and psychiatric hospitals in the planning area. According to the Texas Department of Aging and Disability Services there are 31 nursing homes in the planning area (2017).
Military Installations	Camp Mabry – the third-oldest active military installation in Texas, houses the headquarters of the Texas Military Forces (Texas Army National Guard, Texas Air National Guard, and Texas State Guard) on a 90-acre site that was added to the National Registry of Historic Places in 1996.

Within Travis County, including all participating jurisdictions, a total of 792 fire events were reported from 2005 to 2015. All of these events were suspected wildfires. Historic loss and annualized estimates due to wildfires are presented in Table 6-6 below. The frequency is approximately 72 events every year.

Table 6-6. Historic Loss Estimates Due to Wildfire[15]

JURISDICTION	NUMBER OF EVENTS	ACRES BURNED	ANNUAL ACRE LOSSES
Travis County	763	14,574	1,325
Lakeway	0	0	0
Manor	6	21	1.9
Pflugerville	20	1,253	62.65
Sunset Valley	3	3	0.27
Village of the Hills	0	0	0

[14] Austin-Travis County CWPP, 2014

[15] Events divided by 10 years of data.

Figure 6-16 provides a structure combustion risk ranking throughout Travis County as indicated in the Austin-Travis County Community Wildfire Protection Plan (CWPP). This indicates the probability of structure loss for the area in the event of a wildfire. Table 6-7 provides the probability for each participating jurisdiction below.

Figure 6-16. Structure Combustion Risk – Travis County

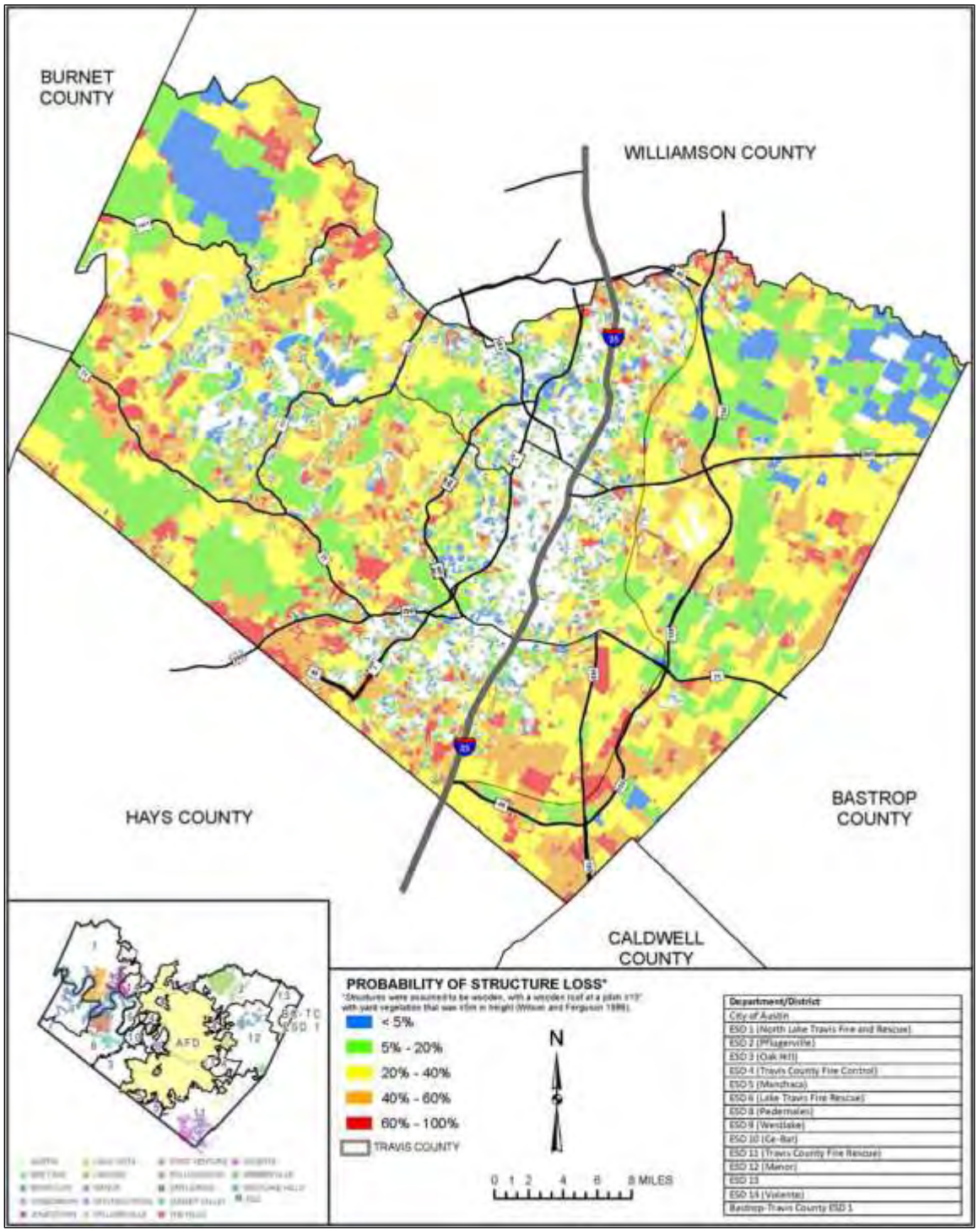


Table 6-7. Probability of Structure Loss by Jurisdiction

JURISDICTION	PROBABILITY
Travis County	2.8% - 38.7%
Lakeway	17%
Manor	24.5%
Pflugerville	19.8%
Sunset Valley	28.6%
Village of the Hills	23.1%

Figures 6-17 through 6-22[16] show the threat of wildfire to Travis County and participating jurisdictions.

[16] Event data, WUI, Fire Intensity Scale (FIS), and Ignition Density data provided by Texas A&M Forest Service Wildfire Risk Assessment Portal (TxWRAP).

Figure 6-17. Wildfire Ignition Density – Travis County

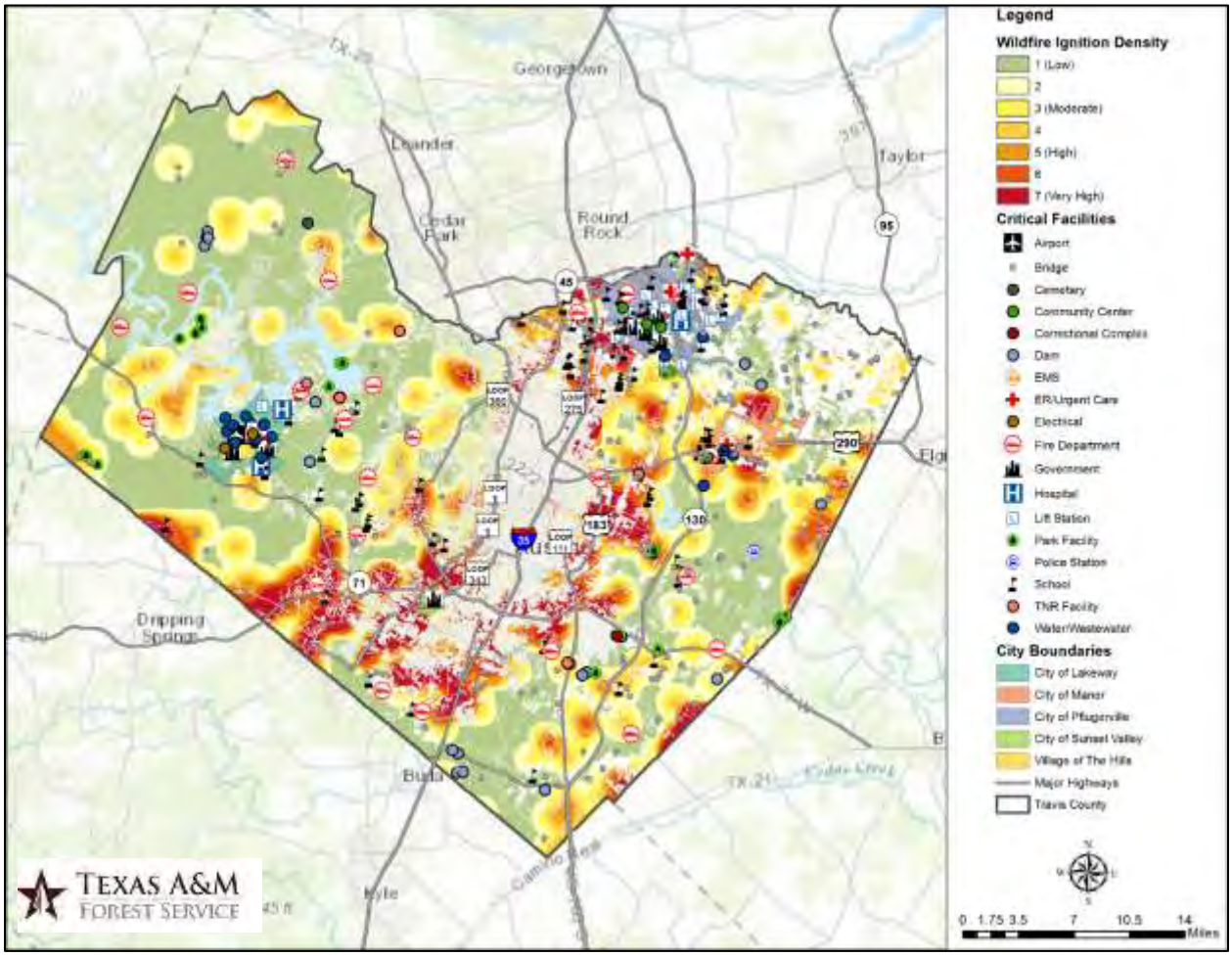


Figure 6-18. Wildfire Ignition Density – Lakeway

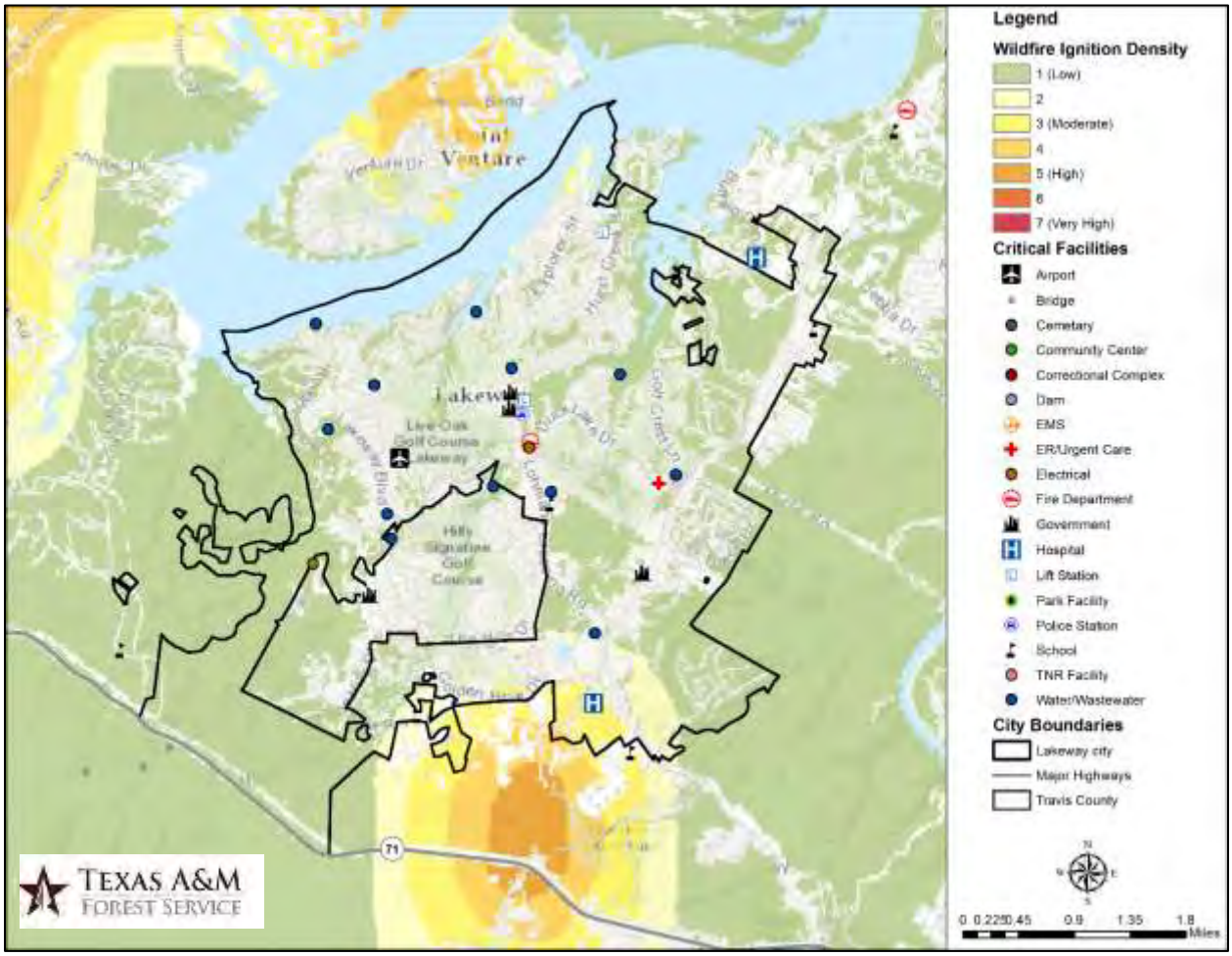


Figure 6-19. Wildfire Ignition Density – Manor

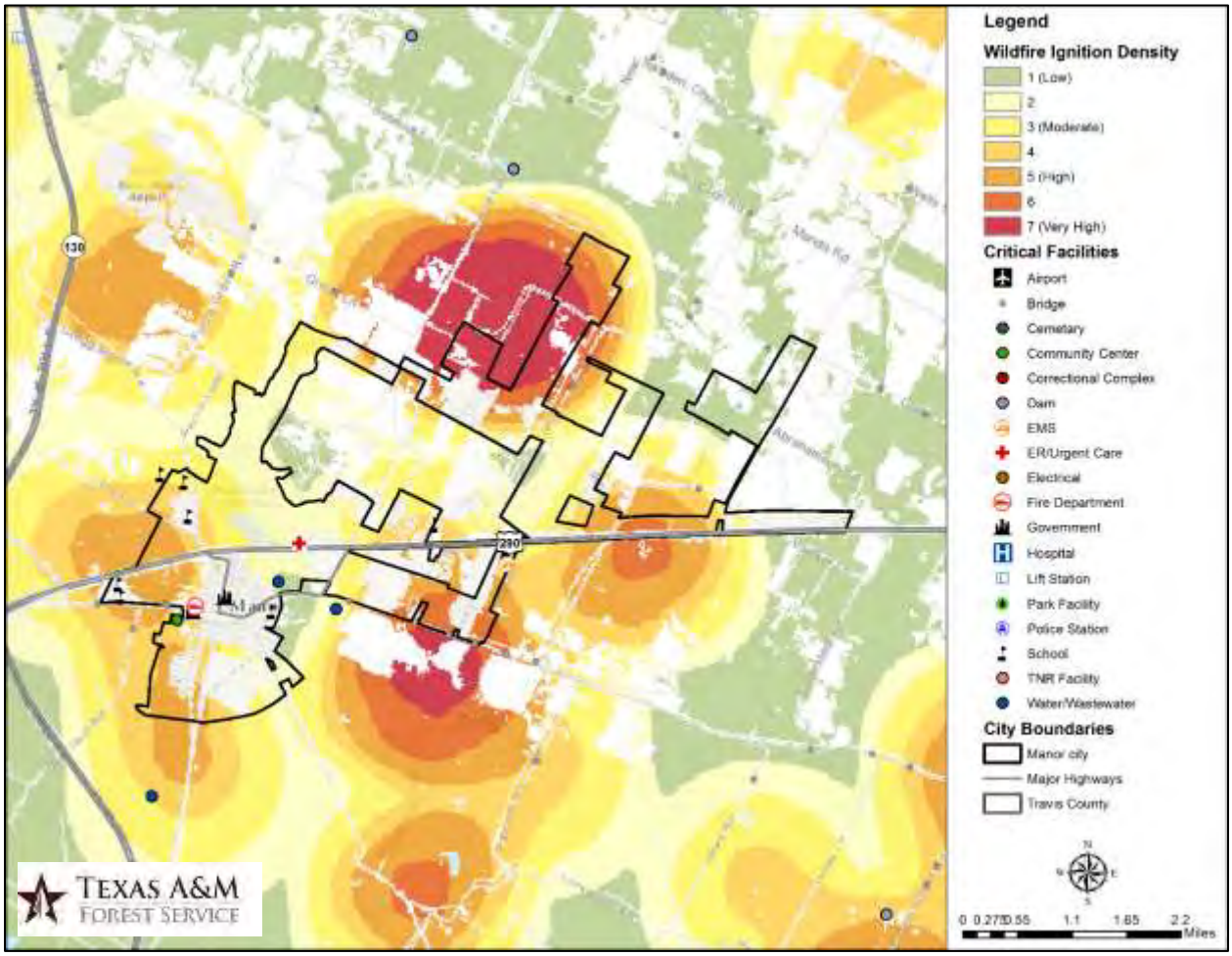


Figure 6-20. Wildfire Ignition Density – Pflugerville

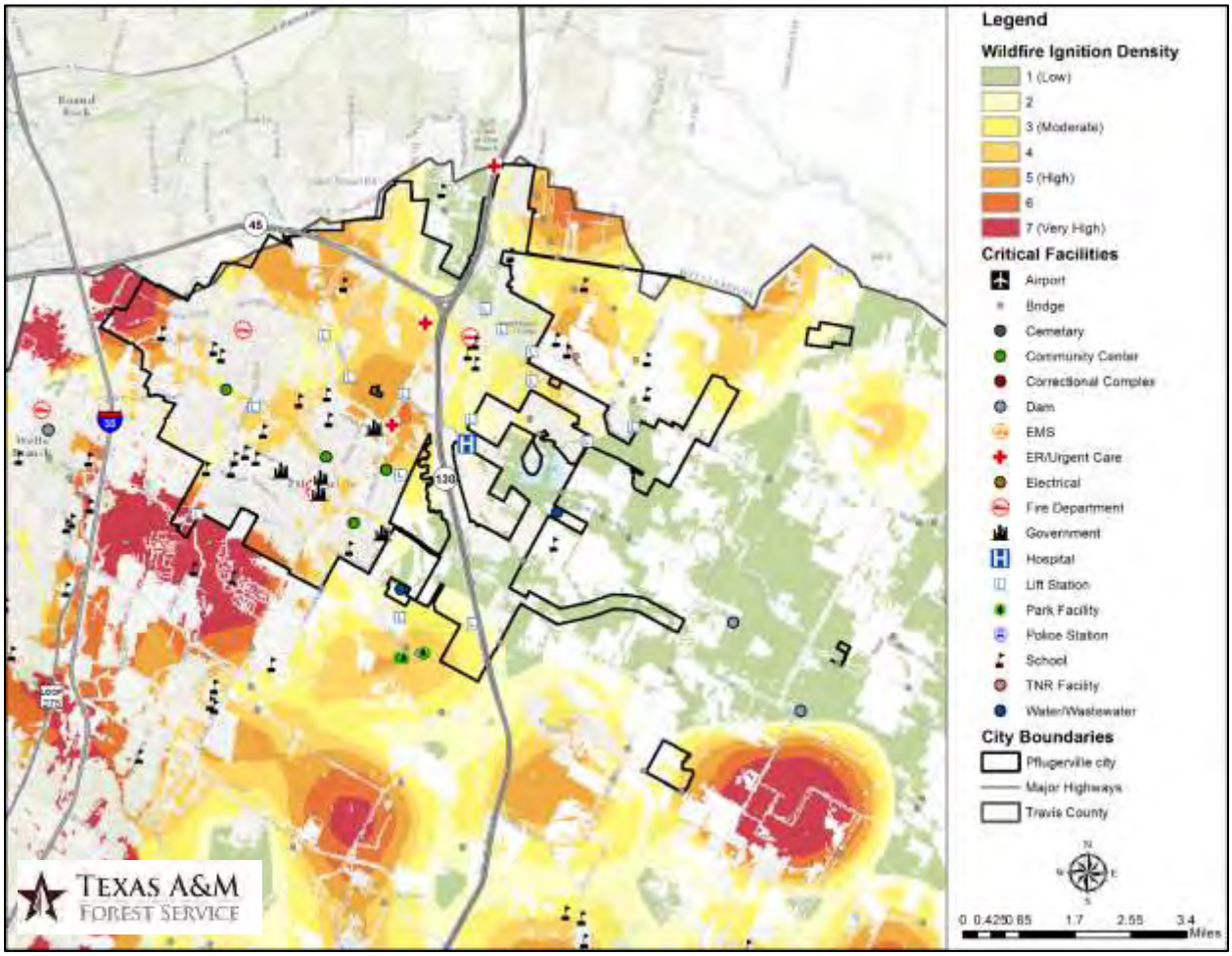


Figure 6-21. Wildfire Ignition Density – Sunset Valley

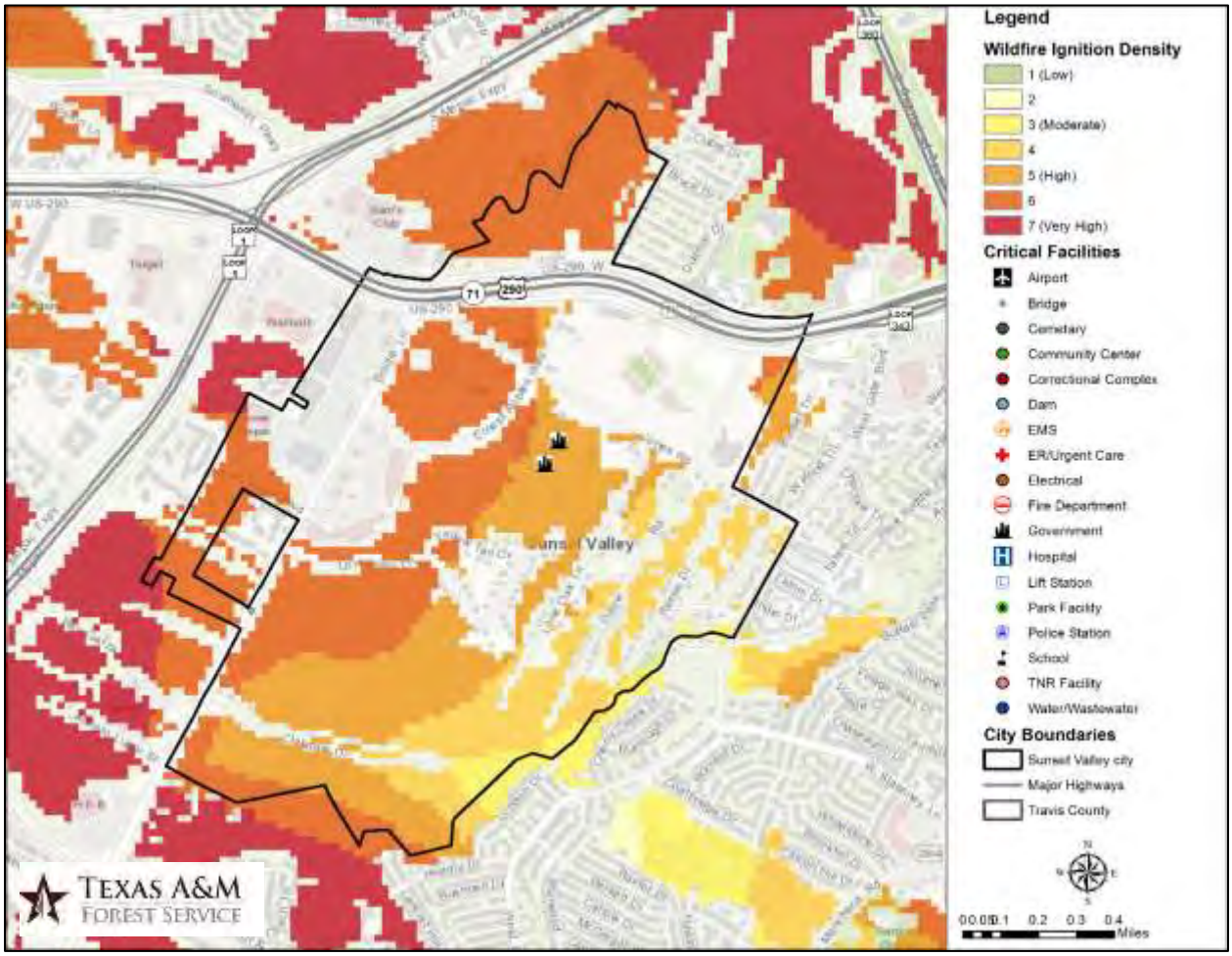
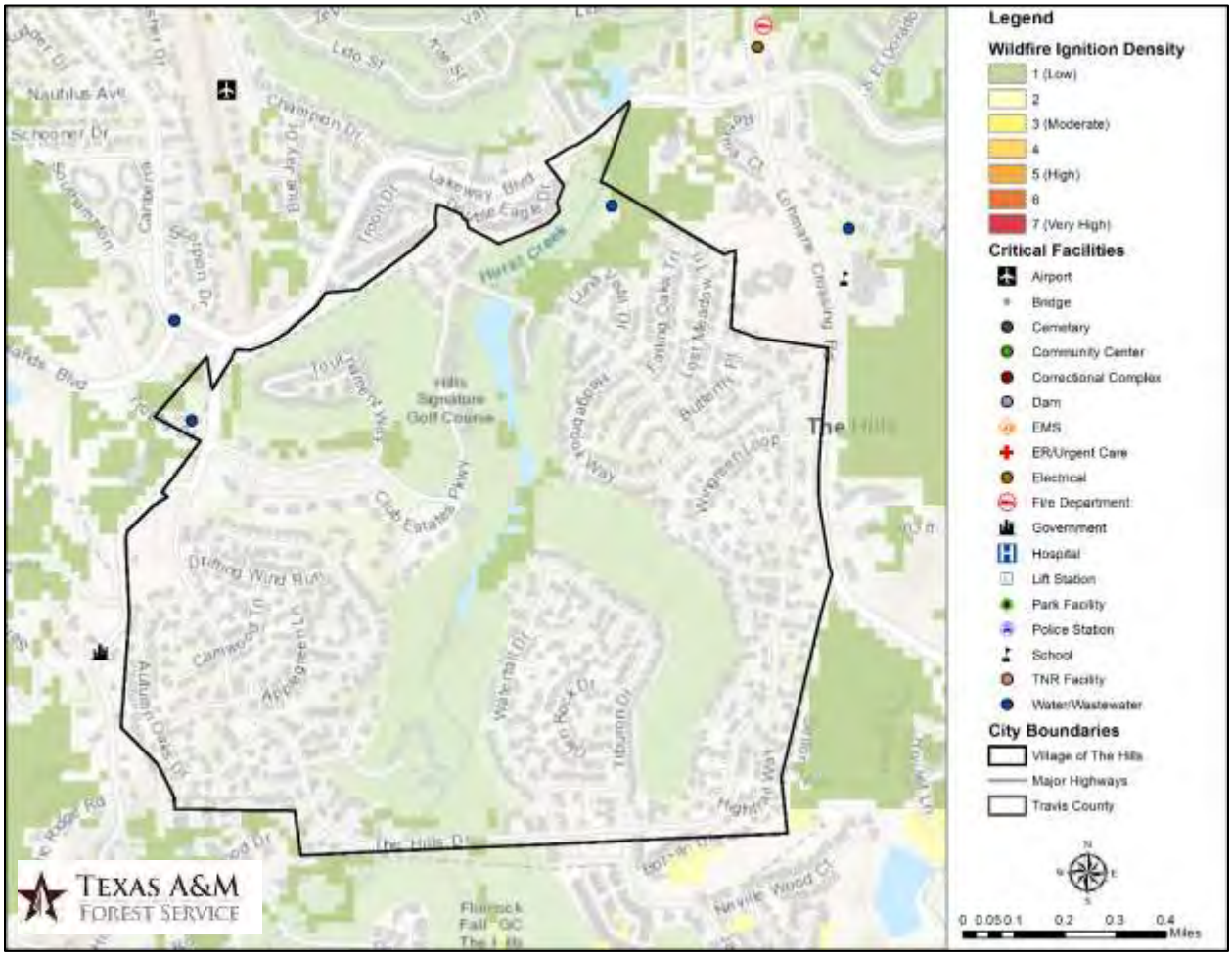


Figure 6-22. Wildfire Ignition Density – Village of the Hills



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 injuries and fatalities. Based on these factors, the impact for each participating

jurisdiction is listed below in Table 6-8. For the Travis County planning area, the impact from a wildfire event can be considered “Minor," meaning injuries and/or illnesses are treatable with first aid, shutdown of facilities and services for 24 hours or less, and less than 10 percent of property is destroyed or with major damage.

Table 6-8. Impact by Jurisdiction

JURISDICTION	IMPACT	DESCRIPTION
Travis County	Minor	Travis County has an estimated 463,092 people, or 45 percent of the total population, living within the Wildland Urban Interface (WUI). Travis County residents, including citizens in unincorporated areas, could be injured or suffer illnesses, but not permanent disability. Critical facilities could be shut down for a week and 10 percent of total property could be damaged.
Lakeway	Minor	The largest population in the City of Lakeway live in an area that is lightly-dense (1 house per 2 acres to 1 house per 3 acres) in the WUI, and the City has a moderate wildfire threat. Although there is a moderate wildfire risk, no wildfire events have been reported for the community in the past 11 years. Therefore, citizens could be injured or suffer illnesses, but not permanent disability. Critical facilities could be shut down for a week and 10 percent of total property could be damaged.
Manor	Minor	The majority of the population in the City of Manor live within a semi-dense (1 house per 2 acres to 3 houses per 1 acre) area in the WUI, with an estimated 73 percent of the total population living within the WUI. Those areas have a low to moderate wildfire risk. There have been 6 wildfire events over the last 11 years and 21 acres burned. Therefore, citizens could be injured or suffer illnesses, but not permanent disability. Critical facilities could be shut down for a week and 10 percent of total property could be damaged.
Pflugerville	Minor	The largest population in the City of Pflugerville live in an area that is semi-dense (1 house per 2 acres to 3 houses per 1 acre) in the WUI, and the City has a moderate wildfire threat. There have been 20 wildfire events in the past 11 years. Therefore, citizens could be injured or suffer illnesses, but not permanent disability. Critical facilities could be shut down for a week and 10 percent of total property could be damaged.
Sunset Valley	Minor	The City of Sunset Valley has an estimated 79 percent of the total population living within the WUI. The

JURISDICTION	IMPACT	DESCRIPTION
		largest population live in an area that is lightly-dense (1 house per 2 acres to 1 house per 3 acres) in the WUI, and the City has a moderate wildfire threat. There have been 3 wildfire events over the last 11 years and 3 acres burned. Therefore, citizens could be injured or suffer illnesses, but not permanent disability. Critical facilities could be shut down for a week and 10 percent of total property could be damaged.
Village of the Hills	Limited	A small portion of the population in the Village of the Hills live in an area that is lightly-dense (1 house per 2 acres to 1 house per 3 acres) in the WUI, and the Village has a low wildfire threat. No wildfire events have been reported for the community in the past 11 years. Therefore, minor quality of life would be lost, critical facilities could be shut down for 24 hours or less, and less than 10 percent of total property could be damaged.

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.
- Travis Lake 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 7: DROUGHT

Hazard Description 1
Location 2
Extent 4
Historical Occurrences 6
Significant Past Events 8
Probability of Future Events 8
Vulnerability and Impact 8
Assessment of Impacts 10

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 7-1 presents definitions for these different types of drought.

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.

Table 7-1. Drought Classification Definitions[1]

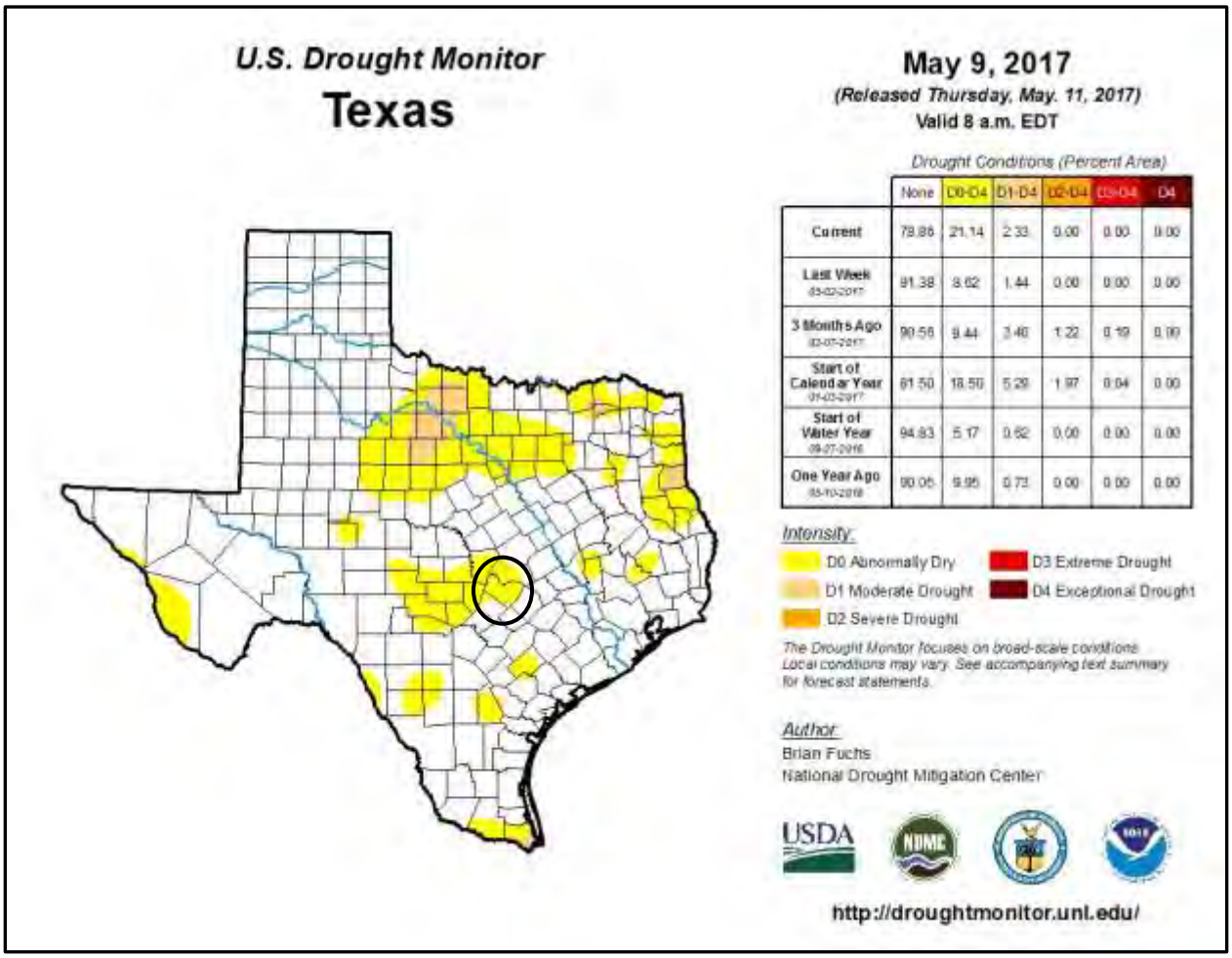
METEOROLOGICAL DROUGHT	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
HYDROLOGIC DROUGHT	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
AGRICULTURAL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

LOCATION

Droughts occur regularly throughout Texas and Travis County, and are a normal condition. However, they can vary greatly in their intensity and duration. The Drought Monitor shows the planning area is currently experiencing abnormally dry conditions (Figure 7-1). The planning area has experienced abnormally dry to exceptional drought conditions over the last 10 years (Figure 7-2). There is no distinct geographic boundary to drought; therefore, it can occur throughout the Travis County planning area equally, including all participating jurisdictions.

[1] Source: Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy, Federal Emergency Management Agency (FEMA).

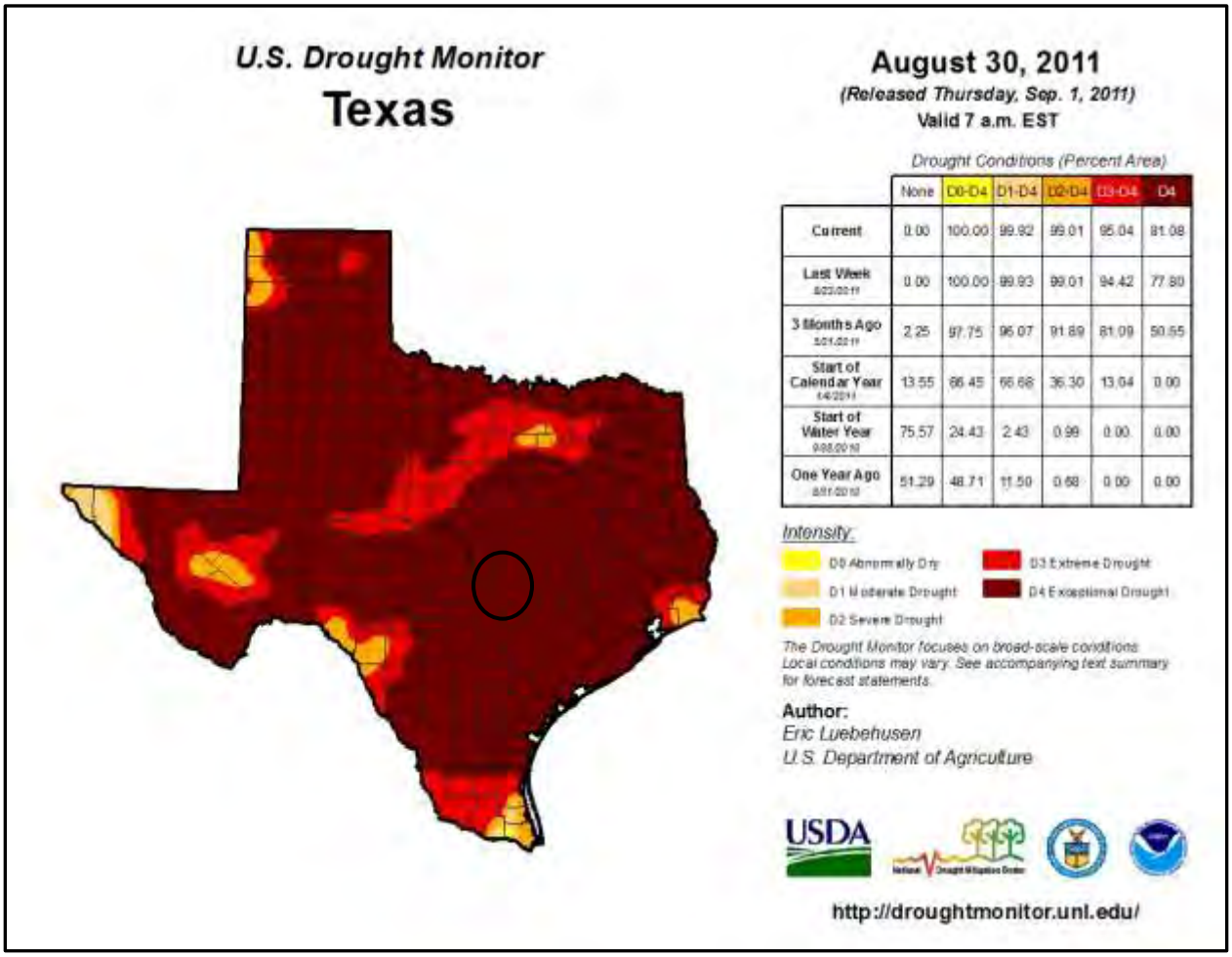
Figure 7-1. U.S Drought Monitor, May 2017[2]



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	78.86	21.14	2.33	0.00	0.00	0.00
Last Week 03-02-2017	91.38	8.62	1.44	0.00	0.00	0.00
3 Months Ago 02-07-2017	90.56	9.44	3.40	1.22	0.19	0.00
Start of Calendar Year 01-03-2017	81.50	18.50	5.29	1.97	0.04	0.00
Start of Water Year 09-27-2016	94.83	5.17	0.62	0.00	0.00	0.00
One Year Ago 05-10-2016	90.05	9.95	0.73	0.00	0.00	0.00

[2] Travis County is located within the black circle.

Figure 7-2. U.S, August 2011[3]



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	99.92	99.01	95.04	81.08
Last Week	0.00	100.00	99.93	99.01	94.42	77.80
3 Months Ago	2.25	97.75	96.07	91.89	81.09	50.55
Start of Calendar Year	13.55	86.45	66.68	36.30	13.04	0.00
Start of Water Year	75.57	24.43	2.43	0.99	0.00	0.00
One Year Ago	51.29	48.71	11.50	0.68	0.00	0.00

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 7-2 depicts magnitude of drought, while Table 7-3 describes the classification descriptions.

[3] Travis County is located within the black circle.

Table 7-2. 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 7-3. Palmer Drought Category Descriptions[4]

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.

[4] Source: National Drought Mitigation Center.

Based on the historical occurrences for drought and the location of the Travis County planning area, including all participating jurisdictions, the area can anticipate a range of drought from abnormally dry to exceptional, or D0 to D4 based on the Palmer Drought Category.

HISTORICAL OCCURRENCES

Travis County may typically experience a severe drought. Tables 7-4 and 7-5 lists historical events that have occurred in Travis County as reported in the National Centers for Environmental Information (NCEI). Historical drought information, as provided by the NCEI, shows drought 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. Historical drought data for all participating jurisdictions (Travis County unincorporated, Cities of Lakeway, Manor, Pflugerville, Sunset Valley, and Village of the Hills) in the Travis County planning area are provided on a County-wide basis, per the NCEI database.

Table 7-4. Historical Drought Years, 1996-2016

DROUGHT YEAR[5]
1996
2000
2011
2012
2012
2013
2013
2014
8 unique events

Table 7-5. Historical Drought Events, 1996-2016

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	4/1/1996	0	0	$0	$0

[5] 2012 and 2013 appear twice in the table as they represent two unique periods of drought in the same year separated by periods of normal, non-drought conditions.

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	5/1/1996	0	0	$0	$0
Travis County	6/1/1996	0	0	$0	$0
Travis County	7/1/1996	0	0	$0	$0
Travis County	8/1/1996	0	0	$0	$0
Travis County	7/1/2000	0	0	$0	$0
Travis County	8/1/2000	0	0	$0	$0
Travis County	9/1/2000	0	0	$0	$0
Travis County	10/1/2000	0	0	$0	$0
Travis County	5/1/2011	0	0	$0	$0
Travis County	6/1/2011	0	0	$0	$0
Travis County	7/1/2011	0	0	$0	$0
Travis County	8/1/2011	0	0	$0	$0
Travis County	9/1/2011	0	0	$0	$0
Travis County	10/1/2011	0	0	$0	$0
Travis County	11/1/2011	0	0	$0	$0
Travis County	12/1/2011	0	0	$0	$0
Travis County	1/1/2012	0	0	$0	$0
Travis County	2/1/2012	0	0	$0	$0
Travis County	6/1/2012	0	0	$0	$0
Travis County	12/1/2012	0	0	$0	$0
Travis County	2/1/2013	0	0	$0	$0
Travis County	3/1/2013	0	0	$0	$0
Travis County	4/1/2013	0	0	$0	$0
Travis County	6/1/2013	0	0	$0	$0
Travis County	7/1/2013	0	0	$0	$0
Travis County	8/1/2013	0	0	$0	$0
Travis County	8/1/2014	0	0	$0	$0

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
TOTALS		0	0	$0	$0

Based on the list of historical drought events for the Travis County planning area, including all participating jurisdictions, 11 events have occurred since the 2011 Plan.

SIGNIFICANT PAST EVENTS

May 2011 – February 2012

Persistent drought conditions continued across portions of south central Texas through the month of May. Most of the area was in exceptional drought conditions, Stage D4. Lack of rain this month moved Bandera, Bexar, Blanco, Caldwell, Comal, Frio, Gillespie, Gonzales, Guadalupe, Hays, Kendall, Medina, Travis, and Williamson counties into this stage, and De Witt and Karnes counties into extreme drought conditions, Stage D3. This means all of South Central Texas was in either extreme or exceptional drought conditions. Fire danger in South Central Texas remained moderate to high and burn bans were in effect for all of the counties except Llano. The Texas A&M agricultural program report indicated the agricultural situation was rapidly deteriorating. Forage availability remained below average. Many stock tanks remained extremely low and some were in danger of drying up. At the end of the month the seven day stream flow average remained in the below or much-below-normal range for basins across South Central Texas and the Rio Grande Plains. Area lakes and reservoirs remained below normal pool elevations, with Lake Travis around 32 feet below normal and Medina Lake near 27 feet below.

August 2014

August was a mainly dry month for South Central Texas. Most of the region had below normal precipitation and much of that area had 50 percent or less than normal. Travis County moved into the severe category drought, Stage D2. Fire danger was moderate to high across the area at the end of August. Area lakes and reservoirs continued well below normal pool elevations. Lake Travis dropped more than 3 feet to 57.4 feet below normal.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, there have been 8 extended time periods of drought (ranging in length from approximately 60 days to over 300 days) within a 21 year reporting period. The probability of future events is 0.38 per year, or an event probable in the next year. This frequency supports a highly likely probability of future events. All participating jurisdictions are included under the County.

VULNERABILITY AND IMPACT

Loss estimates were based on 21 years of statistical data from the NCEI. 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 7-6 shows annualized exposure.

Table 7-6. Drought Event Damage Totals, 1996-2016[6]

JURISDICTION	PROPERTY & CROP LOSS	ANNUALIZED LOSS ESTIMATES
Travis County	$0	$0

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.

In terms of vulnerability, population, agriculture, property, and environment are all vulnerable to drought in the Travis County planning area, including all participating jurisdictions. 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 Travis County planning area are estimated at 8.1 percent of the total population and children under the age of 5 are estimated at 7 percent, for an estimated total of 169,595[7] potentially vulnerable residents in the planning area based on age (Table 7-7).

Table 7-7. Populations at Greater Risk by Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5
Travis County[8]	91,230	78,365
Lakeway	2,473	624
Manor	275	545
Pflugerville	3,936	4,175
Sunset Valley	65	83
Village of the Hills	431	104

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. While all residents in the Travis County planning area could be adversely affected by drought conditions, which could limit water supplies and present health threats during summer drought or hot and dry conditions, elderly persons,

[6] Drought events are reported on a county-wide basis and includes all participating jurisdictions.

[7] US Census Bureau 2015 data for Travis County.

[8] County totals includes all incorporated and unincorporated areas of the County.

small children, infants, and the chronically ill who do not have adequate cooling units in their homes may become more vulnerable to injury and/or death.

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 the ability to produce goods and provide services. If droughts extend over a number of years, the direct and indirect economic impact can be significant.

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.

The impact of droughts experienced in the Travis County 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 percent of property is destroyed or with major damage. No annualized losses were reported for the planning area over the 21-year reporting period.

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: 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 7-8 lists the drought impacts to Travis County from 2005 to 2016, based on reports received by the Drought Impact Reporter.

Table 7-8. Drought Impacts, 2005-2016

DROUGHT IMPACTS 2005-2015	
Agriculture	52
Business and Industry	9
Energy	3
Fire	36
Plants and Wildlife	30
Relief, Response and Restrictions	59
Society and Public Health	17
Tourism and Recreation	16
Water Supply and Quality	68

Drought has the potential to impact people in the Travis County planning area. While it is rare that drought, in and of itself, leads to a direct risk to the health and safety of people in the U.S., severe water shortages could result in inadequate supply for human needs. Drought also is frequently associated with a variety of impacts, including:

- The number of health-related low-flow issues (e.g., diminished sewage flows, increased pollution concentrations, reduced firefighting capacity, cross-connection contamination) will increase as the drought intensifies.
- Public safety issues 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.
- 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 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 move 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 in or near Lake Travis, 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 of water or developing 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 in the aftermath of a drought event.

SECTION 8: TORNADO

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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 1 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.

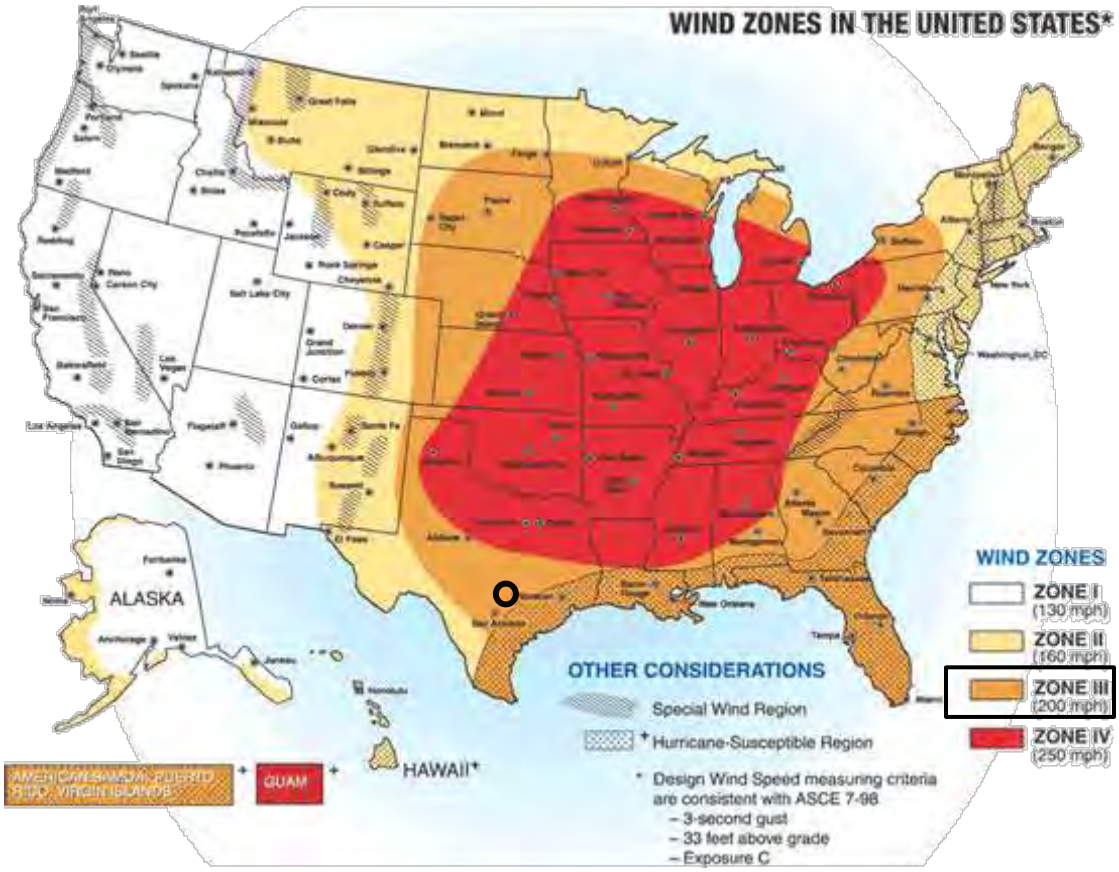
Table 8-1. Variations among Tornadoes

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 1 hour • Winds greater than 205 mph

LOCATION

Tornadoes do not have any specific geographic boundary and can occur throughout the County uniformly. It is assumed that the Travis County planning area, including all participating jurisdictions, is uniformly exposed to tornado activity. The Travis County planning area is located in Wind Zone III (Figure 8-1), where tornado winds can be as high as 200 mph.

Figure 8-1. 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 manufactured homes).

[1] Travis County is indicated by the circle.

Table 8-2. 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%

Tornado magnitudes prior to 2005 were determined using the traditional version of the Fujita Scale (Table 8-2). Since February 2007, the Fujita Scale has been replaced by the Enhanced Fujita Scale (Table 8-3), 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.

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

Table 8-3. 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 F4 on the Fujita Scale, a "Devastating Tornado." Based on the planning area's location in Wind Zone III, the planning area could experience anywhere from an EF0 to an EF5 depending on the wind speed.

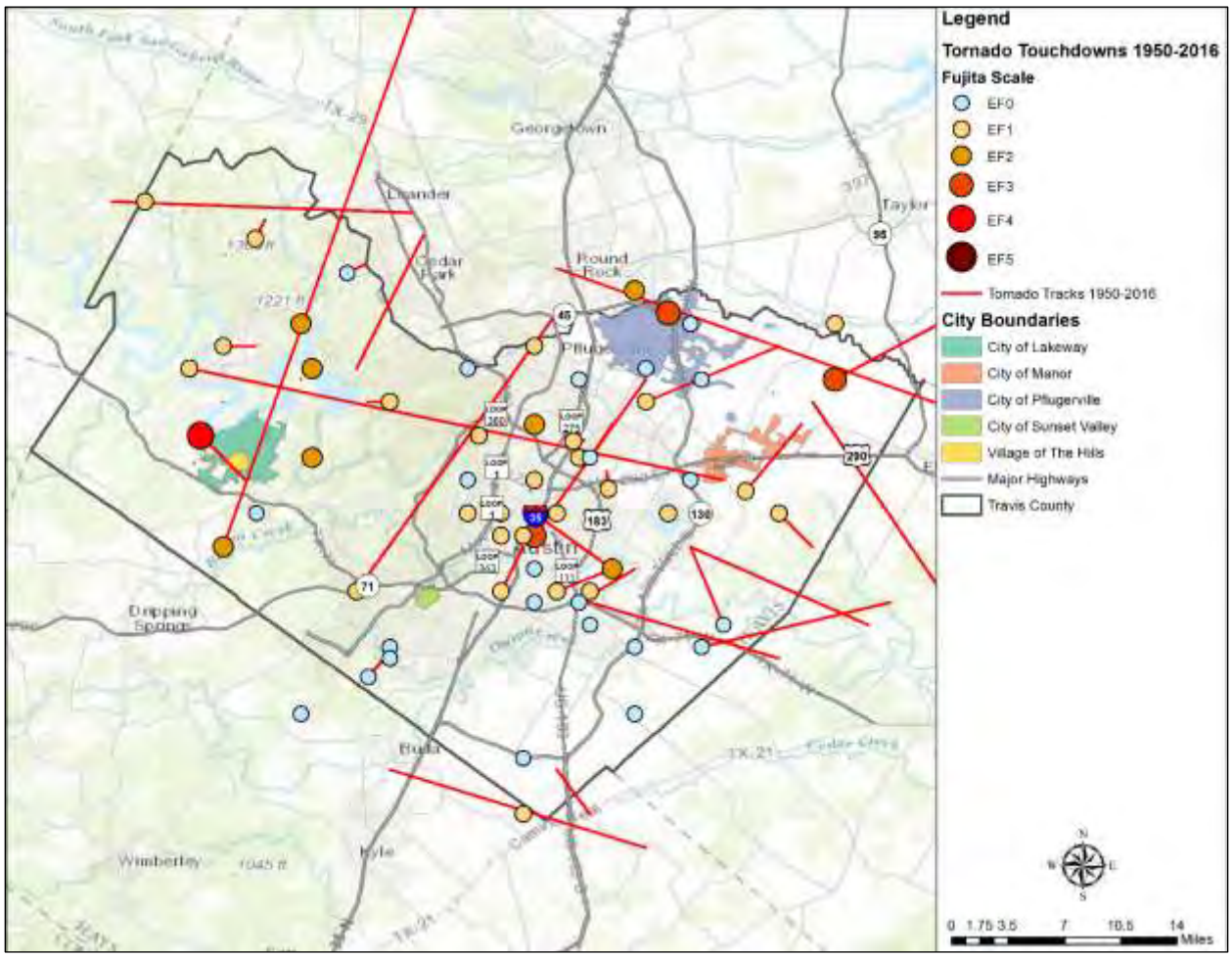
The events in Travis County have been between EF0 to an EF5 (Table 8-4). Therefore, the range of intensity that the Travis County planning area, including all participating jurisdictions, would be expected to mitigate is a tornado event that would be a low to high risk, an EF0 to EF5.

HISTORICAL OCCURRENCES

Only reported tornadoes were factored into the Risk Assessment. It is likely that a high number of occurrences have gone unreported over the past 67 years.

Figure 8-2 identifies the locations of previous occurrences in the Travis County planning area from 1950 through 2016. A total of 71 events have been recorded by the Storm Prediction Center (NOAA) and National Centers for Environmental Information (NCEI) databases for Travis County. The strongest event reported occurred in Travis County. The F4 tornado swept a path 5.6 miles long and 440 yards wide through Pedernales Valley, a heavily wooded area in western Travis County, destroying 15 permanent homes, 3 mobile homes, and 2 businesses. 1 fatality was attributed to the tornado.

Figure 8-2. Spatial Historical Tornado Events, 1950-2016[3]



[3] Source: NOAA Records.

Table 8-4. Historical Tornado Events, 1950-2016[4]

JURISDICTION	DATE	TIME	MAGNITUDE	DEATH	INJURIES	PROPERTY DAMAGE[5]	CROP DAMAGE[6]
Travis County	10/23/1953	1:00 AM	F1	0	0	$229,400	$0
Travis County	3/31/1957	9:05 AM	F2	0	0	$2,179,708	$0
Travis County	3/31/1957	10:50 AM	F2	0	0	$217,970	$0
Travis County	3/31/1957	9:15 PM	F1	0	0	$2,179	$0
Travis County	4/22/1957	2:25 AM	F1	0	0	$2,179	$0
Travis County	4/24/1957	2:20 PM	F0	0	0	$261	$0
Travis County	5/10/1959	3:20 PM	F3	0	0	$2,104,804	$0
Travis County	7/20/1960	6:15 AM	F1	0	0	$20,693	$0
Travis County	5/17/1965	1:30 AM	F1	0	0	$1,945	$0
Travis County	9/20/1967	10:00 AM	F0	0	0	$18,339	$0
Travis County	9/20/1967	10:00 AM	F1	0	0	$18,339	$0
Travis County	9/20/1967	10:00 AM	F1	0	1	$18,339	$0
Travis County	9/20/1967	10:00 AM	F0	0	0	$18,339	$0
Travis County	9/20/1967	10:00 AM	F0	0	0	$18,339	$0
Travis County	9/21/1967	12:00 PM	F1	0	0	$18,339	$0
Travis County	7/4/1970	6:00 PM	F2	1	4	$0	$0
Travis County	8/3/1972	11:10 AM	F0	0	0	$146,531	$0
Travis County	1/20/1973	9:00 PM	F2	0	0	$137,950	$0
Travis County	3/10/1973	5:45 AM	F1	0	2	$1,379,500	$0
Travis County	5/9/1974	9:00 PM	F1	0	10	$1,242,389	$0
Travis County	5/7/1975	4:00 PM	F2	0	0	$1,138,472	$0
Travis County	3/5/1976	1:15 AM	F0	0	0	$107,644	$0

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

[5] Values are in 2017 dollars.

[6] Values are in 2017 dollars.

JURISDICTION	DATE	TIME	MAGNITUDE	DEATH	INJURIES	PROPERTY DAMAGE[5]	CROP DAMAGE[6]
Travis County	3/30/1976	3:45 AM	F0	0	8	$1,076,446	$0
Travis County	4/14/1977	5:20 PM	F2	0	0	$1,010,723	$0
Travis County	5/2/1977	4:50 PM	F2	0	0	$10,107	$0
Travis County	4/7/1980	5:30 PM	F3	0	3	$743,323	$0
Travis County	8/10/1980	12:40 PM	F1	0	0	$743,323	$0
Travis County	8/10/1980	1:40 PM	F2	0	4	$743,322,651	$0
Travis County	8/10/1980	2:50 PM	F0	0	0	$743,323	$0
Travis County	6/13/1981	3:00 PM	F1	0	0	$67,382	$0
Travis County	6/22/1982	4:50 PM	F0	0	0	$77	$0
Travis County	5/18/1983	11:15 AM	F1	0	0	$6,149	$0
Travis County	9/20/1996	7:58 PM	F1	0	0	$7,807	$0
Travis County	5/27/1997	3:11 PM	F2	0	0	$76,324	$15,265
Travis County	5/27/1997	3:15 PM	F1	0	0	$7,633	$0
Lakeway	5/27/1997	3:50 PM	F4	1	5	$22,897,117	$0
Travis County	8/29/1998	5:45 PM	F1	0	0	$45,092	$0
Travis County	11/15/2001	3:50 PM	F1	0	0	$138,340	$0
Travis County	11/15/2001	4:45 PM	F0	0	0	$415,018	$0
Travis County	11/15/2001	5:30 PM	F1	0	0	$110,671	$0
Travis County	11/15/2001	5:44 PM	F0	0	0	$20,751	$0
Manor	12/23/2002	7:04 AM	F1	0	1	$272,373	$0
Travis County	6/8/2004	7:45 PM	F0	0	0	$194,547	$0
Manor	3/25/2005	9:50 PM	F1	0	0	$125,447	$0
TOTALS				**2**	**38**	**$781,056,283**	**$15,265**

Table 8-5. Summary of Historical Tornado Events, 1950-2016[7]

JURISDICTION	Number of Events	MAGNITUDE	FATALITIES	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	65	F3	1	32	$757,761,346	$15,265
Lakeway	1	F4	1	5	$22,897,117	$0
Manor	2	F1	0	1	$397,820	$0
Pflugerville	3	F0	0	0	$0	$0
Sunset Valley	0	N/A	0	0	$0	$0
Village of the Hills	0	N/A	0	0	$0	$0
TOTAL LOSSES	**71**	**(Max Extent)**	**2**	**38**	**$781,071,548**	

Based on the list of historical tornado events for the Travis County planning area, including all participating jurisdictions, 5 of the events have occurred since the 2011 Plan.

SIGNIFICANT PAST EVENTS

August 10, 1980 – Travis County

Hurricane Allen, one of the most intense hurricanes to ever cross the Gulf of Mexico, made landfall on the Texas coastline August 9, 1980. As this large storm moved over south Texas and weakened on August 10, it spawned a tornado in Travis County. The tornado was rated F2 with winds of about 125 mph. The tornado stayed on the ground for approximately 5.4 miles and caused $250 million in damages. Much of this destruction was at the Robert Mueller Airport where many planes were destroyed. 4 injuries were reported as a direct result of the tornado.

May 27, 1997 – Lakeway

This event was known as the Pedernales Valley tornado and began on the shore of Lake Travis, destroying trees and a floating marina where nearly all of the watercraft were substantially damaged. The tornado swept a path 5.6 miles long and 440 yards wide through Pedernales Valley, a heavily wooded area in western Travis County. A number of structures sustained varying damage until the tornado reached Bee Creek Road. At this location, a Southwest Bell building housing telephone switching equipment was destroyed. The building was well constructed and was one of several buildings which indicated an F4 rating for this tornado. In the Hazy Hills subdivision, 15 permanent homes and 3 manufactured homes were totally destroyed. Several houses in this subdivision survived but sustained major damage. The tornado caused 1 death when a mobile home was demolished and a vehicle was tossed several hundred feet.

December 23, 2002 – Manor

[7] Values are in 2017 dollars.

This tornado, rated F1, touched down 1 mile southeast of Manor shortly after 7 am, and moved northeastward for approximately 5.5 miles before dissipating. Rated as an F1, it damaged nearly a dozen homes and mobile homes and 2 businesses. It destroyed 4 mobile homes and overturned several vehicles as well. A young woman suffered a shoulder separation injury as the tornado blew over her mobile home.

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, Travis County experiences a tornado touchdown approximately once a year. This frequency supports a highly likely probability of future events for the Travis County planning area, including all participating jurisdictions.

VULNERABILITY AND IMPACT

Because tornadoes often cross jurisdictional boundaries, all existing and future buildings, facilities, and populations in Travis County 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 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.

Utility systems on roofs at larger commercial facilities and buildings, such as schools, would be vulnerable and could be damaged by debris and high winds. Portable buildings would be more vulnerable to tornado damage than typical site built structures. 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 Travis County planning area features multiple mobile or manufactured home parks throughout the planning area. These parks are typically more vulnerable to tornado events than typical site built structures. In addition, manufactured homes are located sporadically throughout the planning area, including all jurisdictions, which would also be more vulnerable. The U.S. Census data indicates a total of

15,405 manufactured homes located in the Travis County planning area, including all participating jurisdictions (Table 8-6). In addition, 33.6 percent (approximately 155,763 structures) of the Single Family Residential (SFR) structures in the Travis County 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.

Table 8-6. Structures at Greater Risk by Jurisdiction[8]

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Travis County[9]	15,405	155,763
Lakeway	10	900
Manor	93	295
Pflugerville	418	945
Sunset Valley	0	83
Village of the Hills	14	0

The following critical facilities would be vulnerable to tornado events in each participating jurisdiction:

Table 8-7. Critical Facilities by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Travis County	206 Bridges, 1 Cemetery, 1 Community Center, 30 Correctional Complex Facilities, 1 Electrical Substation, 3 ER/Urgent Care Facilities, 22 Fire Stations, 1 Government Facility, 1 Hospital, 2 Lift Stations, 47 Park Facilities, 2 Police Stations, 61 Schools, 27 TNR Facilities, 3 Water/Waste Water Facilities
Lakeway	1 Police Station, 3 Government Facilities, 1 Fire Station and Administration Building, 1 Airport, 1 Hospital, 1 Emergency Room, 8 Water/Waste Water Facilities, 2 Lift Stations, 2 Utility Facilities, 4 Schools, 2 Electrical Substations
Manor	1 Police Station, 1 Fire Station, 2 Government Facilities, 7 Schools, 1 Emergency Room, 3 Water/Waste Water Facilities
Pflugerville	2 ER/Urgent Care Facilities, 3 Fire Stations, 1 Hospital

[8] Source: U.S. Census Bureau data estimates for 2015.

[9] County totals includes all incorporated and unincorporated areas of the County.

JURISDICTION	CRITICAL FACILITIES
Sunset Valley	2 Government Facilities
Village of the Hills	4 Water/Waste Water Facilities, 1 Emergency Operations Center (EOC)

The average loss estimate of property and crop is $781,071,548 (in 2017 dollars), having an approximate annual loss estimate of $11,657,784 (Table 8-8). Based on historic loss and damages, the impact of a tornado event on the Travis County planning area and participating jurisdictions can be considered "Major", with more than 25 percent of property expected to be destroyed, injuries resulting in permanent disability, and critical facilities shut down for at least 2 weeks.

Table 8-8. Potential Annualized Losses by Jurisdiction, 1950-2016

JURISDICTION	PROPERTY & CROP DAMAGE	ANNUAL LOSS ESTIMATES
Travis County[10]	$757,776,611	$11,310,099
Lakeway	$22,897,117	$341,748
Manor	$397,820	$5,938
Pflugerville	$0	$0
Sunset Valley	$0	$0
Village of the Hills	$0	$0

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.
- Manufactured homes may suffer substantial damage as they would be more vulnerable than typical site built structures.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.

[10] County totals include all participating jurisdictions, unincorporated areas, and the City of Austin.

- 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 outages 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 must enter the damage area shortly after the tornado passes to begin rescue operations and to organize cleanup and assessments efforts. Therefore, they 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, and damaged emergency vehicles and equipment.
- City or county departments may be damaged or destroyed, delaying response and recovery efforts for the entire community.
- Private sector entities that jurisdictions 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 9: THUNDERSTORM WIND

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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 greater 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

Thunderstorms 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 Travis County's planning area, including all participating jurisdictions, as these storms develop randomly and are

not confined to any geographic area within the County. It is assumed that the entire Travis County 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 9-1 describes the different intensities of wind in terms of speed and effects, from calm to violent and destructive.

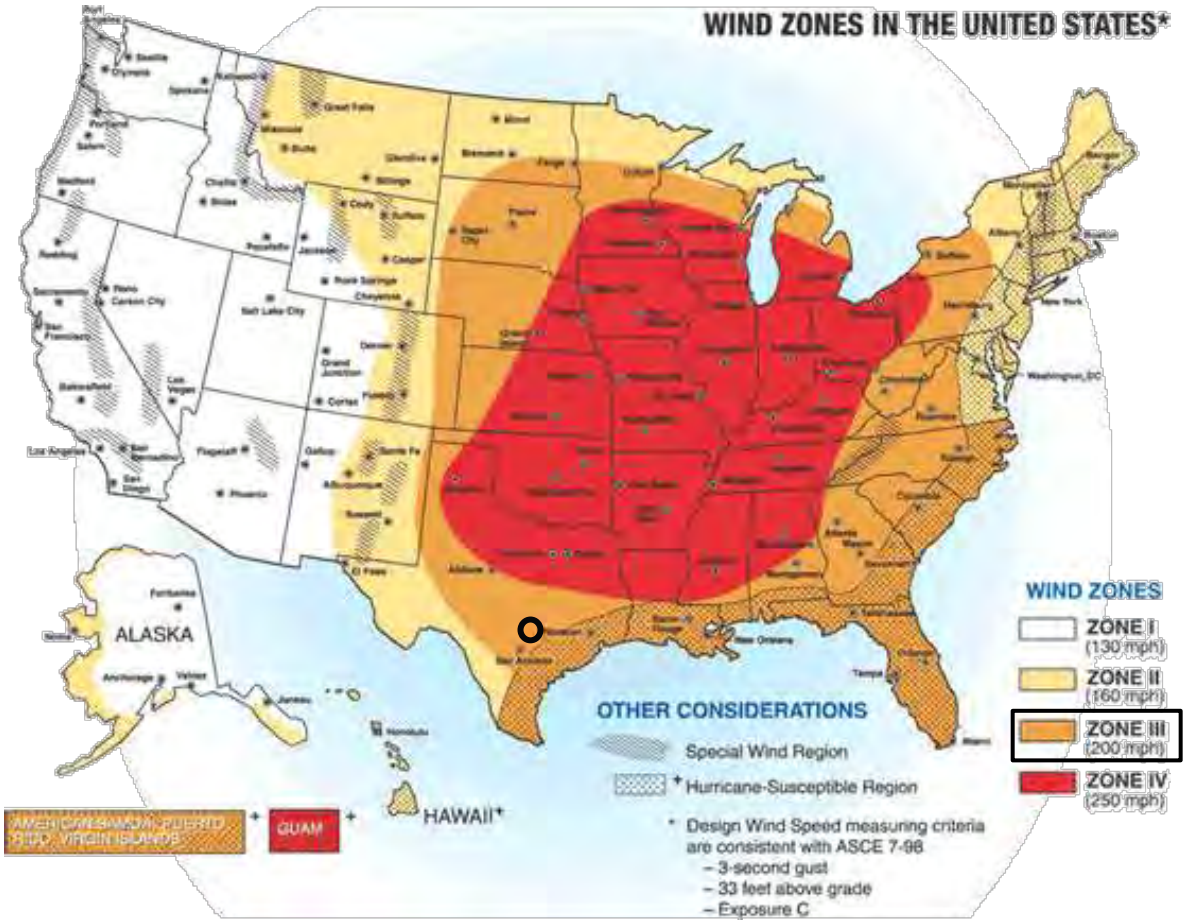
Table 9-1. Beaufort Wind Scale[1]

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	8-12	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

Figure 9-1 displays the wind zones as derived from the National Oceanic and Atmospheric Administration (NOAA).

[1] Source: World Meteorological Organization.

Figure 9-1. Wind Zones in the United States[2]



On average, the planning area experiences 3 to 4 thunderstorm wind events every year. The County is located within Wind Zone III, meaning it can experience winds up to 200 mph. Travis County 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 9-2, 9-3 and 9-4 depict historical occurrences of thunderstorm wind events for the Travis County planning area according to the National Centers for Environmental Information (NCEI) data. Since January 1955, 239 thunderstorm wind events are known to have impacted Travis County, based upon NCEI records. Table 9-3 presents information on known historical events impacting the Travis County planning

[2] Travis County is indicated by the circle.

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

The NCEI is a national data source organized under the National Oceanic and Atmospheric Administration (NOAA) and is the largest archive available for climate data. It is important to note that only incidents reported to the NCEI 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. Where an estimate has been provided in a table for losses, the dollar amounts have been altered to indicate the damage in 2017 dollars.

Table 9-2. Historical Thunderstorm Wind Events, With Reported Damages, 1955-2016

MAXIMUM WIND SPEED RECORDED (KNOTS)	NUMBER OF REPORTED EVENTS
0-30	0
31-40	6
41-50	13
51-60	12
61-70	6
71-80	2
81-90	0
91-100	0
Unknown	21

Table 9-3. Historical Thunderstorm Wind Events, 1955-2016[3]

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	5/27/1992	6:44 PM	55 knots	4	0	$0	$0
Travis County	5/30/1993	6:59 PM	51 knots	0	0	$0	$8,477
Travis County	10/19/1993	11:25 PM	Unknown	0	0	$8,477	$8,477
Lakeway	10/19/1993	10:45 PM	Unknown	0	0	$0	$84,775

[3] Only recorded events with fatalities, injuries or damages are listed. Magnitude is listed when available. Damage values are in 2017 dollars.

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	5/29/1994	10:52 PM	53 knots	0	0	$82,658	$8,266
Travis County	5/30/1994	12:15 AM	Unknown	0	0	$82,658	$8,266
Travis County	11/4/1994	11:55 PM	57 knots	0	0	$8,266	$0
Travis County	3/8/1995	1:39 AM	74 knots	0	0	$80,380	$0
Travis County	5/31/1995	11:02 PM	68 knots	0	0	$160,761	$0
Travis County	6/11/1995	1:26 AM	65 knots	0	0	$16,076	$16,076
Travis County	9/7/1995	8:00 PM	Unknown	0	7	$4,822,818	$0
Travis County	8/31/1996	8:50 PM	Unknown	0	0	$7,807	$0
Travis County	9/20/1996	8:55 PM	Unknown	0	0	$31,230	$0
Travis County	4/4/1997	6:30 PM	Unknown	0	0	$305,295	$0
Travis County	3/7/1998	5:50 PM	Unknown	0	0	$225,459	$0
Travis County	4/8/1998	4:10 AM	Unknown	0	0	$37,577	$0
Travis County	4/26/1998	7:50 PM	Unknown	0	0	$120,245	$0
Travis County	8/29/1998	5:40 PM	Unknown	0	0	$15,031	$0
Travis County	5/24/1999	8:30 PM	Unknown	0	0	$73,529	$0
Travis County	5/26/1999	5:25 PM	Unknown	0	0	$102,941	$0
Travis County	4/11/2000	11:42 PM	51 knots	0	0	$28,455	$0
Pflugerville	9/2/2000	5:20 PM	Unknown	0	0	$113,821	$0
Travis County	3/12/2001	1:30 AM	Unknown	0	5	$207,509	$0
Pflugerville	5/20/2001	9:10 PM	Unknown	0	10	$2,766,789	$138,339
Travis County	9/3/2001	8:05 PM	Unknown	0	0	$69,170	$0
Travis County	6/16/2002	2:00 AM	Unknown	0	0	$68,093	$0
Travis County	6/26/2002	7:00 PM	69 knots	0	0	$408,559	$0
Travis County	6/26/2002	7:20 PM	Unknown	0	0	$136,186	$0
Travis County	12/23/2002	6:25 AM	Unknown	0	0	$13,619	$0
Travis County	6/13/2003	3:45 PM	56 knots	0	0	$133,152	$0
Travis County	8/8/2003	3:23 PM	57 knots	0	0	$133,152	$0

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	8/11/2003	7:05 PM	60 knots	0	0	$798,910	$0
Travis County	6/28/2004	4:40 PM	60 knots	0	0	$25,940	$0
Travis County	5/4/2006	9:30 PM	64 knots	0	0	$121,527	$0
Travis County	10/10/2006	6:17 AM	55 knots	0	0	$121,527	$0
Travis County	4/13/2007	8:30 PM	55 knots	0	0	$59,081	$0
Travis County	5/14/2008	11:30 PM	70 knots	0	0	$56,896,361	$0
Travis County	6/21/2008	1:00 PM	50 knots	0	0	$5,690	$0
Travis County	3/25/2009	4:45 PM	39 knots	0	0	$57,100	$0
Travis County	4/2/2009	10:29 AM	45 knots	0	0	$11,420	$0
Travis County	4/2/2009	1:07 PM	45 knots	0	0	$11,420	$0
Travis County	4/2/2009	1:37 PM	40 knots	0	0	$11,420	$0
Travis County	4/2/2009	1:55 PM	39 knots	0	0	$11,420	$0
Travis County	4/2/2009	2:17 PM	40 knots	0	0	$11,420	$0
Travis County	4/2/2009	2:40 PM	45 knots	0	0	$114,199	$0
Travis County	8/12/2009	2:55 PM	50 knots	0	0	$2,284	$0
Travis County	8/26/2009	7:32 PM	52 knots	0	0	$2,284	$0
Travis County	8/27/2009	4:40 PM	50 knots	0	0	$11,420	$0
Manor	4/11/2011	4:05 AM	50 knots	0	0	$545	$0
Travis County	5/20/2011	7:10 PM	40 knots	0	0	$1,089	$0
Travis County	7/15/2012	4:25 PM	50 knots	0	0	$16,006	$0
Travis County	4/7/2014	6:35 PM	48 knots	0	0	$2,070	$0
Travis County	5/26/2014	11:00 AM	35 knots	0	0	$1,035	$0
Lakeway	6/12/2014	8:45 PM	70 knots	0	0	$5,175	$0
Lakeway	6/12/2014	9:05 PM	74 knots	0	0	$206,981	$0
Travis County	4/18/2015	8:25 PM	50 knots	0	0	$1,034	$0
Travis County	4/18/2015	8:30 PM	50 knots	0	0	$10,337	$0
Travis County	4/18/2015	8:30 PM	50 knots	0	0	$10,337	$0

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	10/30/2015	8:50 AM	50 knots	0	0	$516,839	$0

Table 9-4. Summary of Historical Thunderstorm Wind Events, 1950-2016[4]

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	226	75 knots	4	14	$66,211,273	$49,562
Lakeway	3	74 knots	0	0	$212,156	$84,775
Manor	4	61 knots	0	0	$545	$0
Pflugerville	6	63 knots	0	10	$2,880,610	$138,339
Sunset Valley	0	N/A	0	0	$0	$0
Village of the Hills	0	N/A	0	0	$0	$0
TOTAL LOSSES	**239**	**(Max Extent)**	**4**	**24**	**$69,577260**	

Based on the list of historical thunderstorm wind events for the Travis County planning area, including all participating jurisdictions, 58 events have occurred since the 2011 Plan.

SIGNIFICANT PAST EVENTS

May 20, 2001 – Pflugerville

Thunderstorm winds measured at between 50 and 60 knots, with estimates of gusts at times near 80 knots, produced widespread damage. These winds, at time accompanied by very large hail, damaged the roofs of homes and blew down power lines between Round Rock and Pflugerville. The large hail further damaged homes and broke windows in houses and vehicles. Nearly 300 mobile homes were damaged by the winds. Damage was also reported to the doors of a large theater complex in Pflugerville.

May 14, 2008 – Travis County

Widespread damage occurred over portions of central Austin when a large severe thunderstorm rolled through the downtown area. There were numerous reports of large trees and branches downed, along with wind-blown hail. The hardest hit area was downtown near Tarrytown, Hyde Park, UT campus, and the I-35 corridor just north of the river. The combination of baseball size hail and winds of 70 to 80 mph blew out building and apartment windows throughout this area. Windows on the Texas Capitol building were blown out as well. The Lions golf course and Morris Williams course sustained damage and had to

[4] Damage values are in 2017 dollars.

briefly close. Power was knocked off to nearly 20,000 customers. Large old oak trees were damaged. Total monetary losses were estimated at 50 million dollars.

PROBABILITY OF FUTURE EVENTS

Most thunderstorm winds occur during the spring, in the months of March, April, and May, and in the fall, during the month of September. Based on available records of historic events, 239 events in a 62 year reporting period provide a frequency of occurrence of 3 to 4 events every year. Even though the intensity of thunderstorm wind events is not always damaging for the Travis County planning area, the frequency of occurrence for a thunderstorm wind event is highly likely, meaning that an event is probable within the next year for the Travis County planning area, including all participating jurisdictions.

VULNERABILITY AND IMPACT

Vulnerability is difficult to evaluate since thunderstorm 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 within the Travis County planning area, including all participating jurisdictions, could potentially be impacted and remain vulnerable to possible injury and property loss from strong winds.

Trees, power lines and poles, signage, manufactured housing, radio towers, concrete block walls, storage barns, windows, garbage receptacles, brick facades, and vehicles, unless reinforced, are vulnerable to thunderstorm 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. The portable buildings used at schools and construction sites would be more vulnerable to thunderstorm wind events than typical site built structures and could potentially pose a greater risk for wind-blown debris.

The U.S. Census data indicates a total of 15,405 manufactured homes located in the Travis County planning area, including all participating jurisdictions (Table 9-5). In addition, 33.6 percent (approximately 155,763 structures) of the residential structures in the Travis County 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.

Table 9-5. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Travis County[5]	15,405	155,763
Lakeway	10	900
Manor	93	295
Pflugerville	418	945
Sunset Valley	0	83
Village of the Hills	14	0

Table 9-6 includes critical facilities that would be vulnerable to thunderstorm wind events in the Travis County planning area.

Table 9-6. Critical Facilities by Jurisdiction

JURISDICTION	Critical facilities
Travis County	16 Government Facilities, 16 Dams, 1 Hospital, 20 Fire Stations, 2 Police Stations, 1 Correctional Facility, 1 EMS, 59 Schools, 2 Water/Waste Water Facilities
Lakeway	1 Police Station, 3 Government Facilities, 1 Fire Station and Administration Building, 1 Airport, 1 Hospital, 1 Emergency Room, 8 Water/Waste Water Facilities, 2 Lift Stations, 2 Utility Facilities, 4 Schools, 2 Electrical Substations
Manor	1 Police Station, 1 Fire Station, 2 Government Facilities, 7 Schools, 1 Emergency Room, 3 Water/Waste Water Facilities
Pflugerville	9 Government Facilities, 3 Emergency Rooms, 3 Fire Stations, 1 Hospital, 18 Schools, 15 Lift Stations
Sunset Valley	2 Government Facilities
Village of the Hills	4 Water/Waste Water Facilities, 1 Emergency Operations Center (EOC)

A thunderstorm wind event can also result in traffic disruptions, injuries, and in rare cases, fatalities. Impact of thunderstorms winds experienced in the Travis County planning area has resulted in 24 injuries and 4 fatalities. Impact of thunderstorm wind events experienced in the Travis County planning area, including all participating jurisdictions, would result in “Minor” damages. However, due to the loss of life and number of past injuries, the impact of thunderstorm wind events for the entire planning area is

[5] County totals includes all incorporated and unincorporated areas of the County.

considered "substantial" with multiple deaths, and with facilities shut down for 30 days or more. Overall, the average loss estimate (in 2017 dollars) is $69,577,260 having an approximate annual loss estimate of $1,038,467 (Table 9-7).

Table 9-7. Potential Annualized Losses for Travis County

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Travis County	$66,260,835	$988,968
Lakeway	$296,931	$4,432
Manor	$545	$8
Pflugerville	$3,018,949	$45,059
Sunset Valley	$0	$0
Village of the Hills	$0	$0
Planning Area	**$69,577,260**	**$1,038,467**

ASSESSMENT OF IMPACTS

Thunderstorm 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.
- 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.
- Thunderstorm 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 outages often result 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 thunderstorm 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 thunderstorm 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.
- Lake Travis is a large recreational lake that attracts fishing and boating activities throughout the year. A large thunderstorm wind event could impact recreational water activities, placing boaters and campers in imminent danger, potentially requiring emergency services or lake evacuation. The boat docks at the Lake Travis shoreline could also sustain damage.
- Recreational areas and parks may be damaged or inaccessible due to downed trees or debris, causing temporary impacts to area businesses.

The economic and financial impacts of thunderstorm winds 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 thunderstorm wind event.

SECTION 10: EXTREME HEAT

Hazard Description 1
Location 1
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Probability of Future Events 7
Vulnerability and Impact 7
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HAZARD DESCRIPTION

Extreme heat is a prolonged period of excessively high temperatures and exceptionally humid conditions. Extreme heat during the summer months is a common occurrence throughout the State of Texas, and Travis County is no exception. The unincorporated areas of the County and the jurisdictions of Lakeway, Manor, Pflugerville, Sunset Valley, and Village of the Hills typically experience extended heat waves. A heat wave is an extended period of extreme heat, and is often accompanied by high humidity.

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, lacking immediate family or friends to look out for their well-being.

LOCATION

Though a death from extreme heat has been recorded at a specific location in the County, there is no specific geographic scope to the extreme heat hazard. Extreme heat could occur anywhere within the Travis County planning area, including all participating jurisdictions.

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 10-1. This index measures how hot it feels outside when humidity is combined with high temperatures.

Figure 10-1. Extent Scale for Extreme Summer Heat[1]

Relative Humidity (%)	Temperatures (°F)	Temperatures (°F)	Temperatures (°F)	Temperatures (°F)
40	80 - 88: CAUTION	90 - 96: EXTREME CAUTION	98 - 106: DANGER	108 - 110: EXTREME DANGER
45	80 - 88: CAUTION	90 - 94: EXTREME CAUTION	96 - 104: DANGER	106 - 110: EXTREME DANGER
50	80 - 86: CAUTION	88 - 94: EXTREME CAUTION	96 - 102: DANGER	104 - 110: EXTREME DANGER
55	80 - 86: CAUTION	88 - 92: EXTREME CAUTION	94 - 100: DANGER	102 - 110: EXTREME DANGER
60	80 - 84: CAUTION	86 - 90: EXTREME CAUTION	92 - 98: DANGER	100 - 110: EXTREME DANGER
65	80 - 84: CAUTION	86 - 90: EXTREME CAUTION	92 - 96: DANGER	98 - 110: EXTREME DANGER
70	80 - 84: CAUTION	86 - 88: EXTREME CAUTION	90 - 94: DANGER	96 - 110: EXTREME DANGER
75	80 - 82: CAUTION	84 - 88: EXTREME CAUTION	90 - 94: DANGER	96 - 110: EXTREME DANGER
80	80 - 82: CAUTION	84 - 86: EXTREME CAUTION	88 - 92: DANGER	94- 110: EXTREME DANGER
85	80 - 82: CAUTION	84 - 86: EXTREME CAUTION	88 - 90: DANGER	92- 110: EXTREME DANGER
90	80: CAUTION	82 - 84: EXTREME CAUTION	86 - 90: DANGER	92- 110: EXTREME DANGER
95	80: CAUTION	82 - 84: EXTREME CAUTION	86 - 88: DANGER	90- 110: EXTREME DANGER
100	80: CAUTION	82 - 84: EXTREME CAUTION	86 - 88: DANGER	90- 110: EXTREME DANGER

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

The Extent Scale in Figure 10-1 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 10-1.

[1] Source: NOAA.

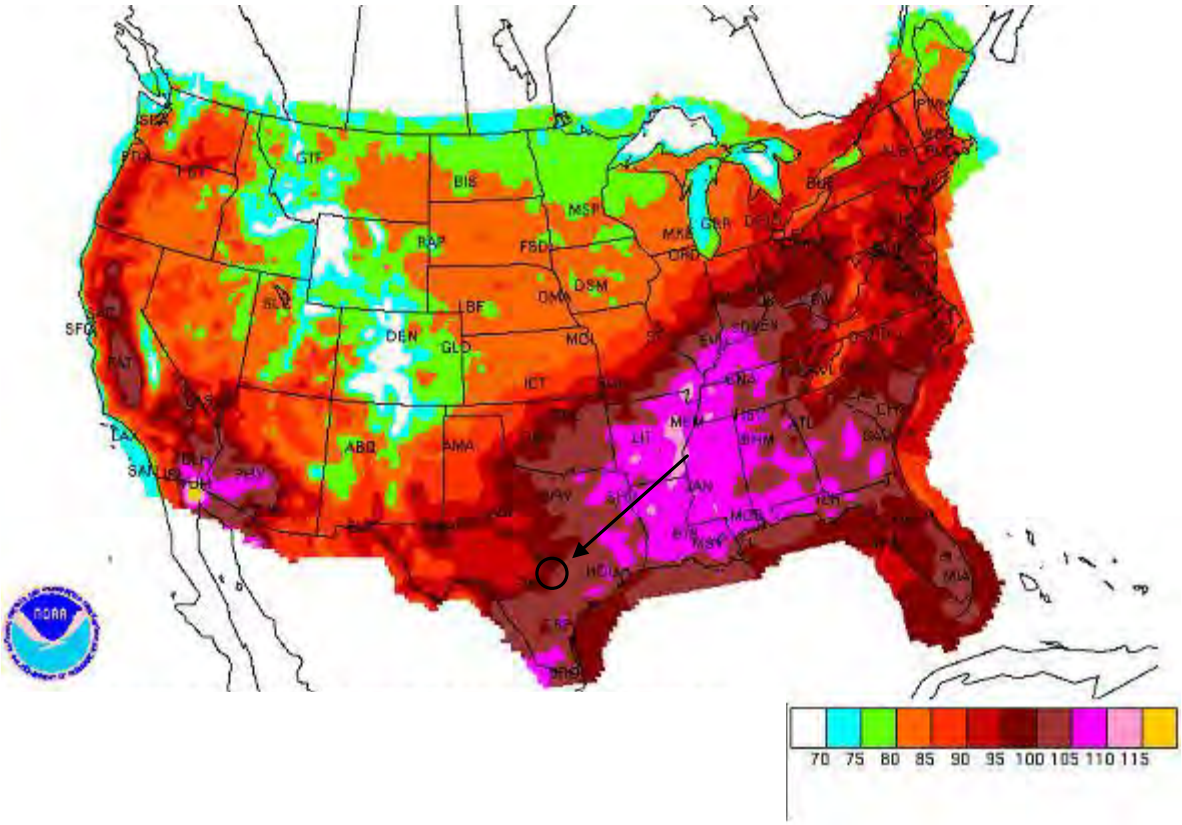
Table 10-1. Heat Index & Warnings

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.	

Travis County's geographic features are relatively diverse. The northern and western portions are characterized by the hilly and rugged topography of the Edwards Plateau and the Balcones Escarpment. The remainder of the County is characterized by the gently rolling hills and plains of the Blackland Prairies to the east and the Gulf Coast Plains to the south. Due to its geography and its warm, sunny, and humid subtropical climate, the Travis County planning area, including all participating jurisdictions, 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 10-2 displays the daily maximum heat index as derived from NOAA, based on data compiled from 1838 to 2015. The black circle shows the Travis County area. The brown and dark red colors indicate a daily maximum heat index of 90°F to 105°F. Travis County, including all participating jurisdictions, could experience extreme heat from 90°F to 105°F, and should mitigate to the extent of "extreme caution," which can include sunstroke, muscle cramps, and heat exhaustion.

Figure 10-2. 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 United States. 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 Travis County. Table 10-2 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 National Centers for Environmental Information (NCEI) database.

[2] Source: NOAA; the black circle indicates the Travis County planning area.

Table 10-2. 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	1
2014	0
2015	5
2016	6

Because the Texas Department of State Health Services reports on total events statewide, previous occurrences for extreme heat are derived from the NCEI database. According to heat related incidents

located solely within Travis County, there are 12 heat waves[3] on record for Travis County (Table 10-3). Historical extreme heat information, as provided by the NCEI, shows extreme heat 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. Historical extreme heat data for Lakeway, Manor, Pflugerville, Sunset Valley, and Village of the Hills are provided on a County-wide basis per the NCEI database. Only extreme heat events that have been reported have been factored into this Risk Assessment. It is likely that additional extreme heat occurrences have gone unreported before and during the recording period.

Table 10-3. Historical Extreme Heat Events, 1996-2016

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	7/29/1999	1	0	$0	$0
Travis County	8/14/1999	1	0	$0	$0
Travis County	8/16/1999	1	0	$0	$0
Travis County	7/4/2000	1	0	$0	$0
Travis County	7/5/2000	1	0	$0	$0
Travis County	7/18/2000	1	0	$0	$0
Travis County	7/23/2000	1	0	$0	$0
Travis County	7/15/2009	0	0	$0	$0
Travis County	5/25/2011	0	0	$0	$0
Travis County	8/9/2011	1	0	$0	$0
Travis County	7/22/2015	0	0	$0	$0
Travis County	8/6/2015	0	0	$0	$0
TOTALS		**8**	**0**	**$0**	**$0**

Based on the list of historical extreme heat events for the Travis County planning area, including all participating jurisdictions, 4 events have occurred since the 2011 Plan.

[3] Even though the County experiences heat waves each summer, NCEI data only records events reported. Based on reports, only 12 events are on record.

SIGNIFICANT PAST EVENTS

August 14-16, 1999 – Travis County
A 76-year-old woman, apparently not wanting to increase her energy bill, did not use the air conditioner in her apartment. She was found dead on the 16th, and was believed to have died on the 14th. Two days later a 77-year-old man was found dead in his home due to heat exhaustion. His health had been further weakened by a heart condition.

July 7, 2000 – Travis County
A 26-year-old man died of heat stroke Tuesday morning after working outdoors at a construction site on Monday afternoon. He had been working outside in a surveying crew and was taken to a hospital Monday evening with a 108°F temperature.

July 23, 2000 – Travis County
A 2-year-old boy died of heat stroke. He had a temperature of 108°F when he reached the hospital. He was left on the floor of a sunroom and his mother had fallen asleep. A 72-year-old woman also died of heat stroke. Although air conditioning was available in her home, she had not turned it on.

PROBABILITY OF FUTURE EVENTS

According to historical records, the Travis County planning area, including all participating jurisdictions, has experienced 12 events in a 21 year reporting period. This provides a frequency of occurrence of approximately 1 event every year. This frequency supports a highly likely probability of future events.

VULNERABILITY AND IMPACT

There is no defined geographic boundary for extreme heat events. While the entire Travis County planning area 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. Table 10-4 shows annualized exposure.

Table 10-4. Extreme Heat Event Damage Totals, 1996-2016[4]

JURISDICTION	PROPERTY & CROP LOSS	ANNUALIZED LOSS ESTIMATES
Travis County	$0	$0

[4] Extreme Heat events are reported on a county-wide basis and includes all participating jurisdictions.

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

Travis County, in coordination with the City of Austin, developed standard operations to monitor extreme heat conditions and coordinate outreach efforts to at-risk populations during extreme heat events. The phased approach includes monitoring conditions, utilizing media and local organizations to inform vulnerable populations, and providing direct relief to those at risk when necessary including but not limited to: cooling stations, water distribution, and increased capacity for homeless shelters.[5]

Populations over 65 in the Travis County planning area is estimated at 8.1 percent of the total population and children under the age of 5 are estimated at 7 percent, for an estimated total of 169,595[6] potentially vulnerable residents in the planning area based on age (Table 10-5).

Table 10-5. Populations at Greater Risk by Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5
Travis County[7]	91,230	78,365
Lakeway	2,473	624
Manor	275	545
Pflugerville	3,936	4,175
Sunset Valley	65	83
Village of the Hills	431	104

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.

[5] City of Austin Special Operations Plan, Heat Emergencies, May 2015

[6] U.S. Census Bureau 2015 data for Travis County.

[7] County totals includes all incorporated and unincorporated areas of the County.

Typically more than 12 hours of warning time would be given before the onset of an extreme heat event. While only minor property damage would result, the potential impact of excessive summer heat is considered "Substantial" due to the high probability of injury or death throughout the entire planning area. Based on historical records over a 21-year period, annualized losses (property and crop) for Travis County, including all participating jurisdictions, are negligible.

In terms of vulnerability to 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 10 percent of residential and commercial property could be damaged if extreme heat events led to structure fires.

ASSESSMENT OF IMPACTS

The greatest risk from extreme heat is to public health and safety. Potential impacts to the community may 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).
- 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.
- Vehicle 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 predominant in the Lake Travis area 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 of water or developing supplemental water resources.
- Outdoor activities may see an increase in school injury or illness during extreme heat events.

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 11: EXPANSIVE SOILS

Hazard Description 1

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Vulnerability and Impact 9

HAZARD DESCRIPTION

Expansive soils are soils and soft rocks with a relatively high percentage of clay minerals that are subject to changes in volume as they swell and shrink with changing moisture conditions. Drought conditions can cause soils to contract in response to a loss of soil moisture.

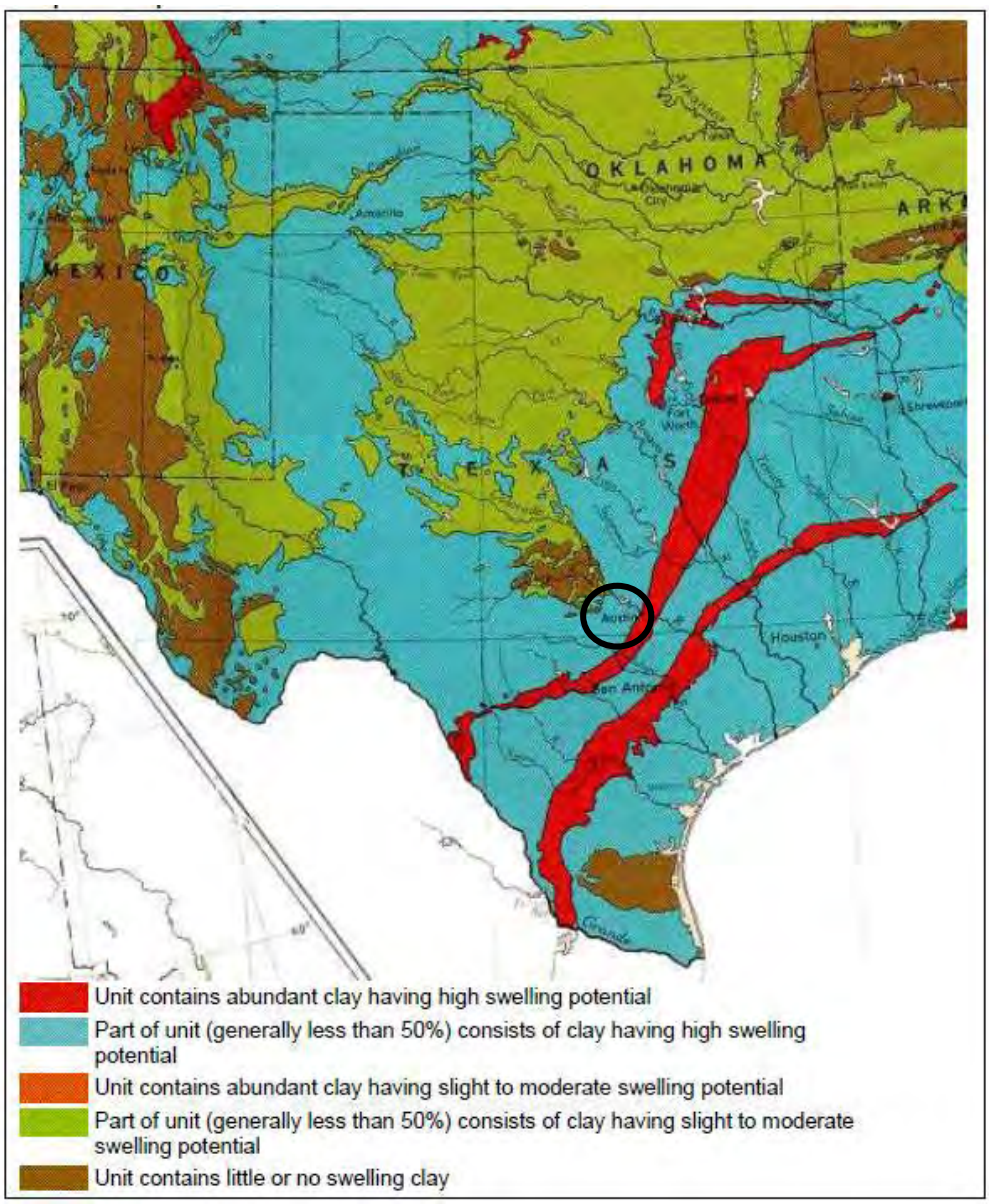
Expansive soils contain minerals such as smectite clays that are capable of absorbing water. When these clays absorb water they increase in volume and expand. Expansions in soil of 10 percent or more are not uncommon in the Travis County planning area. The change in soil volume and resulting expansion can exert enough force on a building or other structure to cause damage.

Expansive soils will also lose volume and shrink when they dry. A reduction in soil volume can affect the support to buildings or other structures and result in damage. Fissures in the soil can also develop and facilitate the deep penetration of water when moist conditions or runoff occurs. This produces a cycle of shrinkage and swelling that places repetitive stress on structures.

LOCATION

The Travis County planning area, including all participating jurisdictions, may be affected by the band of expansive soils stretching from northeast Dallas, southwest through San Antonio, towards Laredo, and along an area also known as the I-35 corridor. Figure 11-1 depicts expansive soils across the State of Texas and the Travis County planning area is identified within the black circle. These areas receive the most moisture and are also vulnerable to droughts, which can cause the soils to expand and contract. Figure 11-2 depicts the types of land resources in the State of Texas due to their soil types.

Figure 11-1. Texas Geological Survey[1]



[1] Source: United States Geological Survey, http://www.usgs.gov

Figure 11-2. Texas Geological Survey[2]

The Travis County planning area, including all participating jurisdictions, is located within the Edwards Plateau and Blackland Prairie, as identified within the black circle in Figure 11-2. The entire planning area is located in an area affected by expansive soils.

Edwards Plateau: The 22.7 million acres of the Edwards Plateau are in South Central Texas, east of the Trans-Pecos and west of the Blackland Prairie. Uplands are nearly level to undulating, except near large

[2] Source: USDA, http://www.nrcs.usda.gov

stream valleys, where the landscape is hilly with deep canyons and steep slopes. There are many cedar brakes in this area and surface drainage is rapid.

Upland soils are mostly shallow, stony, or gravelly, and consisting of dark alkaline clays and clay loams underlain by limestone. Lighter-colored soils are on steep sideslopes and deep, less-stony soils are in the valleys. Bottomland soils are mostly deep, dark-gray or brown, with alkaline loams and clays.

Raising beef cattle is the main enterprise in this region, but it is also the center of Texas' and the nation's mohair and wool production. The area provides a major deer habitat and hunting leases produce income. Cropland is mostly in the valleys on the deeper soils and is used mainly for growing forage crops and hay. The major soil-management concerns are brush control, large stones, low fertility, excess lime, and limited soil moisture.

Blackland Prairie: The Blackland Prairies consist of about 12.6 million acres of east-central Texas, extending southwesterly from the Red River to Bexar County. There are smaller areas to the southeast. The landscape is undulating with few scattered wooded areas that are mostly in the bottomlands. Surface drainage is moderate to rapid.

Both upland and bottomland soils are deep, dark-gray to black, and consist of alkaline clays. Some soils in the western part are shallow to moderately deep over chalk. Soils on the eastern edge are typically neutral to slightly acidic, grayish clays and loams over mottled clay subsoils (sometimes called graylands). Blackland soils are known as "cracking clays" because of their high shrink-swell property and the large, deep cracks that form in dry weather. This high shrink-swell property can cause serious damage to foundations, highways, and other structures, and is a safety hazard in pits and trenches.

Land use is almost equally cropland and grassland. Cotton, grain sorghums, corn, wheat, oats, and hay are grown in this area. Grassland is mostly improved pastures, with native range on the shallower and steeper soils. Water erosion, cotton root rot, soil tilth, and brush control are the major management problems.

EXTENT

The extent to which soil expansion is present in an area can be measured using the standard test method for expansive soils which has been adopted by the American Society for Testing and Materials (ASTM D-4829).[3] The expansion index (EI) provides an indication of swelling potential for a compacted soil. The EI measures volumetric swelling and is calculated by bringing a soil sample to 50 percent saturation and then multiplying the percentage of soil swelling by the fraction of soil to pass through a No. 4 sieve, and then by 100.

[3] http://www.astm.org/Standards/D4829.htm

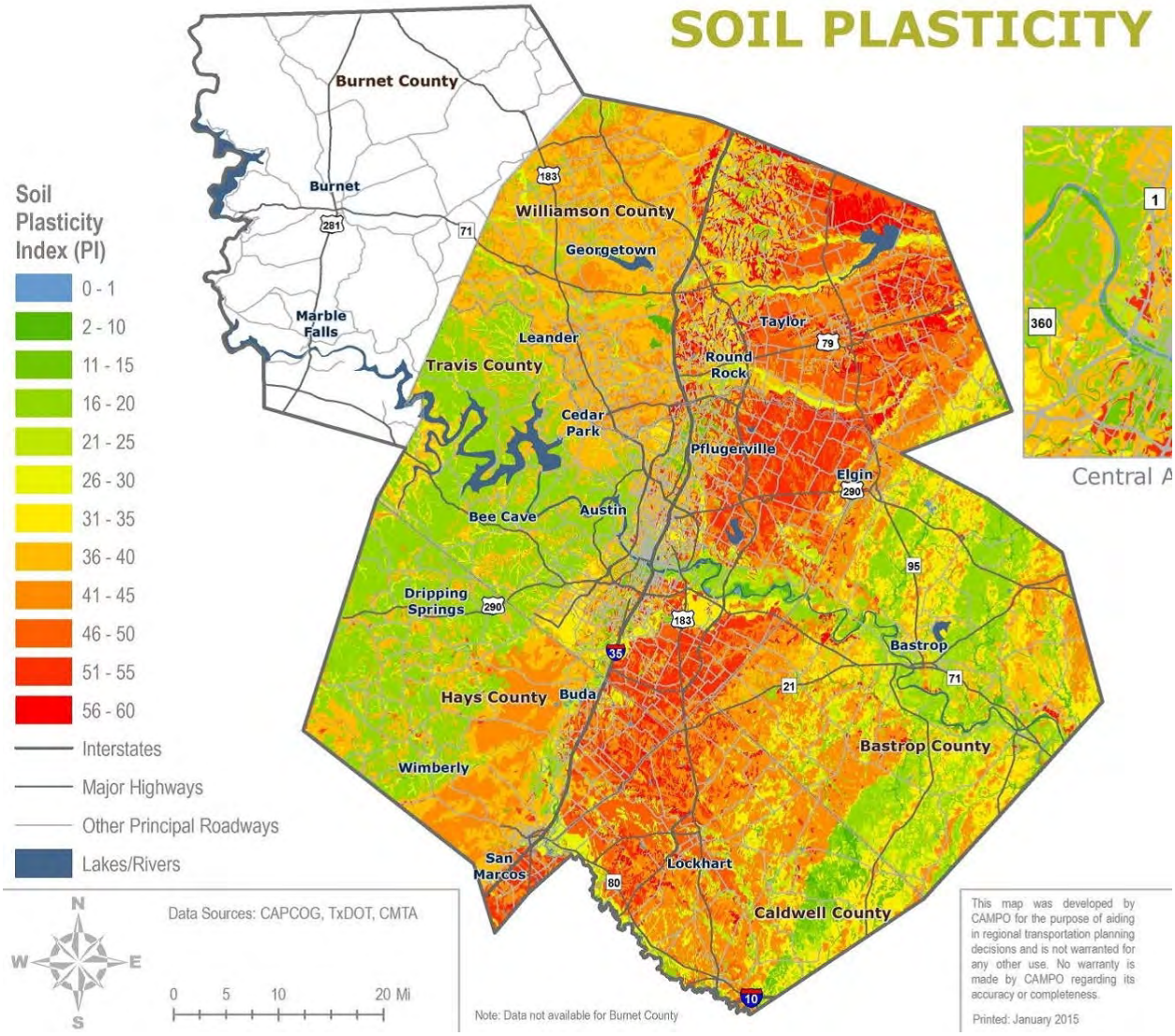
Table 11-1. Swelling Potential of Soils and Plasticity Index

Potential Expansion	Expansion Index
Low	0 – 15
Medium	10 – 35
High	20 – 55
Very High	35 and above

The amount and depth of potential swelling that can occur in a clay material are, to some extent, functions of the cyclical moisture content in the soil. In drier climates where the moisture content in the soil near the ground surface is low because of evaporation, there is a greater potential for extensive swelling than in the same soil in wetter climates where the variations of moisture content are not as severe. Volume changes in highly expansive soils range between 7 and 10 percent, however under abnormal conditions, they can reach as high as 25 percent.

The Web Soil Survey is used to measure the extent of expansive soils by measuring the type of soils and their moisture content. Figure 11-3 depicts the plasticity index of the soils in the Travis County planning area.

Figure 11-3. Plasticity Index of Travis County Planning Area Soils[4]



The red and orange areas shown in Figure 11-3 indicate locations with relatively higher plasticity soils, which can exhibit greater sensitivity to drought conditions. High plasticity soils are prone to shrink and swell as soil moisture changes, which can degrade pavement, causing longitudinal cracking and edge drop-off. This effect can damage foundations of buildings and homes.

[4] Source: United States Department of Agriculture (USDA)

Table 11-2. Swelling Potential of Soils and Plasticity Index by Jurisdiction

Jurisdiction	Soil Plasticity Index	Potential Expansion
Travis County	2-60	Low, Medium, High
Lakeway	11-30	Low, Medium
Manor	36-60	Medium, High
Pflugerville	36-60	Medium, High
Sunset Valley	21-40	Medium
Village of the Hills	11-30	Low, Medium

HISTORICAL OCCURRENCES

Expansive soils is a condition that is native to Texas soil characteristics, and cannot be documented as a time-specific event, except when it leads to structural and infrastructure damage. Extreme conditions can damage roads, structures, and infrastructure, including projects still under construction.

The photos below represent the types of longitudinal cracking damage that expansive soils have caused in the planning area. All of the pictures feature relatively new roads that were damaged, in part, by changes in soil moisture. Roads in the planning area have been damaged by expansive soils in 2008, 2009, and in the summer of 2011, according to the Capital Area Metropolitan Planning Organization (CAMPO) Risk Assessment.[5]

The Texas State Highway (SH) 130 tollway, under construction in 2011 in neighboring Caldwell County, suffered an estimated $30 million in damage from cracks across several sections. In response, builders repaired cracks and also changed the substructure to create moisture barriers designed to mitigate soil moisture-related damage in the future.

[5] Source: CAMPO Extreme Weather Vulnerability Assessment.

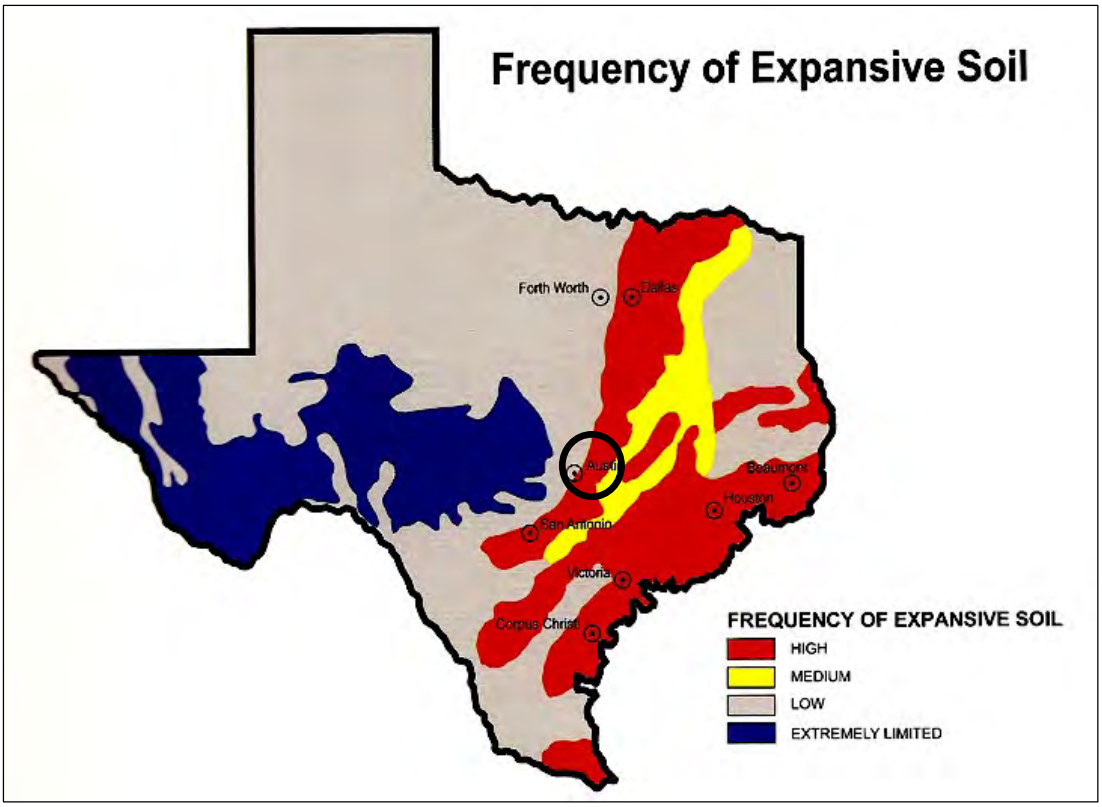
Left: Photo of pavement cracks in a new Austin subdivision in 2009. Right: Longitudinal cracking on Golden Falls Drive in Travis County in 2008. Photo credit: City of Austin.

PROBABILITY OF FUTURE EVENTS

Since no other records (other than listed above) of specific incidences of loss associated with expansive soils were found, and no specific occurrences of expansive soils were identified within the planning area, the probability of future events cannot be determined at this time. However, according to public opinion, the probability of future events of loss due to expansive soils within the planning area, is highly possible, especially when periods of drought increase throughout the planning area.

Figure 11-4 displays the frequency of expansive soil occurrences for the entire state. The Travis County planning area, including all participating jurisdictions, is shown in the black circle and is subject to a range of frequency of expansive soils, with a maximum “High” frequency.

Figure 11-4. Frequency of Expansive Soil



VULNERABILITY AND IMPACT

The effects of expansive soils are most prevalent when periods of moderate to high precipitation are followed by drought and then again by periods of rainfall. Other cases of damage result from increases in moisture volume from such sources as broken or leaking water and sewer lines. Dry clays are capable of absorbing water and will increase in volume in an amount proportional to the amount of water absorbed. Soils capable of changes in volume present a hazard to structures built over them and to the pipelines buried in them. Houses and one-story commercial buildings are more apt to be damaged by the expansion of swelling clays than are multi-story buildings, which are usually heavy enough to counter swelling pressures. However, if constructed on wet clay, multi-story buildings may also be damaged by clay shrinkage when moisture levels are substantially reduced.

Cracked foundations and floors, jammed windows and doors, and ruptured pipelines are typical types of damage resulting from swelling soils. Damage to the upper floors of larger buildings can occur when motion in the structure is significant. While all infrastructure within the Travis County planning area,

including all participating jurisdictions, is vulnerable, slab on grade structures are more likely to suffer damages from expansive soils. In addition, older structures built to less stringent building codes may also be more susceptible to damages than new construction.

While the number of slab on grade structures is not available, the U.S. Census data indicates approximately 155,763 of the residential structures in the planning area were built before 1980 (Table 11-3) and may be more susceptible to damages.

Table 11-3. Structures at Greater Risk by Jurisdiction

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980
Travis County	155,763
Lakeway	900
Manor	295
Pflugerville	945
Sunset Valley	83
Village of the Hills	0

The following critical facilities would be vulnerable to expansive soils in the planning area by jurisdiction.

Table 11-4. Critical Facilities by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Travis County	16 Government Facilities, 16 Dams, 1 Hospital, 20 Fire Stations, 2 Police Stations, 1 Correctional Facility, 1 EMS, 59 Schools, 2 Water/Waste Water Facilities
Lakeway	1 Police Station, 3 Government Facilities, 1 Fire Station and Administration Building, 1 Airport, 1 Hospital, 1 Emergency Room, 8 Water/Waste Water Facilities, 2 Lift Stations, 2 Utility Facilities, 4 Schools, 2 Electrical Substations
Manor	1 Police Station, 1 Fire Station, 2 Government Facilities, 7 Schools, 1 Emergency Room, 3 Water/Waste Water Facilities
Pflugerville	9 Government Facilities, 3 Emergency Rooms, 3 Fire Stations, 1 Hospital, 18 Schools, 15 Lift Stations
Sunset Valley	2 Government Facilities
Village of the Hills	4 Water/Waste Water Facilities, 1 Emergency Operations Center (EOC)

The impact of expansive soils ranges from cosmetic cracks in walls to substantial foundation and structural damage that can result in a need for building demolition. Infrastructure such as pipelines can be damaged, causing increased maintenance and repairs, replacement, or damage to the point of failure. Sewer and

water lines are also affected by shrink and swell soils. The movement of the soils can snap water and sewer lines, producing a minimum of temporary discomfort, and a maximum of a serious health and welfare risk.

Homeowners and public agencies that assume they cannot afford preventative measures such as more costly foundations and floor systems, often incur the largest percentage of damage and costly repairs from expanding soil. No figures are available for the total damage to homes in the planning area from expansive clays. For the Travis County planning area, including all participating jurisdictions, the most extensive damage from expansive soils can occur to bridges, highways, streets, and parking lots. The greatest damage occurs when structures are constructed when clays are dry (such as during a drought) and then subsequent soaking rains swell the clay.

The impact of expansive soils experienced in the Travis County 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 percent of property is destroyed or with major damage.

SECTION 12: HAIL

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Significant Past Events 5
Probability of Future Events 6
Vulnerability and Impact 6
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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 frozen masses of round or irregularly shaped ice typically 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 Travis County planning area, including all participating jurisdictions, is equally at risk to the hazard of hail.

EXTENT

The National Weather Service (NWS) classifies a storm as "severe" if there is hail 3/4 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 Centers for Environmental Information (NCEI) Intensity Scale in Table 12-1.

Table 12-1. 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 12-1 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 Travis County planning area, including all participating jurisdictions, may experience hailstorms ranging from an H0 to an H10. The planning area can mitigate a storm from low risk or hard hail to a severe, super hailstorm with baseball size hail that leads to extensive structural damage and could cause fatal injuries.

HISTORICAL OCCURRENCES

Historical evidence shown in Figure 12-1 demonstrates that the planning area is vulnerable to hail events overall, which typically result from severe thunderstorm activity. Historical events with reported damages, injuries, or fatalities are shown in Table 12-2. A total of 374 reported historical hail events impacted the Travis County planning area between 1955 and 2016 (Summary Table 12-3). These events were reported to NCEI and National Oceanic and Atmospheric Administration (NOAA) databases, and may not represent

[1] NCEI Intensity Scale, based on the TORRO Hailstorm Intensity Scale.

all hail events to have occurred during the past 62 years. Only those events for the Travis County planning area with latitude and longitude available were plotted (Figure 12-1).

Figure 12-1. Spatial Historical Hail Events, 1955-2016

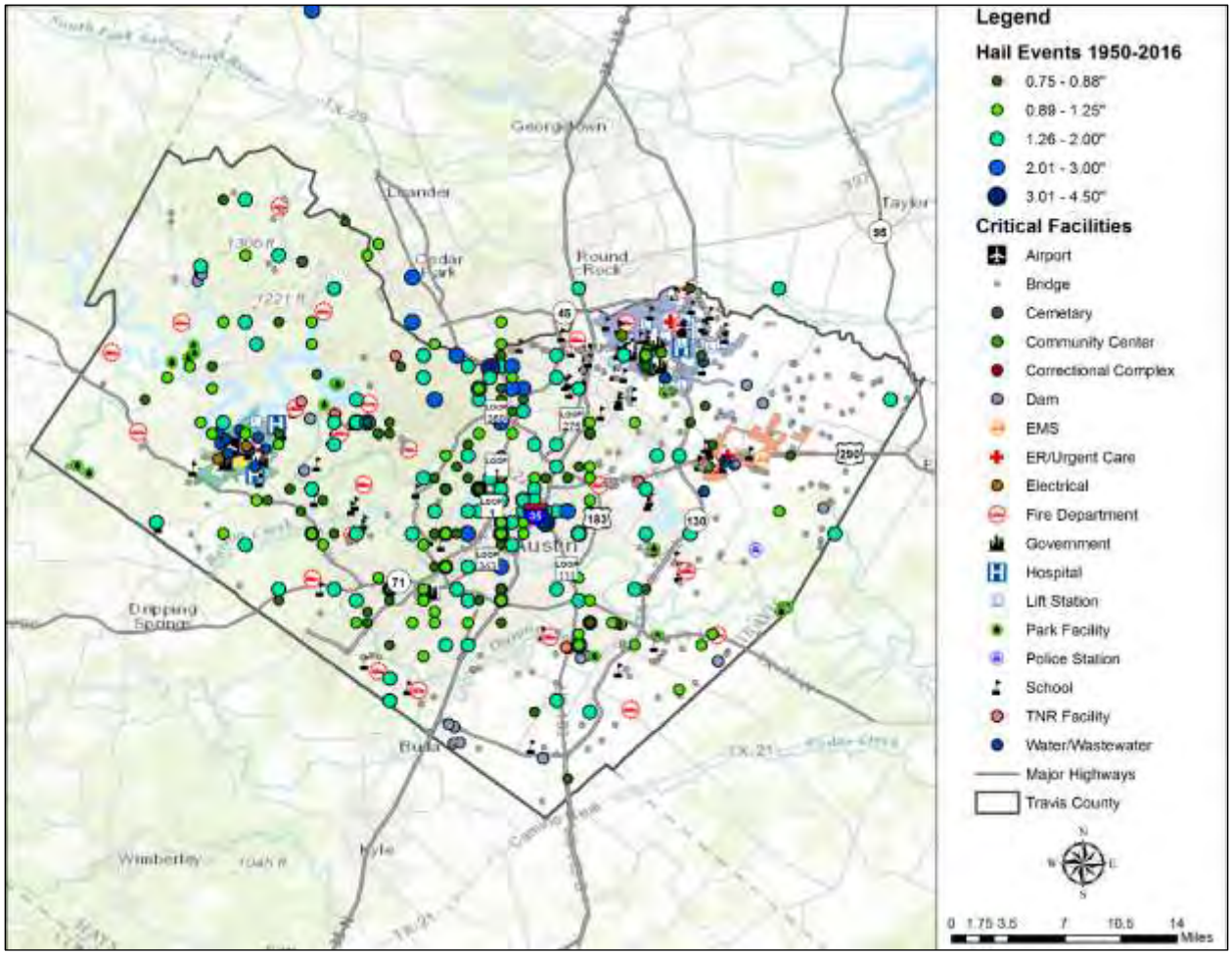

Table 12-2. Historical Hail Events, 1955-2016[2]

JURISDICTION	Date	MAGNITUDE (Inches)	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	3/25/1993	1.75	0	0	$87,244	$0
Travis County	3/25/1993	0.75	0	0	$0	$8,471
Travis County	3/25/1993	0.75	0	0	$0	$8,471
Travis County	3/25/1993	1.75	0	0	$84,708	$0
Travis County	3/25/1993	1.5	0	0	$84,708	$0
Travis County	3/25/1993	1.75	0	0	$847,084	$0
Travis County	3/25/1993	2	0	0	$84,708,353	$0
Travis County	3/25/1993	0.88	0	0	$0	$8,471
Travis County	3/25/1993	2	0	0	$127,062,529	$8,471
Travis County	5/30/1993	0.75	0	0	$84,708	$0
Travis County	4/5/1994	0.75	0	0	$847,084	$82,594
Travis County	9/20/1996	2	0	0	$15,603	$0
Travis County	10/17/1996	1.5	0	0	$31,206	$0
Travis County	10/17/1996		0	0	$15,603	$0
Travis County	10/20/2002	1.75	0	0	$680,398	$0
Travis County	8/11/2003	1.75	0	0	$133,048	$0
Travis County	4/6/2004	1.75	0	0	$266,095	$0
Travis County	4/13/2004	1	0	0	$647,981	$0
Travis County	3/25/2005	2	0	0	$125,349,278	$0
Travis County	5/14/2008	2.75	0	0	$113,704	$0
Travis County	5/14/2008	2.75	0	0	$113,704	$0
Travis County	5/14/2008	2	0	0	$113,704	$0
Travis County	5/14/2008	1.75	0	0	$1,137	$0

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

JURISDICTION	Date	MAGNITUDE (Inches)	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	5/14/2008	4	0	0	$1,137	$0
Travis County	3/25/2009	3	0	0	$182,575,231	$0
Travis County	3/25/2009	2	0	0	$11,411	$0
Travis County	4/27/2014	1.25	0	0	$1,034	$0
TOTALS			**0**	**0**	**$523,993,170**	

Table 12-3. Historical Hail Events Summary, 1955-2016

JURISDICTION	Number of Events	MAGNITUDE	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	356	4.00 inches	0	0	$523,876,692	$116,478
Lakeway	6	1.75 inches	0	0	$0	$0
Manor	2	1.00 inches	0	0	$0	$0
Pflugerville	10	1.75 inches	0	0	$0	$0
Sunset Valley	0	N/A	0	0	$0	$0
Village of the Hills	0	N/A	0	0	$0	$0
TOTAL LOSSES	**374**	**(Max Extent)**	**0**	**0**	**$523,993,170**	

Based on the list of historical hail events for the Travis County planning area, including all participating jurisdictions, 78 events have occurred since the 2011 Plan.

SIGNIFICANT PAST EVENTS

March 25, 2005 – Travis County

On the evening of March 25, the most destructive hailstorm in 10 years struck Travis County. The total damage to homes, vehicles, businesses, and property has been estimated at over $100 million. The event began as two supercells located near Marble Falls and Round Mountain merged into a line of thunderstorms as they moved eastward into Travis County. This new line stretched from near Lago Vista on the north edge, across Lake Travis and Lakeway, to near Bee Cave. The storm began producing hail up to golf-ball-size at Lake Travis and Lakeway. At the same time, near the mid part of the line, a combination of large hail and damaging winds struck near FM 620 and Anderson Mill Road. The storm knocked out power to 5,000 homes from northwest Austin to the Oak Hills area. As the hailstorm crossed the central and south portions of the County, it shattered windows in hundreds of homes and thousands of cars, as well as denting thousands of cars. The storm continued on toward Manor, producing 1 inch hail in 3 to 6 inch drifts in the Manor area, just prior to producing an F1 tornado.

March 25, 2009 – Travis County

A cold front stalled across South Central Texas on the morning of March 25th. Thunderstorms reached the Edwards Plateau by early afternoon and continued moving toward the east into the evening. Total estimated loss from this storm is around $160 million, the most ever for a Travis County hail storm. The storm produced hail ranging from quarter to teacup size. The Emergency Operations Center (EOC) received 14 reports of severe size hail, 9 of which were 2 inches or larger. The teacup size hail was reported by the media and fell near the Austin Arboretum.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, 374 events in a 62 year reporting period for Travis County provide a frequency of occurrence of approximately 6 events every year. This frequency supports a highly likely probability of future events for the Travis County planning area, including all participating jurisdictions. The numbers listed for the jurisdictions within the County are historical events that are known to have specifically impacted those jurisdictions. Typically hail events and associated damages are reported on a county-wide basis.

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 critical facilities 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. Outdoor activities and events may elevate the risk to residents and visitors when a hailstorm strikes with little warning. Portable buildings typically utilized by schools and commercial sites such as construction areas would be more vulnerable to hail events than the typical site built structures.

The Travis County planning area features multiple mobile or manufactured home parks throughout the planning area. These parks are typically more vulnerable to hail events than typical site built structures. In addition, manufactured homes are located sporadically throughout the planning area including all jurisdictions, except Sunset Valley, which would also be more vulnerable. The U.S. Census data indicates a total of 15,405 manufactured homes located in the Travis County planning area (Table 12-4). In addition, 33.6 percent (approximately 155,763 structures) of the single family residential (SFR) structures in the Travis County 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.

Table 12-4. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Travis County[3]	15,405	155,763
Lakeway	10	900
Manor	93	295
Pflugerville	418	945
Sunset Valley	0	83
Village of the Hills	14	0

Table 12-5 includes critical facilities that would be vulnerable to hail events in the Travis County planning area.

Table 12-5. Critical Facilities by Jurisdiction

JURISDICTION	CRITICAL FACLITIES
Travis County	16 Government Facilities, 16 Dams, 1 Hospital, 20 Fire Stations, 2 Police Stations, 1 Correctional Facility, 1 EMS, 59 Schools, 2 Water/Waste Water Facilities
Lakeway	1 Police Station, 3 Government Facilities, 1 Fire Station and Administration Building, 1 Airport, 1 Hospital, 1 Emergency Room, 8 Water/Waste Water Facilities, 2 Lift Stations, 2 Utility Facilities, 4 Schools, 2 Electrical Substations
Manor	1 Police Station, 1 Fire Station, 2 Government Facilities, 7 Schools, 1 Emergency Room, 3 Water/Waste Water Facilities
Pflugerville	9 Government Facilities, 3 Emergency Rooms, 3 Fire Stations, 1 Hospital, 18 Schools, 15 Lift Stations
Sunset Valley	2 Government Facilities
Village of the Hills	4 Water/Waste Water Facilities, 1 Emergency Operations Center (EOC)

Hail has been known to cause injury to humans and occasionally has been fatal. Overall, the average loss estimate of property and crop (in 2017 dollars) is $523,993,170, having an approximate annual loss estimate of $8,451,503. Based on historic loss and damages, the impact of hail damages on the Travis County planning area can be considered “Minor” severity of impact, meaning injuries and illness do not

[3] County totals includes all incorporated and unincorporated areas of the County.

result in permanent disability, County area facilities shut down for more than one week, and more than 10 percent of property destroyed or with major damage.

Table 12-6. Potential Annualized Losses for Travis County

JURISDICTION	PROPERTY & CROP DAMAGE	ANNUAL LOSS ESTIMATE
Travis County	$523,993,170	$8,451,503
Lakeway	$0	$0
Manor	$0	$0
Pflugerville	$0	$0
Sunset Valley	$0	$0
Village of the Hills	$0	$0
Planning Area	**$523,993,170**	**$8,451,503**

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 outages 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.
- A large hail event could impact the accessibility of recreational areas and parks due to extended power outages or debris clogged access roads.

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 13: LIGHTNING

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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 Federal Emergency Management Agency (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.

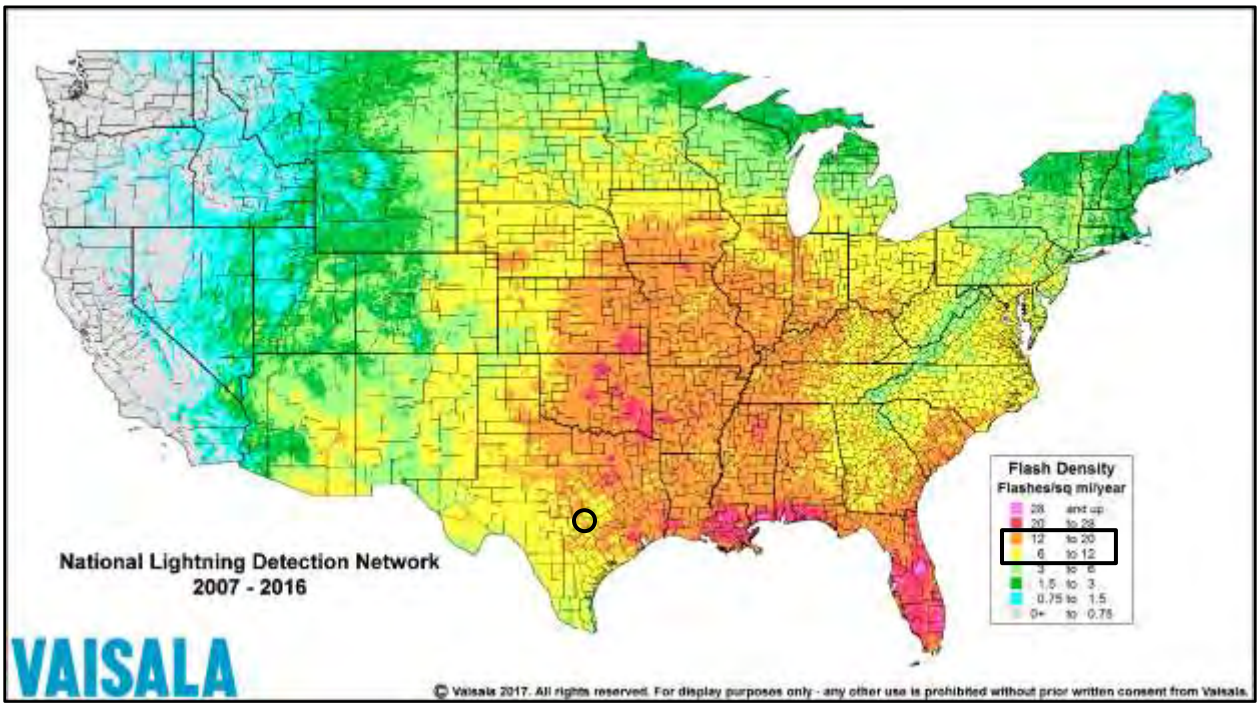
LOCATION

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

EXTENT

According to the NOAA, the average number of cloud-to-ground flashes for the State of Texas between 2007 and 2016 was 11.3 flashes per square mile. Vaisala's U.S. National Lightning Detection Network lightning flash density map (Figure 13-1) shows a range of 6 to 20 cloud-to-ground lightning flashes per square mile per year for the entire Travis County planning area. This rate equates to approximately 6,138 to 20,460 flashes per year for the entire planning area.

Figure 13-1. Lightning Flash Density, 2007-2016[1]



The extent for lightning can be expressed in terms of the number of strikes in an interval. NOAA utilizes lightning activity levels (LALs) on a scale from 1-6. LAL rankings reflect the frequency of cloud-to-ground lightning either forecast or observed (Table 13.1).

Table 13-1. NOAA Lightning Activity Levels (LAL)

LAL	CLOUD & STORM DEVELOPMENT	LIGHTNING STRIKES/ 15 MIN
1	No thunderstorms.	-

[1] Travis County is indicated by the circle.

LAL	CLOUD & STORM DEVELOPMENT	LIGHTNING STRIKES/ 15 MIN
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense.	>25
6	Similar to LAL 3 except thunderstorms are dry.	

The NCEI does not include the LAL for historical lightning events, therefore in order to determine the extent of lightning strikes, the yearly average range of estimated number of lightning strikes within the planning area (6,138 to 20,460 flashes) and a cloud-to-ground flash density of 6 to 20 per square mile, were divided by the average number of thunderstorm events that occur annually in the planning area. Travis County, including all participating jurisdictions should expect a range of 16 to 53 lightning strikes within 15 minutes at any given time during a lightning or combined lightning and thunderstorm event, indicating lightning strikes have a LAL range of 2 to 5.

HISTORICAL OCCURRENCES

Table 13-2 depicts the historical occurrences of lightning for the Travis County planning area, including all participating jurisdictions, with associated damages according to the National Centers for Environmental Information (NCEI) data. Since January 1996, 20 recorded lightning events are known to have impacted the Travis County planning area, based upon National Climatic Data Center (NCDC) records.

The NCEI is a national data source organized under the National Oceanic and Atmospheric Administration (NOAA) and is the largest archive available for climate data. It is important to note that only incidents reported to the NCEI have been factored into this risk assessment. Damage estimates provided in a table for losses have been modified to reflect the damage in 2017 dollars. With limited reported incidents in the planning area, the team also utilized the most current lightning flash density estimate in the risk assessment for future probability.

Table 13-2. Historical Lightning Events, 1996-2016

JURISDICTION	DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	4/5/1996	2:20 PM	1	0	$0	$0
Manor	8/12/1996	8:00 PM	0	1	$0	$0
Travis County	7/4/1998	1:00 PM	0	6	$0	$0
Travis County	8/16/1998	5:00 PM	0	2	$0	$0
Travis County	7/16/2000	3:00 PM	0	1	$0	$0
Travis County	8/8/2002	3:00 PM	0	3	$0	$0
Travis County	3/18/2008	3:05 PM	0	0	$5,685	$0
Lakeway	4/27/2008	5:45 AM	0	0	$34,111	$0
Travis County	10/7/2008	2:15 AM	0	0	$568,518	$0
Travis County	6/3/2009	1:00 AM	0	0	$11,411	$0
Travis County	6/30/2009	8:00 AM	0	0	$114,110	$0
Travis County	6/30/2009	8:15 AM	0	0	$171,164	$0
Travis County	6/9/2010	3:54 AM	0	0	$673,608	$0
Travis County	4/29/2013	2:00 PM	0	3	$0	$0
Travis County	7/26/2013	10:58 PM	0	0	$136,613	$0
Travis County	7/26/2013	11:00 PM	0	0	$52,543	$0
Travis County	7/26/2013	11:45 PM	0	0	$78,815	$0
Travis County	8/26/2014	3:40 PM	0	3	$0	$0
Travis County	5/23/2015	8:40 PM	0	0	$10,329	$0
Travis County	9/25/2016	4:00 PM	1	0	$0	$0
TOTAL LOSSES			**2**	**19**	**$1,856,907**	

Table 13-2. Historical Lightning Events Summary, 1996-2016

JURISDICTION	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	2	18	$1,822,796	$0
Lakeway	0	0	$34,111	$0
Manor	0	1	$0	$0
Pflugerville	0	0	$0	$0
Sunset Valley	0	0	$0	$0
Village of the Hills	0	0	$0	$0
PLANNING AREA	**2**	**19**	**$1,856,907**	

Based on the list of historical lightning events for the Travis County planning area, including all participating jurisdictions, 7 events have occurred since the 2011 Plan.

SIGNIFICANT PAST EVENTS

April 5, 1996 – Travis County
Lightning struck a 51-year-old visitor from Scotland as he was playing golf in the southeast part of Austin. He remained in critical condition for nearly 2 weeks after the strike, and died on April 13th.

July 4, 1998 – Travis County
Lightning struck a group of swimmers, injuring 6 at a local park near Lake Travis. All were treated and quickly released.

September 25, 2016 – Travis County
The Travis County Sheriff's Office reported that a woman was struck and killed by lightning in northwestern Austin. She was found dead on a hiking trail off of River Place Boulevard.

PROBABILITY OF FUTURE EVENTS

Based on historical records, the U.S. National Lightning Detection Network, and input from the planning team, the probability of occurrence for future lightning events in the Travis County planning area, including all participating jurisdictions, is considered highly likely, or an event probable in the next year. According to NOAA, the Travis County planning area is located in a part of the country that experiences 6 to 20 lightning flashes per square mile per year (approximately 6,138 to 20,460 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 lightning 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 the Travis County planning area 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 Travis County, incluing all participating jurisdictions, 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. Populations located outdoors are considered at risk and more vulnerable to a lightning strike compared to populations inside a structure. Moving to a lower risk location will decrease a person's vulnerability.

The entire general building stock and all infrastructure of the planning area 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.

Table 13-3 includes critical facilities that would be vulnerable to lightning events in the Travis County planning area.

Table 13-3. Critical Facilities by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Travis County	16 Government Facilities, 16 Dams, 1 Hospital, 20 Fire Stations, 2 Police Stations, 1 Correctional Facility, 1 EMS, 59 Schools, 2 Water/Waste Water Facilities
Lakeway	1 Police Station, 3 Government Facilities, 1 Fire Station and Administration Building, 1 Airport, 1 Hospital, 1 Emergency Room, 8 Water/Waste Water Facilities, 2 Lift Stations, 2 Utility Facilities, 4 Schools, 2 Electrical Substations
Manor	1 Police Station, 1 Fire Station, 2 Government Facilities, 7 Schools, 1 Emergency Room, 3 Water/Waste Water Facilities
Pflugerville	9 Government Facilities, 3 Emergency Rooms, 3 Fire Stations, 1 Hospital, 18 Schools, 15 Lift Stations
Sunset Valley	2 Government Facilities
Village of the Hills	4 Water/Waste Water Facilities, 1 Emergency Operations Center (EOC)

Impact of lightning experienced in the Travis County planning area, including all participating jurisdictions, has resulted in 19 injuries and 2 fatalities. Impact of lightning events experienced in the Travis County planning area would result in "Limited" damages and facilities would be shut down for 24 hours or less. However, due to the loss of life and number of past injuries, the impact of lightning events for the entire planning area is considered "Substantial," with multiple deaths or injuries possible. Overall, the average loss estimate for Travis County (in 2017 dollars) is $1,856,907, having an approximate annual loss estimate of $88,424 (Table 13-4).

Table 13-4. Potential Annualized Losses for Travis County

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Travis County	$1,822,796	$86,800
Lakeway	$34,111	$1,624
Manor	$0	$0
Pflugerville	$0	$0
Sunset Valley	$0	$0
Village of the Hills	$0	$0
PLANNING AREA	**$1,856,907**	**$88,424**

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:

- Lake Travis is a large recreational lake that attracts fishing and boating activities throughout the year. Lightning events could impact recreational water activities, placing boaters and campers in imminent danger, potentially requiring emergency services or lake evacuation.
- 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 outages often result 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 lightning 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 14: WINTER STORM

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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 Travis County usually begin as powerful cold fronts that push south from central Canada. While the planning area is at risk to ice hazards and extremely cold temperatures, as well as snow, the effects and frequencies of winter storm events are generally mild and short-lived. As indicated in Figure 14-1, on average, the Travis County planning area, including all participating jurisdictions, experiences less than 10 extreme cold days a year, meaning 1 to 10 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 14-1 describes the types of winter storms possible to occur in Travis County.

Figure 14-1. Extreme Cold Days, 1960-2003[1]

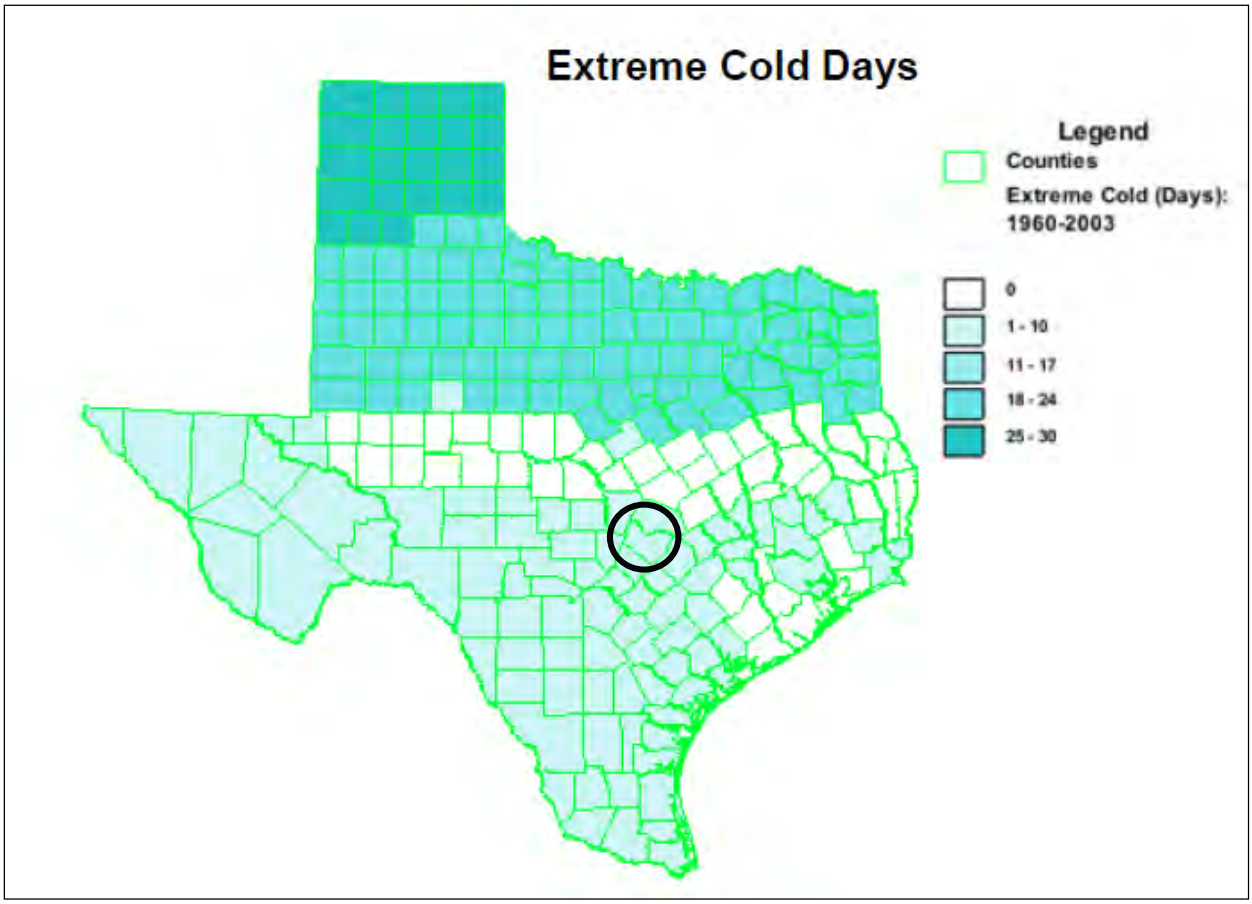

Table 14-1. Types of Winter Storms

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 the area (freezing rain, sleet, or heavy snow may occur separately or in combination).
Winter Storm Warning	Severe winter weather conditions are imminent.
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.

[1] Source: National Weather Service (NWS). Travis County indicated by circle.

TYPE OF WINTER STORM	DESCRIPTION
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 Travis County planning area, including all participating jurisdictions, 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 14-2. Table 14-2 should be read in conjunction with the wind chill factor described in Figure 14-2 to determine the intensity of a winter storm. The chart is not applicable when temperatures are over 50°F or when winds are calm. This is an index developed by the National Weather Service (NWS).

Table 14-2. 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.
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 and 30 mph), and sleet or ice up to 5 millimeters in diameter.

INTENSITY	TEMPERATURE RANGE (Fahrenheit)	EXTENT DESCRIPTION
Severe	Below 20°	Winds of 35 mph or more and snow and sleet greater than 4 inches.

Figure 14-2. Wind Chill Chart

Wind Chill Chart

Wind (mph)	Temperature (°F) 40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	29	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph) *Effective 11/01/01*

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 Travis County planning area, including all participating jurisdictions, has never experienced a blizzard, but based on 23 previous occurrences recorded from 1996 to 2016, it has been subject to winter storm watches, warnings, freezing rain, sleet, snow, and wind chill.

The average number of cold days is similar for the entire County planning area. Therefore, the intensity or extent of a winter storm event to be mitigated for the area ranges from mild to moderate according to the definitions at Table 14-2. The Travis County planning area, including all participating jurisdictions, can expect anywhere between 0.1 to 3.0 inches of ice and snow during a winter storm event, and temperatures between 30°F and 50°F with winds ranging from 0 to 15 mph.

HISTORICAL OCCURRENCES

Table 14-3 shows historical occurrences for Travis County from 1996 to 2016 provided by the National Centers for Environmental Information (NCEI) database. There have been 23 recorded winter storm events in Travis County. Historical winter storm information, as provided by the NCEI, 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. Historical winter storm data for all jurisdictions and Independent School Districts are provided on a County-wide basis per the NCEI database. Table 14-3 shows historical incident information for the planning area which resulted in property or crop damage.

Table 14-3. Historical Winter Storm Events, 1996-2016[2]

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	2/1/1996	0	0	$0	$0
Travis County	1/7/1997	0	0	$0	$0
Travis County	1/11/1997	0	0	$0	$0
Travis County	12/23/1998	0	0	$0	$0
Travis County	12/12/2000	0	0	$0	$0
Travis County	11/28/2001	0	0	$0	$0
Travis County	2/24/2003	0	0	$0	$0
Travis County	12/7/2005	0	0	$0	$0
Travis County	1/15/2007	0	0	$1,889,108	$0
Travis County	1/27/2009	0	0	$0	$0
Travis County	2/3/2011	0	0	$0	$0
Travis County	2/9/2011	0	0	$0	$0
Travis County	12/5/2013	0	0	$0	$0
Travis County	12/7/2013	0	0	$0	$0
Travis County	1/23/2014	0	0	$0	$0
Travis County	1/27/2014	0	0	$0	$0
Travis County	3/4/2014	0	0	$0	$0
Travis County	1/9/2015	0	0	$0	$0
Travis County	1/23/2015	0	0	$0	$0
Travis County	2/16/2015	0	0	$0	$0
Travis County	2/23/2015	0	0	$0	$0

[2] Values are in 2017 dollars.

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Travis County	2/27/2015	0	0	$0	$0
Travis County	3/4/2015	0	0	$0	$0

Based on the list of historical winter storm events for the Travis County planning area, including all participating jurisdictions, 13 events have occurred since the 2011 Plan.

SIGNIFICANT PAST EVENTS

January 15-17, 2007 – Travis County

Light freezing rain and drizzle began to fall the morning of January 15, with reports of significant ice layers on roads and bridges by the mid-afternoon. City and County offices, along with schools and businesses, were closed through the following day. Many state offices were also closed on January 16 as well. Dozens of flight delays and over 150 cancellations were reported at Austin-Bergstrom International Airport on January 15 and 16. Over 35,000 residents were left without power during the event. The event cost more an estimated $1.6 million in overtime and crew costs as a result of the winter storm.

PROBABILITY OF FUTURE EVENTS

According to historical records, the planning area experiences 1 or 2 winter storm events per year. Hence, the probability of a future winter storm event affecting the Travis County planning area, including all participating jurisdictions, is highly likely, with a winter storm likely to occur within the next year. Participating jurisdictions events are included under the County.

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 entire Travis County 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 the rural areas of the County 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.

The population over 65 in the Travis County planning area is estimated at 8.1 percent of the total population or an estimated total of 91,230[3] potentially vulnerable residents in the planning area based on age (Table 14-4).

Table 14-4. Populations at Greater Risk by Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER
Travis County[4]	91,230
Lakeway	2,473
Manor	275
Pflugerville	3,936
Sunset Valley	65
Village of the Hills	431

The Travis County Winter Weather Plan includes operating procedures for Street and Bridge Operations to pre-treat access to facilities that house emergency service units or house equipment necessary to maintain critical infrastructures ahead of severe winter events. The City of Austin and Travis County also provide assistance as practical to other critical facilities such as hospitals or schools. For all areas inside Travis County, the Emergency Operation Center manages and coordinates sanding requests for all roadways maintained by the City of Austin, Travis County, and the TXDOT. In addition, the county has worked closely with the Central Texas School Safety Consortium, The University of Texas, Austin Community College, and various higher education institutions to develop a system for coordinating the closure of schools or the modification of school hours.[5] Table 14-5 includes critical facilities that would be vulnerable to winter storm events in the Travis County planning area.

[3] U.S. Census Bureau 2015 data for Travis County.

[4] County totals includes incorporated and unincorporated areas of the County.

[5] City of Austin Winter Weather Emergency Plan, December 2016

Table 14-5. Critical Facilities by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Travis County	16 Government Facilities, 16 Dams, 1 Hospital, 20 Fire Stations, 2 Police Stations, 1 Correctional Facility, 1 EMS, 59 Schools, 2 Water/Waste Water Facilities
Lakeway	1 Police Station, 3 Government Facilities, 1 Fire Station and Administration Building, 1 Airport, 1 Hospital, 1 Emergency Room, 8 Water/Waste Water Facilities, 2 Lift Stations, 2 Utility Facilities, 4 Schools, 2 Electrical Substations
Manor	1 Police Station, 1 Fire Station, 2 Government Facilities, 7 Schools, 1 Emergency Room, 3 Water/Waste Water Facilities
Pflugerville	9 Government Facilities, 3 Emergency Rooms, 3 Fire Stations, 1 Hospital, 18 Schools, 15 Lift Stations
Sunset Valley	2 Government Facilities
Village of the Hills	4 Water/Waste Water Facilities, 1 Emergency Operations Center (EOC)

Historic loss, in 2017 dollars, is estimated at $1,889,108 in damages over the 21-year recording period, giving an approximate loss of $89,958 in damages annually (Table 14-6). The potential severity of impact for the Travis County planning area, including all participating jurisdictions, is "Limited," meaning injuries are treatable with first aid, shutdown of facilities and services for 24 hours or less, and less than 10 percent of property destroyed or with major damage.

Table 14-6. Winter Storm Event Damage Totals, 1996-2016

JURISDICTION	PROPERTY & CROP LOSS	ANNUALIZED LOSS ESTIMATES
Travis County	$1,889,108	$89,958

ASSESSMENT OF IMPACTS

The greatest risk from a winter storm hazard is to public health and safety. Potential impacts for the planning area 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 sources 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.
- 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.
- Severe cold and ice could significantly damage agricultural crops.
- Schools may be forced to shut early due to treacherous driving conditions.
- 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 government, businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of a winter storm event.

SECTION 15: DAM FAILURE

Hazard Description 1
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Historical Occurrences 13
Probability of Future Events 14
Vulnerability and Impact 14
Assessment of Impacts 14

HAZARD DESCRIPTION

Dams are water storage, control, or diversion structures that impound water upstream in reservoirs. Dam failure can take several forms, including a collapse of or breach in the structure. While most dams have storage volumes small enough that failures have few or no repercussions, dams storing large amounts can cause significant flooding downstream. Dam failures can result from any one or a combination of the following causes:

- Prolonged periods of rainfall and flooding, which cause most failures;
- Inadequate spillway capacity, resulting in excess overtopping of the embankment;
- Internal erosion caused by embankment or foundation leakage or piping;
- Improper maintenance, including failure to remove trees, repair internal seepage problems, or maintain gates, valves, and other operational components;
- Improper design or use of improper construction materials;
- Failure of upstream dams in the same drainage basin;
- Landslides into reservoirs, which cause surges that result in overtopping;
- High winds, which can cause significant wave action and result in substantial erosion;
- Destructive acts of terrorism; and,
- Earthquakes, which typically cause longitudinal cracks at the tops of the embankments, leading to structural failure.

Benefits provided by dams include water supplies for drinking, irrigation and industrial uses; flood control; hydroelectric power; recreation; and navigation. At the same time, dams also represent a risk to public safety. Dams require ongoing maintenance, monitoring, safety inspections, and sometimes even rehabilitation to continue safe service.

In the event of a dam failure, the energy of the water stored behind the dam is capable of causing rapid and unexpected flooding downstream, resulting in loss of life and substantial property damage. A

devastating effect on water supply and power generation could be expected as well. The terrorist attacks of September 11, 2001 generated increased focus on protecting the country's infrastructure, including ensuring the safety of dams.

One major issue with the safety of dams is their age. The average age of America's 84,000 dams is 52 years. More than 2,000 dams near population centers are in need of repair, according to statistics released in 2009 by the Association of State Dam Safety Officials[1]. In addition to the continual aging of dams there have not been significant increases in the number of safety inspectors, resulting in haphazard maintenance and inspection.

The Association of State Dam Safety Officials estimate that $18.2 billion will be needed to repair all high-hazard dams, but the total for all state dam-safety budgets is less than $11 million[2]. The current maintenance budget does not match the scale of America's long-term modifications of its watersheds. Worse still, more people are moving into risky areas. As the American population grows, dams that once could have failed without major repercussions are now upstream of cities and development.

[1] Association of State Dam Safety Officials, Journal of Dam Safety.

[2] Source: www.damsafety.org

LOCATION

The State of Texas has 7,126 dams, all regulated by the Texas Commission on Environmental Quality (TCEQ). The National Dam Safety Review Board, in coordination with the Federal Emergency Management Agency (FEMA) and the National Inventory of Dams (NID), lists a total of 74 dams in the entire Travis County planning area, including all jurisdictions. Each of these dams were analyzed individually by location, volume, elevation, and condition (where available) when determining the risk, if any, for each dam. Each dam site was further analyzed for potential risks utilizing FEMA's National Flood Hazard Layer to map locations and fully understand development near the dam and topographical variations that may increase risk. Many of the dams listed were embankments for typically dry detention drainage areas or shored up stream embankments. These types of structures are utilized for flood control and do not pose a dam failure risk. Other dams in the planning area feature such limited storage capacity that they pose no risk to structures, infrastructure, or citizens. Dams that were deemed to pose no past, current, or future risk to the planning area are not profiled in the plan as no loss of life or impact to critical facilities or infrastructure is expected in the event of a breach. Based on this detailed analysis, the planning team was able to determine that only 6 of the 74 dams identified, pose a risk to the planning area. These dams are profiled in detail below. Figure 15-1, illustrates general locations for each dam posing a potential risk to the planning area.

Figure 15-1. Planning Area Dams with Potential Risk

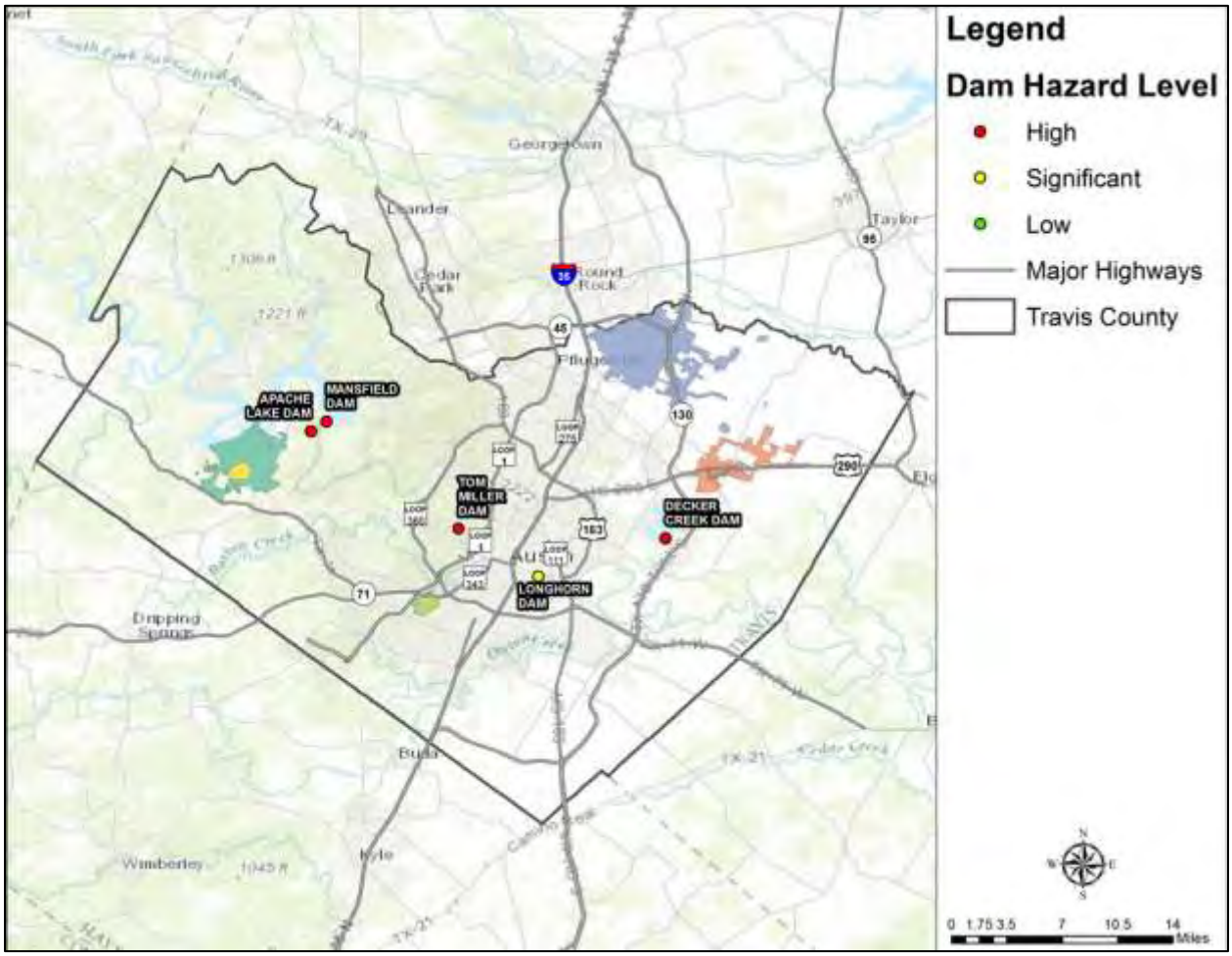


Table 15-1. Travis County Dam Survey

JURISDICTION	DAM NAME	HEIGHT (Ft.)	STORAGE (Acre Ft.)	CONDITION	PROFILED
Travis	Apache Lake Dam	41	82	Not Rated	Yes
Travis	Decker Creek Dam	83	45,200	Not Rated	Yes
Travis	Longhorn Dam (AKA Town Lake Dam)	65	6,850	Fair	Yes
Travis	Mansfield Dam (AKA Marshall Ford Dam)	278	3,223,000	Fair	Yes
Pflugerville	Pflugerville Dam	46.5	3,273	Satisfactory	Yes
Travis	Tom Miller Dam	85	115,404	Fair	Yes

EXTENT

The extent or magnitude of a dam failure event is described in terms of the classification of damages that could result from a dam's failure; not the probability of failure. The Texas Commission on Environmental Quality (TCEQ) classifications for extent effective 2009 are found in Table 15-2 below. Figures 15-2 through 15-6 are inundation maps that show the flood risk areas for each dam that poses a risk and needs to be mitigated, according to the FEMA National Flood Hazard Layer (NFHL); in the event of a dam breach, the flow of water is expected to follow the same path of flood as the NFHL. An estimated depth for dam breach is indicated in the paragraph below Figures 15-2 through 15-7.[3]

Table 15-2. Extent Classifications

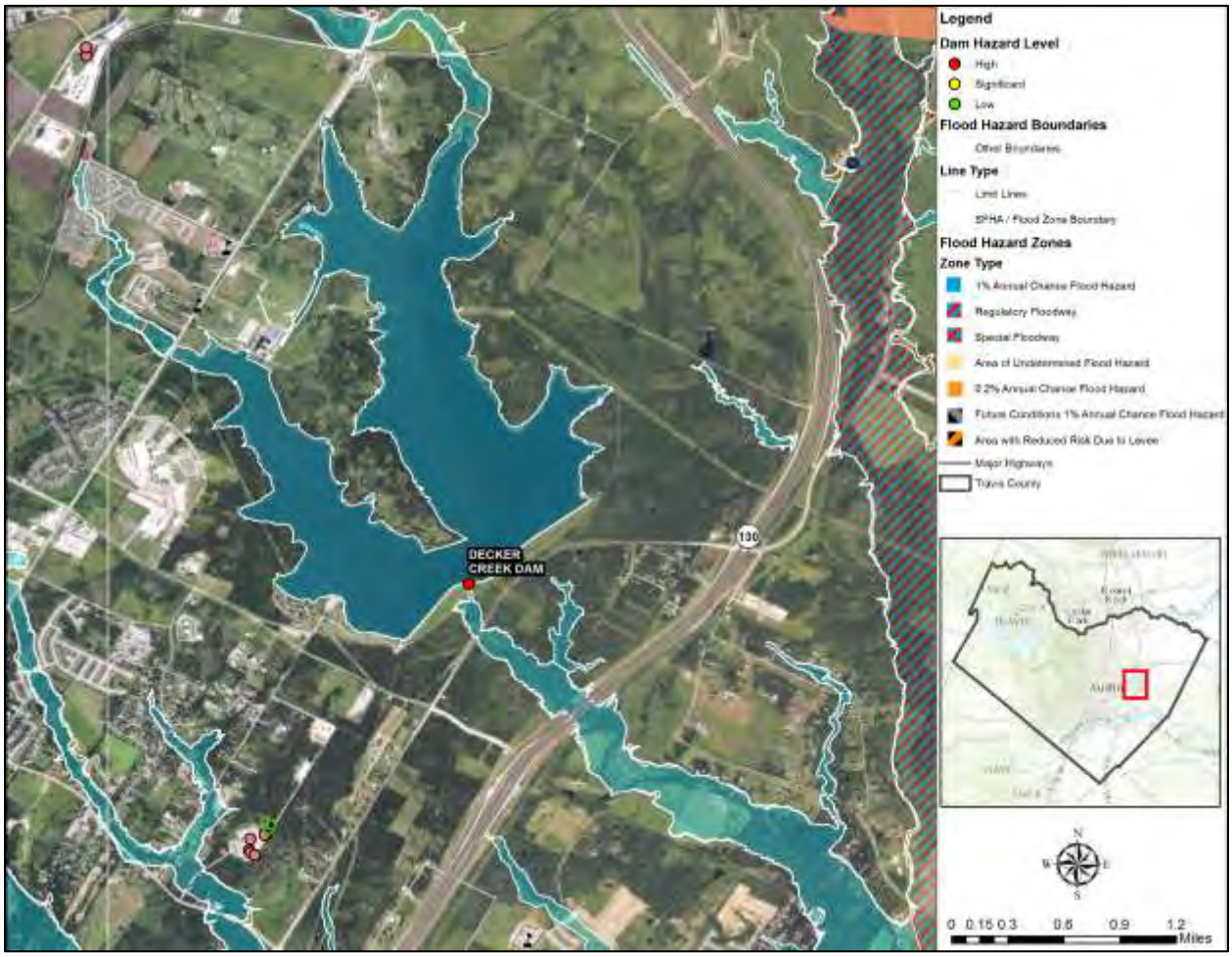
HAZARD POTENTIAL CLASSIFICATION	LOSS OF HUMAN LIFE	DAM STORAGE CAPACITY
Low	None Expected	Less than 10,000 acre-feet
Significant	Probable (1 to 6)	Between 10,000 and 100,000 acre-feet
High	Loss of Life Expected (7 or More)	100,000 acre-feet or more

[3] Dam breach depth is an estimate based on best available data, not statistical data.

Figure 15-2. Apache Lake Dam Flood Risk Areas

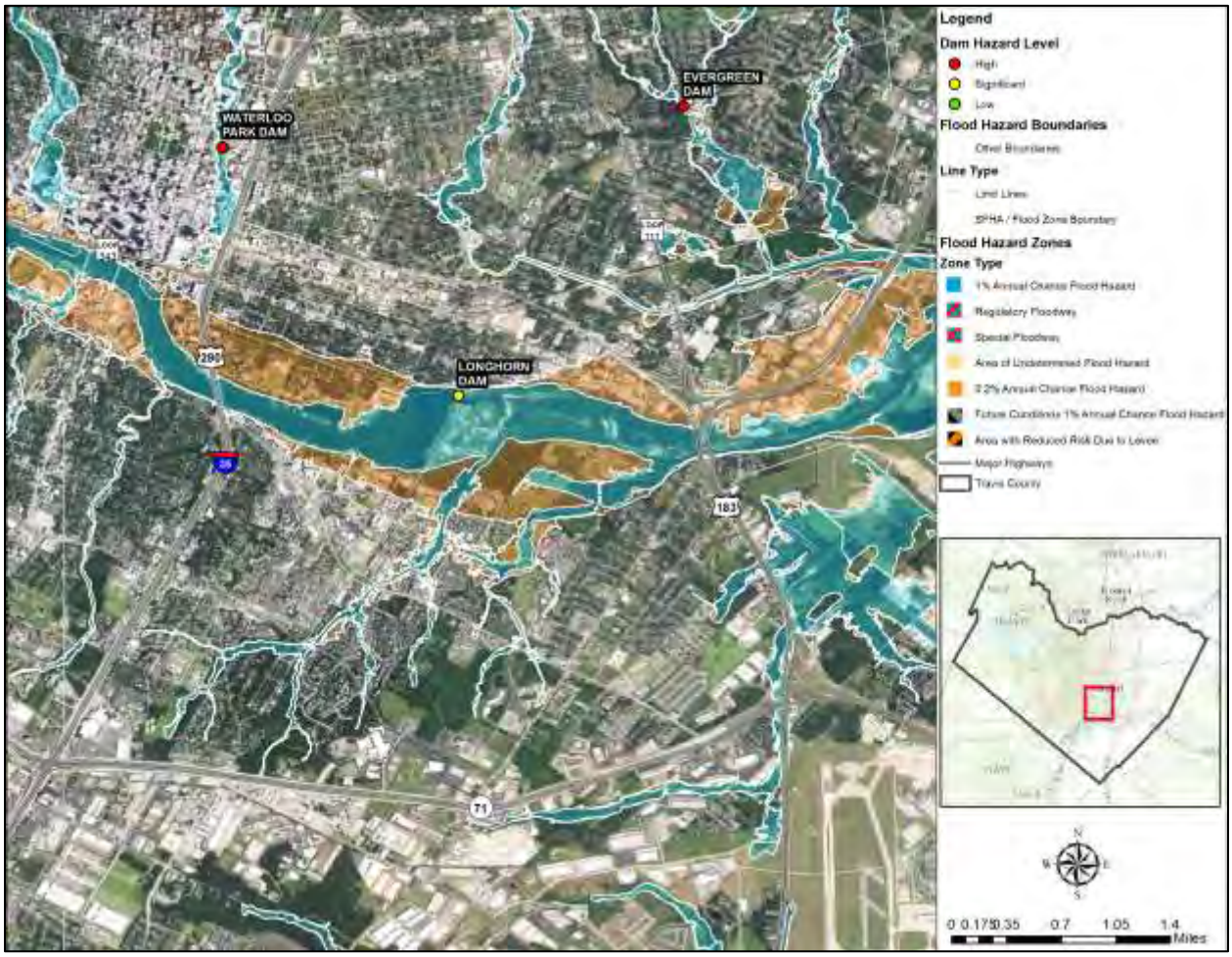
Apache Lake Dam is located in Travis County on a tributary of the Colorado River and is used for recreation purposes. The earthen dam is privately owned. It was constructed in 1969. The area located near the dam is a semi-densely populated area. Extensive damages are not anticipated in the event of a breach due to the limited capacity of the dam. It is anticipated that the breach flow would primarily follow the course of the river. However, the area near the dam is rolling terrain with semi-dramatic changes in elevations. This topography could result in damages outside of the predicted path of the breach. Approximately 15 residential structures within one mile of the dam may be impacted in the event of a breach. In addition, a dam failure could cause limited infrastructure damages, minor power outages, and could disrupt utility systems. In the event of a breach, it is estimated that the average breach width would be 72.3 feet with a maximum breach flow of 1,549 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam.

Figure 15-3. Decker Creek Dam Flood Risk Areas



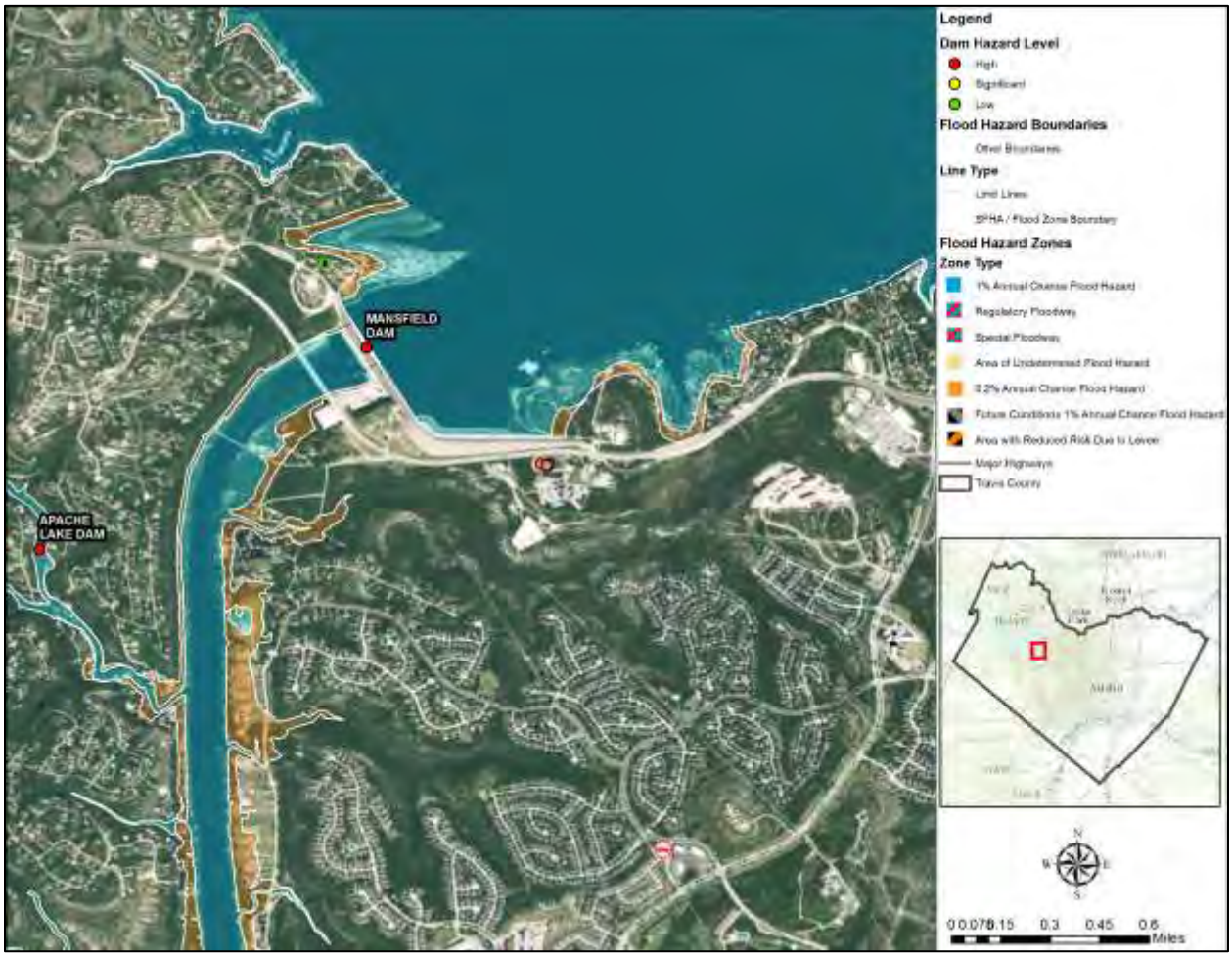
Decker Creek Dam is located in Travis County in the City of Austin on Decker Creek and is used for recreation purposes. This earthen dam with a metal core and a foundation of rock and soil is owned by Austin Energy. It was constructed in 1967. The area located near the dam is a semi-densely populated area. Approximately 878 residential structures, 15 commercial structures, and 1 elementary school are located within 3 miles of the dam and may be impacted in the event of a breach. In addition, a dam failure could cause limited infrastructure damage (roads and bridges), create power outages, and could disrupt utility systems. In the event of a breach, it is estimated that the average breach width would be 418.1 feet with a maximum breach flow of 554,333 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 15 feet, with the highest depth in the immediate (primarily undeveloped) area of the dam. Water depths would drop dramatically as the flow travels away from the dam.

Figure 15-4. Longhorn Dam Flood Risk Areas



Longhorn Dam is on the Colorado River in Travis County and is used primarily for recreation purposes. The earthen construction, rock fill, gravity dam, is owned by the City of Austin and was constructed in 1960. The area located near the dam is a densely populated area. Extensive damages are not anticipated in the event of a breach due to the capacity of the dam and changes in elevations near the dam. It is anticipated that the breach flow would primarily follow the course of the river. However, a breach could result in damages to development in the area including a softball complex, disk golf course, wildlife sanctuary, Austin Recreation Department facilities, and approximately 30 multi-family residential structures within one mile of the dam. In addition, a dam failure could cause limited infrastructure damages, minor power outages, and could disrupt utility systems. In the event of a breach, it is estimated that the average breach width would be 245.4 feet, with a maximum breach flow of 263,620 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 15 feet, with the highest depth in the immediate (ball fields and golf course) area of the dam. Water depths would drop dramatically as the flow travels away from the dam.

Figure 15-5. Mansfield Dam Flood Risk Areas

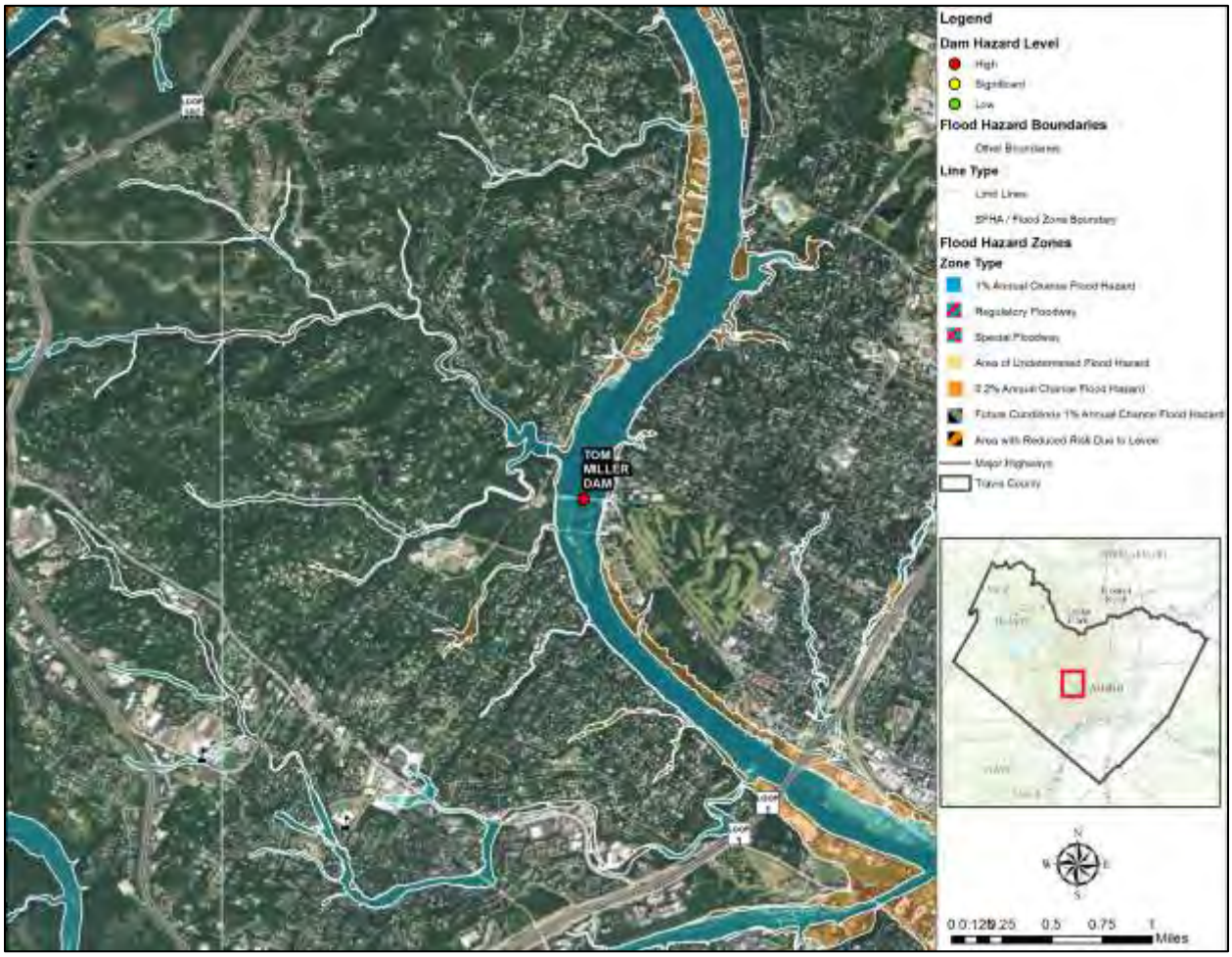


Mansfield Dam is on the Colorado River in the City of Austin and is used for irrigation and hydroelectric power purposes. It contains 24 floodgates. The earthen construction, rock fill, gravity dam is owned by the Lower Colorado River Authority and was constructed in 1942. The area located near the dam is a densely populated area. Mansfield Dam serves as the only flood control structure for the lower Colorado River basin. A breach of the Mansfield dam would be catastrophic, potentially impacting 11,387 structures, 87 bridges, 4 fire stations, 2 police stations, 12 schools, 1 hospital, 2 health clinics, 1 nursing home, 1 post office, 1 museum, and 1 convention center. Loss of life is highly likely. Substantial damage to infrastructure and utility systems would also be anticipated. In the event of a breach, it is estimated that the average breach width would be 1643.6 feet, with a maximum breach flow of 12,105,507 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 25 feet with the highest depth in the immediate area of the dam. Water depths would drop dramatically as the flow travels away from the dam; however, a catastrophic failure of the dam would likely result in a catastrophic failure of Tom Miller Dam due to the large volume of water released from Mansfield Dam. The Tom Miller Dam is addressed below.

Figure 15-6. Pflugerville Dam Flood Risk Areas

Pflugerville Dam is located in the City of Pflugerville on a tributary of the Wilbarger Creek and is used for recreation purposes. The earthen dam is owned by the City of Pflugerville. It was constructed in 2005. The area located near the dam is a semi-densely populated area. However, the majority of development is located outside of the anticipated inundation area should a breach occur. Development at risk for flooding in the event of a breach is primarily comprised of farm land. Approximately a dozen residential structures, one business (Choice Water Conditioning) and several barns and outbuildings could be impacted by a dam breach within one mile of the dam. Extensive damages are not anticipated due to the limited capacity of the dam. It is anticipated that the breach flow would primarily follow the course of the creek. A dam failure could cause limited infrastructure damages, minor power outages, and could disrupt utility systems. In the event of a breach, it is estimated that the average breach width would be 187.6 feet with a maximum breach flow of 95,722 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 15 feet, with the highest depth in the immediate area of the dam.

Figure 15-7. Tom Miller Dam Flood Risk Areas



Tom Miller Dam is on the Colorado River in the City of Austin and used for hydroelectric power and recreation purposes. The concrete gravity dam is owned by the City and was constructed in 1939. The area located near the dam is a densely populated area. A breach of the Tom Miller dam would be catastrophic, potentially impacting 1,995 structures, and 21 bridges. Loss of life is highly likely. Substantial damage to infrastructure and utility systems would also be anticipated. In the event of a breach, it is estimated the average breach width would be 531.7 feet with a maximum breach flow of 610,435 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 25 feet, with the highest depth in the immediate area of the dam. Water depths would drop dramatically as the flow travels away from the dam.

Table 15-3 represents the extent or magnitude of a dam failure event that could be expected for the Travis County planning area, per profiled dam.

Table 15-3. Extent for the Travis County Planning Area per Profiled Dam

JURISDICTION	PROFILED DAM	EXTENT (Flow Depth)	LEVEL OF INTENSITY TO MITIGATE
Travis County	Apache Lake Dam	0-10 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Travis County	Decker Creek Dam	0-15 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Travis County	Longhorn Dam (AKA Town Lake Dam)	0-15 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Travis County	Mansfield Dam (AKA Marshall Ford Dam)	0-25 Feet	Dam failure presents a substantial threat for the County. Significant loss of life is expected. Extensive residential and commercial structures would be impacted as well as critical facilities, infrastructure, and utilities. Economic loss would be catastrophic in the event of a dam failure.
Travis County	Tom Miller Dam	0-25 Feet	Dam failure presents a substantial threat for the County. Significant loss of life is expected. Extensive residential and commercial structures would be impacted as well as critical facilities, infrastructure, and utilities. Economic loss would be catastrophic in the event of a dam failure.
Lakeway	None	No Impact	N/A
Manor	None	No Impact	N/A

JURISDICTION	PROFILED DAM	EXTENT (Flow Depth)	LEVEL OF INTENSITY TO MITIGATE
Pflugerville	Pflugerville Dam	0-15 Feet	Dam failure presents a low threat for the City. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Sunset Valley	None	No Impact	N/A
Village of the Hills	None	No Impact	N/A

HISTORICAL OCCURRENCES

There are approximately 84,000 dams in the United States today.[4] Catastrophic dam failures have occurred frequently throughout the past century. Between 1918 and 1958, 33 major U.S. dam failures caused 1,680 deaths. From 1959 to 1965, 9 major dams failed worldwide. Some of the largest disasters in the U.S. have resulted from dam failures. More than 90 dam incidents, including 23 dam failures, were reported in the past 10 years to the National Performance of Dams Program, which collects and archives information on dam performance from state and federal regulatory agencies and dam owners.

In the State of Texas there have been 171 dam failures since 1900, although the State has not experienced loss of life or extensive economic damage due to a dam failure since the first half of the twentieth century. However, there may be many incidents that are not reported and, therefore, the actual number of incidents is likely to be greater.

There have been two major dam failures that have affected the Travis County planning area. In April of 1900 Lake Austin Dam broke at a point of 300 feet from the east end when the Colorado River rose 11 feet after torrential rains in the area. With no upstream dams to capture runoff, the Austin Dam was defenseless against the resulting flood wave, which one eyewitness estimated at 25 feet high and a mile wide. On April 7, the floodwaters crested at 11 feet atop the dam before it disintegrated, with two 250-foot sections – almost half the dam – breaking away.[5] 23 people died, over 200 were injured, and the dam failure caused $1.4 million (1900 dollars) in damages. The dam failed again in September 1915 during a

[4] FEMA, Dam Safety Program.

[5] Source: http://kxan.com/blog/2010/04/07/tom-miller-dam-turns-70/

large flood. 20 of the 28 large gates and all 26 small gates were destroyed. The dam was rebuilt in 1940 as the Tom Miller Dam and anchored to prevent overturning or sliding in 2004-2005.

PROBABILITY OF FUTURE EVENTS

Based on historical occurrences of dam failures, the probability for future of events is unlikely for the Travis County planning area, including all participating jurisdictions, meaning an event is possible in the next ten years.

VULNERABILITY AND IMPACT

There are 74 dams in the Travis County planning area. All dams were evaluated in-depth to determine the risk, if any, associated with each dam. This analysis indicated 5 dams in the planning area that present a risk to structures or infrastructure in the planning area.

Flooding is the most prominent effect of dam failure. If the dam failure is extensive, a large amount of water would enter the downstream waterways, forcing them out of their banks. There may be significant environmental effects, resulting in flooding that could disperse debris and hazardous materials downstream that can damage local ecosystems. If the event is severe, debris carried downstream can block traffic flow, cause power outages, and disrupt local utilities, such as water and wastewater, which could result in school closures.

Annualized loss-estimates for dam failure are not available; neither is a breakdown of potential dollar losses for critical facilities, infrastructure and lifelines, or hazardous-materials facilities. If a major dam should fail, however, the severity of impact could be substantial.

A dam breach could result in multiple deaths, with facilities being shut down for 30 days or more, and more than 50 percent of property destroyed or damaged. For these reasons, creating mitigation actions to remove or protect people and structures from the path of destruction is necessary in order to minimize impact from dam failure.

ASSESSMENT OF IMPACTS

Any individual dam has a very specific area that will be impacted by a catastrophic failure. Dams identified with potential risk can directly threaten the lives of individuals living or working in the inundation zone below the dam. The impact from any catastrophic failure would be similar to that of a flash flood. Potential impacts for the planning area include:

- Lives could be lost.
- There could be injuries from impacts with debris carried by the flood.
- Swift-water rescue of individuals trapped by the water puts the immediate responders at risk for their own lives.
- Individuals involved in the cleanup may be at risk from the debris left behind.
- Continuity of operations for any jurisdiction outside the direct impact area could be very limited.

- Roads and bridges could be destroyed.
- Homes and businesses could be damaged or destroyed.
- Emergency services may be temporarily unavailable.
- Disruption of operations and the delivery of services in the impacted area.
- A large dam with a high head of water could effectively scour the terrain below it for miles, taking out all buildings, and other infrastructure.
- Scouring force could erode soil and any buried pipelines.
- Scouring action of a large dam will destroy all vegetation in its path.
- Wildlife and wildlife habitat caught in the flow will likely be destroyed.
- Fish habitat will likely be destroyed.
- Topsoil will erode, slowing the return of natural vegetation.
- The destructive high velocity water flow may include substantial debris and hazardous materials, significantly increasing the risks to life and property in its path.
- Debris and hazardous material deposited downstream may cause further pollution of areas far greater than the inundation zone.
- Destroyed businesses and homes may not be rebuilt, reducing the tax base and impacting long term economic recovery.
- Historical or cultural resources may be damaged or destroyed.
- Recreational activities and tourism may be temporarily unavailable or unappealing, slowing economic recovery.

The economic and financial impacts of dam failure on the area will depend entirely on the location of the dam, 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 government, community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any dam failure event.

SECTION 16: MITIGATION STRATEGY

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MITIGATION GOALS

Based on the results of the risk and capability assessments, the Planning Team developed and prioritized the mitigation strategy. This involved utilizing the results of both assessments and reviewing the goals and objectives that were included in the previous 2011 Plan.

At the Mitigation Workshop in March 2017, Planning Team members reviewed the mitigation strategy from the previous 2011 Plan. The consensus among all members present was that the strategy developed for the 2011 Plan did not require changes, as it identified overall improvements to be sought in the Plan Update. The Mitigation Goal Statement is "It is the goal of Travis County to protect public health, safety, and welfare and to reduce losses due to hazards by identifying hazards, by minimizing exposure of citizens and property to hazards, and by increasing public awareness and involvement."

GOAL 1

Protect public health and safety.

OBJECTIVE 1.1

Advise the public about health and safety precautions to guard against injury and loss of life from hazards.

OBJECTIVE 1.2

Maximize utilization of the latest technology to provide adequate warning, communication, and mitigation of hazard events.

OBJECTIVE 1.3

Reduce the danger to, and enhance protection of, high risk areas during hazard events.

OBJECTIVE 1.4

Protect critical facilities and services.

GOAL 2

Build and support local capacity and commitment to continuously become less vulnerable to hazards.

OBJECTIVE 2.1

Build and support local partnerships to continuously become less vulnerable to hazards.

OBJECTIVE 2.2

Build a cadre of committed volunteers to safeguard the community before, during, and after a disaster.

OBJECTIVE 2.3

Build hazard mitigation concerns into county planning and budgeting processes.

GOAL 3

Increase public understanding, support, and demand for hazard mitigation.

OBJECTIVE 3.1

Heighten public awareness regarding the full range of natural and man-made hazards the public may face.

OBJECTIVE 3.2

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 3.3

Publicize and encourage the adoption of appropriate hazard mitigation measures.

GOAL 4

Protect new and existing properties.

OBJECTIVE 4.1

Reduce repetitive losses to the National Flood Insurance Program (NFIP).

OBJECTIVE 4.2

Use the most cost-effective approach to protect existing buildings and public infrastructure from hazards.

OBJECTIVE 4.3

Enact and enforce regulatory measures to ensure that future development will not put people in harm's way or increase threats to existing properties.

GOAL 5

Maximize the resources for investment in hazard mitigation.

OBJECTIVE 5.1

Maximize the use of outside sources of funding.

OBJECTIVE 5.2

Maximize participation of property owners in protecting their properties.

OBJECTIVE 5.3

Maximize insurance coverage to provide financial protection against hazard events.

OBJECTIVE 5.4

Prioritize mitigation projects, based on cost-effectiveness and sites facing the greatest threat to life, health, and property.

GOAL 6

Promote growth in a sustainable manner.

OBJECTIVE 6.1

Incorporate hazard mitigation activities into long-range planning and development activities.

OBJECTIVE 6.2

Promote beneficial uses of hazardous areas while expanding open space and recreational opportunities.

OBJECTIVE 6.3

Utilize regulatory approaches to prevent creation of future hazards to life and property.

SECTION 17: PREVIOUS ACTIONS

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SUMMARY

Planning Team members were given copies of the previous mitigation actions submitted in the 2011 Plan at the mitigation workshop. Travis County reviewed the previous actions and provided an analysis as to whether the action had been completed, should be deferred as an ongoing activity, or be deleted from the Plan. The actions from the 2011 Plan are included in this section as they were written in 2011, with the exception of the "2017 Analysis" section.

TRAVIS COUNTY

		Travis County (Past Action) – N1
	Action Item Description / Benefits	Evaluate the feasibility of structural elevations as flood mitigation throughout unincorporated Travis County. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood, High Winds/Severe Storms, Tornado
Lead Manager	TNR
Funding / Support	Existing Travis County Budget; Support: Moderate.
Cost-Effectiveness	Not independently cost-effective, but forms basis of mitigation actions.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. As Travis County conducts flood mitigation studies of watersheds within its boundaries, structural elevation will be evaluated as a mitigation option.

		Travis County (Past Action) – N2
	Action Item Description / Benefits	The restudy of Lake Travis has resulted in a significant increase in the actual Base Flood Elevation (BFE) around the Lake. It was always known the area was flood-prone but the new maps and BFEs provide the empirical data to prove various mitigation measures would be cost effective. Consider multiple mitigation alternatives to remove these homes from harm's way, including: Elevation, Demo/Rebuild, and Acquisition/Demolition. Apply for grant funds and implement when feasible, cost-effective, and supported by the Travis County Leadership. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood, High Winds/Severe Storms, Tornado
Lead Manager	TRN
Funding / Support	Existing Travis County Budget; Support: Moderate.
Cost-Effectiveness	On a structure by structure basis, cost-effective, demonstrated by benefit-cost analysis required for FEMA program eligibility.

2017 Analysis:
Delete Action. Due to lack of support from elected officials.

		Travis County (Past Action) – N3
	Action Item Description / Benefits	Establish central phone number that County residents can call for information about post-disaster recovery, cleanup, mitigation, and permits (carryover from original plan). Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood, High Winds/Severe Storms, Tornado
Lead Manager	TRN
Funding / Support	Existing Travis County Budget; Support: Moderate.
Cost-Effectiveness	Not independently cost-effective, but part of the County's overall priorities.

2017 Analysis:
Delete Action. The County has phone numbers that are published for all of the post disaster functions, but it is not feasible to combine them into a single number. Rather, the County posts information on their website that tells their citizens whom they should contact.

		Travis County (Past Action) – N4
	Action Item Description / Benefits	Complete acquisitions and demolitions in the Timber Creek area to remove all remaining flood-prone properties from the area. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	TRN
Funding / Support	Grants through FEMA and USACE; Support: Strong.
Cost-Effectiveness	Cost-effective, demonstrated by benefit-cost analysis required for FEMA program eligibility.

2017 Analysis:
Completed. A total of 141 properties were acquired and demolished in the area of Timber Creek that was more susceptible to flooding. Landowners of 16 properties located in the area of Timber Creek less likely to flood also applied for the flood buyout program. However, funding was not available for these properties. Buyouts were funded with a combination of FEMA grants, bond funds, general funds, and USACE grants from 1998 through 2017. **Defer Action.** Any new buyouts on the east side of the neighborhood will be managed by the Flood Plain Administrator. The new buyouts plan to be funded by Certificates of Obligation.

		Travis County (Past Action) – N5
	Action Item Description / Benefits	Continue to pursue acquisition/demolition as the preferred mitigation alternative in Graveyard Point. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	TNR
Funding / Support	Grants through FEMA; Support: Strong.
Cost-Effectiveness	Cost-effective, demonstrated by benefit-cost analysis required for FEMA program eligibility.

2017 Analysis:
Delete Action. Two adjacent properties were purchased from one owner. Buyouts in this area were then suspended by the Commissioner for Precinct Three and the Commissioners Court. Further buyouts were not approved by the Commissioner's Court as a result of concerns by the City of Lakeway. It was believed the transient population would increase in the buyout area as properties were purchased and converted to parkland. Many of the structures on Graveyard Point have been elevated as a result of our regulatory process.

		Travis County (Past Action) – N6
	Action Item Description / Benefits	Continue to pursue acquisition/demolition as the preferred mitigation alternative on Citation Avenue. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	TNR
Funding / Support	Grants through FEMA; Support: Strong.
Cost-Effectiveness	Cost-effective, demonstrated by benefit-cost analysis required for FEMA program eligibility.

2017 Analysis:
Completed. A total of 20 properties were acquired and demolished on Citation Avenue in Thoroughbred Farms. Voter-approved bond funds were used for the project, supplemented by FEMA grant funds through the Flood Mitigation Assistance Program.

		Travis County (Past Action) – N7
	Action Item Description / Benefits	Post information from the Elevation Mark Database on the County's web site. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	TNR
Funding / Support	County general fund; Support: Strong.
Cost-Effectiveness	Not independently cost-effective, but contributes to cost-effective mitigation measures.

2017 Analysis:
Completed. The database is on the City of Austin's website instead of the County's.

		Travis County (Past Action) – N8
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Big Sandy Drive @ Long Hollow Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Completed. 2011 bond funds.

		Travis County (Past Action) – N9
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Springdale Road @ Walnut Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N10
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Juniper Trail @ Long Hollow.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N11
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Wyldwood Road @ Slaughter Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N12
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Great Divide Road @ Little Barton Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N13
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Fall Creek Road @ Fall Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N14
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Pedernales Canyon Trail @ Lick Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N15
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Slaughter Creek Drive @ Tributary 1 to Slaughter Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N16
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Tumbleweed Train @ unnamed tributary to Lake Austin.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N17
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Crystal Bend Drive @ Harris Branch.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N18
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Cottonwood Drive @ Long Hollow.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N19
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Jacobson Road @ Maha Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Completed. 2011 bond project.

		Travis County (Past Action) – N20
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Live Oak Drive @ Sheep Hollow.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Completed. 2011 bond project.

		Travis County (Past Action) – N21
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Springdale Road @ Tributary 5 to Walnut Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N22
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Gregg Lane @ Wilbarger Creek

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N23
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Jesse Bohls Road @ unnamed tributary to Wilbarger Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N24
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Lime Creek Road @ Fisher Hollow.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N25
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Nameless Road @ unnamed tributary to Big Sandy.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N26
	Action Item Description / Benefits	Mitigate low-water crossing flooding: D. Morgan Road @ Tributary to Grape Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N27
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Bee Creek Road @ Bee Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Project was funded, but was shelved due to neighborhood objections.

		Travis County (Past Action) – N28
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Navarro Creek Road @ Navarro Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Completed. 2011 bond project.

		Travis County (Past Action) – N29
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Bitting School Road @ unnamed tributary to Wilbarger Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N30
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Weir Look Circle @ Devil's Pen Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N31
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Tom Sassman Road @ Maha Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N32
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Felder Lane @ Cottonwood Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N33
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Parsons Road @ Wilbarger Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Completed. 2011 bond project.

		Travis County (Past Action) – N34
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Westlake Drive @ unnamed tributary to Lake Austin.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N35
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Nameless Road @ Nameless Hollow.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N36
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Ledgestone Terrace @ unnamed tributary to Pen Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N37
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Wild Basin Street @ unnamed tributary to Bee Creek

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Completed. 2011 bond project.

		Travis County (Past Action) – N38
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Caldwell Lane @ River Timber Drive.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N39
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Nameless Road @ unnamed tributary to Big Sandy.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Travis County (Past Action) – N40
	Action Item Description / Benefits	Mitigate low-water crossing flooding: Weir Loop @ Williamson Creek.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Roads and Bridges
Funding / Support	County general fund, State funds, FEMA grant funds if project determine programmatically eligible, and if project is cost-effective; Support: Medium.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Will require benefit-cost analysis to be eligible for FEMA grant funds.

2017 Analysis:
Completed. 2011 bond project.

		Travis County (Past Action) – N41
	Action Item Description / Benefits	Flood mitigation: Swiss Alpine Subdivision.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Engineering
Funding / Support	County general fund, State funds, FEMA grant funds if project determined programmatically eligible, and if project is cost-effective; Support: TBD.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Requires benefit-cost analysis to be eligible for FEMA grant.

2017 Analysis:
Deleted. More specific mitigation actions have been identified for the 2017 update.

		Travis County (Past Action) – N42
	Action Item Description / Benefits	Flood mitigation: Arroyo Doble Subdivision

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Engineering
Funding / Support	County general fund, State funds, FEMA grant funds if project determined programmatically eligible, and if project is cost-effective; Support: TBD.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Requires benefit-cost analysis to be eligible for FEMA grant.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Design to be completed with 2017 CO by May 2018. Combined with Action N43.

		Travis County (Past Action) – N43
	Action Item Description / Benefits	Flood mitigation: Twin Creeks Park Subdivision.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Engineering
Funding / Support	County general fund, State funds, FEMA grant funds if project determined programmatically eligible, and if project is cost-effective; Support: TBD.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Requires benefit-cost analysis to be eligible for FEMA grant.

2017 Analysis:
Delete Action. This project has been combined with N42 and the design portion of the project has been funded with the 2017 CO insurance. Design is expected to be complete by May 2018.

		Travis County (Past Action) – N44
	Action Item Description / Benefits	Flood mitigation: Thoroughbred Farms Subdivision (repeated from above for consistency with drainage study priorities).

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Engineering
Funding / Support	County general fund, State funds, FEMA grant funds if project determined programmatically eligible, and if project is cost-effective; Support: TBD.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Requires benefit-cost analysis to be eligible for FEMA grant.

2017 Analysis:
Completed. 2011 bond project and FMA grant funds.

		Travis County (Past Action) – N45
	Action Item Description / Benefits	Flood mitigation: Southwest Territory Subdivision.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Engineering
Funding / Support	County general fund, State funds, FEMA grant funds if project determined programmatically eligible, and if project is cost-effective; Support: TBD.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Requires benefit-cost analysis to be eligible for FEMA grant.

2017 Analysis:
Deleted. More specific mitigation actions have been identified for the 2017 update.

		Travis County (Past Action) – N46
	Action Item Description / Benefits	Flood mitigation: Austin Lake Subdivision.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods
Lead Manager	Engineering
Funding / Support	County general fund, State funds, FEMA grant funds if project determined programmatically eligible, and if project is cost-effective; Support: TBD.
Cost-Effectiveness	Presumed cost-effective based on study methodology and prioritization. Requires benefit-cost analysis to be eligible for FEMA grant.

2017 Analysis:
Deleted. More specific mitigation actions have been identified for the 2017 update.

		Travis County (Past Action) – N47
	Action Item Description / Benefits	Due to the data deficiency identified as part of the Dam Failure Risk Assessment, work with LCRA, TCEQ, and private Dam owners (where possible) to encourage the development of inundation maps for all high hazards dams within the planning area. When and if available, this data will be used for the next plan update to complete a more thorough risk assessment, to include extent and impact of potential dam failures.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods and Dam Failure
Lead Manager	Floodplain Administrator
Funding / Support	Minimal costs, staff time only as the development of inundation maps is the responsibility of the LCRA, TCEQ, and/or private Dam owners.
Cost-Effectiveness	Not independently cost-effective.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Expanded TNR GIS staffing is expected to help with this.

		Travis County (Past Action) – N48
	Action Item Description / Benefits	Due to the data deficiency identified as part of the Landslide Risk Assessment, establish and maintain relationships with the State Geologic Survey of Texas and the U.S. Geologic Survey, with the purpose of ensuring the County and incorporated areas have the most current available information about the potential for landslides. If conditions suggest that further study is needed, initiate a survey to determine areas of increased hazard for landslides, and measure the potential extent and severity.

MITIGATION ACTION DETAILS	
Hazard Addressed	Landslides
Lead Manager	Engineering
Funding / Support	Staff Time; Support: TBD.
Cost-Effectiveness	Not independently cost-effective.

2017 Analysis:
Deleted.

		Travis County (Past Action) – N49
	Action Item Description / Benefits	Coordinate with the State to monitor and conserve existing water supplies in the County. Install additional water storage facilities to compensate during drought conditions.

MITIGATION ACTION DETAILS	
Hazard Addressed	Drought
Lead Manager	Engineering
Funding / Support	Dependent on funding availability.
Cost-Effectiveness	Not independently cost-effective.

2017 Analysis:
Ongoing Activity.

		Travis County (Past Action) – N50
	Action Item Description / Benefits	Enforce water restrictions during times of drought.

MITIGATION ACTION DETAILS	
Hazard Addressed	Drought
Lead Manager	Engineering
Funding / Support	Action dependent on conditions and vote/directive from Commissioners Court.
Cost-Effectiveness	Not independently cost-effective.

2017 Analysis:
Complete. Standard operating procedures.

		Travis County (Past Action) – N51
	Action Item Description / Benefits	Development of Ready, Set, Go flyers customized for Austin/Travis County.

MITIGATION ACTION DETAILS	
Hazard Addressed	Wildfire
Lead Manager	TNR
Funding / Support	Staff Time.
Cost-Effectiveness	

2017 Analysis:
Completed. National flyers were customized for use in Central Texas, Austin, and Travis County. The flyers are still in use.

		Travis County (Past Action) – N52
	Action Item Description / Benefits	Development of a Wildland Fire Task Force.

MITIGATION ACTION DETAILS	
Hazard Addressed	Wildfire
Lead Manager	TNR
Funding / Support	Staff Time.
Cost-Effectiveness	

2017 Analysis:
Completed. This is an ongoing committee. The Austin Travis County Wildfire Coalition was established to address wildfire risks on a coordinated, regional basis by the key agencies with a role in wildfire preparedness, response, mitigation, and recovery.

		Travis County (Past Action) – N53
	Action Item Description / Benefits	Complete fuel reduction projects in the Balcones Canyon preserve. This will include clearing lower limbs, dead wood, ladder fuels, preserving tight canopy to reduce grass growth. Also included will be outreach to property owners in the interface to highlight the importance of and recommendations for defensible space initiatives.

MITIGATION ACTION DETAILS	
Hazard Addressed	Wildfire
Lead Manager	TNR
Funding / Support	County general fund, State funds, FEMA grant funds if project determined programmatically eligible, and if project is cost-effective. Support: Strong.
Cost-Effectiveness	A BCA has been completed and this action is cost effective.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. Fuel reduction treatments have been initiated and are conducted annually from September 1 through February 28. Follow-up treatments are needed every 5-6 years. There is political support for the project. The project is funded via FEMA grants and County funds. Fuel mitigation funds will be requested annually in the TC TNR Natural Resources Program budget. New treatment project funds may be requested through FEMA grants, if available.

		Travis County (Past Action) – N54
	Action Item Description / Benefits	Complete fuel reduction projects in other vulnerable, high risk areas of the County. This will include clearing lower limbs, dead wood, ladder fuels, preserving tight canopy to reduce grass growth. Also included will be outreach to property owners in the interface to highlight the importance of and recommendations for defensible space initiatives.

MITIGATION ACTION DETAILS	
Hazard Addressed	Wildfire
Lead Manager	TNR
Funding / Support	County general fund, State funds, FEMA grant funds if project determined programmatically eligible, and if project is cost-effective. Support: TBD.
Cost-Effectiveness	Anticipated cost-effective.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Travis County TNR Parks Division implemented a prescribed burn program and hired a burn boss. Additional funds, staffing, and equipment may be needed to meet fire mitigation goals for County Parks.

		Travis County (Past Action) – N55
	Action Item Description / Benefits	Install Emergency Generators in County owned critical facilities.

MITIGATION ACTION DETAILS	
Hazard Addressed	Floods, Tornadoes, Wildland Grass/Brush Fire, Drought, Severe Storms, and Winter Storms
Lead Manager	Emergency Management
Funding / Support	County general fund, State funds, FEMA grant funds if project determined programmatically eligible.
Cost-Effectiveness	N/A

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

CITY OF PFLUGERVILLE

		Pflugerville (Past Action) – 1
	Action Item Description / Benefits	Pflugerville Parkway East (FM 685 to SH130) roadway project which will eliminate the low water crossing just east of FM 685. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	City Engineer
Cost Estimate/Funding	$3.8 Million
Schedule	2011-2012
Cost-Effectiveness	To be determined. Presumed cost-effective.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Completed. Mitigated a frequently inundated low water crossing along a minor arterial roadway. The project was locally funded with Certificates of Obligation. Project was completed in 2013, at a cost of $2,655,526.

		Pflugerville (Past Action) – 2
	Action Item Description / Benefits	Construct drainage improvements along Railroad Ave. by Gilleland Creek. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	City Engineer
Cost Estimate/Funding	$350,000
Schedule	2014
Cost-Effectiveness	To be determined. Presumed cost-effective.
Status as of 2011	The City currently has funding in the amount of $200,000 budgeted for this project. Project is currently on hold until additional funding is allocated for this project. Fiber optic line relocation is also required prior to initiating construction.

2017 Analysis:
Delete Action. Funds were reallocated.

		Pflugerville (Past Action) – 3
	Action Item Description / Benefits	Pursue grant funding from FEMA's Hazard Mitigation Grant Program (HMGP) and Flood Mitigation Assistance (FMA) program to receive assistance with mitigating (acquisition, elevation, etc.) flood prone properties within the City. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	City Manager's Office
Cost Estimate/Funding	Contingent on specifics of application; application prepared by City staff; anticipated non-federal match of 25% for FEMA programs.
Schedule	Unknown as of 2010 HMP update.
Cost-Effectiveness	Any projects submitted to FEMA grant programs subject to BCA to ensure cost-effectiveness.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Delete Action.

		Pflugerville (Past Action) – 4
	Action Item Description / Benefits	Complete a detailed structural/engineering survey of City facilities to ensure their soundness with respect to resisting the effects of high winds and hail. Forms basis of decisions about any additional actions to mitigate risk. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Tornadoes, Straight-line Wind, Hail, Seismic events
Lead Manager	City Engineer
Cost Estimate/Funding	To be determined, but if initiated probably from City General Fund.
Schedule	TBD
Cost-Effectiveness	Not independently cost-effective, but the initial step in identifying appropriate mitigation actions.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Add flooding to the list of hazards to evaluate.

		Pflugerville (Past Action) – 5
	Action Item Description / Benefits	Based on the results of the study in Action 4, initiate upgrades to at-risk City structures and/or infrastructure. Mitigates specific risks to structures, people and operations. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Tornadoes, Straight-line Wind, hail, Seismic events.
Lead Manager	City Engineer/Building Department
Cost Estimate/Funding	Varies depending on measure. Funding from City General Fund or FEMA grant programs.
Schedule	TBD based on study.
Cost-Effectiveness	Cost-effectiveness will vary with level of risk and project cost.
Status as of 2011	TBD, but likely to be initiated no earlier than 2011 and continue into 2012.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Related to pre-requisite action item #4, which was not completed.

		Pflugerville (Past Action) – 6
	Action Item Description / Benefits	Encourage the building of tornado safe community shelters. Encourage the installation of a tornado safe room in new public facilities or designated shelters. Priority: Low to Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Tornado, High Winds
Lead Manager	Building Department
Cost Estimate/Funding	Depends on size of shelter. Cost unknown until feasibility and scoping are completed.
Schedule	Unknown as of 2010 update.
Cost-Effectiveness	Cost-effective.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Modify “Encourage” to “Evaluate” for both occurrences.

		Pflugerville (Past Action) – 7
	Action Item Description / Benefits	Incorporate specific actions from the Pflugerville Action Plan that are designed to reduce flooding into the City's Comprehensive Plan. Actions should be related to protecting existing and future development from increased flooding potential and erosion. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	City Engineer
Cost Estimate/Funding	Cost unknown, but uses existing staff resources, City General Fund.
Schedule	2011+
Cost-Effectiveness	Not independently cost-effective, but part of an overall strategy to implement cost-effective actions and projects.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. General Fund; anticipate initiating a Comprehensive Plan update in FY 2018 with completion by the end of FY 2020 (September 2020), and establishing a policy / regulation for integration into related plans and regulatory documents. Implementation primarily to follow adoption of comprehensive plan update, but evaluation of such opportunities would be ongoing.

		Pflugerville (Past Action) – 8
	Action Item Description / Benefits	Promote the purchase of flood insurance. Advertise the availability of costs, and coverage of flood insurance through the National Flood Insurance Program (NFIP). Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Building Department
Cost Estimate/Funding	Cost unknown, but uses existing staff resources, City General Fund.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective, but part of an overall strategy to implement cost-effective actions and projects.
Status as of 2011	In Spring 2010, a brochure titled "Living in the Floodplain" was distributed to all residents within 100 feet of a floodplain.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. This is an annual action to fulfill Community Rating System (CRS) requirements. It was completed but should continue.

		Pflugerville (Past Action) – 9
	Action Item Description / Benefits	Increase public awareness of hazards and hazardous areas. Distribute public awareness information regarding flood hazards, SFHAs, and the potential mitigation measures using the local newspaper, utility bill inserts, inserts in the phone book, a City hazard awareness website, and an education program for school age children. Priority: Low to Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	All hazards, in particular flood
Lead Manager	Building Department
Cost Estimate/Funding	Cost unknown, but uses existing staff resources, City General Fund.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective, but part of an overall strategy to implement cost-effective actions and projects.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. This action was partially completed, but not all of the methods were utilized. Reassign to Public Information Office.

		Pflugerville (Past Action) – 10
	Action Item Description / Benefits	NFIP Community Rating System (CRS): Look for opportunities to improve rating with the CRS. Priority: Low to Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	All hazards, in particular flood
Lead Manager	Building Department
Cost Estimate/Funding	Cost unknown, but uses existing staff resources, City General Fund.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective, but part of an overall strategy to implement cost-effective actions and projects.
Status as of 2011	Initiated in 2010 HMP. Completed in 2010. Class 7 will become effective in May 2011.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. The effort is ongoing. Pflugerville's CRS rating has slipped from a Class 7 to a Class 9.

		Pflugerville (Past Action) – 11
	Action Item Description / Benefits	Sponsor a "Multi-Hazard Awareness Week" to educate the public on hurricanes, tornadoes (sheltering in place, evacuation, emergency preparedness, and structural retrofitting), flooding, (evacuation, emergency preparedness, retrofitting, and flood insurance), thunderstorms and lightning, (emergency preparedness) and hailstorms. Priority: Low to Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Multi-Hazard
Lead Manager	Public Information Office
Cost Estimate/Funding	$5,000 City Budget and Grants
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective, but part of an overall strategy to implement cost-effective actions and projects.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Incorporate seasonally each year.

		Pflugerville (Past Action) – 12
	Action Item Description / Benefits	Increase public awareness of hazards and hazardous areas. Distribute public awareness information regarding flood hazards, SFHAs, and the potential mitigation measures using the local newspaper, utility bill inserts, inserts in the phone book, a City hazard awareness website, and an education program for school age children or "how to" classes in retrofitting by local merchants. Integrate "Disaster Resistance Education" into the public school curriculum. Provide public education on the importance of maintaining ditches. Priority: Low to Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Multi-Hazard
Lead Manager	Building Department
Cost Estimate/Funding	$15,000 City Budget and Grants
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective, but part of an overall strategy to implement cost-effective actions and projects.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. This effort is ongoing. This action is generally redundant with Action No. 9.

		Pflugerville (Past Action) – 13
	Action Item Description / Benefits	Ensure adequate plans, procedures, and capabilities to respond to a dam failure. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood, Dam Failure
Lead Manager	City Engineer
Cost Estimate/Funding	Cost unknown, but uses existing staff resources, City General Fund.
Schedule	2010
Cost-Effectiveness	Not independently cost-effective, but part of an overall strategy to implement cost-effective actions and projects.
Status as of 2011	Initiated in 2010 HMP. Pflugerville Dam Emergency Action Plan (EAP) submitted to TCEQ in December 2010. Pending approval.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. This is an on-going activity, and should be included in the update. City Utility Fund. City performs inspections annually and TCEQ inspects every 5 years (last TCEQ inspection was February 2017).

		Pflugerville (Past Action) – 14
	Action Item Description / Benefits	Establish and maintain relationships with the State Geologic Survey of Texas and the U.S. Geologic Survey, with the purpose of ensuring the City has the most current available information about the potential for seismic events and landslides. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Seismic events, Landslides
Lead Manager	Planning Department
Cost Estimate/Funding	Cost unknown, but uses existing staff resources, City General Fund.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective, except that the action may prevent damages through early warning.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Delete Action. Project Prioritization Considerations.

		Pflugerville (Past Action) – 15
	Action Item Description / Benefits	Continue to ensure that the City has adequate plans and resources in place to address risks posed by potential ice and snow hazards during winter storms. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Winter Storms
Lead Manager	Public Works Department
Cost Estimate/Funding	Cost unknown, but uses existing staff resources, City General Fund.
Schedule	Ongoing
Cost-Effectiveness	Cost-effective
Status as of 2011	Ongoing

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Pflugerville (Past Action) – 16
	Action Item Description / Benefits	Identify residential and non-residential structures that may be at risk from wildfire. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Wildfire
Lead Manager	Emergency Services District #2
Cost Estimate/Funding	Cost unknown, but uses existing staff resources, City General Fund.
Schedule	2012
Cost-Effectiveness	Cost-effective
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. City of Pflugerville should be the lead.

		Pflugerville (Past Action) – 17
	Action Item Description / Benefits	For at risk residential and non-residential structures, develop a wildfire vegetation maintenance program to trim back and remove vegetation near structures. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Wildfire
Lead Manager	Planning and Forestry Departments
Cost Estimate/Funding	Estimated at $30,000, but also uses existing staff resources, City General Fund.
Schedule	Ongoing
Cost-Effectiveness	Cost-effective, depending on specific circumstances.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Completed. Parks Maintenance maintains 15-20 foot mow strips where parkland and drainage areas are adjacent to residential uses.

		Pflugerville (Past Action) – 18
	Action Item Description / Benefits	Create plan for warming centers and shelters. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Winter Storm
Lead Manager	Police Department
Cost Estimate/Funding	Cost unknown, but uses existing staff resources, City General Fund.
Schedule	2013
Cost-Effectiveness	Not independently cost-effective, but part of an overall strategy to implement cost-effective actions and projects.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Pflugerville (Past Action) – 19
	Action Item Description / Benefits	Create cooperative relationship with news outlets for distributing information about winter storms. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Winter Storm
Lead Manager	Public Information Office
Cost Estimate/Funding	Cost Unknown, but uses existing staff resources, City General Fund.
Schedule	2011+
Cost-Effectiveness	Not independently cost-effective, but part of an overall strategy to implement cost-effective actions and projects.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. This is an on-going activity, and should be included in the update.

		Pflugerville (Past Action) – 20
	Action Item Description / Benefits	Coordinate with the State to monitor and conserve existing water supplies in the County. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Drought
Lead Manager	Public Utilities Department
Cost Estimate/Funding	Cost unknown, but uses existing staff resources, City General Fund.
Schedule	2011+
Cost-Effectiveness	Not independently cost-effective, but part of an overall strategy to implement cost-effective actions and projects.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. This is an on-going activity, and should be included in the update.

		Pflugerville (Past Action) – 21
	Action Item Description / Benefits	Enhance water and energy conservation at City facilities. Priority: Low to Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Drought
Lead Manager	Managing Director of Operations
Cost Estimate/Funding	Cost unknown, but uses existing staff resources, City General Fund.
Schedule	2011+
Cost-Effectiveness	Not independently cost-effective, but part of an overall strategy to implement cost-effective actions and projects.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. This is an on-going activity, and should be included in the update.

CITY OF SUNSET VALLEY

		Sunset Valley (Past Action) – 1
	Action Item Description / Benefits	Land and easement acquisition for the purpose of reducing flood risk. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	$300,000. City General Fund
Schedule	Part of Drainage Utility Storm Water Program for FY 2011-2012.
Cost-Effectiveness	Very cost-effective
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 2
	Action Item Description / Benefits	Identify properties for possible participation in voluntary acquisition and demolition. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Administration
Cost Estimate/Funding	No additional cost – uses existing staff resources. City General Fund.
Schedule	2-5 years
Cost-Effectiveness	Not independently cost-effective, but required as part of implementation.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 3
	Action Item Description / Benefits	Structure demolition.Purchase and demolition of flood prone structures, specific structures to be determined. Priority Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	$50,000
Schedule	2-5 years
Cost-Effectiveness	Very cost-effective
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 4
	Action Item Description / Benefits	Natural waterway maintenance. This program includes debris removal from the waterways, non-native plant removal, and the removal of fallen trees that are in excess of a 45 degree angle within the creek. Under the direction of the City Environmental Manager some trimming or removal of native vegetation may be performed. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	$30,000
Schedule	3-5 year schedule, some additional maintenance after significant rain events.
Cost-Effectiveness	Very cost-effective
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 5
	Action Item Description / Benefits	Lot to lot drainage. City will provide technical support to identify solutions to drainage problems affecting two or more properties, and perform minor grading work in easement, as needed. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	$20,000
Schedule	Ongoing
Cost-Effectiveness	Very cost-effective
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 6
	Action Item Description / Benefits	City will continue routine maintenance of ditch lines, storm water inlets, storm water lift stations, as well as make standard preparations for storms and subsequent clean up. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	$20,000
Schedule	Ongoing
Cost-Effectiveness	Very cost-effective
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 7
	Action Item Description / Benefits	Implement Emergency Notification System (ENS) with Travis County for use of 9-1-1 telephone number data base to contact flood-prone residents in the event of possible flood events. Pursue addition of cell phones (on voluntary basis) which are not in the 9-1-1. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	All hazards
Lead Manager	Police and Administration Departments
Cost Estimate/Funding	Not yet determined
Schedule	2011
Cost-Effectiveness	Not independently cost-effective, but part of an overall strategy to prevent deaths and injuries and limit property losses.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Completed. In place with the use of Code Red, with a cost of $2,500 annually.

		Sunset Valley (Past Action) – 8
	Action Item Description / Benefits	Box culvert improvement on Westgate Bridge at Sunset Valley tributary. Benefit-costs analysis on project. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	TBD. Benefit-cost analysis estimated at $5,000.
Schedule	2-5 years
Cost-Effectiveness	TBD, presumed cost-effective, but will be subject to BCA to prove.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 9
	Action Item Description / Benefits	Culvert improvements at the 4 low water crossings along the Sunset Valley Tributary (Sunset Trail, Reese Drive, Pillow Road, Lone Oak Drive). Increase size of box culvert at each location. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	$1,670,820
Schedule	3-5 years
Cost-Effectiveness	Very likely to be highly cost-effective, but BCA will require H+H study and further analysis.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. This project is partially completed.

		Sunset Valley (Past Action) – 10
	Action Item Description / Benefits	Channel realignment between Lone Oak Train and Reese Road. Realign the tributary beginning east of Lone Oak Train and reconnect to the existing channel west of Reese Road. The channel would be approximately 820 feet long. The purposed culvert crossing at Pillow Road would consist of three 10-foot by 3-foot box culverts. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	$686,750
Schedule	3-5 years
Cost-Effectiveness	Very likely to be highly cost-effective, but BCA will require H+H study and further analysis.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 11
	Action Item Description / Benefits	Culvert improvements, storm sewer system, and roadside ditch improvements along Oakdale Drive, Reese Road. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	City General Fund
Schedule	3-5 years
Cost-Effectiveness	Very likely to be highly cost-effective, but BCA will require H+H study and further analysis.
Status as of 2011	Currently under design.

2017 Analysis:
Completed.

		Sunset Valley (Past Action) – 12
	Action Item Description / Benefits	Culvert improvements, storm sewer system, and roadside ditch improvements along Sunset Trail, Lone Oak Drive, Yellow Tail Cove, and Pillow Road. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	City General Fund
Schedule	3-5 years
Cost-Effectiveness	Very likely to be highly cost-effective, but BCA will require H+H study and further analysis.
Status as of 2011	Currently under design.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 13
	Action Item Description / Benefits	Create a Stormwater Management Program to analyze historical and current conditions contributing to flooding. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	City General Fund
Schedule	FY11
Cost-Effectiveness	Not independently cost-effective, but forms the basis of additional mitigation actions.
Status as of 2011	To be implemented with the adoption of the Drainage Utility began October 2010.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 14
	Action Item Description / Benefits	Implement regulations to prohibit new construction in creek beds and the floodway. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	No additional cost – uses existing staff resources. City General Fund.
Schedule	FY11
Cost-Effectiveness	Difficult to prove cost-effectiveness because doing so would require supposition about potential for development; assumed highly cost-effective because action is inexpensive.
Status as of 2011	Updates to codes as part of review of the Land Development Code.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 15
	Action Item Description / Benefits	Perform an inventory of existing man-made and natural structures that inhibit free flow of water within creek beds. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	No additional cost – uses existing staff resources. City General Fund.
Schedule	2011 (planned)
Cost-Effectiveness	Not independently cost-effective, but forms the basis of additional mitigation actions.
Status as of 2011	Ongoing

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 16
	Action Item Description / Benefits	Develop interlocal agreements to facilitate emergency removal of creek blockage or cleaning activities that are beyond the capability of Sunset Valley staff and equipment. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works / Administration
Cost Estimate/Funding	No additional cost – uses existing staff resources. City General Fund.
Schedule	2011 (planned)
Cost-Effectiveness	Cost-effective
Status as of 2011	Ongoing

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 17
	Action Item Description / Benefits	Pursue grant funding from FEMA's Hazard Mitigation Grant Program (HMGP) and Flood Mitigation Assistance (FMA) program to receive assistance with mitigating (acquisition, elevation, etc.) flood prone properties within the City. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	Depends on specific project for which funds being sought; HMGP has a 25% non-federal match in most cases – this would presumably come from City General Fund.
Schedule	TBD – depends on when City identifies projects and match funding.
Cost-Effectiveness	Depends on specific projects
Status as of 2011	City will initiate grant actions on an ongoing basis.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 18
	Action Item Description / Benefits	Develop and implement a Flood Event Warning System to monitor rainfall in key areas upstream of the City and alert citizens to potential flooding. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Police Department and Department of Public Works
Cost Estimate/Funding	TBD
Schedule	Initiated in 2010
Cost-Effectiveness	Difficult to determine because it is unknown how often the system will be used – presumed cost-effective based on life safety issues.
Status as of 2011	City is currently working with Travis County to implement automatic notification system.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Low water crossing arms for flood risk areas – cost of over $30,000.

		Sunset Valley (Past Action) – 19
	Action Item Description / Benefits	Incorporate additional language into the Sunset Valley master Drainage Plan to pursue federal funding (such as FEMA) for mitigation grants that will reduce damages associated with flooding. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Administration
Cost Estimate/Funding	No additional cost – uses existing staff resources. City General Fund.
Schedule	Initiated in 2012.
Cost-Effectiveness	Not independently cost-effective.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 20
	Action Item Description / Benefits	Incorporate into the City Comprehensive Plan specific flood mitigation actions from the Sunset Valley Mitigation Action Plan. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Administration and Public Works
Cost Estimate/Funding	No additional cost – uses existing staff resources. City General Fund.
Schedule	Initiated in 2012.
Cost-Effectiveness	Not independently cost-effective.
Status as of 2011	Initiated as part of 2010 HMP.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 21
	Action Item Description / Benefits	Promote the purchase of flood insurance. Advertise the availability of costs and coverage of flood insurance through the National Flood Insurance Program (NFIP). Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	No additional cost – uses existing staff resources. City General Fund.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective.
Status as of 2011	Ongoing

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 22
	Action Item Description / Benefits	Increase public awareness of hazards and hazardous areas. Distribute public awareness information regarding flood hazards, SFHAs, and the potential mitigation measures using the local newspaper, utility bill inserts, inserts in the phone book, a City hazard awareness website, and an education program for school age children. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Administration and Public Works
Cost Estimate/Funding	No additional cost – uses existing staff resources. City General Fund.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective.
Status as of 2011	Ongoing

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 23
	Action Item Description / Benefits	Encourage the 70 residents located within the low water crossing inundation area identified in Figure K-5 (of the 2011 HMP update) to purchase flood insurance. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Flood Plain Administrator
Cost Estimate/Funding	No additional cost – uses existing staff resources.
Schedule	Initiated 2011.
Cost-Effectiveness	Not independently cost-effective.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 24
	Action Item Description / Benefits	Look for opportunities to improve rating with the Community Rating System (CRS). Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Department of Public Works
Cost Estimate/Funding	No additional cost – uses existing staff resources.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective, but in the long term will result in the City implementing additional flood mitigation activities.
Status as of 2011	Ongoing

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 25
	Action Item Description / Benefits	Complete a detailed structural / engineering survey of City facilities to ensure their soundness with respect to resisting the effects of high winds and hail. Form basis of decisions about any additional actions to mitigate risk. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Tornadoes, Straight-line Wind, Hail, Seismic events
Lead Manager	Department of Public Works
Cost Estimate/Funding	To be determined, but if initiated probably from City General Fund.
Schedule	TBD
Cost-Effectiveness	Not independently cost-effective, but the initial step in identifying appropriate mitigation actions.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. This project is subject to their current project for new city facilities, PD, and PW buildings.

		Sunset Valley (Past Action) – 26
	Action Item Description / Benefits	Based on the results of the study in Action 17, initiate upgrades to at-risk City structures and/or infrastructure. Mitigates specific risks to structures, people, and operations. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Tornadoes, Straight-line Wind, Hail, Seismic events
Lead Manager	To be determined – depends on specific measure.
Cost Estimate/Funding	Varies depending on measure. Funding from City General Fund or FEMA grant programs.
Schedule	TBD based on study.
Cost-Effectiveness	Cost-effectiveness will vary with level of risk and project cost.
Status as of 2011	TBD, but likely to be initiated no earlier than 2011 and continue into 2012.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 27
	Action Item Description / Benefits	Develop a campaign to inform the public about developing or ongoing risks from the range of hazards that can affect the City. Project may include mailings, web site postings, PSAs, media notifications, and other methods such as Facebook and Twitter notifications. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	All Hazards
Lead Manager	Administration
Cost Estimate/Funding	Estimated $25,000
Schedule	TBD, probably 2011 or 2012.
Cost-Effectiveness	Not independently cost-effective but will lead to actions that protect citizens, operations and structures.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 28
	Action Item Description / Benefits	Continue to monitor drought conditions through contact with State agencies. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Drought
Lead Manager	Public Works
Cost Estimate/Funding	No additional cost – uses existing staff resources.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective.
Status as of 2011	Ongoing

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 29
	Action Item Description / Benefits	Initiate public information campaigns and/or water use restrictions to ensure sufficient water pressure for fire-fighting and provision of drinking water. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Drought
Lead Manager	Public Works
Cost Estimate/Funding	No additional cost – uses existing staff resources.
Schedule	Ongoing
Cost-Effectiveness	Very difficult to determine, but presumed very cost-effective because actions preserves essential function.
Status as of 2011	Ongoing

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Review by committee and council liaison of social media platforms for pushing information.

		Sunset Valley (Past Action) – 30
	Action Item Description / Benefits	Continue to ensure that the City has adequate plans and resources in place to address risks posed by potential ice and snow hazards during winter storms. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Winter storms
Lead Manager	Department of Public Works
Cost Estimate/Funding	No additional cost-uses existing staff resources.
Schedule	Ongoing
Cost-Effectiveness	Cost-effective
Status as of 2011	Ongoing

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 31
	Action Item Description / Benefits	Establish and maintain relationships with the State Geologic Survey of Texas and the U.S. Geologic Survey, with the purpose of ensuring the City has the most current available information about the potential for seismic events and landslides. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Seismic events, Landslides
Lead Manager	Department of Public Works
Cost Estimate/Funding	No additional cost-uses existing staff resources.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective, except that the action may prevent damages through early warning.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update.

		Sunset Valley (Past Action) – 32
	Action Item Description / Benefits	Develop and implement a public information campaign to inform citizens about the potential for wildland-urban interface fires. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Wildfires and Wildland-Interface Fire
Lead Manager	Department of Public Works
Cost Estimate/Funding	$10,000 (estimated)
Schedule	TBD
Cost-Effectiveness	Difficult to determine; presumed cost effective due to relatively low cost, but this hazard is not significant in the area.
Status as of 2011	Initiated in 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Review by committee and council liaison of social media platforms for pushing information.

VILLAGE OF THE HILLS

		The Hills (Past Action) – 1
	Action Item Description / Benefits	Initiate a drainage maintenance program. This program might consist of regular mowing/brush clearing within drainage easements and removal of debris and sediment from roadside culverts and roadside ditches. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Village of the Hills
Cost Estimate/Funding	Developing the program will use existing staff resources. Carrying out the program will require the services of a contractor, cost to be determined.
Schedule	Initiate in 2011 or 2012.
Cost-Effectiveness	Cost-effective as the measure is relatively inexpensive and prevents the most significant cause of flooding.
Status as of 2011	Initiated as part of the 2011 HMP update.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. This is an ongoing action – the contractor regularly maintains drainage easements. Budget annually; continue to utilize existing resources.

		The Hills (Past Action) – 2
	Action Item Description / Benefits	Pursue grant funding from FEMA's Hazard Mitigation Grant Program (HMGP) and Flood Mitigation Assistance (FMA) program to receive assistance with mitigating (acquisition, elevation, etc.) flood prone properties within the City. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Village of the Hills
Cost Estimate/Funding	Depends on number of grants – may use existing staff resources or a consultant.
Schedule	Not yet established.
Cost-Effectiveness	Any grants submitted will be subject to benefit-cost analysis.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Utilize new staff resources.

		The Hills (Past Action) – 3
	Action Item Description / Benefits	Join the NFIP Community Rating System (CRS). Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Village of the Hills
Cost Estimate/Funding	Uses existing staff resources.
Schedule	Not yet established.
Cost-Effectiveness	Not independently cost-effective.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Delete Action. Staff resources prevented implementation.

		The Hills (Past Action) – 4
	Action Item Description / Benefits	Promote the purchase of flood insurance. Advertise the availability of costs and coverage of flood insurance through the National Flood Insurance Program (NFIP). Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood
Lead Manager	Village of the Hills
Cost Estimate/Funding	Uses existing staff resources.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Utilize new staff and website.

		The Hills (Past Action) – 5
	Action Item Description / Benefits	Encourage the building of tornado safe community shelters. Encourage the installation of a tornado safe room in new public facilities or designated shelters. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Tornado, High Winds
Lead Manager	Village of the Hills
Cost Estimate/Funding	Not presently part of any budgeting process; to be determined.
Schedule	Not yet established.
Cost-Effectiveness	Cost-effectiveness of a shelter to be determined.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Delete Action. Budget restraints prevented implementation.

		The Hills (Past Action) – 6
	Action Item Description / Benefits	Complete a detailed structural/engineering survey of present and future Village facilities to ensure their soundness with respect to resisting the effects of high winds and hail. Forms basis of decisions about any additional actions to mitigate risk. Priority: Low to Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Tornadoes, Straight-line Wind, Hail, Seismic events
Lead Manager	Village of the Hills
Cost Estimate/Funding	To be determined, but if initiated probably from Village budget.
Schedule	TBD
Cost-Effectiveness	Not independently cost-effective, but the initial step in identifying appropriate mitigation actions.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Delete Action. Village facilities are limited to park structures.

		The Hills (Past Action) – 7
	Action Item Description / Benefits	Sponsor a "Multi-Hazard Awareness Week" to educate the public on hurricanes, tornadoes (sheltering in place, evacuation, emergency preparedness, and structural retrofitting), flooding, (evacuation, emergency preparedness, retrofitting, and flood insurance), thunderstorms and lightning (emergency preparedness), and hailstorms. This activity may be carried out in collaboration with the County or other surrounding jurisdictions. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	All Hazards
Lead Manager	Village of the Hills
Cost Estimate/Funding	$5,000 Village budget and grants
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective, but decreases risk community-wide.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Additional staff available to coordinate this event.

		The Hills (Past Action) – 8
	Action Item Description / Benefits	Increase public awareness of hazards and hazardous areas. Distribute public awareness information regarding flood hazards, SFHAs, and the potential mitigation measures using the local newspaper, utility bill inserts, inserts in the phone book, a Village hazard awareness website, and an education program for school age children or "how to" classes in retrofitting by local merchants. Integrate "Disaster Resistance Education" into the public school curriculum. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	All Hazards
Lead Manager	Village of the Hills
Cost Estimate/Funding	$15,000 Village budget and grants.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective, but decreases risk community-wide.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Public awareness of all hazards mitigation was improved through public information/website. The school piece has not been implemented because of inadequate staffing. Public awareness campaign will continue; 2017 plan will be modified to remove school curriculum.

		The Hills (Past Action) – 9
	Action Item Description / Benefits	Ensure adequate plans, procedures, and capabilities to respond to a dam failure. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Flood, Dam Failure
Lead Manager	Village of the Hills
Cost Estimate/Funding	No additional cost – uses existing staff resources.
Schedule	2015
Cost-Effectiveness	Not independently cost-effective, but decreases risk community-wide.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Defer Action – Will include in the 2017 Plan Update. Ongoing action. Continue training, particularly for new staff.

		The Hills (Past Action) – 10
	Action Item Description / Benefits	Identify residential and non-residential structures that may be at risk from wildfire. Priority: Low to Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Wildfire
Lead Manager	Village of the Hills
Cost Estimate/Funding	No additional cost – uses existing staff resources.
Schedule	2012
Cost-Effectiveness	Not independently cost-effective, but a necessary precursor to finding appropriate mitigation actions.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. Ongoing risk assessment for wildfire; FEMA wildfire mitigation grant and local plan/funding contributed to the project's success. Annual budgeting and contract renewal will be added to this action.

		The Hills (Past Action) – 11
	Action Item Description / Benefits	For at risk residential and non-residential structures, develop a wildfire vegetation maintenance program to trim back and remove vegetation near structures. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Wildfire
Lead Manager	Village of the Hills
Cost Estimate/Funding	No additional cost – uses existing staff resources.
Schedule	Ongoing
Cost-Effectiveness	Cost-effectiveness depends on likelihood of fire – considered low at this point.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. Ongoing risk assessment for wildfire; FEMA wildfire mitigation grant and local plan/funding contributed to the project's success. Annual budgeting and contract renewal will be added to this action.

		The Hills (Past Action) – 12
	Action Item Description / Benefits	Create plan for warming centers and shelters. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Winter Storm
Lead Manager	Village of the Hills
Cost Estimate/Funding	TBD
Schedule	2013
Cost-Effectiveness	Not yet determined, presumed cost-effective.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Delete Action. Not a practical concern for the community.

		The Hills (Past Action) – 13
	Action Item Description / Benefits	Create cooperative relationship with news outlets for distributing information about winter storms. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Winter Storm
Lead Manager	Village of the Hills
Cost Estimate/Funding	No additional cost – uses existing staff resources.
Schedule	2013
Cost-Effectiveness	Cost-effective as a way to reduce risk for the entire community.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. Ongoing action. Goals were met, regionally coordinated communications contributed to success. Implement as needed.

		The Hills (Past Action) – 14
	Action Item Description / Benefits	Coordinate with the State to monitor and conserve existing water supplies in the County. Priority: High

MITIGATION ACTION DETAILS	
Hazard Addressed	Drought
Lead Manager	Village of the Hills
Cost Estimate/Funding	No additional cost – uses existing staff resources.
Schedule	2015
Cost-Effectiveness	Cost-effective
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. Ongoing action. Goals were met, regionally coordinated communications contributed to success. Continue to work with regional partners and the State; use existing staff resources.

		The Hills (Past Action) – 15
	Action Item Description / Benefits	Enhance water and energy conservation at County facilities. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Drought
Lead Manager	Village of the Hills
Cost Estimate/Funding	Not yet determined.
Schedule	Begin in 2011.
Cost-Effectiveness	Cost-effective
Status as of 2011	Initiated as part of 2011 HMP update,

2017 Analysis:
Delete Action. The Village does not own or operate County facilities.

		The Hills (Past Action) – 16
	Action Item Description / Benefits	Establish and maintain relationships with the State Geologic Survey of Texas and the U.S. Geologic Survey, with the purpose of ensuring the City has the most current available information about the potential for seismic events and landslides. Priority: Low

MITIGATION ACTION DETAILS	
Hazard Addressed	Seismic events, Landslides
Lead Manager	Village of the Hills
Cost Estimate/Funding	No additional costs – uses existing staff resources.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective, except that the action may prevent damages through early warning.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. Ongoing action; regionally coordinated communications contributed to success. Continue to utilize existing staff resources.

		The Hills (Past Action) – 17
	Action Item Description / Benefits	Develop and implement a public information campaign to inform citizens about the potential for wildland-urban interface fires. Priority: Low to Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Wildfires and Wildland-Interface Fire
Lead Manager	Village of the Hills
Cost Estimate/Funding	$10,000 (estimated)
Schedule	TBD
Cost-Effectiveness	Difficult to determine; presumed cost-effective due to relatively low cost, but this hazard is not significant in the area.
Status as of 2011	Initiated as part of 2011 HMP update.

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. Ongoing action. The Village website and local news media are primary outlets for the public information campaign. Continue to utilize existing staff resources and develop information for social media distribution.

		The Hills (Past Action) – 18
	Action Item Description / Benefits	Initiate public information campaigns and/or water use restrictions to ensure sufficient water pressure for fire-fighting and provision of drinking water. Priority: Medium

MITIGATION ACTION DETAILS	
Hazard Addressed	Drought
Lead Manager	Village of the Hills
Cost Estimate/Funding	No additional cost – uses existing staff resources.
Schedule	Ongoing
Cost-Effectiveness	Very difficult to determine but presumed very cost-effective because actions preserves essential function.
Status as of 2011	Ongoing

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. Ongoing action. The Village coordinates with the Municipal Utility District and Property Owners Association to inform residents. Continue to utilize existing staff resources and develop information for social media distribution.

		The Hills (Past Action) – 19
	Action Item Description / Benefits	Continue to monitor drought conditions through contact with State agencies. Priority: Medium to High

MITIGATION ACTION DETAILS	
Hazard Addressed	Drought
Lead Manager	Village of the Hills
Cost Estimate/Funding	No additional cost – uses existing staff resources.
Schedule	Ongoing
Cost-Effectiveness	Not independently cost-effective.
Status as of 2011	Ongoing

2017 Analysis:
Completed. Defer Action – Will include in the 2017 Plan Update. Ongoing action. Regional coordination and communication contributes to success. Continue to utilize existing staff resources.

SECTION 18: MITIGATION ACTIONS

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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 hazards included in the Plan. Each of the actions in this section were prioritized based on the Federal Emergency Management Agency's (FEMA) Social, Technical, Administrative, Political, Legal, Economic, and Environmental [STAPLE(E)] 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 STAPLE(E) analysis, jurisdictions 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 18-1. Travis County and Participating Jurisdictions Mitigation Action Matrix

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.				
TRAVIS COUNTY: MITIGATION ACTION MATRIX				
HAZARDS	**Types of Action:**			
	LOCAL PLANS/ REGULATIONS	**STRUCTURAL/ INFRASTRUCTURE**	**NATURAL SYSTEM PROTECTION**	**EDUCATION & AWARENESS**
Flood	XX	XXXXXXXXXXXXXXXXX+		XXXXXX
Wildfire	X	XXX	XXX	XXXXXX
Drought	XX		X	XXX
Tornado		XX		XXXX
Thunderstorm Wind		XX		XXXX
Extreme Heat		XXX		XXXX
Expansive Soils	X			XXX
Hail		XX		XXX
Lightning		X		XXX
Winter Storm		XXX		XXXX
Dam Failure	XXX	XX		XXX
Preparedness/ Response/Other	XXXXXX			X

CITY OF LAKEWAY: MITIGATION ACTION MATRIX				
HAZARDS	Types of Action:			
	LOCAL PLANS/ REGULATIONS	STRUCTURAL/ INFRASTRUCTURE	NATURAL SYSTEM PROTECTION	EDUCATION & AWARENESS
Flood	X	XX		XXX
Wildfire		XX	X	XXX
Drought	X	X		XX
Tornado		XX		XXX
Thunderstorm Wind		XX		XXX
Extreme Heat		XXX		XXX
Expansive Soils	X	X		XX
Hail		XXX		XXX
Lightning		XX		XXX
Winter Storm		XXX		XXX
Dam Failure	X	XX		XXX
Preparedness/ Response/Other	XX			

CITY OF MANOR: MITIGATION ACTION MATRIX				
HAZARDS	Types of Action:			
	LOCAL PLANS/ REGULATIONS	STRUCTURAL/ INFRASTRUCTURE	NATURAL SYSTEM PROTECTION	EDUCATION & AWARENESS
Flood	XX	XXX		XXX
Wildfire		X		XXX
Drought	XX			XX
Tornado		X		XXX
Thunderstorm Wind		X		XXX
Extreme Heat		XX		XXX
Expansive Soils	XX			XXX
Hail		XX		XXX
Lightning		X		XXX
Winter Storm		XX		XXX
Dam Failure	X	X		XXX
Preparedness/ Response/Other		X		

CITY OF PFLUGERVILLE: MITIGATION ACTION MATRIX				
HAZARDS	Types of Action:			
	LOCAL PLANS/ REGULATIONS	STRUCTURAL/ INFRASTRUCTURE	NATURAL SYSTEM PROTECTION	EDUCATION & AWARENESS
Flood	XX	XXX		XXXX
Wildfire	X	XX		XXX
Drought	XXX			XXX
Tornado		XXXX		XXX
Thunderstorm Wind		XX		XXX
Extreme Heat	X	XXX		XXX
Expansive Soils	X			XXX
Hail		XXX		XXX
Lightning	X	XX		XXX
Winter Storm		XXX		XXXX
Dam Failure	X	XX		XXX
Preparedness/ Response/Other	XXXX			

CITY OF SUNSET VALLEY: MITIGATION ACTION MATRIX				
HAZARDS	Types of Action:			
	LOCAL PLANS/ REGULATIONS	STRUCTURAL/ INFRASTRUCTURE	NATURAL SYSTEM PROTECTION	EDUCATION & AWARENESS
Flood	XX	XXXXXXXXX		XXXX
Wildfire		X		XXXX
Drought	XX			XXX
Tornado		XX		XXX
Thunderstorm Wind		XX		XXX
Extreme Heat		XX		XX
Expansive Soils	X			XX
Hail		XXX		XXX
Lightning		XX		XXX
Winter Storm	X	XX		XXX
Dam Failure	X	X		XX
Preparedness/ Response/Other	X	X		

VILLAGE OF THE HILLS: MITIGATION ACTION MATRIX				
HAZARDS	Types of Action:			
	LOCAL PLANS/ REGULATIONS	STRUCTURAL/ INFRASTRUCTURE	NATURAL SYSTEM PROTECTION	EDUCATION & AWARENESS
Flood	X	XXX		XXXXX
Wildfire		X	X	XXXXX
Drought	XX			XXXX
Tornado	X	X		XXXX
Thunderstorm Wind	X	X		XXXX
Extreme Heat	X	XX		XXXX
Expansive Soils	XX			XXXX
Hail	X	XX		XXXX
Lightning	X	XX		XXXX
Winter Storm	X	XX		XXXX
Dam Failure	X	X		XXXX
Preparedness/ Response/Other	X			

Table 18-2 is a summary table of all of the mitigation actions created by the Planning Team members, presented by jurisdiction. The Mitigation Action Worksheets below Table 18-2 give additional details for each action.

Table 18-2. Travis County and Participating Jurisdictions Summary of Mitigation Actions

TRAVIS COUNTY: SUMMARY OF MITIGATION ACTIONS					
ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
HIGH PRIORITY					
1	Update Austin Travis County Community Wildfire Protection Plan.	Wildfire	TNR	$30,000	Within 12-24 months of plan adoption
2	Evaluate evacuation routes and shelter-in-place locations for public use during wildfire events.	Wildfire	Emergency Services, ATCWCF, TNR	$10,000	Within 12-24 months of plan adoption, pending available funding
3	Plan and implement fuel reduction projects at county parks, preserves, open space, and facilities.	Wildfire	TNR, ATCWCF	$1,000,000	Within 12-24 months of plan adoption, pending available funding
4	Utilize Geographic Information System (GIS) to create maps that identify and analyze high risk areas for floods, wildfires, and dam failure. Adopt land use restrictions in high risk areas identified in the analysis.	Flood, Wildfire, Dam Failure	TNR	$25,000	Within 12-24 months of plan adoption, pending available funding
5	Develop a database of flood-related data, including GIS layer identifying building permits, land use, and parcel data.	Flood	TNR, Emergency Services, City of Austin	$25,000	Within 12-24 months of plan adoption, pending available funding
6	Implement a GIS System to create a map of Emergency and Evacuation Routes to be used by emergency vehicles in flooding conditions.	Flood, Tornado, Wildfire	TNR, Emergency Services	$5,000	Within 12-24 months of plan adoption, pending available funding
7	Update GIS data for the Austin Travis County wildfire risk model.	Wildfire	TNR, Emergency Services, City of Austin, ATCWCF	$10,000	Within 12-24 months of plan adoption, pending available funding
MODERATE PRIORITY					
8	Identify and prioritize structures for elevation as flood mitigation. Elevate flood prone structures throughout unincorporated Travis County.	Flood, Dam Failure	TNR	$3,000,000	Within 12-24 months of plan adoption, pending available funding

ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
9	Identify best practices to reduce the impacts of drought on water supply, water quality, and natural resources. Adopt and implement water restrictions as indicated in the analysis.	Drought	TNR	$2,500	Within 24-36 months of plan adoption
10	Assess potential impacts of extended drought on County water supplies and natural resources. Incorporate drought tolerant landscaping at all public facilities.	Drought	TNR	$5,000 per site	Within 24-35 months of plan adoption
11	Utilize local radio stations to provide public service announcements to educate residents on natural hazard risks and mitigation measures in order to protect property and lives.	Flood, Wildfire, Drought, Tornado, Thunderstorm Wind, Extreme Heat, Expansive Soils, Hail, Lightning, Winter Storm, Dam Failure	Travis County / TNR	$3,000	Within 24-36 months of plan adoption, pending funding
12	Assist local communities, neighborhoods, and municipalities with the development of local Community Wildfire Protection Plans.	Wildfire	Emergency Services, Emergency Service Districts, TNR	$100,000	Within 24-36 months of plan adoption, pending available funding
13	Distribute flyers to addresses in or near the floodplain to educate citizens on risk, flood insurance, and mitigation measures to reduce risk of flood.	Flood	Travis County / TNR	$3,000	Within 24-36 months of plan adoption, pending funding
14	Presentations to neighborhood organizations. Targeted to specific risk areas, such as flood-prone neighborhoods or near low water crossings. Educate residents on natural hazard risks and mitigation measures to reduce risk.	Flood, Wildfire, Drought, Tornado, Thunderstorm Wind, Extreme Heat, Expansive Soils, Hail, Lightning, Winter Storm, Dam Failure	Travis County / TNR	$1,000	Within 24-36 months of plan adoption, pending funding
15	Post flyers in neighborhoods, public space, churches, gathering places, online neighborhood portals, etc., to educate residents on natural hazards and mitigation measures to reduce risk.	Flood	Travis County / TNR	$5000	Within 24-36 months of plan adoption, pending funding
16	Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.	Flood	Public Works	$2,295,200	Within 24-36 months of plan adoption, pending funding

ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
17-42	Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.	Flood	Public Works	Varies per location	Within 24-36 months of plan adoption, pending funding
43	Provide additional means of ingress and egress into single-entry neighborhoods and gated communities for use during emergencies and wildfire events.	Wildfire	TNR	$500,000 per neighbor-hood	Within 24-36 months of plan adoption, pending funding
44	Implement drainage improvements at Arroyo Doble Subdivision and Twin Creeks Park Subdivision to reduce flood damages to structures and infrastructure.	Flood	Engineering	$5,100,000	Within 24-36 months of plan adoption, pending funding
45	Due to the data deficiency identified as part of the Dam Failure Risk Assessment, work with LCRA, TCEQ, and private Dam owners (where possible) to encourage the development of inundation maps for all high hazard Dams within the planning area. When and if available, this data will be used for the next plan update to complete a more thorough risk assessment, to include extent and impact of potential dam failures.	Dam Failure	Floodplain Administrator	$2,000	Within 24-36 months of plan adoption, pending funding
46	Development of a Wildland Fire Task Force.	Wildfire	TNR	Staff Time	Within 24-36 months of plan adoption, pending available funding
47	Complete fuel reduction projects in the Balcones Canyon preserve. This will include cleaning lower limbs, dead wood, ladder fuels, and preserving tight canopy to reduce grass growth. Also included will be outreach to property owners in the interface to highlight the importance of and recommendations for defensible space initiatives.	Wildfire	TNR	$1,000,000	Within 24-36 months of plan adoption, pending available funding

ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
48	Complete fuel reduction projects in other vulnerable, high risk areas of the County. This will include clearing lower limbs, dead wood, ladder fuels, and preserving tight canopy to reduce grass growth. Also included will be outreach to property owners in the interface to highlight the importance of and recommendations for defensible space initiatives.	Wildfire	TNR	$1,000,000	Within 24-36 months of plan adoption, pending available funding
49	Conduct public education program on best practices for creating defensible space and fire-adapted landscapes.	Wildfire	Emergency Services, TNR, ATCWCF	$3,000	Within 24-36 months of plan adoption, pending available funding
50	Conduct public education program to advise public about evacuation routes, shelter-in-place locations for use during wildfire events, wildfire risks, and best wildland fire mitigation techniques for Central Texas.	Wildfire	Emergency Services, TNR, ATCWCF	$2,000	Within 24-36 months of plan adoption, pending available funding

TRAVIS COUNTY COUNTY-WIDE: SUMMARY OF MITIGATION ACTIONS					
ACTION NO.	**PROPOSED ACTION**	**HAZARDS ADDRESSED**	**LEAD AGENCY**	**ESTIMATED COST**	**IMPLEMENTATION SCHEDULE**
MODERATE PRIORITY					
1	Purchase and install generators and hardwire quick generator connections at critical facilities throughout the planning area.	Flood, Wildfire, Tornado, Dam Failure Thunderstorm Wind, Extreme Heat, Hail, Lightning, Winter Storm	Local and County Administration / Public Works	$50,000 per site	Within 24-36 months of plan adoption, pending available funding
2	Adopt and implement land use restrictions and/or building code requirements in high risk areas to mitigate the risk of land subsidence, expansive soils and flood.	Flood, Dam Failure, Expansive Soils	Local and County Administration	$2,500	Within 24-36 months of plan adoption, pending available funding
LOW PRIORITY					
3	Install covered parking facilities for critical City/County vehicles.	Hail, Extreme Heat, Winter Storm	Local and County Administration / Public Works	$25,000	Within 36-48 months of plan adoption, pending available funding
4	Require drought tolerant landscaping at all new public buildings.	Drought	Local and County Administration	$1,000	Within 36-48 months of plan adoption, pending available funding
5	Increase public awareness of all hazards and hazardous areas. Distribute public awareness information regarding natural hazards, including SFHAs, along with potential mitigation measures that can reduce risk of damages and injuries. Utilize resources such as the local newspapers, utility bill inserts, and websites.	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm	Local and County Administration	$2,000	Within 36-48 months of plan adoption, pending available funding

LAKEWAY: SUMMARY OF MITIGATION ACTIONS					
ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
HIGH PRIORITY					
1	Review the Lakeway Emergency Operations Plan and continue to establish an Emergency Operations Center.	Flood, Wildfire, Drought, Tornado, Thunderstorm Wind, Extreme Heat, Expansive Soils, Hail, Lightning, Winter Storm, Dam Failure	City of Lakeway / Police Dept.	$2,500	Within 12 months of plan adoption, pending available funding
2	Acquisition and relocation of Police Department. Retrofit/harden new location with wind and fire resistant materials, sprinkler system, surge protectors, and drought tolerant landscaping. Acquire and install generator with permanent hard wire quick connections to ensure continuity of emergency services.	Flood, Wildfire, Drought, Tornado, Thunderstorm Wind, Extreme Heat, Expansive Soils, Hail, Lightning, Winter Storm, Dam Failure	City of Lakeway	$23,000,000	Within 12-24 months of plan adoption, pending available funding
MODERATE PRIORITY					
3	Conduct joint Skywarn training with emergency services (police, fire, EMS) / City staff / LTISD / bus drivers. Skywarn training is conducted as part of our citizens Police Academy and is open to the public. City will expand training to include additional citizens and incorporate mitigation measures to reduce risk of damages and injuries.	Flood, Wildfire, Tornado, Hail, Winter Storm, Thunderstorm Wind, Dam Failure, Extreme Heat, Lightning	Police/EMA	$200	Annual
4	Develop a mass debris removal plan.	Tornado, Thunderstorm Wind, Flood, Wildfire, Hail, Dam Failure	Lakeway PD&CE and Public Works	$500	Within 24 months of plan adoption, pending available funding
5	Implement fuels reduction / brush management program to reduce wildfire risk and assist with wildfire control.	Wildfire	City of Lakeway / Public Works / Parks Dept.	$100,000	Within 24 months of plan adoption, pending available funding
6	Utilize Social Media to provide educational materials to residents on all natural hazard risks and mitigation measures to protect property and lives.	Flood, Wildfire, Drought, Tornado, Thunderstorm Wind, Extreme Heat, Expansive Soils, Hail, Lightning, Winter Storm, Dam Failure	City of Lakeway / Police	$2,000	Within 24 months of plan adoption, pending available funding

MANOR: SUMMARY OF MITIGATION ACTIONS					
ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
HIGH PRIORITY					
1	Acquire and install All Hazards warning sirens.	Dam Failure, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm	City Manager / Public Works	$40,000 - $60,000	Within 24 months of plan adoption, pending available funding
MODERATE PRIORITY					
2	Purchase, distribute, and promote the use of NOAA's all hazard radios. Incorporate with Citizens Police Academy training give away.	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm	Police Dept.	$5,000 - $10,000	Within 24 months of plan adoption, pending available funding
3	Implement plan to clean up and improve the alley ways located in the downtown Manor area. Implement drainage improvements in the downtown area to improve drainage and reduce damages.	Flood	City Manager/ Public Works	$100,000	Within 24 months of plan adoption, pending available funding
4	Adopt and implement plan to clean up and remove debris from ditches, drains, and culverts to maintain capacity.	Flood	City Manager/ Public Works	$1,000	Within 24 months of plan adoption, pending available funding
5	Develop / Update drought contingency plan. Adopt and implement water restrictions identified in the plan.	Drought	City Manager / Planning / Public Works	$1,000	Within 24 months of plan adoption
6	Public Awareness and education campaign to educate the public on expansive soil and methods and actions that can be taken to protect existing structures.	Expansive Soils	City Manager	$500	Within 24 months of plan adoption, pending available funding
7	Develop and implement code requirements for foundations to protect against damage caused by expansive soils.	Expansive Soils	City Manager	$500	Within 24 months of plan adoption, pending available funding
8	Develop and initiate extreme summer heat public awareness campaign and fan drive/giveaway. Implement fan drive to collect donations and distribute fans to vulnerable populations.	Extreme Heat	City Manager / Police Dept.	$5,000 - $10,000	Within 24 months of plan adoption, pending available funding

PFLUGERVILLE: SUMMARY OF MITIGATION ACTIONS					
ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
HIGH PRIORITY					
1	Construct shelters and safe refuge locations for public evacuation triggered by disasters such as wildfire, dam failure, winter storms, and extreme heat.	Winter Storm, Extreme Heat, Wildfires, Dam Failure, Tornado, Flood	Police Dept.	$50,000	Within 12-24 months of plan adoption, pending available funding
2	Study, adopt, and implement a drainage utility plan to fund/implement regular maintenance and operations for drainage improvements.	Flood	City Engineer	$250,000	Within 24-36 months of plan adoption, pending available funding
3	Identify locations and construct tornado safe room community shelters. Install tornado safe rooms in new public facilities or designated shelters.	Tornado	City Manager's Office	$150,000	Within 24-36 months of plan adoption, pending available funding
4	Incorporate specific actions from the Hazard Mitigation Plan that are designed to reduce flooding into the City's Comprehensive Plan. Actions should be related to protecting existing and future development from increased flooding potential and erosion, and incorporate into the City of Pflugerville Unified Development Code.	Flood	Development Services Departments	$500	Within 24-36 months of plan adoption, pending available funding
5	Implement an education and awareness program to further promote the purchase of flood insurance. Advertise the availability of costs, and coverage of flood insurance through the National Flood Insurance Program (NFIP).	Flood	CRS / Floodplain Administrator	$1,000	Within 24-36 months of plan adoption, pending available funding (then annually)

ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
6	Increase public awareness of hazards and hazardous areas. Distribute public awareness information regarding natural hazards, including SFHAs, along with potential mitigation measures that can reduce risk. Utilize resources such as the local newspaper, utility bill inserts, inserts in the phone book, a City hazard awareness website, and an education program for school age children; provide "how to" classes in retrofitting by local merchants, integrate "Disaster Resistance Education" into the public school curriculum, and/or provide public education on the importance of maintaining ditches.	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm	Public Information Office	$15,000	Within 24-36 months of plan adoption, pending available funding (then annually)
7	NFIP Community Rating System (CRS): Evaluate and implement activities to improve rating with the CRS, such as adopting higher floodplain standards.	Flood	Building Department	TBD	Within 24-36 months of plan adoption, pending available funding (then annually)
8	Sponsor a "Multi-Hazard Awareness Week" to educate the public on hazards including hurricanes, tornadoes (sheltering in place, evacuation, emergency preparedness, and structural retrofitting), flooding (evacuation, emergency preparedness, retrofitting, and flood insurance), thunderstorms and lightning (emergency preparedness) and hailstorms.	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm.	Public Information Office	$5,000	Within 24-36 months of plan adoption, pending available funding (then annually)
9	Ensure adequate plans, procedures, and capabilities to prevent and respond to dam failure.	Flood, Dam Failure.	City Engineer	TBD	Within 24-36 months of plan adoption, pending available funding
MODERATE PRIORITY					
10	Planning for and maintaining adequate road and debris clearing capabilities.	Winter Storm, Tornado, Thunderstorm Wind.	City of Pflugerville	$5,000	Within 12-24 months of plan adoption, pending available funding (then annually)

ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
11	Adopt ordinance to restrict water and energy consumption at public facilities.	Drought, Extreme Heat.	City Manager's Office	$150,000	Within 24-36 months of plan adoption, pending available funding
12	Develop and implement a plan for installing network of lightning detection equipment systems and lightning rods at existing and future city park facilities.	Lightning	Parks and Recreation	$150,000	Within 24-36 months of plan adoption, pending available funding
13	Study, adopt, and implement a Drainage Master Plan and FIRM study of Wilbarger Creek watershed.	Drought	City Engineer	$250,000	Within 24-36 months of plan adoption, pending available funding
14	Evaluate, adopt, and implement National Fire Protection Association (NFPA) codes and standards as well as Austin / Travis County Community Wildfire Protection Plan to minimize and manage the wildfire threat as appropriate.	Wildfire	Travis County ESD No. 2	$50,000	Within 24-36 months of plan adoption, pending available funding
15	Acquire, implement, and maintain equipment, apparatus and personnel trained in support of Stillwater and swiftwater capabilities. This would address life and property.	Flood	Travis County ESD No. 2	$43,090 annually	Within 24-36 months of plan adoption
16	Acquire, implement, and maintain equipment, apparatus and personnel trained in support of wildland firefighting capabilities. This would address life and property.	Wildfire	Travis County ESD No. 2	$53,200 annually	Within 24-36 months of plan adoption
LOW PRIORITY					
17	Complete a detailed structural/engineering survey of City facilities to ensure their soundness with respect to resisting the effects of Thunderstorm wind, Tornado, and Hail. With information from the survey, implement mitigation activities to harden facilities, reduce damages, and ensure continuity of services. Mitigation actions can include items such as hail resistant construction materials, storm shutters, shatter proof glass, and/or roof straps.	Tornado, Thunderstorm Wind, Hail	City Manager's Office	$150,000	Within 36-48 months of plan adoption, pending available funding

ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
18	Utilize news outlets and social media for distributing updated information about winter storms, including mitigation measures to reduce damages and health and safety tips.	Winter Storm	Public Information Office	$5,000	Within 36-48 months of plan adoption, pending available funding (then annually)
19	Coordinate with the State to monitor and conserve existing water supplies in the County. Adopt and implement mandatory water conservation measures during extreme droughts.	Drought	Public Works, Utilities Dept.	$5,000	Within 36-48 months of plan adoption, pending available funding

SUNSET VALLEY: SUMMARY OF MITIGATION ACTIONS					
ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
HIGH PRIORITY					
1	Pursue funding and implement land and easement acquisition for the purpose of reducing flood risk.	Flood	Administration	$300,000	Within 12 months of plan adoption, pending available funding
2	Implement a natural waterway maintenance program. This program includes debris removal from the waterways, non-native plant removal, and the removal of fallen trees that are in excess of a 45 degree angle within the creek. Under the direction of the City Environmental Manager some trimming and or removal of native vegetation may also be performed.	Flood	Dept. of Public Works	$30,000	Within 12-24 months of plan adoption, pending available funding
3	Lot to lot drainage. City will provide technical support to identify solutions to drainage problems affecting two or more properties, and perform minor grading work in easements, as needed to reduce flood risk.	Flood	Dept. of Public Works	$20,000	Within 12-24 months of plan adoption, pending available funding
4	Implement education program to promote the purchase of flood insurance. Advertise the availability of costs, and coverage of flood insurance through the National Flood Insurance Program (NFIP). Encourage the 70 households located within the low water crossing inundation area identified to purchase flood insurance.	Flood	City Administration	$1,000	Within 12 months of plan adoption, pending available funding

ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
5	Implement education program to increase public awareness of hazards and hazardous areas. Distribute public awareness information regarding natural hazards, including SFHAs, and potential mitigation measures to reduce risk. Distribute information through local newspaper, utility bill inserts, inserts in the phone book, a City hazard awareness website, and an education program for school age children.	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm	City Administration	$5,000	Within 12 months of plan adoption, pending available funding
6	Adopt and implement program to insulate outdoor pipes at public buildings annually and prior to winter storm events.	Winter Storm	Department of Public Works.	$1,000 (Staff Time)	Within 12-24 months of plan adoption, pending available funding
MODERATE PRIORITY					
7	Identify properties for possible participation in voluntary acquisition and demolition. Pursue funding and implement acquisition and demolition of flood prone structures.	Flood	Department of Public Works.	$50,000	Within 24-36 months of plan adoption, pending available funding.
8	Implement routine maintenance of ditch lines, storm water inlets, storm water lift stations, as well as make standard preparations for storms and subsequent clean up.	Flood	Department of Public Works.	$20,000	Within 24-36 months of plan adoption, pending available funding.
9	Upgrade culvert on Westgate Bridge at Sunset Valley tributary to increase capacity and reduce damages. Project requires joint participation with the City of Austin.	Flood	Department of Public Works.	$2,000,000	Within 24-36 months of plan adoption, pending available funding.
10	Implement channel realignment between Lone Oak Trail and Reese Road. Realign the tributary beginning east of Lone Oak Trail and reconnect to the existing channel west of Reese Road. The channel would be approximately 820 feet long. The proposed culvert crossing at Pillow Road would consist of three 10-foot by 3-foot box culverts.	Flood	Department of Public Works.	$686,750	Within 24-36 months of plan adoption, pending available funding.

ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
11	Implement culvert improvements, storm sewer system, and roadside ditch improvements along Sunset Trail, Lone Oak Drive, Yellow Tail Cove, and Pillow Road.	Flood	Department of Public Works	$750,000	Within 24-36 months of plan adoption, pending available funding.
12	Pursue grant funding from FEMA's Hazard Mitigation Grant Program (HMGP) and Flood Mitigation Assistance (FMA) program to implement acquisition and elevation program for flood prone properties within the City.	Flood	City Administration .	$2,000,000	Within 24-36 months of plan adoption, pending available funding.
13	Develop and implement a Flood Event Warning System to monitor rainfall in key areas upstream of the City and alert citizens to potential flooding.	Flood	Department of Public Works, Police Department.	$10,000	Within 24-36 months of plan adoption, pending available funding.
14	Continue to monitor drought conditions through contact with State agencies.	Drought	Department of Public Works	$3,000	Within 24-36 months of plan adoption, pending available funding.
15	Implement public information/education campaigns on water conservation during times of drought. Adopt water use restrictions to ensure sufficient water pressure for fire-fighting and provision of drinking water during droughts.	Drought	Department of Public Works	$3,000	Within 24-36 months of plan adoption, pending available funding.
LOW PRIORITY					
16	Implement activities to improve Community Rating System (CRS) rating such as adopting higher floodplain standards.	Flood	City Administration	$2,500	Within 48 months of plan adoption, pending available funding.
17	Complete a detailed structural/engineering survey of City facilities to ensure through soundness with respect to resisting the effects of high winds and hail. Initiate/ implement upgrades to at-risk City structures and/or infrastructure (harden facilities). Mitigate specific risks to structures, people, and operations to reduce risk of damages and ensure continuity of services.	Tornado, Thunderstorm Wind, Hail, Lightning.	Department of Public Works.	$500,000	Within 48 months of plan adoption, pending available funding.

ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
18	Develop and implement a public information campaign to inform citizens about the potential for wildland-urban interface fires and mitigation measures to reduce risk.	Wildfire	City Administration	$10,000	Within 48 months of plan adoption, pending available funding.
19	Provide tree pruning education classes to reduce damages and power outages caused by falling limbs and debris.	Thunderstorm Wind, Wildfire, Winter Storm, Tornado, Hail, Lightning, Flood, Dam Failure.	Public Works.	$1,000	Within 48 months of plan adoption, pending available funding.

THE HILLS: SUMMARY OF MITIGATION ACTIONS					
ACTION NO.	**PROPOSED ACTION**	**HAZARDS ADDRESSED**	**LEAD AGENCY**	**ESTIMATED COST**	**IMPLEMENTATION SCHEDULE**
HIGH PRIORITY					
1	Expand and implement drainage maintenance program to include regular mowing/brush clearing within drainage easements and removal of debris and sediment from roadside culverts and roadside ditches.	Flood	Village of the Hills Administration	$2,000	Within 12 months of plan adoption
2	Identify residential and non-residential structures at risk from wildfire. Expand wildfire vegetation maintenance program to trim back and remove vegetation near high risk structures.	Wildfire	Village of the Hills Administration	$250,000	Within 12 months of plan adoption
3	Coordinate with the State to monitor and conserve existing water supplies in the County. Adopt and implement mandatory water conservation measures to ensure sufficient water pressure for fire-fighting and provision of drinking water during droughts.	Drought	Village of the Hills Administration	$2,500	Within 12-24 months of plan adoption
MODERATE PRIORITY					
4	Pursue funding and implement acquisition and elevation program for flood prone properties within the Village. Prioritize repetitive loss properties. Pursue grant funding from FEMA's Hazard Mitigation Grant Program (HMGP) and Flood Mitigation Assistance (FMA) program to receive assistance for mitigating (acquisition, elevation, etc.) flood prone properties within the City.	Flood	Village of the Hills Administration .	$1,000,000	Within 24-36 months of plan adoption, pending funding.

ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
5	Sponsor a "Multi-Hazard Awareness Week" to educate the public on all natural hazards (sheltering in place, evacuation, emergency preparedness, health and safety tips and structural retrofitting, flood insurance, etc.). This activity may be carried out in collaboration with the County or other surrounding jurisdictions.	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm	Village of the Hills Administration	$2,000	Within 24-36 months of plan adoption, pending funding
6	Increase public awareness of hazards and hazardous areas. Distribute public awareness information regarding natural hazards, including SFHAs, along with potential mitigation measures that can reduce risk. Educate residents on tools associated with Smart Meters, encourage monitoring of water use through technology, and notify residents of suspected water leaks. Utilize resources such as the local newspaper, utility bill inserts, and a Village hazard awareness website.	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm	Village of the Hills Administration	$5,000	Within 24-36 months of plan adoption, pending available funding
7	Develop alternative evacuation routes/plans and designate emergency thoroughfares, particularly in areas with limited capacity. Educate citizens on evacuation routes and procedures.	Dam Failure, Flood, Wildfire.	Village of the Hills Administration	$2,500	Within 24-36 months of plan adoption
8	Work with local news outlets to disseminate information about natural hazards, including health and safety tips and mitigation measures to reduce risk.	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm.	Village of the Hills Administration .	$1,000	Within 24-36 months of plan adoption
9	Develop and implement a public information campaign to inform citizens about the potential for wildland-urban interface fires and mitigation measures that reduce risk.	Wildfire	Village of the Hills Administration .	$10,000	Within 24 months of plan adoption.

ACTION NO.	PROPOSED ACTION	HAZARDS ADDRESSED	LEAD AGENCY	ESTIMATED COST	IMPLEMENTATION SCHEDULE
LOW PRIORITY					
10	Implement education and awareness program to promote the purchase of flood insurance. Advertise the coverage, availability, and costs of flood insurance through the National Flood Insurance Program (NFIP) on the village website.	Flood	Village of the Hills Administration	$500	Within 36-48 months of plan adoption, pending funding
11	Increase tree planting around buildings to shade parking lots and along public rights-of-way.	Extreme Heat	Village of the Hills Administration	$5,000	Within 36-48 months of plan adoption
12	Implement irrigation policies for public facilities; maintain a watering schedule to minimize the effects of expansive soils.	Expansive Soils	Village of the Hills Administration	$1,000	Within 36-48 months of plan adoption
13	Establish standard requirements for all utilities regarding tree pruning around lines.	Thunderstorm Wind, Tornado, Winter Storm, Hail, Lightning	Village of the Hills Administration	$2,500	Within 36-48 months of plan adoption
14	Install and maintain surge protection on critical electronic equipment.	Lightning	Village of the Hills Administration	$1,000	Within 36-48 months of plan adoption

TRAVIS COUNTY

		Travis County – Action #1
	Proposed Action:	**Update Austin Travis County Community Wildfire Protection Plan.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Identifies risks and prioritizes actions Travis County can take to reduce risk, improve resilience, and adapt landscapes to wildfire.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Decreases risk of damage or structure loss.
Priority (High, Moderate, Low):	High
Estimated Cost:	$30,000
Potential Funding Sources:	Travis County, FEMA Grants, other grants.
Lead Agency/Department Responsible:	TNR
Implementation Schedule:	Within 12-24 months of plan adoption.
Incorporation into Existing Plans:	Community Wildfire Protection 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

		Travis County – Action #2
	Proposed Action:	**Evaluate evacuation routes and shelter-in-place locations for public use during wildfire events.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of injury and loss of life during wildfire events.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	Travis County, Grants.
Lead Agency/Department Responsible:	Emergency Services, Austin Travis County Wildfire Coalition, TNR.
Implementation Schedule:	Within 12-24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Community Wildfire Protection 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 = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #3
	Proposed Action:	**Plan and implement fuel reduction projects at county parks, preserves, open space, and facilities.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risks of harmful wildfire impacts to natural resources, life, and property.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Natural Systems Protection.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Decreases risk to existing structures.
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000
Potential Funding Sources:	Travis County, Grants.
Lead Agency/Department Responsible:	TNR, Austin Travis County Wildfire Coalition.
Implementation Schedule:	Within 12-24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Community Wildfire Protection 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 = 4

		Travis County – Action #4
	Proposed Action:	**Utilize Geographic Information System (GIS) to create maps that identify and analyze high risk areas for floods, wildfires, and dam failure. Adopt land use restrictions in high risk areas identified in the analysis.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Provides data necessary for planning mitigation actions.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Dam Failure.
Effect on New/Existing Buildings:	Decreases risk of loss of existing and future structures.
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	Travis County, Grants.
Lead Agency/Department Responsible:	TNR
Implementation Schedule:	Within 12-24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Land, Water and Transportation Plan.

COMMENTS
These maps could also be utilized to assist with damage assessments before and after a severe weather event.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 5

		Travis County – Action #5
	Proposed Action:	**Develop a database of flood-related data, including GIS layer identifying building permits, land use, and parcel data.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Will increase general awareness during disasters.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	This would allow the County to examine the potential threat of floods to existing structures in the unincorporated areas of the County.
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	Travis County, Grants.
Lead Agency/Department Responsible:	TNR, Emergency Services, City of Austin.
Implementation Schedule:	Within 12-24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Land, Water and Transportation Plan.

COMMENTS
This system could also be utilized to assist with damage assessments after a severe weather event.
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 = 5

		Travis County – Action #6
	Proposed Action:	**Implement a GIS System to create a map of Emergency and Evacuation Routes to be used by emergency vehicles in flooding conditions.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Enhancement of Public Safety Response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado, Wildfire.
Effect on New/Existing Buildings:	Decreases risk of loss of structures.
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000
Potential Funding Sources:	Travis County, Grants.
Lead Agency/Department Responsible:	TNR, Emergency Services.
Implementation Schedule:	Within 12-24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Land, Water and Transportation Plan, the (future) County Transportation 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 = 5; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		Travis County – Action #7
	Proposed Action:	**Update GIS data for the Austin Travis County wildfire risk model.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Provides data necessary for planning wildfire mitigation actions.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk of loss of structures.
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	General Fund, Grants.
Lead Agency/Department Responsible:	TNR, Emergency Services, City of Austin, Austin Travis County Wildfire Coalition.
Implementation Schedule:	Within 12-24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Community Wildfire Protection 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

		Travis County – Action #8
	Proposed Action:	**Identify and prioritize structures for elevation as flood mitigation. Elevate flood prone structures throughout unincorporated Travis County.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Reduce risk of repetitive losses through elevation mitigation of flood prone structures.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Dam Failure.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	High
Estimated Cost:	$3,000,000
Potential Funding Sources:	Travis County, HMG Grants.
Lead Agency/Department Responsible:	TNR
Implementation Schedule:	Within 12-24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Floodplain Management Plan.

COMMENTS
As Travis County conducts flood mitigation studies of watersheds within its boundaries, structural elevation will be evaluated as a mitigation option. High risk properties will be elevated as funding becomes available.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #9
	Proposed Action:	**Identify best practices to reduce the impacts of drought on water supply, water quality, and natural resources. Adopt and implement water restrictions as indicated in the analysis.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Reduce loss of habitat and decreased water levels.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	Reduce impact on existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,500
Potential Funding Sources:	Travis County, FEMA Grants.
Lead Agency/Department Responsible:	TNR
Implementation Schedule:	Within 24-36 months of plan adoption.
Incorporation into Existing Plans:	Local 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 = 3; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		Travis County – Action #10
	Proposed Action:	**Assess potential impacts of extended drought on County water supplies and natural resources. Incorporate drought tolerant landscaping at all public facilities.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce water consumption at public buildings.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Natural Resources Protection.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	Reduce impact on existing facilities.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000 per site.
Potential Funding Sources:	Travis County, FEMA Grants, other grants.
Lead Agency/Department Responsible:	TNR
Implementation Schedule:	Within 24-35 months of plan adoption.
Incorporation into Existing Plans:	Local 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 = 4; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		Travis County – Action #11
	Proposed Action:	**Utilize local radio stations to provide public service announcements to educate residents on natural hazard risks and mitigation measures in order to protect property and lives.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Reduce risk to residents and their property by promoting a general awareness of weather hazards, emergency staffing resources, and mitigation measures.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Drought, Tornado, Thunderstorm Wind, Extreme Heat, Expansive Soils, Hail, Lightning, Winter Storm, Dam Failure.
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Travis County / TNR.
Implementation Schedule:	Within 24-36 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 = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		Travis County – Action #12
	Proposed Action:	**Assist local communities, neighborhoods, and municipalities with the development of local Community Wildfire Protection Plans.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Educate and engage public in implementing the most effect actions for risk reduction in Central Texas.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Decreases risk of existing structure loss.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$100,000
Potential Funding Sources:	Travis County, Grants.
Lead Agency/Department Responsible:	Emergency Services, Emergency Service Districts, TNR.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Community Wildfire Protection 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

		Travis County – Action #13
	Proposed Action:	**Distribute flyers to addresses in or near the floodplain to educate citizens on risk, flood insurance, and mitigation measures to reduce risk of flood.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County – targeting specific flood-prone areas.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk to residents and their property by encouraging the purchase of flood insurance, encouraging development to code, and promoting a general awareness of weather hazards/emergency planning.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Travis County, TNR.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available 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

		Travis County – Action #14
	Proposed Action:	**Presentations to neighborhood organizations. Targeted to specific risk areas, such as flood-prone neighborhoods or near low water crossings. Educate residents on natural hazard risks and mitigation measures to reduce risk.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Neighborhood or public meeting spaces. Coordination with scheduled annual meetings or events to ensure attendance.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk to residents and their property by encouraging the purchase of flood insurance, encouraging development to code, and promoting a general awareness of weather hazards/emergency planning resources.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Drought, Tornado, Thunderstorm Wind, Extreme Heat, Expansive Soils, Hail, Lightning, Winter Storm, Dam Failure.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000
Potential Funding Sources:	General Funds.
Lead Agency/Department Responsible:	Travis County, TNR.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available 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

		Travis County – Action #15
	Proposed Action:	**Post flyers in neighborhoods, public space, churches, gathering places, online neighborhood portals, etc., to educate residents on natural hazards and mitigation measures to reduce risk.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County – targeting areas of highest risk.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Reduce risk to residents and their property by encouraging the purchase of flood insurance, encouraging development to code, and promoting a general awareness of weather hazards/emergency planning resources.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$500
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Travis County, TNR.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Floodplain 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

		Travis County – Action #16
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Felder Lane, 0.10 miles east of FM 973.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,295,200
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water, and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #17
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Westlake Drive, 0.13 miles east of Woodcutters Way.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$382,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #18
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Ledgestone Terrace, 0.39 miles south of US 290.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,010,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #19
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Wild Basin Ledge, 0.05 miles southeast of Petticoat Lane.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$418,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #20
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Caldwell Lane at intersection with River Timber Drive.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$188,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #21
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Nameless Road, 0.5 miles north of Honeycomb Lane.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,300,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #22
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Wier Loop, 0.22 miles east of Thomas Springs Road.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$15,000 (2017 material costs).
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Project to be implemented by Road and Bridge Crews.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #23
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Springdale Road, 0.11 miles northeast of Ferguson Lane.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$8,095,700
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #24
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Juniper Trail, 0.06 miles north of Yaupon Trail.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,016,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #25
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Two locations on Wyldwood Road, 0.27 miles and 0.46 miles west of Brodie Lane. Located on Slaughter Creek and adjacent tributary.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$4,092,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #26
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Great Divide Road, 0.24 miles south of SH 71.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,150,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #27
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Fall Creek Road, 0.14 miles south of SH 71.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,168,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #28
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Two adjacent locations on Pedernales Canyon Trail between Canyon Ranch Train and Little Creek Trail.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,324,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #29
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Slaughter Creek Drive, 0.18 miles south of Meadowsouth Lane.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,914,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #30
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Tumbleweed Train, 0.07 miles east of Cuernavaca Drive.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$436,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #31
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Crystal Bend Drive, just east of Crooked Creek Drive.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,516,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #32
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cottonwood Drive, 0.07 miles west of Long Hollow Trail.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,186,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #33
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Springdale Road, 0.06 miles south of Vara Drive.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$726,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #34
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Gregg Lane, 0.79 miles west of FM 973.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,410,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #35
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Jesse Bohls Road, 0.63 miles east of Weiss Lane.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,539,300
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #36
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Lime Creek Road, 0.08 miles south of Fisher Hollow Trail.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,394,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #37
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Nameless Road, 0.83 miles north of Shady Mountain Road.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,016,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #38
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	D Morgan Road, 0.54 miles west of Rawhide Trail.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,544,500
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO Issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #39
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Bitting School Road, 1.22 miles north of Hog Eye Road.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,221,800
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #40
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Weir Loop Circle, 0.06 miles south of Rimstone Trail at the westernmost crossing of Devil's Pen Creek.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$592,100
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #41
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Tom Sassman Road, 0.07 miles north of Evelyn Road.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$4,356,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Projects are being considered for 2017 bond and future CO issuances.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #42
	Proposed Action:	**Identify and implement a feasible, cost-effective mitigation action for the low water crossing (identified below), as determined through engineering study.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Bee Creek Road, 0.11 miles south of Ridgepole Lane.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Safer access during flood events. Reduce damages to infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,374,307
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Project was funded, but was shelved due to neighborhood objections.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #43
	Proposed Action:	**Provide additional means of ingress and egress into single-entry neighborhoods and gated communities for use during emergencies and wildfire events.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of loss of life and property.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$500,000 per neighborhood.
Potential Funding Sources:	Travis County, Grants.
Lead Agency/Department Responsible:	TNR
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Community Wildfire Protection 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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #44
	Proposed Action:	**Implement drainage improvements at Arroyo Doble Subdivision and Twin Creeks Park Subdivision to reduce flood damages to structures and infrastructure.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Area generally located south of FM 1626, west of Onion Creek and east of the Union Pacific Railroad.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk to residents and provide safer access during flood events. Reduce damages to structures and infrastructure and reduce emergency response.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to structures and infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,100,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	Engineering
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Basin Study 2009; Land, Water and Transportation Plan.

COMMENTS
Design portion has been funded and is to be completed with 2017 CO by May 2018.
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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Travis County – Action #45
	Proposed Action:	**Due to the data deficiency identified as part of the Dam Failure Risk Assessment, work with LCRA, TCEQ, and private Dam owners (where possible) to encourage the development of inundation maps for all high hazard Dams within the planning area. When and if available, this data will be used for the next plan update to complete a more thorough risk assessment, to include extent and impact of potential dam failures.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk through improved risk assessment and informed decision making.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on New/Existing Buildings:	Reduce risk to existing and future structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,000
Potential Funding Sources:	Staff time only, as the development of inundation maps is the responsibility of the LCRA, TCEQ, and/or private Dam owners.
Lead Agency/Department Responsible:	Floodplain Administrator.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	EAPs

COMMENTS
Expanded TNR GIS staffing is expected to help with this.
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

		Travis County – Action #46
	Proposed Action:	**Development of a Wildland Fire Task Force.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX and neighboring counties.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk to residents and property.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Staff Time.
Potential Funding Sources:	Staff Time.
Lead Agency/Department Responsible:	TNR
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Community Wildfire Protection Plan.

COMMENTS
The Austin Travis County Wildfire Coalition was established to address wildfire risks on a coordinated, regional basis by the key agencies with a role in wildfire preparedness, response, mitigation, and recovery. This is an ongoing committee.
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

		Travis County – Action #47
	Proposed Action:	**Complete fuel reduction projects in the Balcones Canyon preserve. This will include cleaning lower limbs, dead wood, ladder fuels, and preserving tight canopy to reduce grass growth. Also included will be outreach to property owners in the interface to highlight the importance of and recommendations for defensible space initiatives.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Balcones Canyon Preserve.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of wildfire through fuels reduction.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Natural Systems Protection.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	TNR
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Community Wildfire Protection Plan.

COMMENTS
Fuels reduction treatments are initiated and are conducted annually from September 1 through February 28. Follow-up treatments are needed every 5-6 years. There is political support for the project. The project is funded via FEMA grants and County funds. Fuel mitigation funds will be requested annually in the TC TNR Natural Resources Program budget. New treatment project funds may be requested through FEMA grants, if available.
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 = 4

		Travis County – Action #48
	Proposed Action:	**Complete fuel reduction projects in other vulnerable, high risk areas of the County. This will include clearing lower limbs, dead wood, ladder fuels, and preserving tight canopy to reduce grass growth. Also included will be outreach to property owners in the interface to highlight the importance of and recommendations for defensible space initiatives.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX – WUI.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of wildfire through fuels reduction.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Natural Systems Protection.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000,000
Potential Funding Sources:	General Fund, State funds, FEMA Grants.
Lead Agency/Department Responsible:	TNR
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Community Wildfire Protection 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 = 4

		Travis County – Action #49
	Proposed Action:	**Conduct public education program on best practices for creating defensible space and fire-adapted landscapes.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of wildfire, create resilient landscapes, and reduce loss of life and property.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce wildfire risk to structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,000
Potential Funding Sources:	General Funds, Grants.
Lead Agency/Department Responsible:	Emergency Services, TNR, Austin Travis County Wildfire Coalition.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Community Wildfire Protection 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

		Travis County – Action #50
	Proposed Action:	**Conduct public education program to advise public about evacuation routes, shelter-in-place locations for use during wildfire events, wildfire risks, and best wildland fire mitigation techniques for Central Texas.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Travis County, TX
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of loss of life and property.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,000
Potential Funding Sources:	General Fund, Grants.
Lead Agency/Department Responsible:	Emergency Services, Austin Travis County Wildfire Coalition, TNR.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Community Wildfire Protection 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 = 4; Economically Sound = 4; and Environmentally Sound = 4

TRAVIS COUNTY – COUNTY-WIDE ACTIONS

		Travis County (County-Wide) – Action #1
	Proposed Action:	**Purchase and install generators and hardwire quick generator connections at critical facilities throughout the planning area.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Critical facilities throughout the planning area.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Provide power for critical facilities during power outages and ensure continuity of services.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Tornado, Thunderstorm Wind, Extreme Heat, Hail, Lightning, Winter Storm, Dam Failure.
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000 per site.
Potential Funding Sources:	Operating budgets, local funding, PDM, HMGP grants.
Lead Agency/Department Responsible:	Local and County Administration / Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available 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

		Travis County (County-Wide) – Action #2
	Proposed Action:	**Adopt and implement land use restrictions and/or building code requirements in high risk areas to mitigate the risk of land subsidence, dam failure, and flood.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide (all participating jurisdictions).
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce damages to future structures through improved construction techniques and land use restrictions.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Dam Failure, Expansive Soils.
Effect on New/Existing Buildings:	Reduce risk to new structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,500
Potential Funding Sources:	Operating budgets, local funding.
Lead Agency/Department Responsible:	Local and County Administration.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Local 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 = 4; Administratively Possible = 4; Politically Acceptable = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 5

		Travis County (County-Wide) – Action #3
	Proposed Action:	**Install covered parking facilities for critical City/County vehicles.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide (all participating jurisdictions).
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce damages to critical emergency vehicles and equipment and ensure continuity of services.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Extreme Heat, Winter Storm.
Effect on New/Existing Buildings:	Reduce risk to new structures.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$25,000
Potential Funding Sources:	Operating budgets, local funding, HMGP Grants.
Lead Agency/Department Responsible:	Local and County Administration / Public Works.
Implementation Schedule:	Within 36-48 months of plan adoption, pending available 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 = 4; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		Travis County (County-Wide) – Action #4
	Proposed Action:	**Require drought tolerant landscaping at all new public buildings.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide (all participating jurisdictions).
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce need for water at public building during times of drought.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	Reduce risk to new structures.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,000
Potential Funding Sources:	Operating budgets, local funding.
Lead Agency/Department Responsible:	Local and County Administration.
Implementation Schedule:	Within 36-48 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Local 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 = 4; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		Travis County (County-Wide) – Action #5
	Proposed Action:	**Increase public awareness of all hazards and hazardous areas. Distribute public awareness information regarding natural hazards, including SFHAs, along with potential mitigation measures that can reduce risk of damages and injuries. Utilize resources such as the local newspapers, utility bill inserts, and websites.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide (all participating jurisdictions).
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk through education and awareness.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$2,000
Potential Funding Sources:	Operating budgets, local funding.
Lead Agency/Department Responsible:	Local and County Administration.
Implementation Schedule:	Within 36-48 months of plan adoption, pending available 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

CITY OF LAKEWAY

		Lakeway – Action #1
	Proposed Action:	**Review the Lakeway Emergency Operations Plan and continue to establish an Emergency Operations Center.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide; Region-wide.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	The Lakeway Office of Emergency Management has been working with each individual having responsibility in its Emergency Operations plan in order to update the plan to current standards. This is time-consuming due to the number of disciplines involved and detail required, but will provide the city with an emergency plan acceptable to the DEM and FEMA. The new plan format is easier to use and provides greater clarification of assigned responsibilities.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Drought, Tornado, Thunderstorm Wind, Extreme Heat, Expansive Soils, Hail, Lightning, Winter Storm, Dam Failure.
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,500
Potential Funding Sources:	General Revenue.
Lead Agency/Department Responsible:	City of Lakeway / Police Department.
Implementation Schedule:	Within 12 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Emergency Management Plan.

COMMENTS
The Lakeway Police Department and the City of Lakeway have recently revised the Emergency Operations Plan and begun a collaborative effort with nearby jurisdictions to establish an Emergency Operations Center. The collaboration efforts are helping to facilitate an effective response for incidents that may exceed our capability to respond, and require mutual aid from neighboring services.

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 = 3; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		Lakeway – Action #2
	Proposed Action:	**Acquisition and relocation of Police Department. Retrofit/harden new location with wind and fire resistant materials, sprinkler system, surge protectors, and drought tolerant landscaping. Acquire and install generator with permanent hard wire quick connections to ensure continuity of emergency services.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City of Lakeway
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	The current Police Department is located adjacent to a stream that had been subject to high water on numerous occasions. The Department has been subjected to water infiltration due to inadequate drainage of storm water.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Drought, Tornado, Thunderstorm Wind, Extreme Heat, Expansive Soils, Hail, Lightning, Winter Storm, Dam Failure.
Effect on New/Existing Buildings:	Reduce risk to new structure.
Priority (High, Moderate, Low):	High
Estimated Cost:	$23,000,000
Potential Funding Sources:	Bond Election.
Lead Agency/Department Responsible:	City of Lakeway.
Implementation Schedule:	Within 12-24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	City Master Plan.

COMMENTS
Move Police Department to new location at a higher elevation, accessible by personnel without crossing low water areas. Locate critical operations (Dispatch/911) on upper floors and install hardened area for

employee shelter. Improve new structure with multi-hazard mitigation construction techniques. Demolish old structure and deed restrict land from future use.
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 = 3; Legal = 5; Economically Sound = 4; and Environmentally Sound = 4

		Lakeway – Action #3
	Proposed Action:	**Conduct joint Skywarn training with emergency services (police, fire, EMS) / City staff / LTISD / bus drivers. Skywarn training is conducted as part of our citizens Police Academy and is open to the public. City will expand training to include additional citizens and incorporate mitigation measures to reduce risk of damages and injuries.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Host training within community (open to the public).
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	In order to protect citizens, the city continues to update its emergency plans, including training with Skywarn for emergency services to protect against both natural and manmade hazards.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Tornado, Hail, Winter Storm, Thunderstorm Wind, Dam Failure, Extreme Heat, Lightning.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$200
Potential Funding Sources:	General Revenue.
Lead Agency/Department Responsible:	Police / EMA.
Implementation Schedule:	Annual
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

		Lakeway – Action #4
	Proposed Action:	**Develop a mass debris removal plan.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	The City has never had a devastating storm causing damage to city-wide private property, resulting in very large quantities of materials (couches, carpets, appliances, rotting food, building materials such as sheetrock, etc.) ending up curbside. As a result, the City has no plans for managing debris removal in the event of a disaster.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Wind, Flood, Wildfire, Hail, Dam Failure.
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$500
Potential Funding Sources:	General Revenue.
Lead Agency/Department Responsible:	Lakeway PD&CE and Public Works.
Implementation Schedule:	Within 24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	City Policy / SOPs for respective City Departments; Emergency Management Plan.

COMMENTS
The City has been able to respond to localized damage following severe weather events that were managed effectively; however, a city-wide event that effected a sizable amount of the population would require additional resources and coordination.
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 = 3; Administratively Possible = 3; Politically Acceptable = 5; Legal = 5; Economically Sound = 4; and Environmentally Sound = 3

		Lakeway – Action #5
	Proposed Action:	**Implement fuels reduction / brush management program to reduce wildfire risk and assist with wildfire control.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City of Lakeway.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Brush fires are common in Texas especially during the hot and dry summer months. Under-brush and dead vegetation represent a significant fuel source for fires.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Natural Systems Protection.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$100,000
Potential Funding Sources:	General Revenue, Grants.
Lead Agency/Department Responsible:	City of Lakeway / Public Works / Parks Department.
Implementation Schedule:	Within 24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	City of Lakeway Development Plan.

COMMENTS
With the central Texas area being under extreme drought conditions, it is necessary to monitor and clear out any underbrush and/or high grass near trails, streets, houses or businesses. The City is expecting to remain a designated Fire Wise Community.
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 = 4

		Lakeway – Action #6
	Proposed Action:	**Utilize Social Media to provide educational materials to residents on all natural hazard risks and mitigation measures to protect property and lives.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	An effective advance education program has been proven to aid in the preservation of life and property during emergency events.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Drought, Tornado, Thunderstorm Wind, Extreme Heat, Expansive Soils, Hail, Lightning, Winter Storm, Dam Failure.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,000
Potential Funding Sources:	General Revenue.
Lead Agency/Department Responsible:	City of Lakeway / Police.
Implementation Schedule:	Within 24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Policies and SOPs.

COMMENTS
As society and technology changes, so does the way the public receives their information. The City and Police Department are working to promote its social media accounts in order to be available to communicate real time information to the community.
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 = 4; Legal = 4; Economically Sound = 5; and Environmentally Sound = 5

CITY OF MANOR

		Manor – Action #1
	Proposed Action:	**Acquire and install All Hazards warning sirens.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Protect public safety during all hazards by providing an early warning system.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm.
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$40,000 - $60,000.
Potential Funding Sources:	General Fund, Grants, USDA.
Lead Agency/Department Responsible:	City Manager / Public Works.
Implementation Schedule:	Within 24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	City Policy.

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 = 4; and Environmentally Sound = 4

		Manor – Action #2
	Proposed Action:	**Purchase, distribute, and promote the use of NOAA's all hazard radios. Incorporate with Citizens Police Academy training give away.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Provides information pre- and post-disaster to prevent the loss of life or property damage.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm.
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000 - $10,000.
Potential Funding Sources:	General Fund, HMA Grants, Donations.
Lead Agency/Department Responsible:	Police Department.
Implementation Schedule:	Within 24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	City Emergency 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 = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		Manor – Action #3
	Proposed Action:	**Implement plan to clean up and improve the alley ways located in the downtown Manor area. Implement drainage improvements in the downtown area to improve drainage and reduce damages.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Old town Manor area.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Removal of debris and drainage improvements in the downtown alley ways will allow for greater drainage to prevent flooding, and allow greater access for emergency services.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$100,000
Potential Funding Sources:	General Fund, HMA Grants, USDA.
Lead Agency/Department Responsible:	City Manager / Public Works.
Implementation Schedule:	Within 24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	City Development, 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 = 4; Economically Sound = 4; and Environmentally Sound = 4

		Manor – Action #4
	Proposed Action:	**Adopt and implement plan to clean up and remove debris from ditches, drains, and culverts to maintain capacity.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduces the potential for flooding, and property damage from back water flooding.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations, Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce impact to existing structures and infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000
Potential Funding Sources:	General Fund, Grants, USDA.
Lead Agency/Department Responsible:	City Manager / Public Works.
Implementation Schedule:	Within 24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	City 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 = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 4; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		Manor – Action #5
	Proposed Action:	**Develop / Update drought contingency plan. Adopt and implement water restrictions identified in the plan.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Maintain safe water levels and prevent waste.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	City Manager / Planning / Public Works.
Implementation Schedule:	Within 24 months of plan adoption.
Incorporation into Existing Plans:	City 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 = 3; Technically Feasible = 4; Administratively Possible = 5; Politically Acceptable = 4; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		Manor – Action #6
	Proposed Action:	**Public Awareness and education campaign to educate the public on expansive soil and methods and actions that can be taken to protect existing structures.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Protect existing structures from expansive soil damage.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$500
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	City Manager.
Implementation Schedule:	Within 24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	City Emergency 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

		Manor – Action #7
	Proposed Action:	**Develop and implement code requirements for foundations to protect against damage caused by expansive soils.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Protect or minimize the damage done to new construction from expansive soils.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils.
Effect on New/Existing Buildings:	Reduce risk to future structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$500
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	City Manager.
Implementation Schedule:	Within 24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	City 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 = 4; Administratively Possible = 5; Politically Acceptable = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		Manor – Action #8
	Proposed Action:	**Develop and initiate extreme summer heat public awareness campaign and fan drive/giveaway. Implement fan drive to collect donations and distribute fans to vulnerable populations.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Prevent loss of life through education and awareness, and distribution of fans to vulnerable populations.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System 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):	Moderate
Estimated Cost:	$5,000 - $10,000.
Potential Funding Sources:	General Fund, Grants, Donations.
Lead Agency/Department Responsible:	City Manager / Police Department.
Implementation Schedule:	Within 24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	City Emergency 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

CITY OF PFLUGERVILLE

		Pflugerville – Action #1
	Proposed Action:	**Construct shelters and safe refuge locations for public evacuation triggered by disasters such as wildfire, dam failure, winter storms, and extreme heat.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Location in City to be determined.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Minimize disruption to vulnerable populations reducing unnecessary need for medical attention or death.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm, Extreme Heat, Wildfires, Dam Failure, Tornado, Flood.
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	General Fund, Grants.
Lead Agency/Department Responsible:	Police Department.
Implementation Schedule:	Within 12-24 months of plan adoption, pending available 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 = 4; and Environmentally Sound = 4

		Pflugerville – Action #2
	Proposed Action:	**Study, adopt, and implement a drainage utility plan to fund/implement regular maintenance and operations for drainage improvements.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk to residents.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing and future structures and infrastructure.
Priority (High, Moderate, Low):	High
Estimated Cost:	$250,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	City Engineer.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drainage Master 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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Pflugerville – Action #3
	Proposed Action:	**Identify locations and construct tornado safe room community shelters. Install tornado safe rooms in new public facilities or designated shelters.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Mitigates specific risks to structures, people, and operations.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$150,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	City Manager's Office.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Include in Facility Master Plan Scope of Work.

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 = 4

		Pflugerville – Action #4
	Proposed Action:	**Incorporate specific actions from the Hazard Mitigation Plan that are designed to reduce flooding into the City's Comprehensive Plan. Actions should be related to protecting existing and future development from increased flooding potential and erosion, and incorporate into the City of Pflugerville Unified Development Code.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Prevents future losses and reduces risk.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$500
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Development Services Departments.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available 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 = 5; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		Pflugerville – Action #5
	Proposed Action:	**Implement an education and awareness program to further promote the purchase of flood insurance. Advertise the availability of costs, and coverage of flood insurance through the National Flood Insurance Program (NFIP).**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce uninsured property losses.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	CRS / Floodplain Administrator.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding (then annually).
Incorporation into Existing Plans:	Community Rating System documents; City Communication Plan.

COMMENTS
In Spring 2010, a brochure titled "Living in the Floodplain" was distributed to all residents within 100 feet of a floodplain. This is an annual action to fulfill Community Rating System (CRS) requirements.
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

		Pflugerville – Action #6
	Proposed Action:	**Increase public awareness of hazards and hazardous areas. Distribute public awareness information regarding natural hazards, including SFHAs, along with potential mitigation measures that can reduce risk. Utilize resources such as the local newspaper, utility bill inserts, inserts in the phone book, a City hazard awareness website, and an education program for school age children; provide "how to" classes in retrofitting by local merchants, integrate "Disaster Resistance Education" into the public school curriculum, and/or provide public education on the importance of maintaining ditches.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Raise awareness, incite proactive actions by our residents to reduce losses.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$15,000
Potential Funding Sources:	General Fund, Grants.
Lead Agency/Department Responsible:	Public Information Office.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding (then annually).
Incorporation into Existing Plans:	Communications 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

		Pflugerville – Action #7
	Proposed Action:	**NFIP Community Rating System (CRS): Evaluate and implement activities to improve rating with the CRS, such as adopting higher floodplain standards.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide, but generally in proximity to flood prone areas
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of future losses related to flooding.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce the number of existing and future buildings that are susceptible to flooding.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	TBD
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Building Department.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding (then annually).
Incorporation into Existing Plans:	Comprehensive Plan, CRS Materials.

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

		Pflugerville – Action #8
	Proposed Action:	**Sponsor a "Multi-Hazard Awareness Week" to educate the public on hazards including hurricanes, tornadoes (sheltering in place, evacuation, emergency preparedness, and structural retrofitting), flooding (evacuation, emergency preparedness, retrofitting, and flood insurance), thunderstorms and lightning (emergency preparedness) and hailstorms.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Reduce risk to life and property in the community.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000
Potential Funding Sources:	City Budget, Grants.
Lead Agency/Department Responsible:	Public Information Office.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding (then annually).
Incorporation into Existing Plans:	Communications Plan.

COMMENTS
Incorporate seasonally each year.
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

		Pflugerville – Action #9
	Proposed Action:	**Ensure adequate plans, procedures, and capabilities to prevent and respond to dam failure.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Lake Pflugerville
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Properly maintaining the dam minimizes the potential for losses of life and property should Lake Pflugerville dam fail.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Dam Failure.
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	TBD
Potential Funding Sources:	City Utility Fund.
Lead Agency/Department Responsible:	City Engineer.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Dam Safety Master 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 = 4; Economically Sound = 5; and Environmentally Sound = 5

		Pflugerville – Action #10
	Proposed Action:	**Planning for and maintaining adequate road and debris clearing capabilities.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce vehicular accidents, as well as resulting injuries or deaths.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm, Tornado, Thunderstorm Wind.
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	City of Pflugerville.
Implementation Schedule:	Within 12-24 months of plan adoption, pending available funding (then annually).
Incorporation into Existing Plans:	Maintenance and Operations 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

		Pflugerville – Action #11
	Proposed Action:	**Adopt ordinance to restrict water and energy consumption at public facilities.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide public facilities.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Improved resiliency of publicly owned buildings.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat.
Effect on New/Existing Buildings:	Increased efficiency to existing and future buildings.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$150,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	City Manager's Office.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Facilities Master 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 = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		Pflugerville – Action #12
	Proposed Action:	**Develop and implement a plan for installing network of lightning detection equipment systems and lightning rods at existing and future city park facilities.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide park facilities.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of injury or death.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations, Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$150,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Parks and Recreation.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Incorporate into Parks Master Plan Update.

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

		Pflugerville – Action #13
	Proposed Action:	**Study, adopt, and implement a Drainage Master Plan and FIRM study of Wilbarger Creek watershed.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide – Wilbarger Creek watershed.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk to residents.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	Reduce risk to existing and future structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$250,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	City Engineer.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available 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 = 5; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		Pflugerville – Action #14
	Proposed Action:	**Evaluate, adopt, and implement National Fire Protection Association (NFPA) codes and standards as well as Austin / Travis County Community Wildfire Protection Plan to minimize and manage the wildfire threat as appropriate.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide – Pflugerville ETJ.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk to residents and property.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Travis County ESD No. 2.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available 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 = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		Pflugerville – Action #15
	Proposed Action:	**Acquire, implement, and maintain equipment, apparatus and personnel trained in support of Stillwater and swiftwater capabilities. This would address life and property.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide – Pflugerville ETJ.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce loss of lives during water rescue incidents.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations - Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Floods
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$43,090 annually
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Travis County ESD No. 2.
Implementation Schedule:	Within 24-36 months of plan adoption.
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 = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		Pflugerville – Action #16
	Proposed Action:	**Acquire, implement, and maintain equipment, apparatus and personnel trained in support of wildland firefighting capabilities. This would address life and property.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide – Pflugerville ETJ.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce the severity and amount of property loss due to wild land fires.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations - Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfires
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$53,200 annually
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Travis County ESD No. 2.
Implementation Schedule:	Within 24-36 months of plan adoption.
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 = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		Pflugerville – Action #17
	Proposed Action:	**Complete a detailed structural/engineering survey of City facilities to ensure their soundness with respect to resisting the effects of Thunderstorm wind, Tornado, and Hail. With information from the survey, implement mitigation activities to harden facilities, reduce damages, and ensure continuity of services. Mitigation actions can include items such as hail resistant construction materials, storm shutters, shatter proof glass, and/or roof straps.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Mitigates specific risks to structures, people, and operations.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Wind, Hail.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$150,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	City Manager's Office.
Implementation Schedule:	Within 36-48 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Include in Facility Master Plan Scope of Work.

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

		Pflugerville – Action #18
	Proposed Action:	**Utilize news outlets and social media for distributing updated information about winter storms, including mitigation measures to reduce damages and health and safety tips.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce damages to life and property.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$5,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Public Information Office.
Implementation Schedule:	Within 36-48 months of plan adoption, pending available funding (then annually).
Incorporation into Existing Plans:	Communications 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

		Pflugerville – Action #19
	Proposed Action:	**Coordinate with the State to monitor and conserve existing water supplies in the County. Adopt and implement mandatory water conservation measures during extreme droughts.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce water waste and maintain sufficient water pressure and flow.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$5,000
Potential Funding Sources:	Utility Funds.
Lead Agency/Department Responsible:	Public Works, Utilities Department.
Implementation Schedule:	Within 36-48 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Comprehensive Plan, Drought Conservation 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 = 3; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

CITY OF SUNSET VALLEY

		Sunset Valley – Action #1
	Proposed Action:	**Pursue funding and implement land and easement acquisition for the purpose of reducing flood risk.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Designated Special Flood Hazard Area (100 year Floodplain).
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Loss of property in flood prone area.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	High
Estimated Cost:	$300,000
Potential Funding Sources:	City General Fund.
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 12 months of plan adoption, pending available 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 = 3; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Sunset Valley – Action #2
	Proposed Action:	**Implement a natural waterway maintenance program. This program includes debris removal from the waterways, non-native plant removal, and the removal of fallen trees that are in excess of a 45 degree angle within the creek. Under the direction of the City Environmental Manager some trimming and or removal of native vegetation may also be performed.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Williamson Creek Cougar Creek (Sunset Valley Tributary) Kicheon Branch
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Improved natural creek function and flow to reduce flood risk.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project, Natural System Protection.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing and future structures.
Priority (High, Moderate, Low):	High
Estimated Cost:	$30,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Department of Public Works.
Implementation Schedule:	Within 12-24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Floodplain 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 = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Sunset Valley – Action #3
	Proposed Action:	**Lot to lot drainage. City will provide technical support to identify solutions to drainage problems affecting two or more properties, and perform minor grading work in easements, as needed to reduce flood risk.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	As identified – City-wide.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Reduce loss of property to existing structures and infrastructure.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure.
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	Local Budgets, HMA Grants.
Lead Agency/Department Responsible:	Department of Public Works.
Implementation Schedule:	Within 12-24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	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 = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Sunset Valley – Action #4
	Proposed Action:	**Implement education program to promote the purchase of flood insurance. Advertise the availability of costs, and coverage of flood insurance through the National Flood Insurance Program (NFIP). Encourage the 70 households located within the low water crossing inundation area identified to purchase flood insurance.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Households within the identified inundation area.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Public education of knowing risks of flood and understanding of flood loss coverage.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets, Staff Time.
Lead Agency/Department Responsible:	City Administration.
Implementation Schedule:	Within 12 months of plan adoption, pending available 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

		Sunset Valley – Action #5
	Proposed Action:	**Implement education program to increase public awareness of hazards and hazardous areas. Distribute public awareness information regarding natural hazards, including SFHAs, and potential mitigation measures to reduce risk. Distribute information through local newspaper, utility bill inserts, inserts in the phone book, a City hazard awareness website, and an education program for school age children.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide, including Sunset Valley Elementary.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of loss of life, property or limb having public understanding their risk and information to prepare for disasters.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000
Potential Funding Sources:	Local Budgets, Staff Time.
Lead Agency/Department Responsible:	City Administration.
Implementation Schedule:	Within 12 months of plan adoption, pending available 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

		Sunset Valley – Action #6
	Proposed Action:	**Adopt and implement program to insulate outdoor pipes at public buildings annually and prior to winter storm events.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City facilities
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of loss of critical public infrastructure.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000 (Staff Time).
Potential Funding Sources:	Local Budgets, Staff Time.
Lead Agency/Department Responsible:	Department of Public Works.
Implementation Schedule:	Within 12-24 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	SOP

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 = 4; and Environmentally Sound = 5

		Sunset Valley – Action #7
	Proposed Action:	**Identify properties for possible participation in voluntary acquisition and demolition. Pursue funding and implement acquisition and demolition of flood prone structures.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Designated SFHA and/or repetitive loss properties.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Loss of property in flood prone area.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Department of Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Land Use 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 = 3; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 5

		Sunset Valley – Action #8
	Proposed Action:	**Implement routine maintenance of ditch lines, storm water inlets, storm water lift stations, as well as make standard preparations for storms and subsequent clean up.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Preparedness.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$20,000
Potential Funding Sources:	Local Budgets, Grants.
Lead Agency/Department Responsible:	Department of Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	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 = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Sunset Valley – Action #9
	Proposed Action:	**Upgrade culvert on Westgate Bridge at Sunset Valley tributary to increase capacity and reduce damages. Project requires joint participation with the City of Austin.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Westgate Bridge at Sunset Valley Tributary.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce loss of property due to backflow of storm waters at this point.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,000,000
Potential Funding Sources:	Local Budgets, Grants.
Lead Agency/Department Responsible:	Department of Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	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 = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Sunset Valley – Action #10
	Proposed Action:	**Implement channel realignment between Lone Oak Trail and Reese Road. Realign the tributary beginning east of Lone Oak Trail and reconnect to the existing channel west of Reese Road. The channel would be approximately 820 feet long. The proposed culvert crossing at Pillow Road would consist of three 10-foot by 3-foot box culverts.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Sunset Valley Tributary.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce loss of property/structural damages on flood prone properties.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce flood risk on existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$686,750
Potential Funding Sources:	Local Budgets, Grants.
Lead Agency/Department Responsible:	Department of Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	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 = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Sunset Valley – Action #11
	Proposed Action:	**Implement culvert improvements, storm sewer system, and roadside ditch improvements along Sunset Trail, Lone Oak Drive, Yellow Tail Cove, and Pillow Road.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Along Sunset Trail, Lone Oak Drive, Yellow Tail Cove, and Pillow Road.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Reduce risk to existing structures and infrastructure through flood reduction and increased capacity.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$750,000
Potential Funding Sources:	Local Budgets, HMA Grants.
Lead Agency/Department Responsible:	Department of Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	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 = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		Sunset Valley – Action #12
	Proposed Action:	**Pursue grant funding from FEMA's Hazard Mitigation Grant Program (HMGP) and Flood Mitigation Assistance (FMA) program to implement acquisition and elevation program for flood prone properties within the City.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Designated SFHA.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce loss of property and risk from flooding in flood prone area. Continuity of home ownership in City.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,000,000
Potential Funding Sources:	HMGP, FMA.
Lead Agency/Department Responsible:	City Administration.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available 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 = 3; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 5

		Sunset Valley – Action #13
	Proposed Action:	**Develop and implement a Flood Event Warning System to monitor rainfall in key areas upstream of the City and alert citizens to potential flooding.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of loss of life and property.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000
Potential Funding Sources:	HMGP, FMA, Local Budgets.
Lead Agency/Department Responsible:	Department of Public Works, Police Department.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available 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 = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		Sunset Valley – Action #14
	Proposed Action:	**Continue to monitor drought conditions through contact with State agencies.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk through enhanced risk assessment.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,000
Potential Funding Sources:	Local Budgets, Staff Time.
Lead Agency/Department Responsible:	Department of Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drought and Water Conservation 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 = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		Sunset Valley – Action #15
	Proposed Action:	**Implement public information/education campaigns on water conservation during times of drought. Adopt water use restrictions to ensure sufficient water pressure for fire-fighting and provision of drinking water during droughts.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce impact of drought through water restrictions and education.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations, Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,000
Potential Funding Sources:	Local Budgets, Staff Time.
Lead Agency/Department Responsible:	Department of Public Works.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Drought and Conservation 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 = 3; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		Sunset Valley – Action #16
	Proposed Action:	**Implement activities to improve Community Rating System (CRS) rating such as adopting higher floodplain standards.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of loss of property through higher development standards for new and significant loss construction.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Low
Priority (High, Moderate, Low):	Reduce risk to existing structures.
Estimated Cost:	$2,500
Potential Funding Sources:	Local Budgets, Staff Time.
Lead Agency/Department Responsible:	City Administration.
Implementation Schedule:	Within 48 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	CRS Program.

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

		Sunset Valley – Action #17
	Proposed Action:	**Complete a detailed structural/engineering survey of City facilities to ensure through soundness with respect to resisting the effects of high winds and hail. Initiate/ implement upgrades to at-risk City structures and/or infrastructure (harden facilities). Mitigate specific risks to structures, people, and operations to reduce risk of damages and ensure continuity of services.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide critical facilities.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk to facilities and citizens through building protection and ensuring continuity of services.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Wind, Hail, Lightning.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$500,000
Potential Funding Sources:	Local Budgets, HMGP, FEMA.
Lead Agency/Department Responsible:	Department of Public Works.
Implementation Schedule:	Within 48 months of plan adoption, pending available 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 = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		Sunset Valley – Action #18
	Proposed Action:	**Develop and implement a public information campaign to inform citizens about the potential for wildland-urban interface fires and mitigation measures to reduce risk.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Reduce risk of loss of life and property during wildfire event.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$10,000
Potential Funding Sources:	Local Budgets, Grants.
Lead Agency/Department Responsible:	City Administration.
Implementation Schedule:	Within 48 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Community Wildfire Protection 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

		Sunset Valley – Action #19
	Proposed Action:	**Provide tree pruning education classes to reduce damages and power outages caused by falling limbs and debris.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Course to be offered in the City – Available to all residents.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of loss to property and potential power outages.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Wildfire, Winter Storm, Tornado, Hail, Lightning, Flood, Dam Failure.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,000
Potential Funding Sources:	General Fund.
Lead Agency/Department Responsible:	Public Works.
Implementation Schedule:	Within 48 months of plan adoption, pending available 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 = 5; Administratively Possible = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

VILLAGE OF THE HILLS

The Hills – Action #1	
Proposed Action:	**Expand and implement drainage maintenance program to include regular mowing/brush clearing within drainage easements and removal of debris and sediment from roadside culverts and roadside ditches.**
BACKGROUND INFORMATION	
Jurisdiction/Location:	Village easements, common area and parkland.
Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of flooding by maintaining drainage capacity.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing and future structures and infrastructure.
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000
Potential Funding Sources:	Annual budget.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 12 months of plan adoption.
Incorporation into Existing Plans:	Standard Operating Procedures.

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 = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 4

		The Hills – Action #2
	Proposed Action:	**Identify residential and non-residential structures at risk from wildfire. Expand wildfire vegetation maintenance program to trim back and remove vegetation near high risk structures.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce wildfire risk to existing structures.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Natural Systems Protection.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure.
Priority (High, Moderate, Low):	High
Estimated Cost:	$250,000
Potential Funding Sources:	Local Budgets, Staff Time, FEMA Grants.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 12 months of plan adoption.
Incorporation into Existing Plans:	Community Wildfire Protection 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 = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 4

		The Hills – Action #3
	Proposed Action:	**Coordinate with the State to monitor and conserve existing water supplies in the County. Adopt and implement mandatory water conservation measures to ensure sufficient water pressure for fire-fighting and provision of drinking water during droughts.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce impacts of drought through conservation regulations.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,500
Potential Funding Sources:	Local Budget, Staff Time.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 12-24 months of plan adoption.
Incorporation into Existing Plans:	Local 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 = 3; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5

		The Hills – Action #4
	Proposed Action:	**Pursue funding and implement acquisition and elevation program for flood prone properties within the Village. Prioritize repetitive loss properties. Pursue grant funding from FEMA's Hazard Mitigation Grant Program (HMGP) and Flood Mitigation Assistance (FMA) program to receive assistance for mitigating (acquisition, elevation, etc.) flood prone properties within the City.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village-wide flood prone properties.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce or eliminate repetitive flood damages to high risk properties.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000,000
Potential Funding Sources:	HMGP, FMA.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 24-36 months of plan adoption, pending funding.
Incorporation into Existing Plans:	Land Use 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 = 4; Economically Sound = 4; and Environmentally Sound = 5

		The Hills – Action #5
	Proposed Action:	**Sponsor a "Multi-Hazard Awareness Week" to educate the public on all natural hazards (sheltering in place, evacuation, emergency preparedness, health and safety tips and structural retrofitting, flood insurance, etc.). This activity may be carried out in collaboration with the County or other surrounding jurisdictions.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of injury and damages through education and awareness.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,000
Potential Funding Sources:	General Funds, HMA Grants.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Annual Budget.

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

		The Hills – Action #6
	Proposed Action:	**Increase public awareness of hazards and hazardous areas. Distribute public awareness information regarding natural hazards, including SFHAs, along with potential mitigation measures that can reduce risk. Educate residents on tools associated with Smart Meters, encourage monitoring of water use through technology, and notify residents of suspected water leaks. Utilize resources such as the local newspaper, utility bill inserts, and a Village hazard awareness website.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of injury and damages through education and awareness.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000
Potential Funding Sources:	General Fund, HMA Grants.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 24-36 months of plan adoption, pending available funding.
Incorporation into Existing Plans:	Annual Budget.

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

		The Hills – Action #7
	Proposed Action:	**Develop alternative evacuation routes/plans and designate emergency thoroughfares, particularly in areas with limited capacity. Educate citizens on evacuation routes and procedures.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk to citizens through improved evacuation and education.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness).

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Wildfire.
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,500
Potential Funding Sources:	Local Budgets, Staff Time.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 24-36 months of plan adoption.
Incorporation into Existing Plans:	Evacuation 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

		The Hills – Action #8
	Proposed Action:	**Work with local news outlets to disseminate information about natural hazards, including health and safety tips and mitigation measures to reduce risk.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of injury and damages through education and awareness.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm.
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budgets, Staff Time.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 24-36 months of plan adoption.
Incorporation into Existing Plans:	Annual Budget.

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

		The Hills – Action #9
	Proposed Action:	**Develop and implement a public information campaign to inform citizens about the potential for wildland-urban interface fires and mitigation measures that reduce risk.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk to citizens and property through education and awareness.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000
Potential Funding Sources:	Local Budgets, Grants.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 24 months of plan adoption.
Incorporation into Existing Plans:	Community Wildfire Protection 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

		The Hills – Action #10
	Proposed Action:	**Implement education and awareness program to promote the purchase of flood insurance. Advertise the coverage, availability, and costs of flood insurance through the National Flood Insurance Program (NFIP) on the village website.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk through increased insurance coverage and risk awareness.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$500
Potential Funding Sources:	Staff Time.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 36-48 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

		The Hills – Action #11
	Proposed Action:	**Increase tree planting around buildings to shade parking lots and along public rights-of-way.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village facilities
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce effect of extreme heat on citizens and infrastructure.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat.
Effect on New/Existing Buildings:	Reduce effect on structures and infrastructure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$5,000
Potential Funding Sources:	Local Budget.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 36-48 months of plan adoption.
Incorporation into Existing Plans:	Local 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 = 4; Economically Sound = 4; and Environmentally Sound = 5

		The Hills – Action #12
	Proposed Action:	**Implement irrigation policies for public facilities; maintain a watering schedule to minimize the effects of expansive soils.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village public facilities
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce effects of expansive soils on public facilities.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils.
Effect on New/Existing Buildings:	Reduce risk to existing and future structures.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,000
Potential Funding Sources:	Annual budget.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 36-48 months of plan adoption.
Incorporation into Existing Plans:	Local 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 = 5; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5

		The Hills – Action #13
	Proposed Action:	**Establish standard requirements for all utilities regarding tree pruning around lines.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village-wide
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce damages to power lines and damages caused by power outages by reducing risk of downed power lines.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado, Winter Storm, Hail, Lightning.
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	$2,500
Potential Funding Sources:	Local Budget.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 36-48 months of plan adoption.
Incorporation into Existing Plans:	Local 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 = 5; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

		The Hills – Action #14
	Proposed Action:	**Install and maintain surge protection on critical electronic equipment.**
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Village facilities.
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)***:**	Reduce risk of damages to critical equipment and ensure continuity of services.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,000
Potential Funding Sources:	Local Budget.
Lead Agency/Department Responsible:	Village of the Hills Administration.
Implementation Schedule:	Within 36-48 months of plan adoption.
Incorporation into Existing Plans:	Annual Budget.

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

SECTION 19: PLAN MAINTENANCE

Plan Maintenance Procedures 1
Incorporation 1
Process of Incorporation 1
Monitoring and Evaluation 4
Monitoring 4
Evaluation 5
Updating 5
Plan Amendments 5
Five (5) Year Review 6
Continued Public Involvement 6

PLAN MAINTENANCE PROCEDURES

The following is an explanation of how Travis County, participating jurisdictions, and the general public will be involved in implementing, evaluating, and enhancing the Plan over time. The sustained hazard mitigation planning process consists of four main parts:

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

INCORPORATION

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

PROCESS OF INCORPORATION

Once the Plan is adopted, Travis County and participating jurisdictions will implement actions based on priority and the availability of funding. The County currently implements policies and programs to reduce loss of life and property damage from hazards. The mitigation actions developed for this Plan Update 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.

Travis County and participating jurisdictions 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 Update, planning team members from each participating jurisdiction will work to integrate the hazard mitigation strategies into other plans and codes as they are developed. Participating team members will conduct periodic reviews of plans and policies (once per year at a minimum) and analyze the need for amendments in light of the approved Plan Update. 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. Participating jurisdictions will ensure that capital improvement planning in the future will also contribute to the goals of this hazard mitigation Plan Update, in order to reduce the long-term risk to life and property from all hazards. Within 1 year of formal adoption of the hazard mitigation Plan Update, existing planning mechanisms will be reviewed by each jurisdiction.

Travis County is committed to supporting the cities, communities, and participating jurisdictions as they implement their mitigation actions. Travis County and participating 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 County will work to advance the goals of this hazard mitigation plan through its routine, ongoing, long-range planning, budgeting, and work processes.

Table 19-1. Methods of Incorporation of the Plan

Planning Mechanism	Department/Title Responsible	Incorporation of Plan
Grant Applications	Travis County: Assistant Emergency Management Coordinator Lakeway: Police Captain Manor: Police Lieutenant Pflugerville: Assistant City Manager Sunset Valley: Assistant City Administrator The Hills: Village Manager	The Plan Update will be evaluated by Travis County and participating jurisdictions when grant funding is sought for mitigation projects. If a project is not in the Plan Update, an amendment may be necessary to include the action in the Plan Update.
Annual Budget Review	Travis County: Assistant Emergency Management Coordinator Lakeway: Police Captain Manor: Police Lieutenant Pflugerville: Assistant City Manager Sunset Valley: Assistant City Administrator The Hills: Village Manager	Various departments and key personnel that participated in the planning process for Travis County and participating jurisdictions will review the Plan Update and mitigation actions therein when conducting their annual budget review. Allowances will be made in accordance with grant applications sought and mitigation actions that will be undertaken per the implementation schedule of the specific action.
Regulatory Plans	Travis County: Assistant Emergency Management Coordinator Lakeway: Police Captain Manor: Police Lieutenant Pflugerville: Assistant City Manager Sunset Valley: Police Chief The Hills: Emergency Management Coordinator	Currently, Travis County and participating jurisdictions have regulatory plans in place, such as Emergency Management Plans, Continuity of Operations Plans, Economic Development, and Evacuation Plans. The Plan Update will be consulted when County and 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	Travis County: Assistant Emergency Management Coordinator Lakeway: Police Captain Manor: Police Lieutenant Pflugerville: Assistant City Manager Sunset Valley: Assistant City Administrator	Travis County and participating jurisdictions have a Capital Improvement Plan (CIP) in place. Prior to any revisions to the CIP, County and City departments will review the risk assessment and mitigation strategy sections of the HMAP, as limiting public spending in hazardous zones is one of the

Planning Mechanism	Department/Title Responsible	Incorporation of Plan
	The Hills: Village Manager	most effective long-term mitigation actions available to local governments.
Floodplain Management Plans	Travis County: Floodplain Administrator Lakeway: Floodplain Manager Manor: Floodplain Manager Pflugerville: Floodplain Manager Sunset Valley: Floodplain Manager The Hills: Floodplain Manager	Floodplain management plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding and information, found in Section 5 of this Plan Update, discussing the people and property at risk to flood will be reviewed and revised when Travis County updates their management plans or develops new plans.

MONITORING AND EVALUATION

Periodic revisions of the Plan Update are required to ensure that goals, objectives, and mitigation actions are kept current. Revisions may be required to ensure the Plan Update is in compliance with federal and state statutes and regulations. This section outlines the procedures for completing Plan revisions, updates, and review. Table 19-2 indicates the jurisdiction and title of the party responsible for Plan monitoring, updating, and review of the Plan.

Table 19-2. Team Members Responsible for Plan Monitoring, Evaluating, Updating, and Review of the Plan

JURISDICTION	TITLE
Travis County	Assistant Emergency Management Coordinator
Lakeway	Police Captain
Manor	Police Lieutenant
Pflugerville	Assistant City Manager
Sunset Valley	Police Chief
The Hills	Emergency Management Coordinator

MONITORING

Designated Planning Team members are responsible for monitoring, updating, and reviewing the Plan Update, as shown in Table 19-2. Individuals holding the title listed in Table 19-2 will be responsible for monitoring the Plan Update on an annual basis. Plan monitoring includes reviewing the Plan and

incorporating other existing planning mechanisms that relate or support goals and objectives of the Plan; monitoring the incorporation of the Plan into future updates of other existing planning mechanisms as appropriate; reviewing mitigation actions submitted and coordinating with various County and City departments to determine if mitigation actions need to be re-evaluated and updated; evaluating and updating the Plan as necessary; and monitoring plan maintenance to ensure that the process described is being followed, on an annual basis, throughout the planning process. The Planning Team will develop a brief report that identifies policies and actions in the plan that have been successfully implemented and any changes in the implementation process needed for continued success. Team meetings for monitoring the plan will include a sign-in sheet to record attendance and a written summary of meeting notes will report the particulars involved in developing an action into a project.

EVALUATION

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, identify any needed changes, and assess the effectiveness of the plan achieving its stated purpose and goals. The team will evaluate the number of mitigation actions implemented along with the loss-reduction associated with each action. Actions that have not been implemented will be evaluated to determine if any social, political or financial barriers are impeding implementation and if any changes are necessary to improve the viability of an action. The team will evaluate changes in land development and/or programs that affect mitigation priorities in their respective jurisdictions. This annual evaluation process will include an annual meeting with a sign-in sheet to record attendance and a brief report that identifies any changes that may be necessary.

UPDATING

PLAN AMENDMENTS

At any time, minor technical changes may be made to update the Travis County Hazard Mitigation Plan Update. Material changes to mitigation actions or major changes in the overall direction of the Plan Update or the policies contained within it must be subject to formal adoption by the County and participating jurisdictions.

The County will review proposed amendments and vote to accept, reject, or amend the proposed change. Upon ratification, the amendment will be transmitted to the Texas Division of Emergency Management (TDEM).

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

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

FIVE (5) YEAR REVIEW

The Plan will be thoroughly reviewed by the Planning Team at the end of 3 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, an increase or decrease in capability to address hazards, and changes to federal or state legislation.

The Plan review process provides the County and participating jurisdictions 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 Planning Team (Section 2, Table 2-2) meet to review the Plan at the end of 3 years because grant funds may be necessary for the development of a 5-year update. Reviewing planning grant options in advance of the 5-year Plan update deadline is recommended considering the timelines for grant and planning cycles can be in excess of a year.

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 the Federal Emergency Management Agency (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. The Public will be directly involved in the annual review and cyclical updates. Changes or suggestions to improve or update the Plan will provide opportunities for additional public input.

The public can review the Plan Update on the Travis County's website and provide comment. Notification that the Plan Update is available for review and comment will be made via social media outlets.

The Planning Team may also designate voluntary citizens from the County or willing stakeholder members from the private sector businesses that were involved in the Plan's development to provide feedback on an annual basis. It is important that stakeholders and the immediate 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.

Media, including local newspapers 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 Update.

APPENDIX A: PLANNING TEAM

Planning Team Members 1

Stakeholders 3

PLANNING TEAM MEMBERS

The Travis County Plan Update 2017 (Plan or Plan Update), was organized using a direct representative model. An Executive Planning Team from Travis County and participating jurisdictions, 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 Advisory Planning Team, consisting of area organizations and departments that participated throughout the planning process. Table A-3 is comprised of stakeholders who were invited to provide Plan Update input. Public outreach efforts and meeting documentation is provided in Appendix E.

Table A-1. Executive Planning Team

ORGANIZATION	TITLE
Travis County Office of Emergency Management	Assistant Emergency Management Coordinator
Lakeway Police Department	Captain
Manor Police Department	Lieutenant
Pflugerville	Assistant City Manager
Sunset Valley	Assistant City Administrator
Sunset Valley Police Department	Police Chief
Village of the Hills	Emergency Management Coordinator
Village of the Hills	Village Manager

Table A-2. Advisory Planning Team

ORGANIZATION	TITLE
Travis County Office of Emergency Management	Emergency Management Coordinator
Travis County Office of Emergency Management	Senior Planner
Travis County Transportation and Natural Resources	Environmental Project Manager
Travis County Transportation and Natural Resources	Natural Resources Program Manager

ORGANIZATION	TITLE
Travis County Transportation and Natural Resources	Floodplain Administrator, Permits Program Manager
Travis County Transportation and Natural Resources	GIS Manager
Travis County Transportation and Natural Resources	Division Director of Development Services and Long Range Planning
Travis County Transportation and Natural Resources	Engineering Division Manager
Travis County Transportation and Natural Resources	Engineer Specialist
Travis County Transportation and Natural Resources	Public Works Director
Travis County Transportation and Natural Resources	Senior Planner
Travis County Transportation and Natural Resources	Compliance
Travis County Transportation and Natural Resources	Planning Program Manager
Travis County Fire Marshal's Office	Fire Marshal
Travis County Fire Marshal's Office	Deputy Fire Marshal
Travis County Fire Marshal's Office	Deputy Fire Marshal
Lakeway Police Department	Crime Scene Investigator
Lakeway Police Department	Chief of Police
Manor	City Manager
Manor	Director of Finance
Manor Police Department	Chief of Police
Manor Police Department	Police Captain
Manor Police Department	Police Lieutenant
Pflugerville Police	Lieutenant
Pflugerville Police Department	Police Dispatcher
Village of the Hills	Alderman

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, universities, and legislators. The public were also invited to participate via e-mail throughout the planning process. Many of the invited organizations and stakeholders participated and were integral to providing comments and data for the Plan Update. For a list of attendees at meetings, please see Appendix E[1].

Table A-3. Stakeholders

AGENCY	TITLE
Travis County Emergency Services	Public Information Officer
Travis County Emergency Services	County Executive
Travis County Judge's Office	Chief of Staff
Travis County Commissioners Court	Executive Assistant Commissioner Pct. 1
Travis County Commissioners Court	Executive Assistant Commissioner Pct. 2
Travis County Commissioners Court	Executive Assistant Commissioner Pct. 3
Travis County Commissioners Court	Executive Assistant Commissioner Pct. 4
Travis County Fire Rescue	Battalion Chief
Travis County Sheriff's Office	Captain
Travis County Sheriff's Office	Lieutenant
Travis County Transportation and Natural Resources	County Executive
Travis County Health and Human Services	County Executive
Pflugerville Independent School District	Emergency Management Coordinator
City of Austin – Office of Homeland Security and Emergency Management	Senior Planner
City of Austin – Office of Homeland Security and Emergency Management	Plans Officer
City of Austin – Fire Department	Planner

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

AGENCY	TITLE
City of Austin – Fire Department	Division Chief
City of Austin – Wildfire Division	Wildfire Mitigation Division Program Manager
City of Austin – Water Utility	Emergency Management Coordinator
Austin Independent School District	Emergency Management Coordinator
Lake Travis Fire	Wildfire Prevention Specialist
Lake Travis Fire	Lieutenant Prevention
Lower Colorado River Authority	Resiliency Officer
Central Texas Volunteers Active in Disaster (CTZVOAD)	President
Hays County	Emergency Management Coordinator
Williamson County	Emergency Management Coordinator
Llano County	Emergency Management Coordinator
Burnett County	Emergency Management Coordinator
Bastrop County	Emergency Management Coordinator
Caldwell County	Emergency Management Coordinator
City of Round Rock	Emergency Management Coordinator
Capital Area Council of Governments	Director of Homeland Security and Training
Capital Area Trauma Regional Advisory Council	Executive Director
KVUE	Reporter
Community Impact News	Editor
University of Texas, Austin	Fire Marshal, Emergency Management Coordinator
National Weather Service	Warning Coordination Meteorologist

APPENDIX B: PUBLIC SURVEY RESULTS

Overview 1

Public Survey Results 2

OVERVIEW

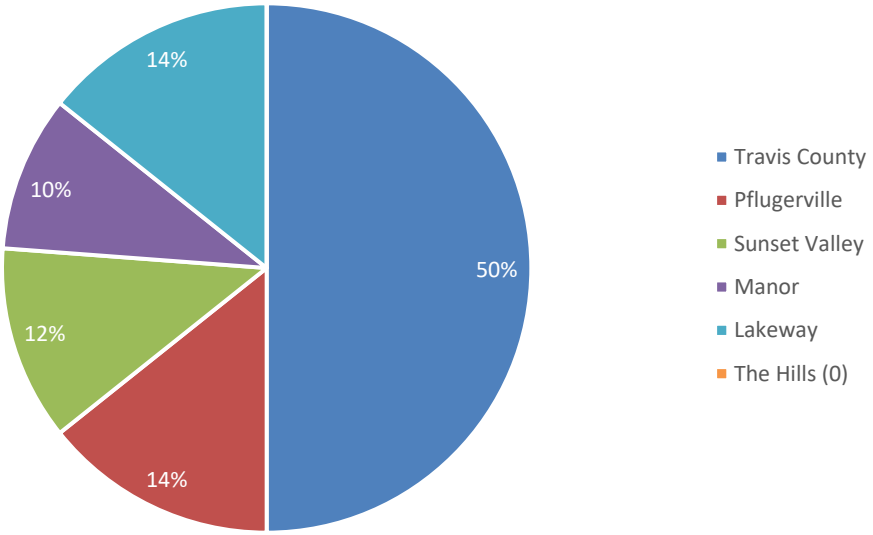
Travis County prepared a public survey that requested public opinion on a wide range of questions relating to natural hazards. The survey was made available on websites, including Travis County's website. This survey link was also distributed at public meetings and stakeholder events throughout the planning process.

A total of 84 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 jurisdictions identify any potential actions or problem areas.

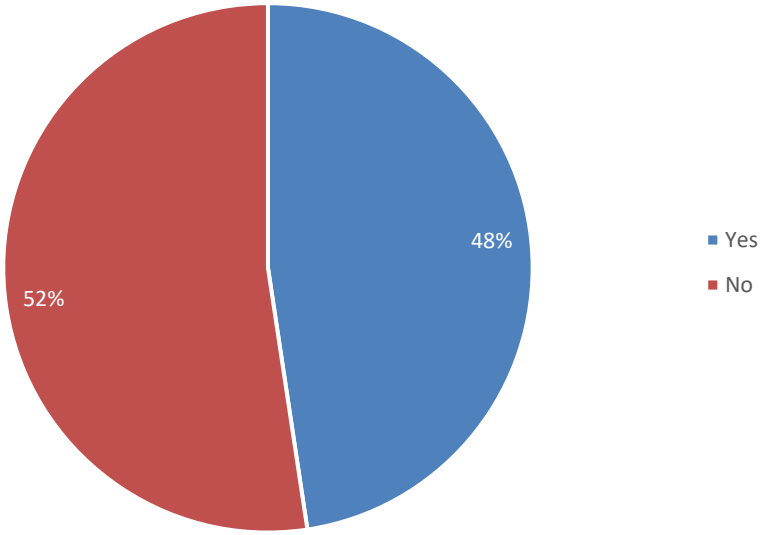
The following survey results depict the percentage of responses for each answer. Similar responses have been summarized for questions that did not provide a multiple-choice answer or that required an explanation.

PUBLIC SURVEY RESULTS

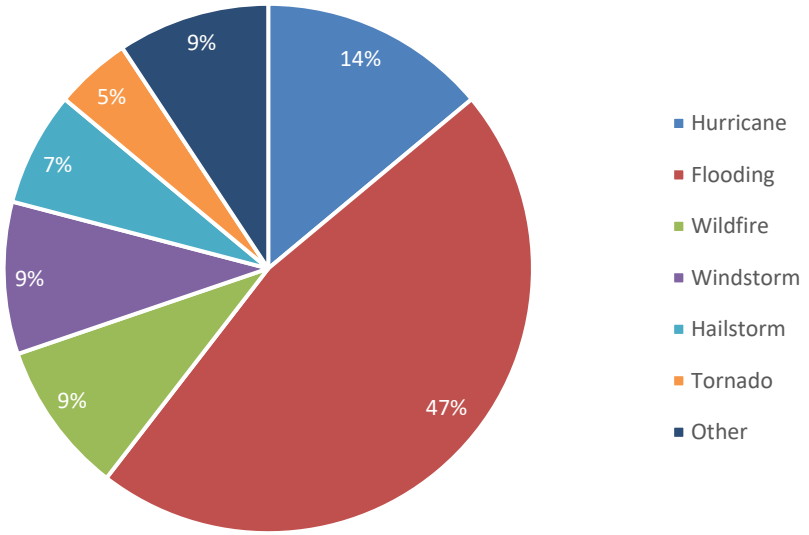
1. Please state the jurisdiction (city and community) where you reside.



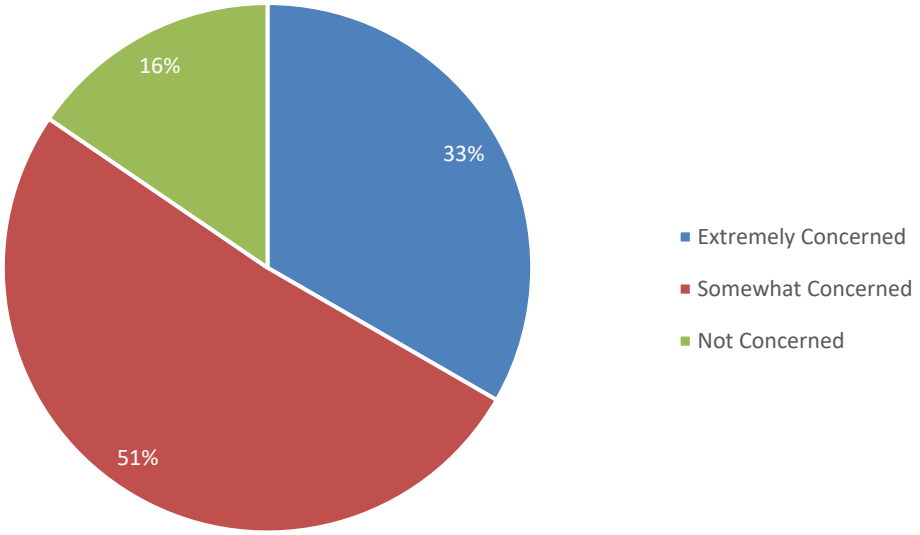
2. A. Have you ever experienced or been impacted by a disaster?



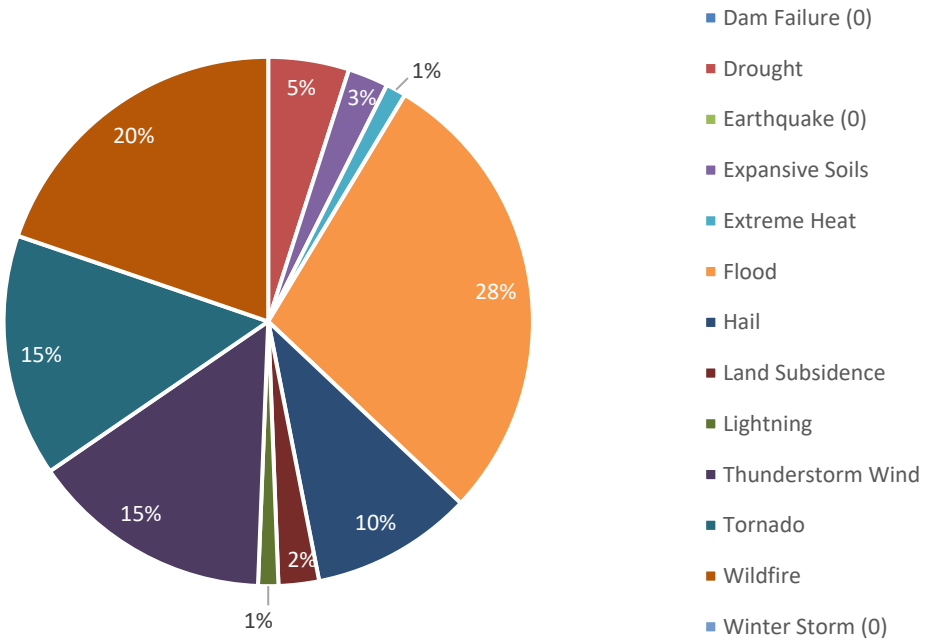
2. B. If "Yes", please explain:



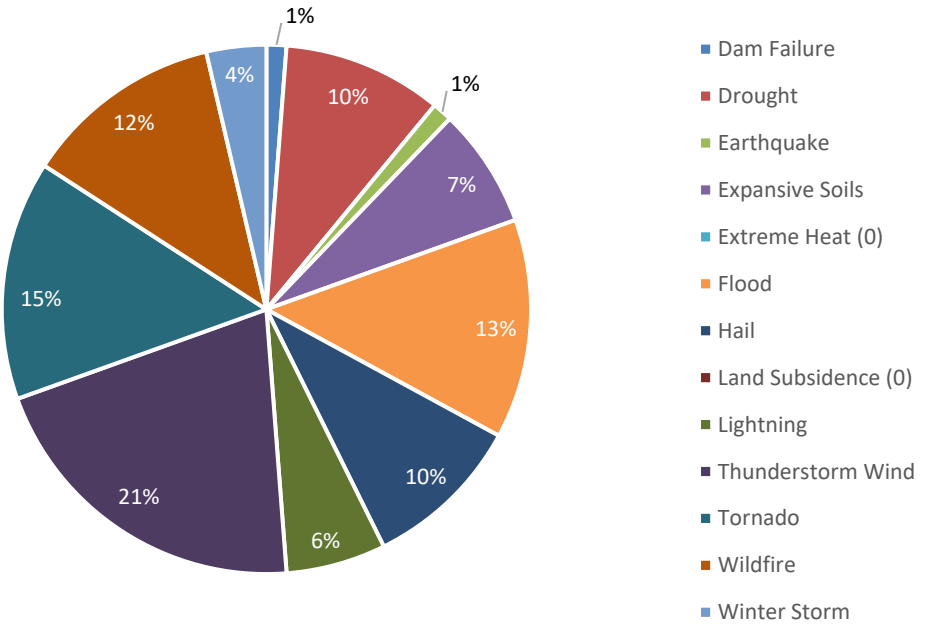
3. How concerned are you about the possibility of your community being impacted by a disaster?



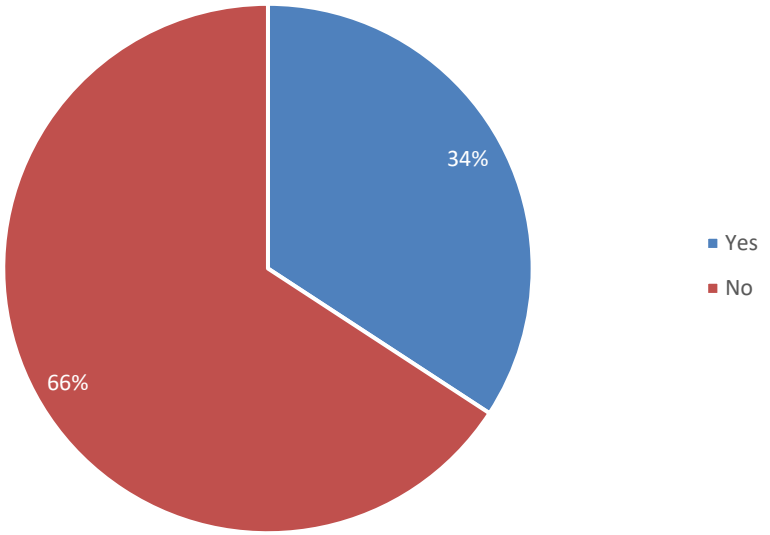
4. Please select the one hazard you think is the highest threat to your neighborhood:



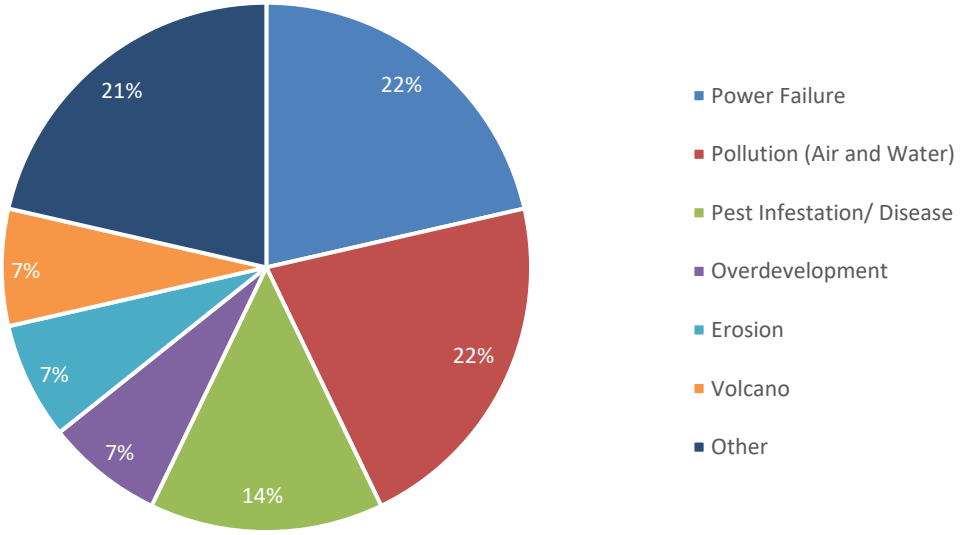
5. Please select the one hazard you think is the second highest threat to your neighborhood:



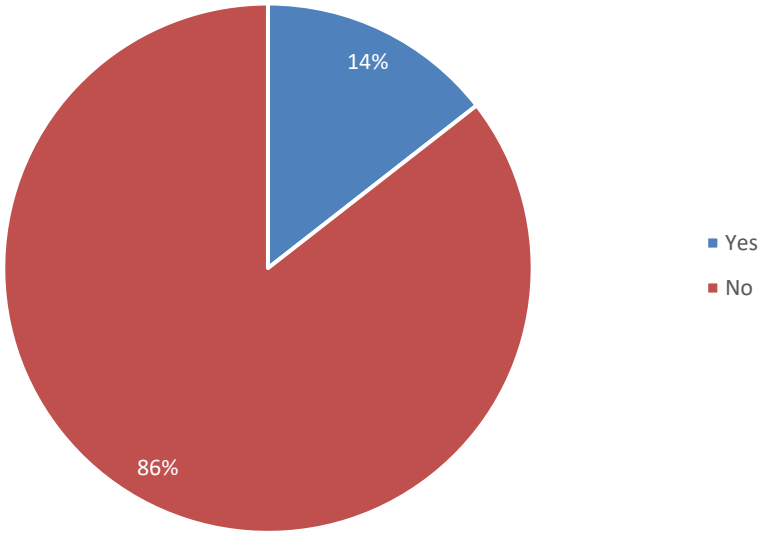
6. A. Are there hazards not listed above that you think is a wide-scale threat to your neighborhood?



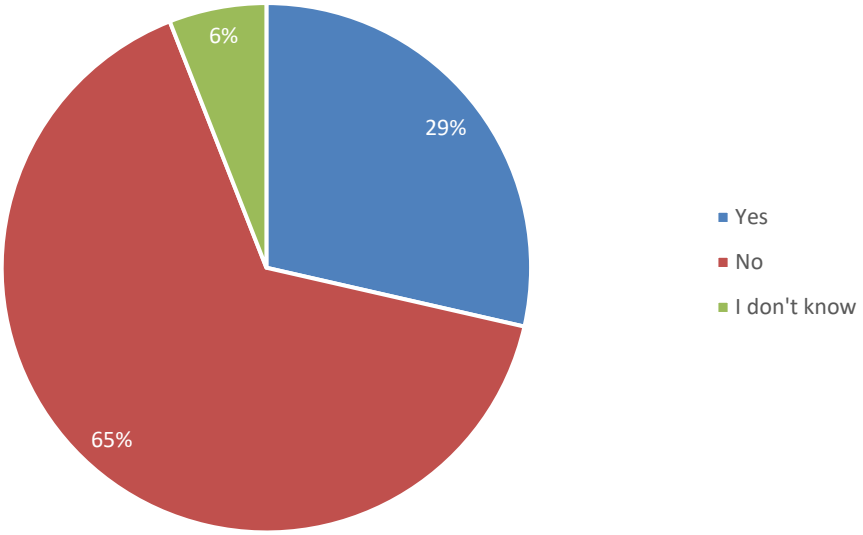
6. B. If "Yes", please explain:



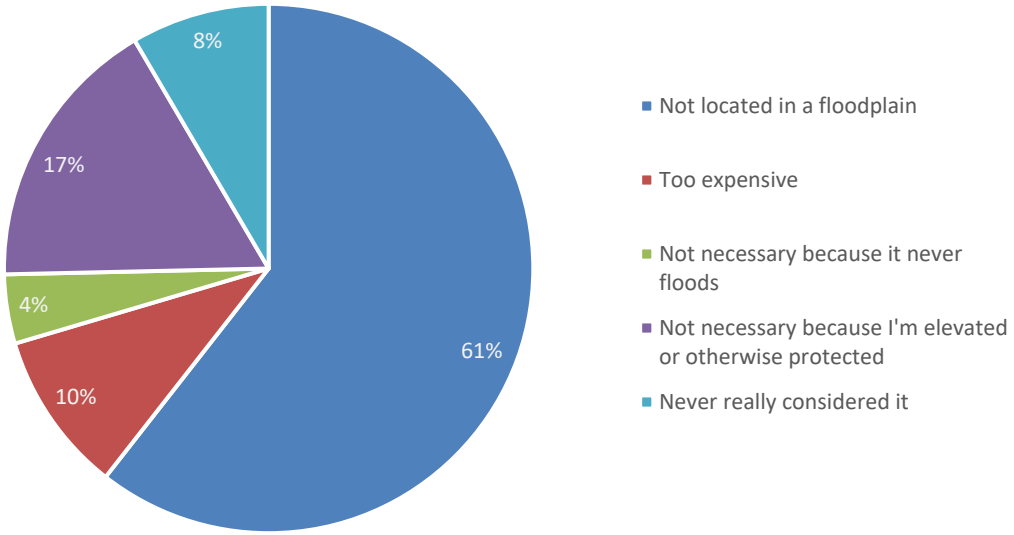
7. Is your home located in a floodplain?



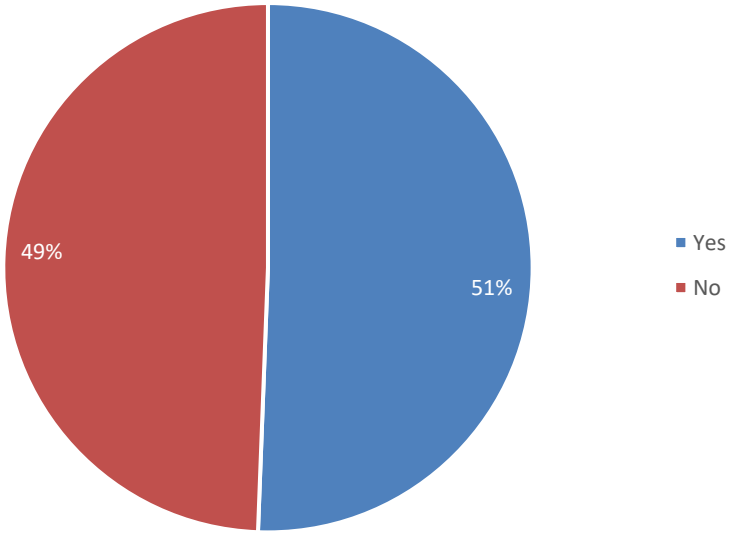
8. Do you have flood insurance?



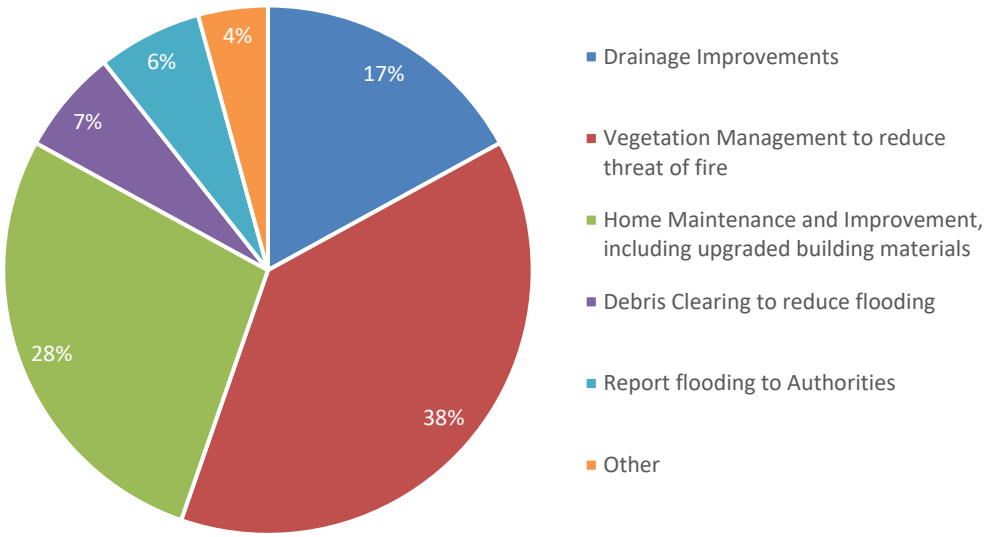
9. If you do not have flood insurance, why not?



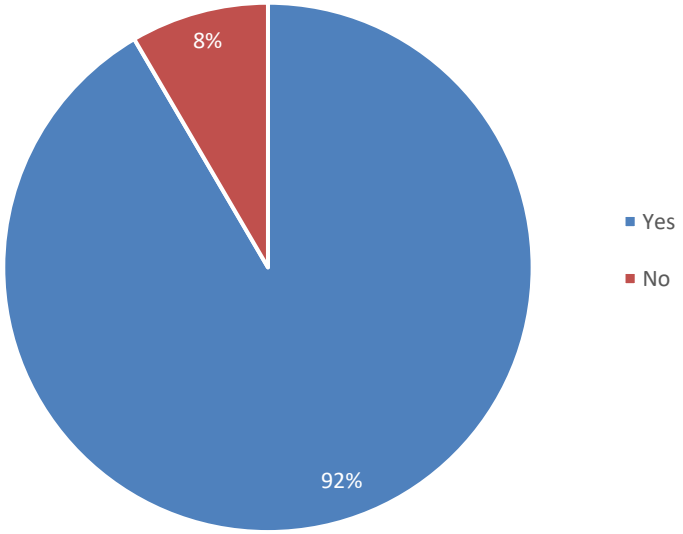
10. A. Have you taken any actions to make your home or neighborhood more resistant to hazards?



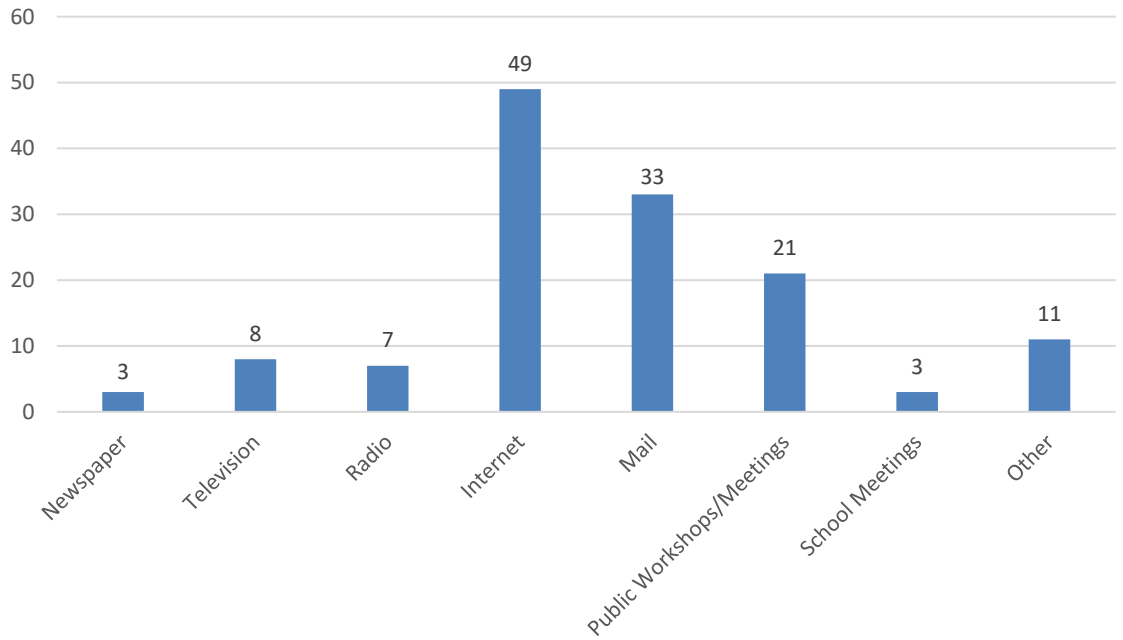
10. B. What have you done?



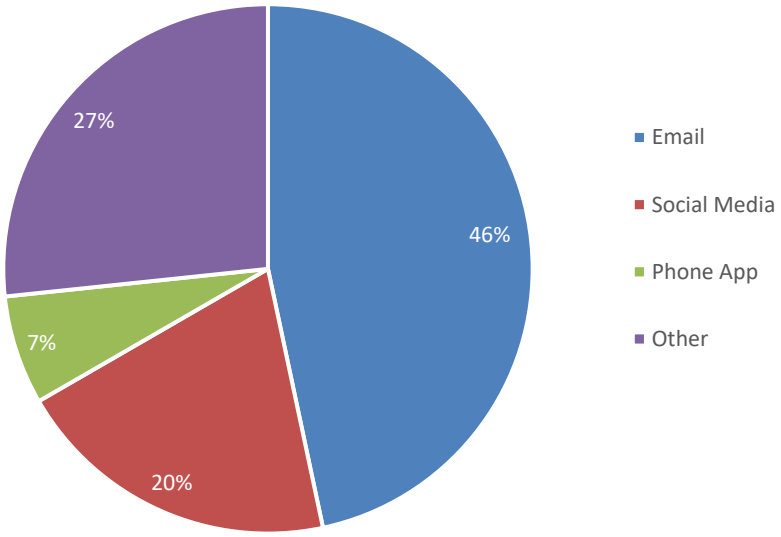
11. Are you interested in making your home or neighborhood more resistant to hazards?



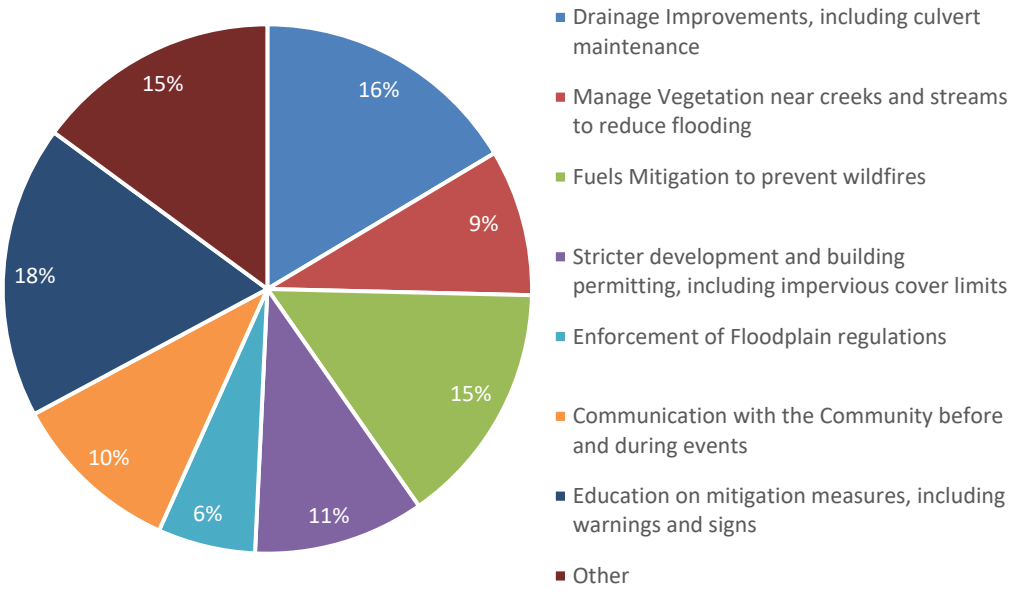
12. A. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?



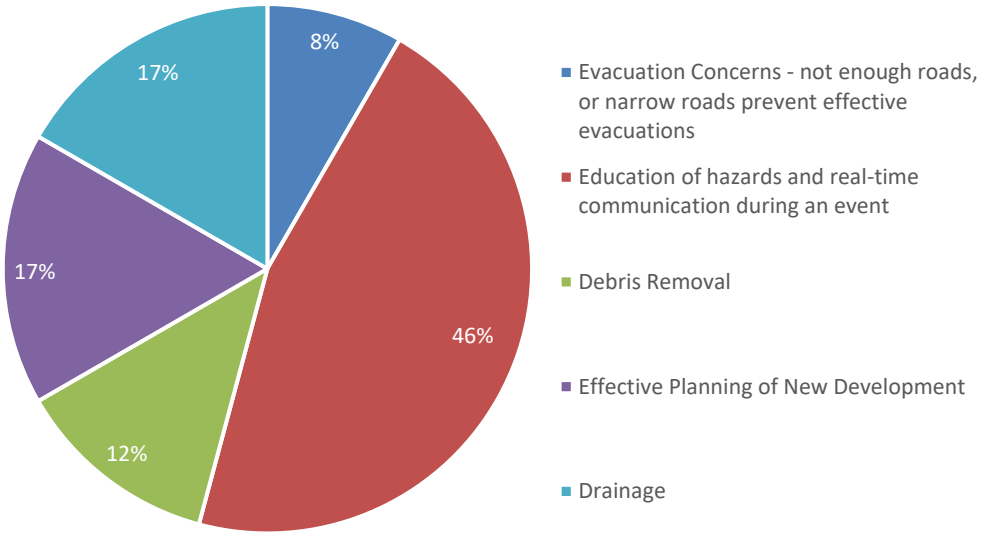
12. B. If "Other", please specify.



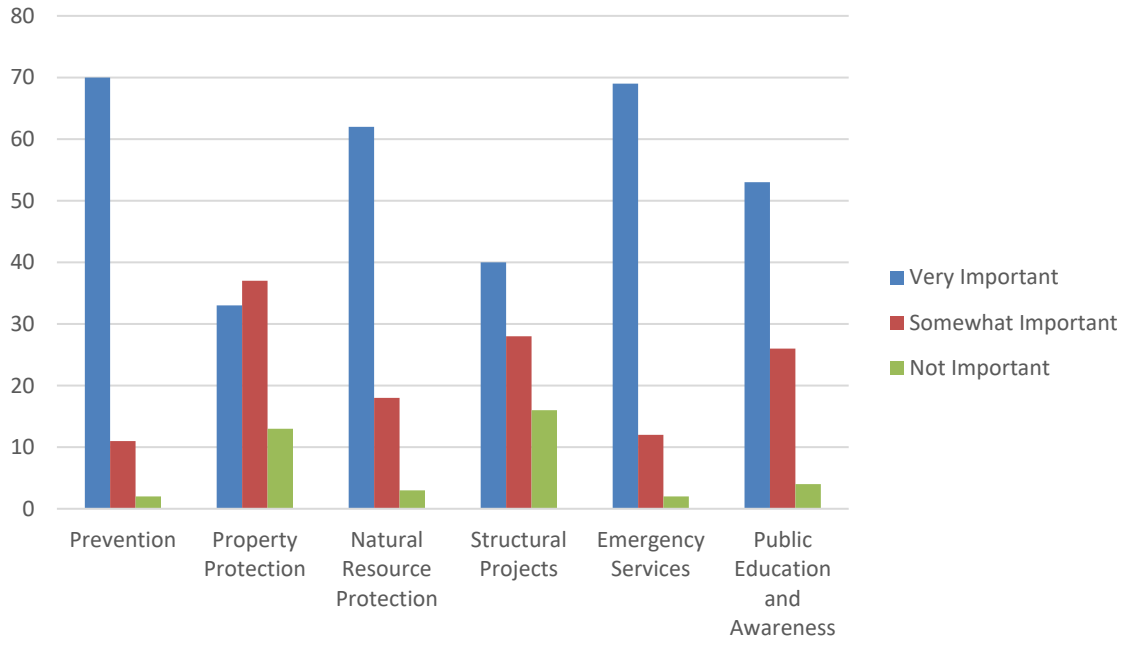
13. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?



14. Are there any other issues regarding the reduction of risk and loss associated with hazards are disasters in the community that you think are important?



15. A number of community-wide activities can reduce the 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

Overview 1

Critical Facilities 1

OVERVIEW

This Appendix is **For Official Use Only (FOUO)** and may be exempt from public release under FOIA. Figures C-1 through C-6 locate all critical facilities that were included in the risk assessment. Mapped facilities were provided by Travis County Planning Team members. Table C-1 notes the critical facilities by type.

CRITICAL FACILITIES

Figure C-1. Critical Facilities in Travis County

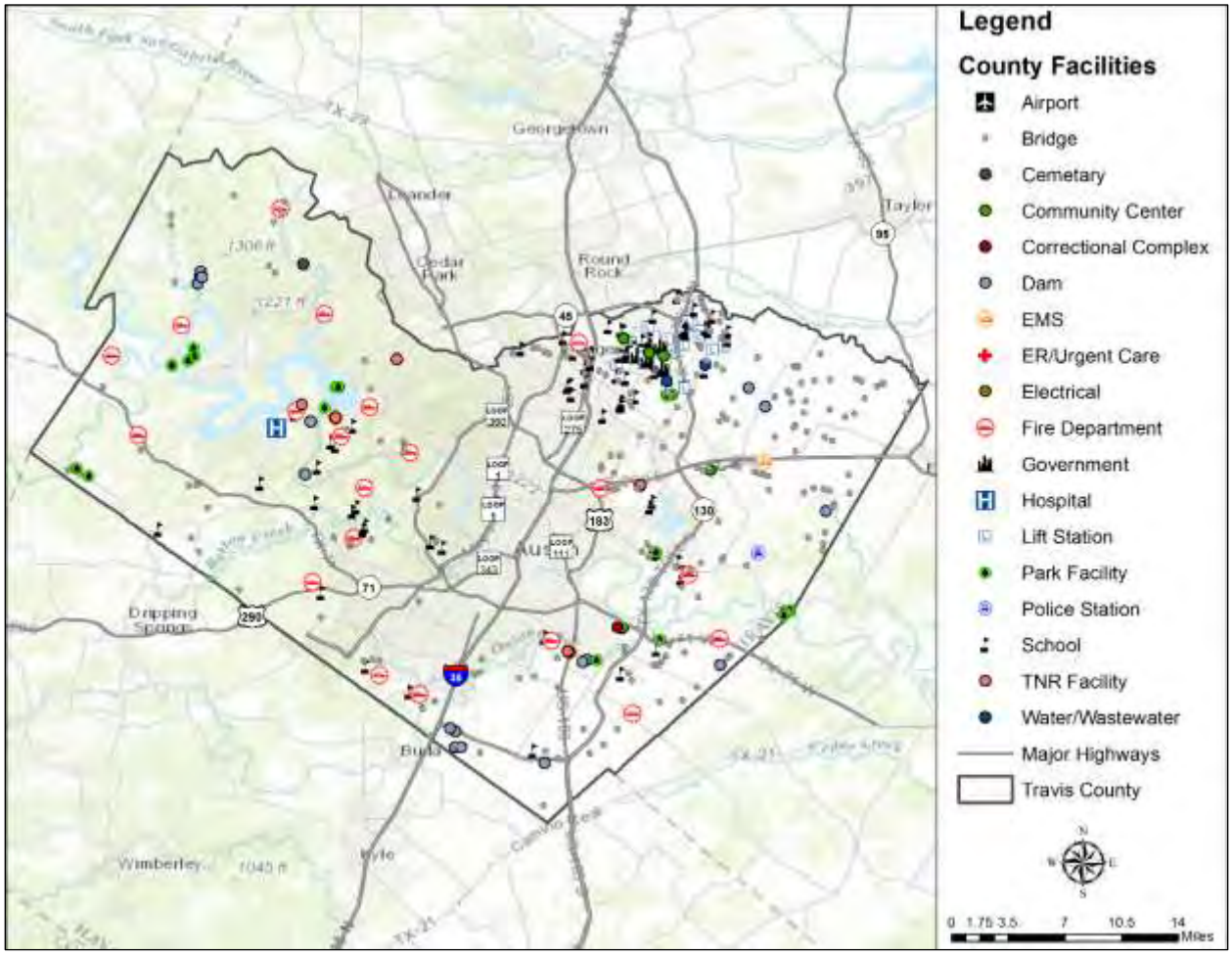


Table C-1. Critical Facilities by Type in Travis County

TYPE	NUMBER
AFD Training Center	1
Bridges	212
Cemetery	1
Clinics	3
Community Centers	2
Correctional Complexes	30
EMS Stations	5
Fire Stations	19
Hospital	1
Private Schools	6
Public Schools	33
Sheriff's Office Centers	4
TNR Facilities	27
TNR Parks	45

Figure C-2. Critical Facilities in the City of Pflugerville

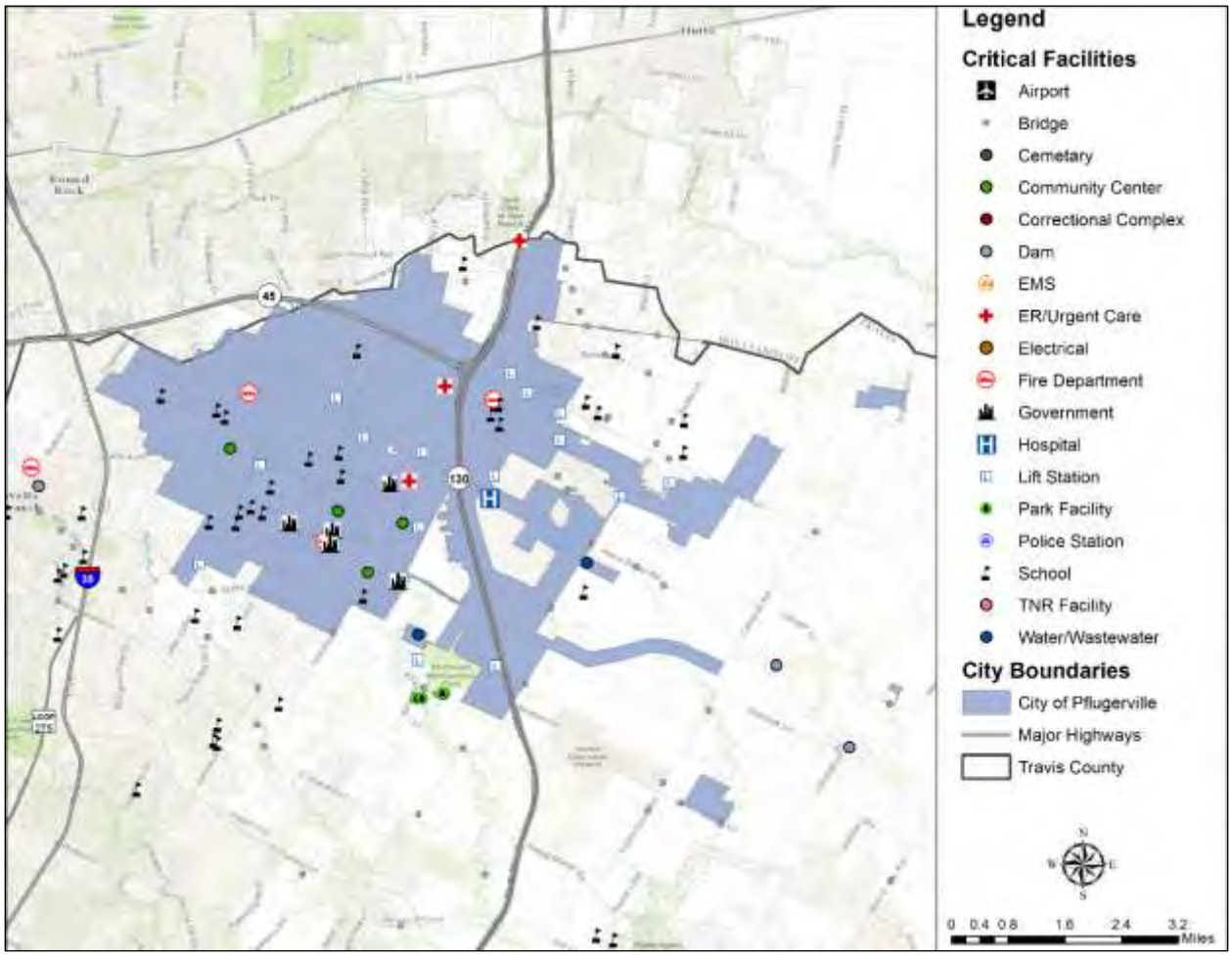


Figure C-3. Critical Facilities in the City of Sunset Valley

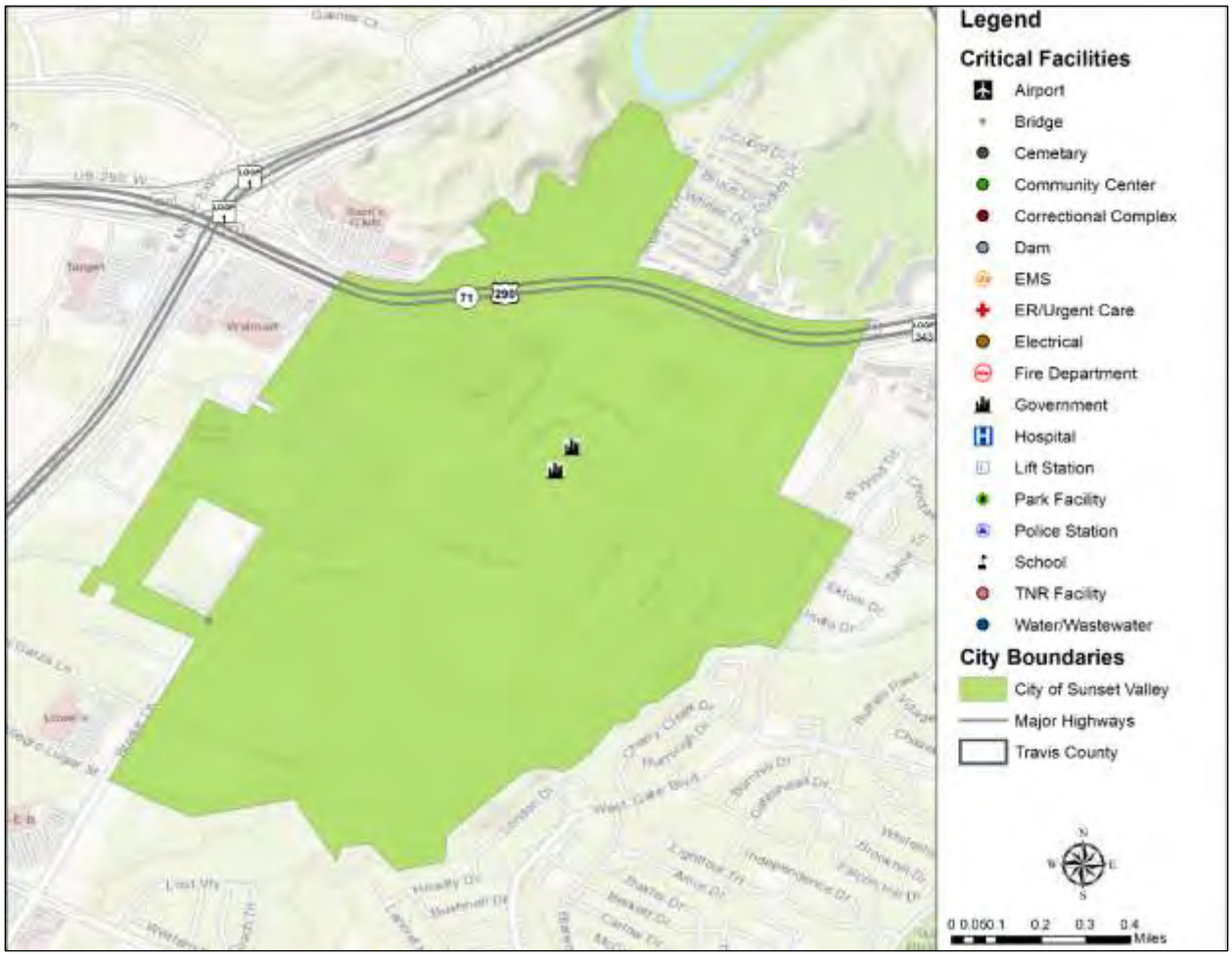


Figure C-4. Critical Facilities in the City of Manor

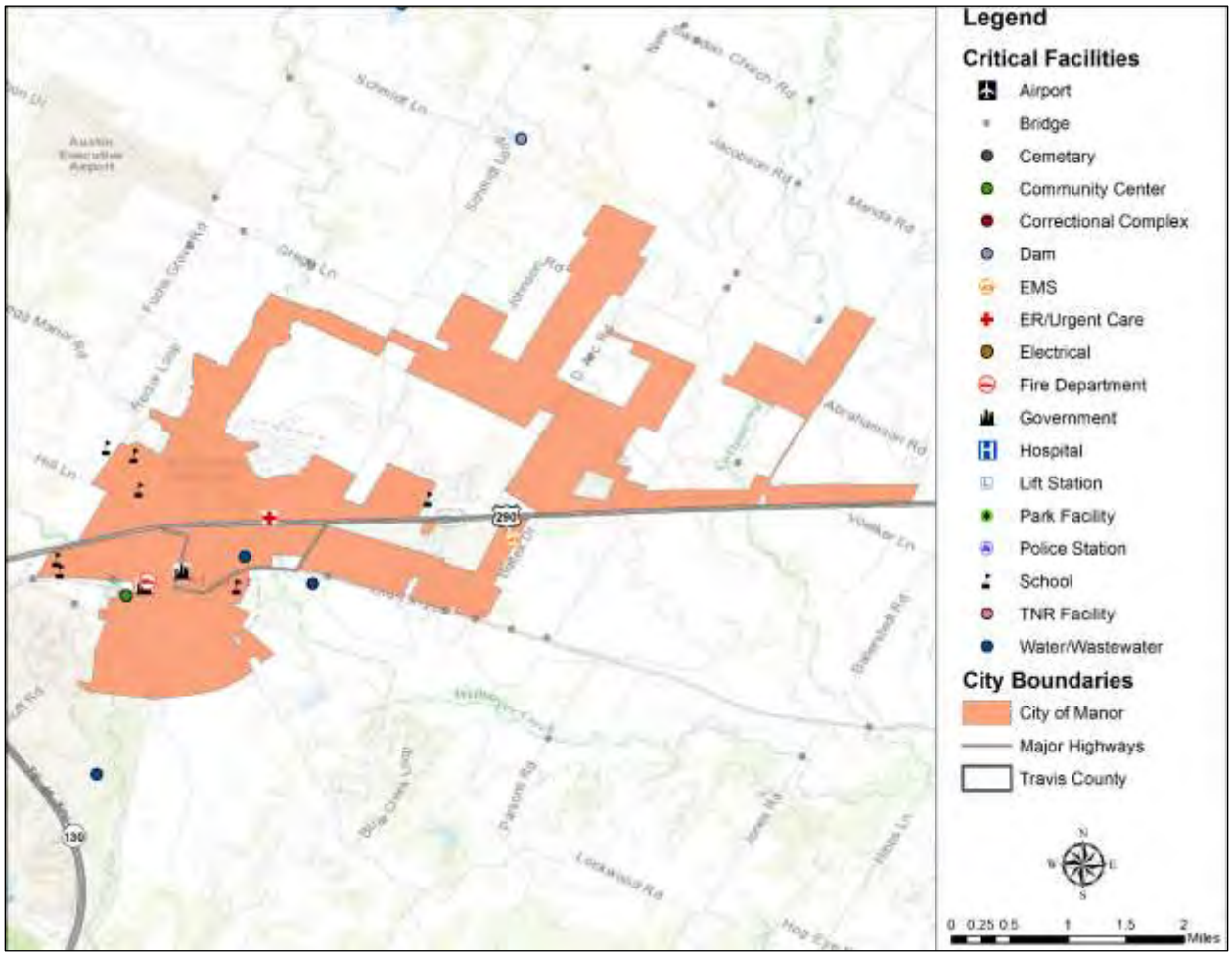


Figure C-5. Critical Facilities in the City of Lakeway

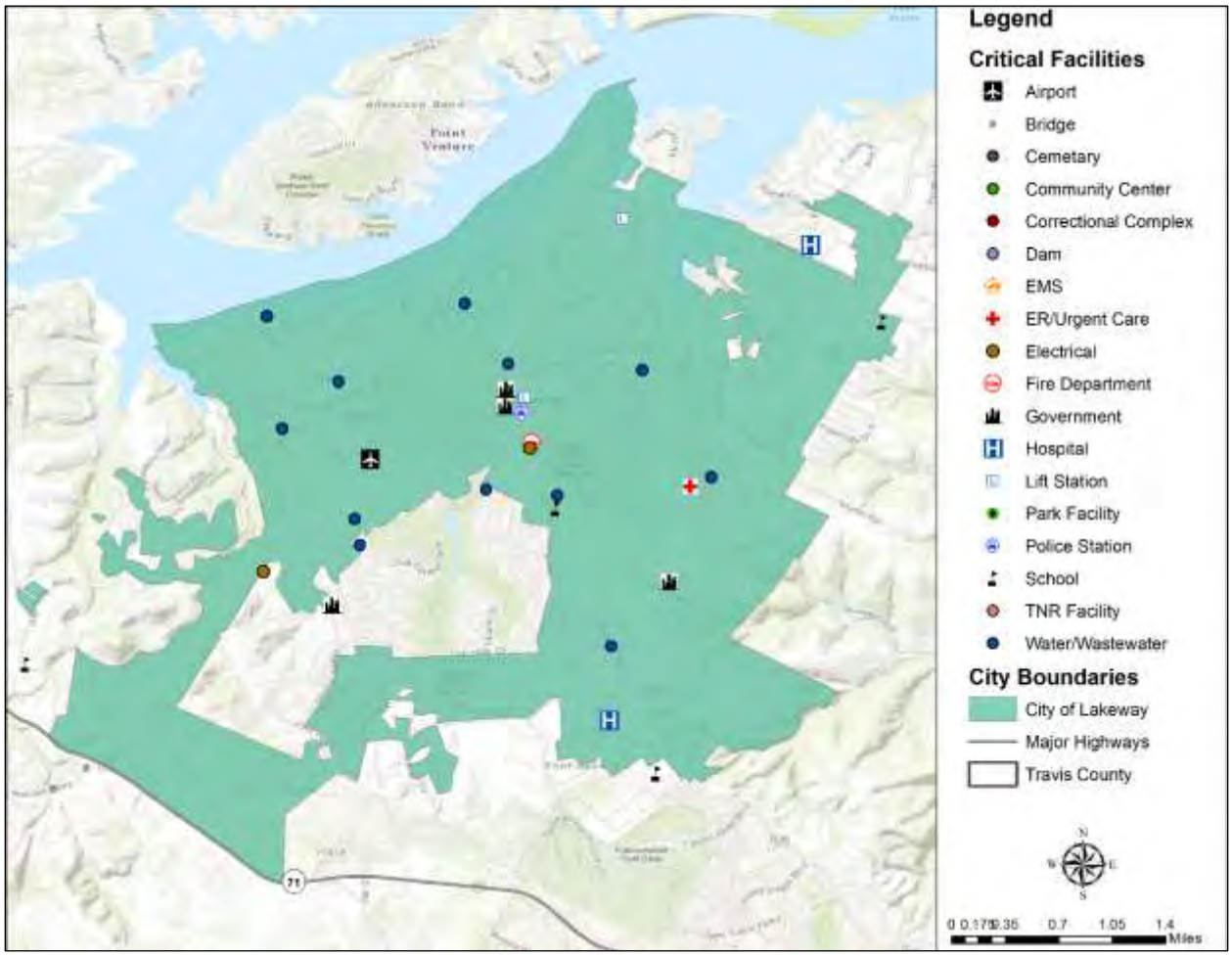
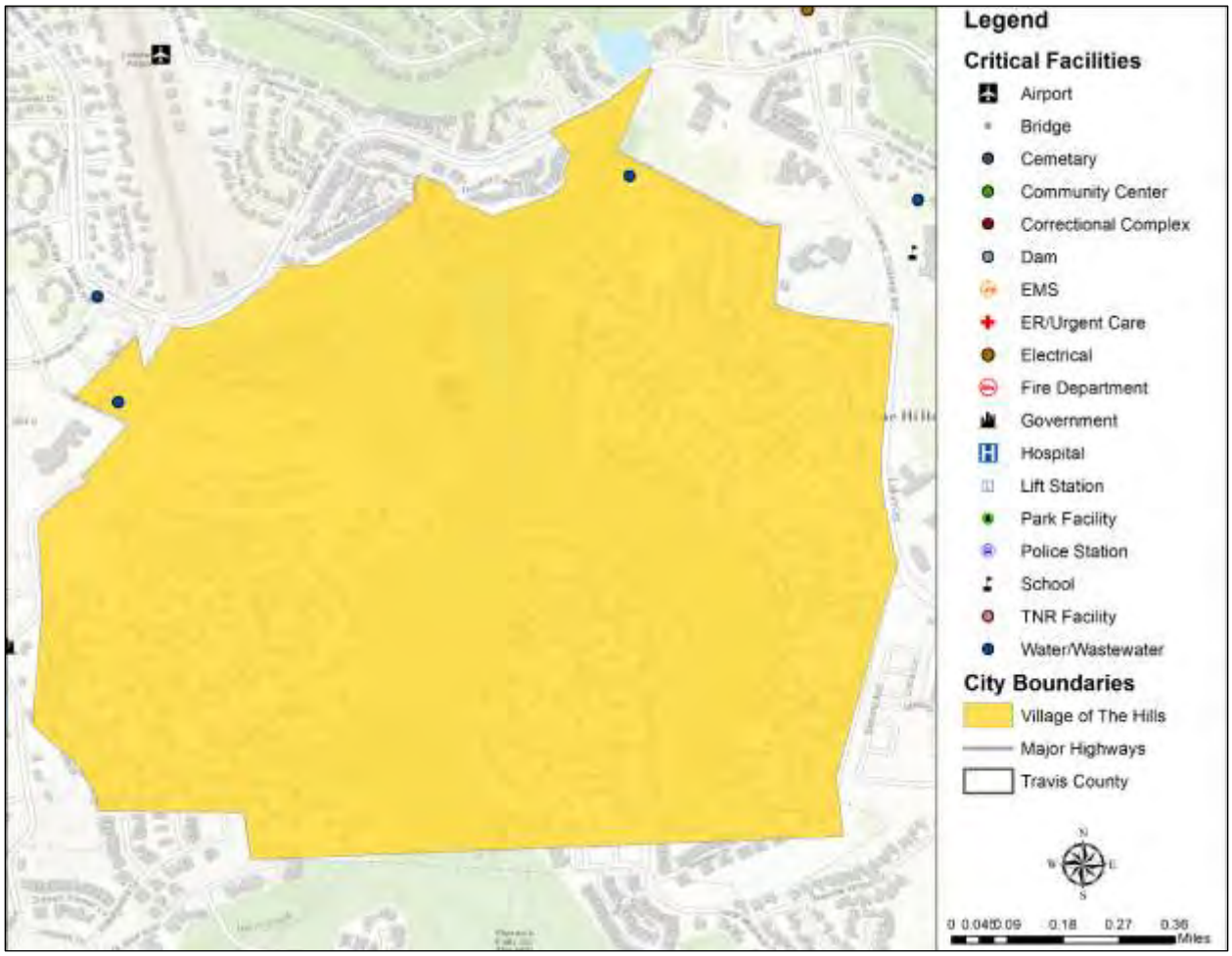


Figure C-6. Critical Facilities in the Village of the Hills



APPENDIX D: DAM LOCATIONS

Overview 1

Dam Locations 1

OVERVIEW

Appendix D is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

DAM LOCATIONS

Table D-1 below reflects all dams that are located in Travis County. This list includes High, Significant, and Low Hazard Dams. Section 15 of the Plan Update doesn't profile dams that were deemed to pose no past, current, or future risk to the planning area as no loss of life or impact to critical facilities or infrastructure is expected in the event of a breach.

Table D-1. Listing of Travis County Dam Locations and Storage Capacities

JURISDICTION	LATITUDE	LONGITUDE	HEIGHT (Feet)	STORAGE (Acre Feet)
Travis	30.106416	-97.791852	24	310
Austin	30.389321	-97.750855	30	30
Austin	30.201576	-97.886663	20	448
Travis	30.334838	-97.60949	9	83
Travis	30.077966	-97.71232	8	247
Travis	30.140987	-97.639185	22	132
Austin	30.362423	-97.778128	58	50
Travis	30.531223	-97.916678	25	74
Austin	30.277111	-97.692687	36	No Information
Austin	30.30295	-97.693717	21	150
Austin	30.196217	-97.880483	14.5	225
Austin	30.45005	-97.680173	16.5	70
Austin	30.392217	-97.907341	277	3,223,000

JURISDICTION	LATITUDE	LONGITUDE	HEIGHT (Feet)	STORAGE (Acre Feet)
Austin	30.294057	-97.786405	85	115,404
Austin	30.250345	-97.713491	65	6,850
Travis	30.352715	-97.98667	24	87
Travis	30.303081	-97.460226	25	115
Travis	30.28545	-97.597073	75	45,200
Austin	30.362487	-97.989268	24	36
Austin	30.434456	-97.791227	42	183
Travis	30.413585	-97.529456	16	90
Travis	30.336322	-97.613807	9	197
Travis	30.092282	-97.787065	18	100
Travis	30.108993	-97.796873	19	93
Travis	30.165535	-97.554832	20	52
Travis	30.441657	-97.726725	18.3	309
Austin	30.204698	-97.851897	11	43.4
Austin	30.484107	-97.983295	27	65
Manor	30.380245	-97.605706	21	100
Travis	30.329586	-97.64837	26	40
Travis	30.383357	-97.921702	38	82
Austin	30.336477	-97.926908	26	144
Austin	30.422159	-97.810358	37	506
Travis	30.091683	-97.792512	18	120
Travis	30.168332	-97.678332	24	73
Austin	30.212687	-97.854432	22	300
Austin	30.406158	-97.664727	14	99
Travis	30.170423	-97.674238	43	200
Travis	30.54121	-97.880118	30	129
Travis	30.394923	-98.048945	18	14

JURISDICTION	LATITUDE	LONGITUDE	HEIGHT (Feet)	STORAGE (Acre Feet)
Travis	0	0	22	225
Travis	30.526517	-97.915851	24	50
Austin	30.410697	-97.719807	36	140
Travis	30.396828	-97.514592	23	130
Austin	30.411861	-97.726315	28	70
Austin	30.371336	-97.7195	12	56.6
Travis	30.398037	-98.047502	13	15
Austin	30.367376	-97.700683	14	62.4
Travis	30.473725	-97.614996	11	78
Travis	30.170676	-97.614433	6.5	64.1
Travis	30.421715	-97.798398	33.5	84
Austin	30.175497	-97.837662	8	57.9
Travis	30.506673	-98.022923	14.6	60
Sunset Valley	30.226192	-97.813662	12.5	34.5
Austin	30.351311	-97.745343	24.77	64.7
Travis	30.438785	-97.568502	37.5	3,273
Austin	30.360676	-97.749767	33	60
Travis	30.273333	-97.735358	19	34.6
Austin	30.5130558	-98.0205612	21	45
Travis	30.399846	-98.045257	16	14
Travis	30.175583	-97.755876	17.3	50
Travis	30.38342	-97.73442	7	98.2
Austin	30.246138	-97.899337	25	176.8
Austin	30.5127773	-98.0200043	19	9.6
Travis	0	0	21	84
Austin	30.5174999	-98.0202789	27	30
Austin	30.406833	-97.702122	16	90.2

JURISDICTION	LATITUDE	LONGITUDE	HEIGHT (Feet)	STORAGE (Acre Feet)
Austin	30.334547	-97.781997	16	204.3
Travis	30.405332	-98.044182	14	28
Travis	30.3858	-97.855	50	120
Travis	30.273227	-98.045371	24	50.4
Travis	30.408331	-97.69116	12	No Information
Travis	30.384306	-97.663305	24.5	15

APPENDIX E: MEETING DOCUMENTATION

Workshop Documentation 1

Public Meeting Documentation 6

Public Notices 11

WORKSHOP DOCUMENTATION

Appendix E is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

Travis County held a series of Planning Team workshops: a Kickoff Workshop on December 9, 2016, a Risk Assessment Workshop on March 9, 2017, and a Mitigation Workshop on March 9, 2017. At each of these workshops members of the Planning Team were informed of the planning process, expressed opinions, and volunteered information. Travis County also hosted seven public meetings. The sign-in sheets for each workshop and public meeting are included below. For more details on the workshops and planning process, see Section 2.

Figure E-1. Travis County Kickoff Workshop, 12.09.16

(3 pages)

H2O PARTNERS

TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Kickoff Workshop
Travis County Emergency Operations Center, Austin, TX
December 19, 2016

Please print clearly.

Name	Title	Department	Phone	Email
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[illegible]	Asst (EMC)	[illegible]	[illegible]	
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David Greear	Sr. Director	TNR	512-854-7650	david.greear@" "
	Lieutenant			
	Dir. Dev. Serv. & long range planning			

1

H2O PARTNERS

TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Kickoff Workshop
Travis County Emergency Operations Center, Austin, TX
December 19, 2016

Please print clearly.

Name	Title	Department	Phone	Email
Thomas Caffall	Complex Eng	Travis TNR	512 854 6435	tom.caffall@travis
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2

H2O PARTNERS

TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Kickoff Workshop
Travis County Emergency Operations Center, Austin, TX
December 19, 2016

Please print clearly.

Name	Title	Department	Phone	Email
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3

Figure E-2. Travis County Risk Assessment and Mitigation Strategy Workshop, 03.09.17

(3 pages)

H2O PARTNERS

TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Risk Assessment & Mitigation Strategy Workshops
Travis County Emergency Operations Center, Austin, TX
March 9, 2017

Please print clearly.

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Melinda Mollar	Program Manager	TC TNR	512 854-4780	Melinda.Mollar@traviscountytx.gov
Anna Poulin	DIV DIR DSKRR	TC TNR	512 854-7561	anna.poulin@traviscountytx.gov
T. BIRKWDAL	RMC	HHS	512-854-8058	

1

H2O PARTNERS

TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Risk Assessment & Mitigation Strategy Workshops
Travis County Emergency Operations Center, Austin, TX
March 9, 2017

Please print clearly.

Name	Title	Department	Phone	Email
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H2O PARTNERS

TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Risk Assessment & Mitigation Strategy Workshops
Travis County Emergency Operations Center, Austin, TX
March 9, 2017

Please print clearly.

Name	Title	Department	Phone	Email
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Blake Claypool	TC Asst Emc	Travis Co OEM	512 974 0472	
Gary Howell	TCFMO	Deputy Fire Marshalls	512-854-4621	Gary.howell@traviscounty tx.gov
Jeremy Traber	TCFMO	" "	512-854-4621	Jeremy.traber@traviscounty tx.gov

3

PUBLIC MEETING DOCUMENTATION

As discussed in Section 2, a series of seven public meetings were held in conjunction with each of the workshops. Documentation in the form of sign-in sheets for each of the meetings follows.

Figure E-3. Village of The Hills/Lakeway Kickoff Public Meeting, 01.23.17 (2 pages)

H2O PARTNERS

TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Kick Off Public Meeting
Lakeway City Hall, Lakeway, TX
January 23, 2017

Please print clearly.

Name	Title	Department	Phone	Email
Rachel Andrews	Mitigation Specialist	H2O Partners	512-983-0092	rachel@h2opartnersusa.com
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WENDY L SMITH	VILLAGE MANAGER	VILLAGE OF THE HILLS	956.330.1554	WENDYSMITH@VILLAGEOFTHEHILLS.OR
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Leslee Bassman	Community Impact	News Editor	512-617-1376	lbassman@communityimpact.com
TODD RADFORD	CHIEF OF POLICE	LPD	512 314 7586	toddradford@lakeway-tx.gov

1

H2O PARTNERS

TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Kick Off Public Meeting
Lakeway City Hall, Lakeway, TX
January 23, 2017

Please print clearly.

Name	Title	Department	Phone	Email
Tina Shively	Reporter		(512) 459-2257	tshively@kvue.com

2

Figure E-4. Pflugerville Kickoff Public Meeting, 01.26.17

H2O PARTNERS

TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Kick Off Public Meeting
Pflugerville Justice Center, Pflugerville, TX
January 26, 2017

Please print clearly.

Name	Title	Department	Phone	Email
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Bryce Miller	Lieutenant	Travis County Sheriff	(512)854-7434	Bryce.Miller@traviscountytx.gov

1

Figure E-5. Manor Kickoff Public Meeting, 01.26.17

H2O PARTNERS

TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Kick Off Public Meeting
Manor City Hall, Manor, TX
January 26, 2017

Please print clearly.

Name	Title	Department	Phone	Email
Rachel Andrews	Mitigation Specialist	H2O Partners	512-983-0092	rachel@h2opartnersusa.com
James Allen	Lieutenant	Manor PD	512-844-7033	jallen@cityofmanor.org
Thomas Bolt	City Mgr	Admin	512-272-5555	tbolt@cityofmanor.org
Lydia M Collins	Director of Finance	Finance	512-272-5555	LCOLLINS@CITYOFMANOR.ORG
Ryan Phipps	Chief of Police	Manor PD	512 272 8177	rphipps@cityofmanor.org
Denver Collins	Police Captain	Manor PD	512 364-5961	dcollins@cityofmanor.org

1

Figure E-6. Sunset Valley Kickoff Public Meeting, 01.30.17

H2O PARTNERS

TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Kick Off Public Meeting
Sunset Valley City Hall, Sunset Valley, TX
January 30, 2017

Please print clearly.

Name	Title	Department	Phone	Email
Rachel Andrews	Mitigation Specialist	H2O Partners	512-983-0092	rachel@h2opartnersusa.com
Ruth Dawson	homeowner		512-892-2896	rdawson@1Name.com
A. Carmona	home owner		512-892-4819	acarmona1@austin.rr.com
S. Wilson	Assistant City Admnist	Admin (COSV)	(512) 892-1383	swilson@sunsetvally.org
M Powers	council		512-784-4123	flymypower123@yahoo.com
Ken Hosen	homeowner		512 590 0445	KHosen@KHMfg.com
Paula Clack	homeowner (PAULA CLACK)		512 422 2935	PAULACLACK1@att.net
TROY CHAFIN	HOMEOWNER		512 899-8112	tchafin@austin.rr.com
DIANA CHAFIN	"		"	dchafin@austin.rr.com
Helen Bass	"		512-892-3153	helench108@gmail.com
Karen Medicus	homeowner		512 382 6353	Kmedicus@austin.rr.com
Ann McMaster	homeowner		512-387-3784	mcmasterann@gmail.com

1

Figure E-7. Del Valle Kickoff Public Meeting, 02.02.17

H2O PARTNERS

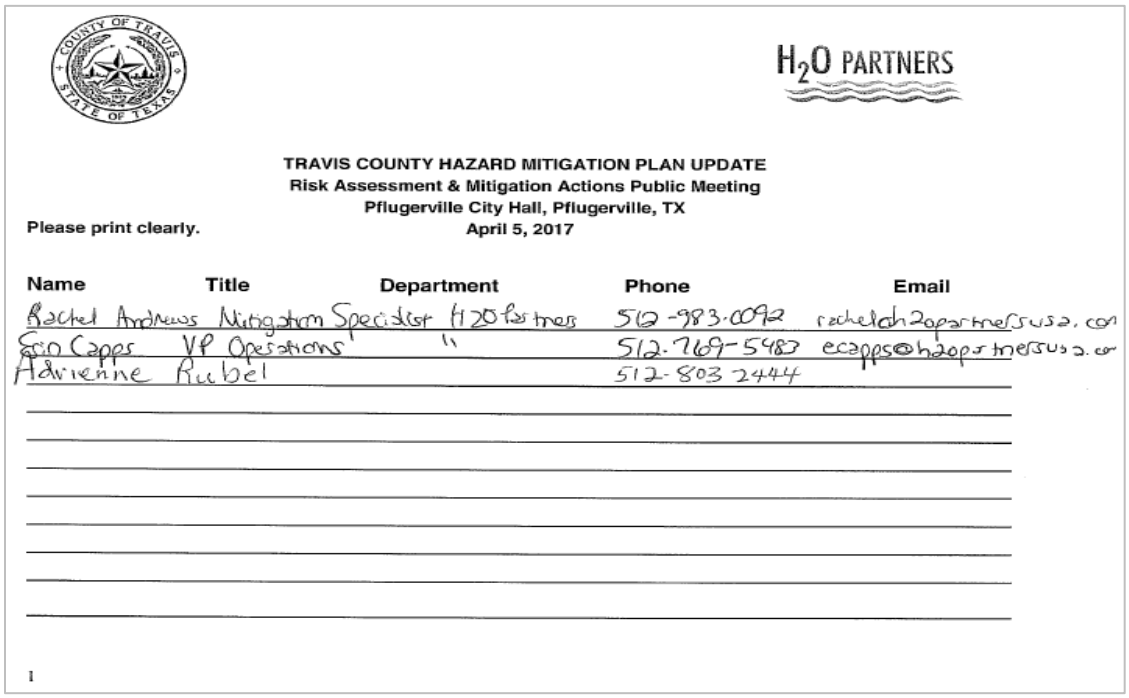
TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Kick Off Public Meeting
Elroy Library, Del Valle, TX
February 2, 2017

Please print clearly.

Name	Title	Department	Phone	Email
Rachel Andrews	Mitigation Specialist	H2O Partners	512-983-0092	rachel@h2opartnersusa.com
Christine Wharton			512-300-7810	aprilswork@yahoo.com
April MARshall			512-577-5205	aprilswork@yahoo.com
BEN WALKER	BATTALION CHIEF	TRAVIS COUNTY FIRE RESCUE	512-652-8690	benwalker@traviscountyfire.org
Blake Clouffer	Assistant EMC	TRAVIS COUNTY OEM	512 974 6472	blake.clouffer@traviscountytx.gov

1

Figure E-8. Pflugerville Risk Assessment and Mitigation Actions Public Meeting, 04.05.17



H2O PARTNERS

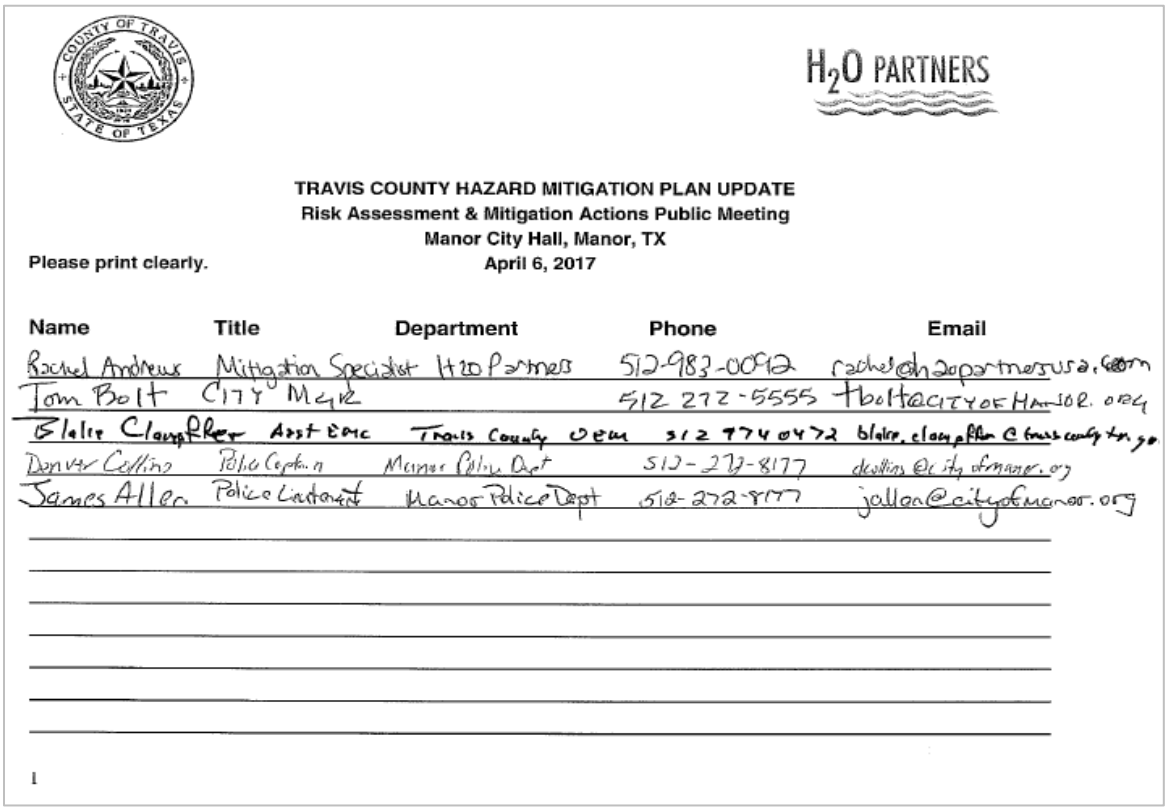
TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Risk Assessment & Mitigation Actions Public Meeting
Pflugerville City Hall, Pflugerville, TX
April 5, 2017

Please print clearly.

Name	Title	Department	Phone	Email
Rachel Andrews	Mitigation Specialist	H2O Partners	512-983-0092	rachel@h2opartnersusa.com
Erin Capps	VP Operations	"	512-769-5483	ecapps@h2opartnersusa.com
Adrienne Rubel			512-803 2444	

1

Figure E-9. Manor Risk Assessment and Mitigation Actions Public Meeting, 04.05.17



H2O PARTNERS

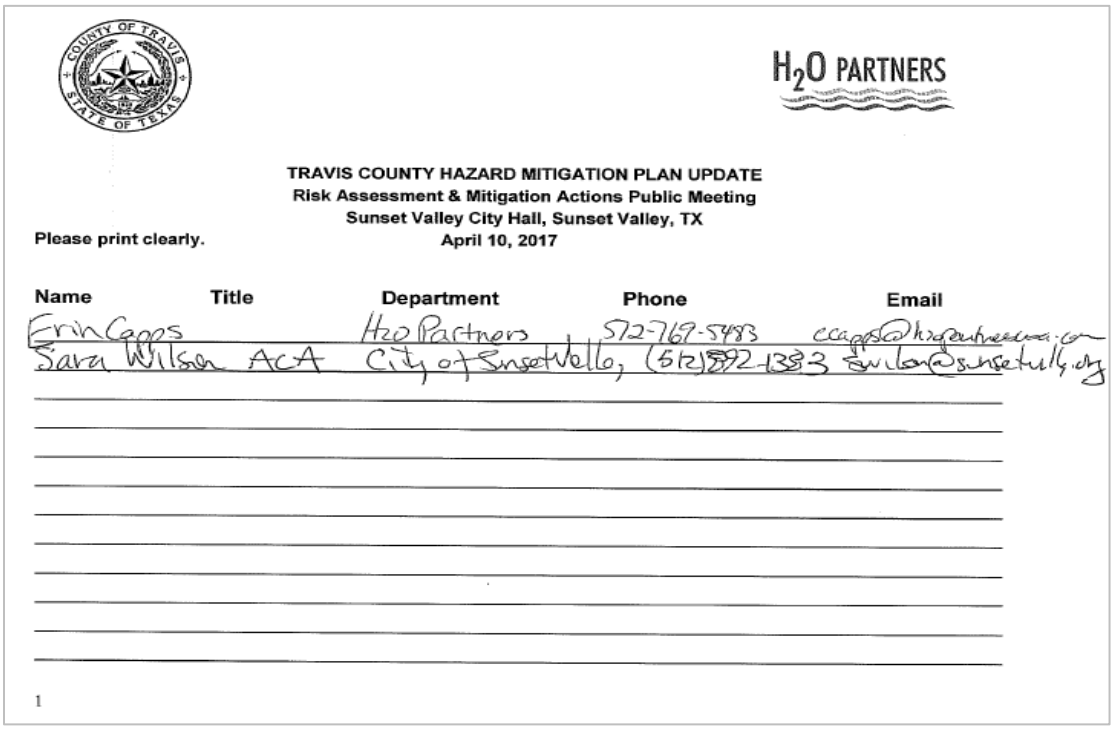
TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Risk Assessment & Mitigation Actions Public Meeting
Manor City Hall, Manor, TX
April 6, 2017

Please print clearly.

Name	Title	Department	Phone	Email
Rachel Andrews	Mitigation Specialist	H2O Partners	512-983-0092	rachel@h2opartnersusa.com
Tom Bolt	City Mayor		512 272-5555	tbolt@cityofmanor.org
Blake Claughton	Asst EMC	Travis County OEM	512 774 0472	blake.claughton@traviscountytx.gov
Denver Collins	Police Captain	Manor Police Dept	512-272-8177	dcollins@cityofmanor.org
James Allen	Police Lieutenant	Manor Police Dept	512-272-8177	jallen@cityofmanor.org

1

Figure E-10. Sunset Valley Risk Assessment and Mitigation Actions Public Meeting, 04.10.17



H2O PARTNERS

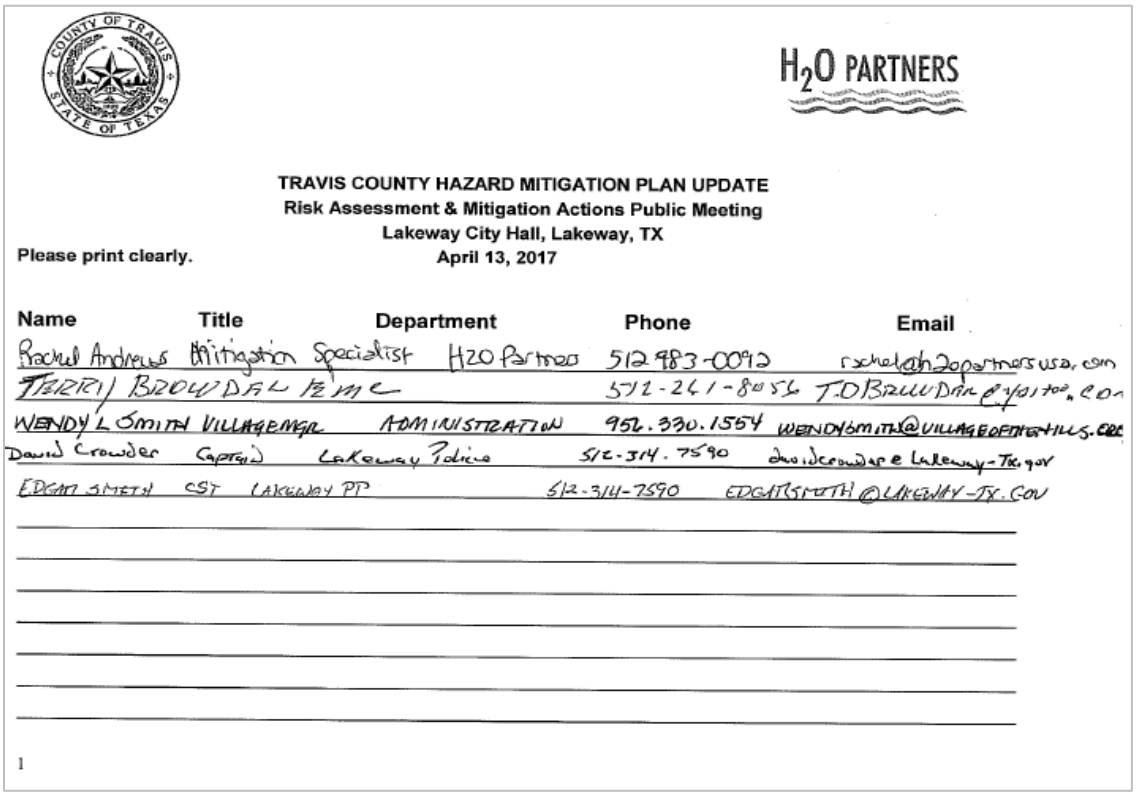
TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Risk Assessment & Mitigation Actions Public Meeting
Sunset Valley City Hall, Sunset Valley, TX
April 10, 2017

Please print clearly.

Name	Title	Department	Phone	Email
Erin Capps		H2O Partners	512-769-5483	ccapps@h2opartnersusa.com
Sara Wilson	ACA	City of Sunset Valley	(512)892-1383	swilson@sunsetvalley.org

1

Figure E-11. Lakeway Risk Assessment and mitigation Actions Public Meeting, 04.06.17



H2O PARTNERS

TRAVIS COUNTY HAZARD MITIGATION PLAN UPDATE
Risk Assessment & Mitigation Actions Public Meeting
Lakeway City Hall, Lakeway, TX
April 13, 2017

Please print clearly.

Name	Title	Department	Phone	Email
Rachel Andrews	Mitigation Specialist	H2O Partners	512 983-0092	rachel@h2opartnersusa.com
Terri Browdal	Fire		512-261-8056	T.Browdal@austintx.com
Wendy L Smith	Village Mgr	Administration	952.330.1554	wendysmith@villageofminnetonkahills.com
David Crowder	Captain	Lakeway Police	512-314.7590	davidcrowder@lakeway-tx.gov
Edgar Smith	CST	Lakeway PD	512-314-7590	edgarsmith@lakeway-tx.gov

1

PUBLIC NOTICES

Public notices to announce Travis County's participation in the Plan Update development process were posted on various websites and Facebook, as shown in Figures E-12 through E-26. Additionally, as seen in Figures E-14, E-15, E17 to E-20, E-23, E-24, and E-26, the County and participating jurisdictions invited the public to participate in the survey.

Figure E-12. Public Notice, Travis County Facebook Posting, 01.25.17 Public Meeting

Figure E-13. Public Notice, the Village of the Hills Web Page, 01.13.17 Public Meeting

Figure E-14. Public Notice, Lakeway Web Page, 01.12.17 Public Meeting and Survey Invitation

Figure E-15. Public Notice, Lakeway Police Facebook Posting, 01.12.17 Public Meeting and Survey Invitation

Figure E-16. Public Notice, Manor Facebook Posting, 01.11.17 Public Meeting

Figure E-17. Public Notice, Sunset Valley Web Page, 01.27.17 Public Meeting and Survey Invitations

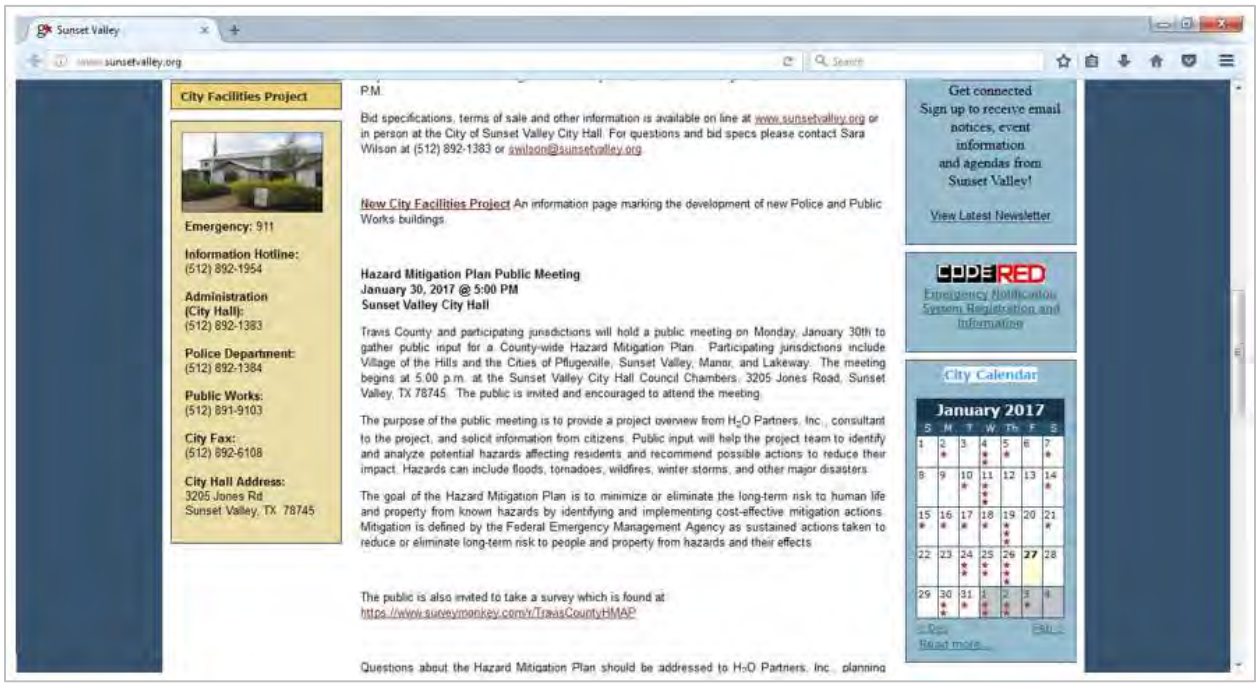


Figure E-18. Public Notice, Del Valle Community Coalition Facebook Posting, 02.06.17 Survey Invitation

Figure E-19. News Report, Travis County, Community Impact Web Page, 01.24.17 Public Meeting and Survey Invitation

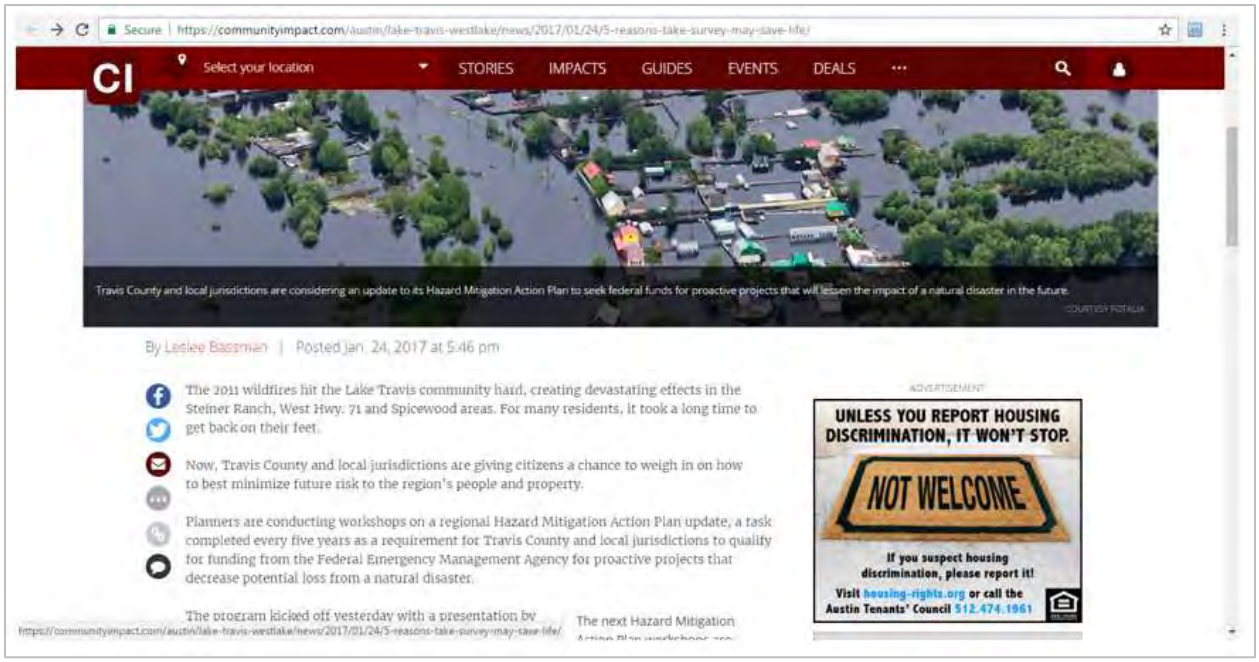


Figure E-20. News Report Travis County, KVUE Web Page, 01.23.17 Public Meeting and Survey Invitations

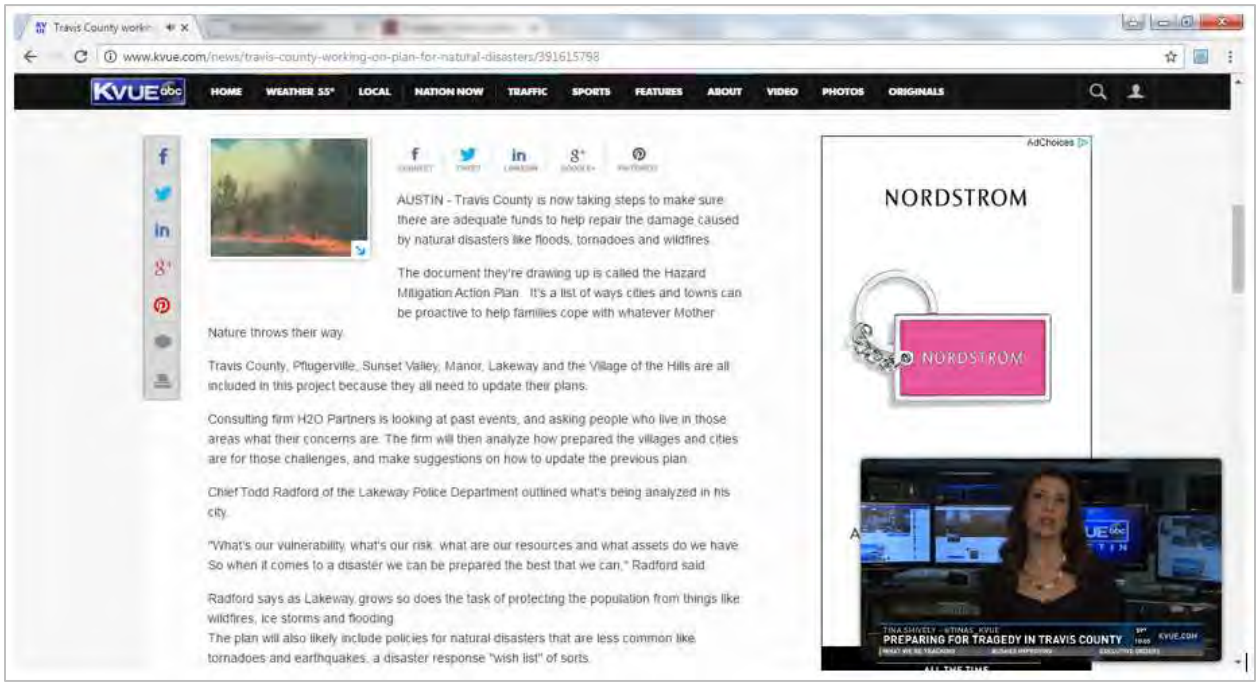
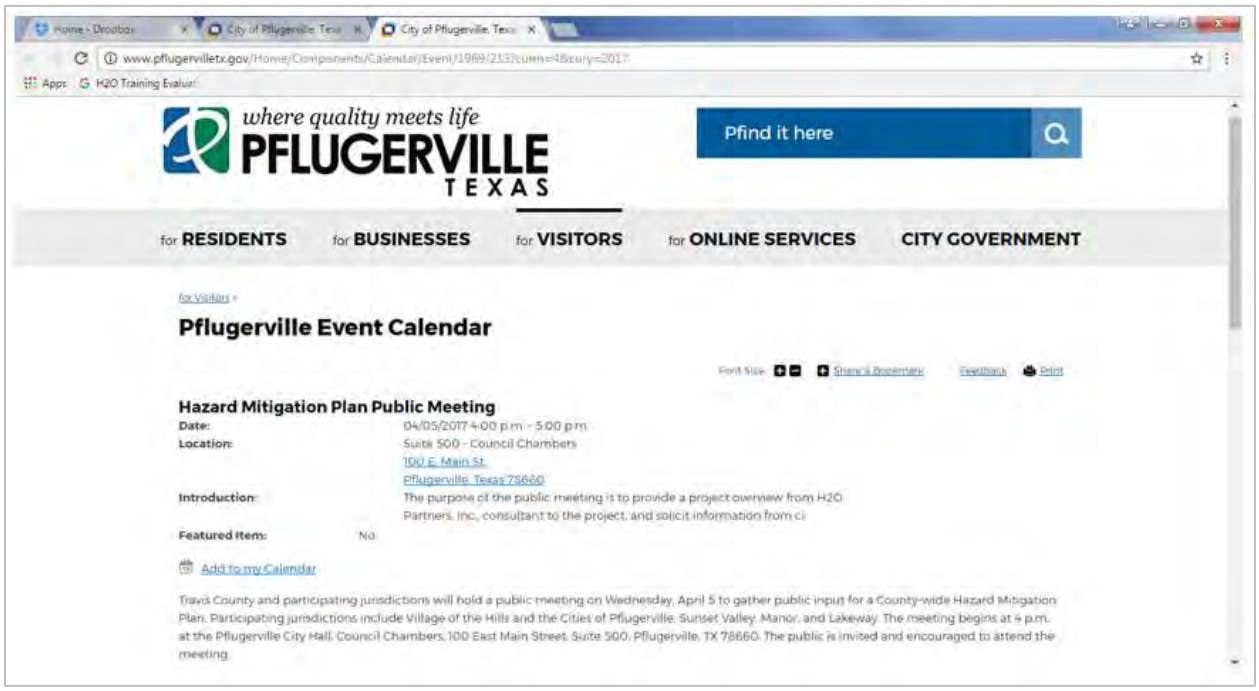


Figure E-21. Pflugerville Community Events Calendar Web Page, 03.14.17 Public Meeting



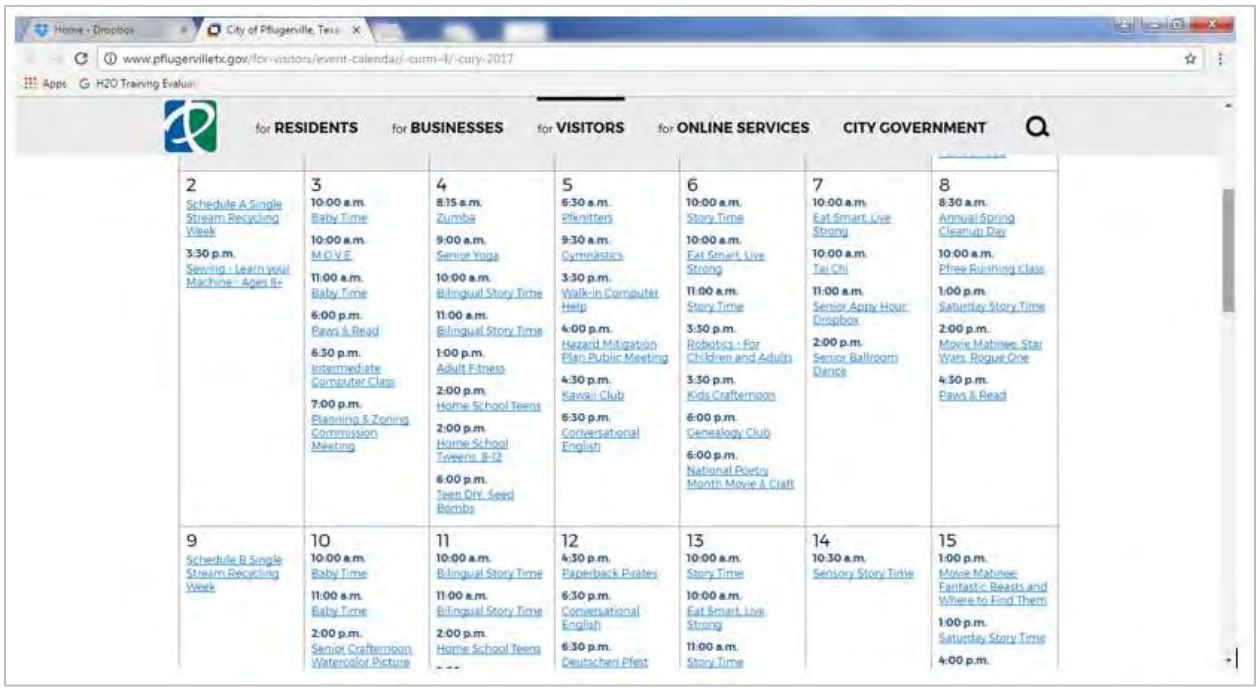
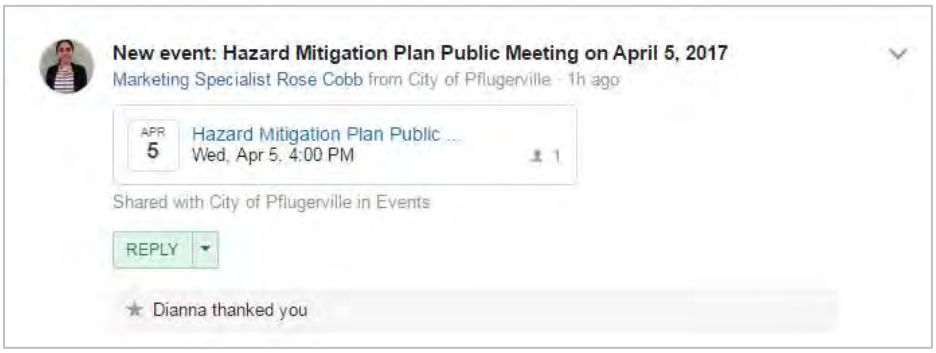


Figure E-22. Nextdoor Pflugerville Calendar Posting, 03.14.17 Public Meeting



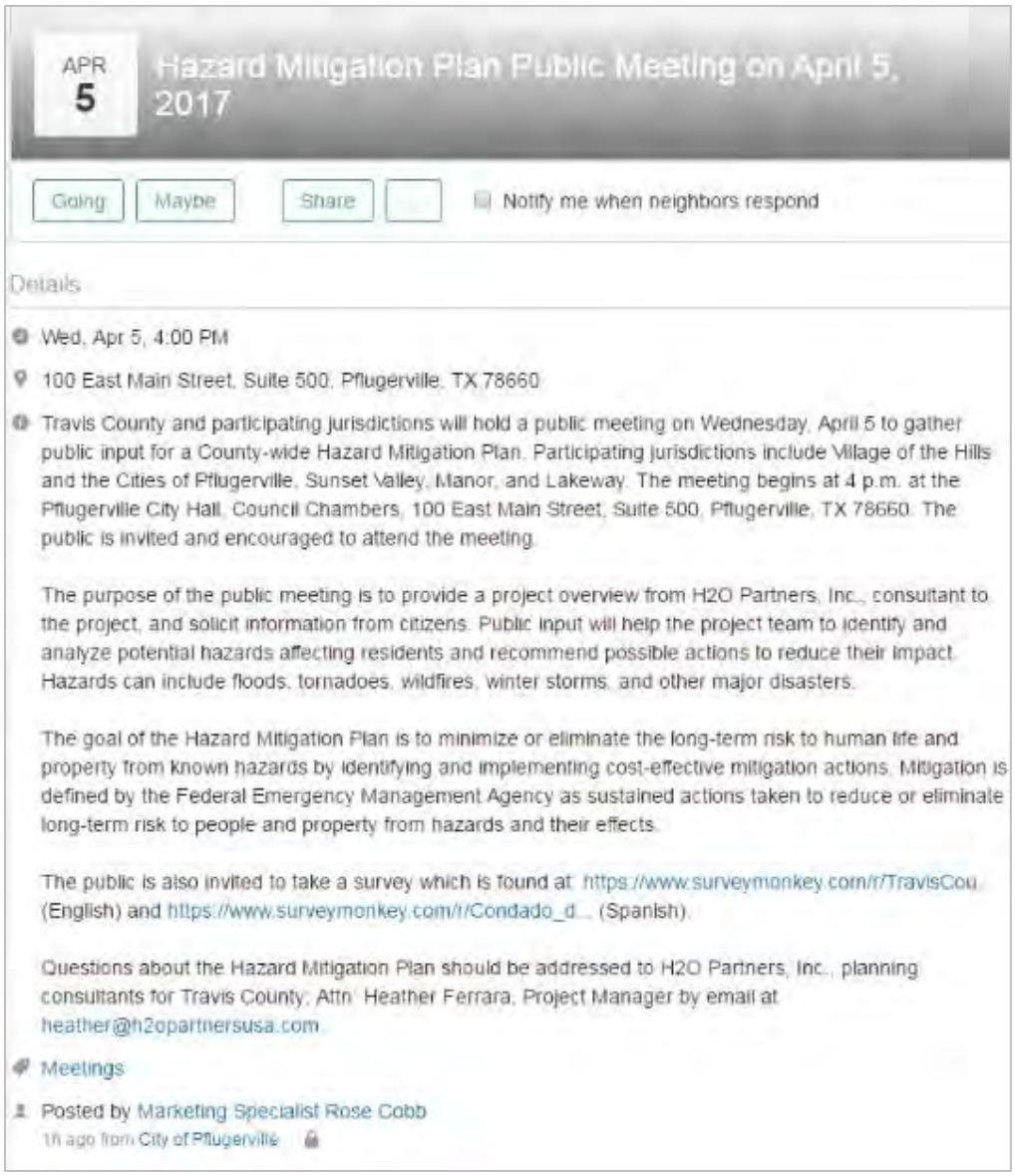
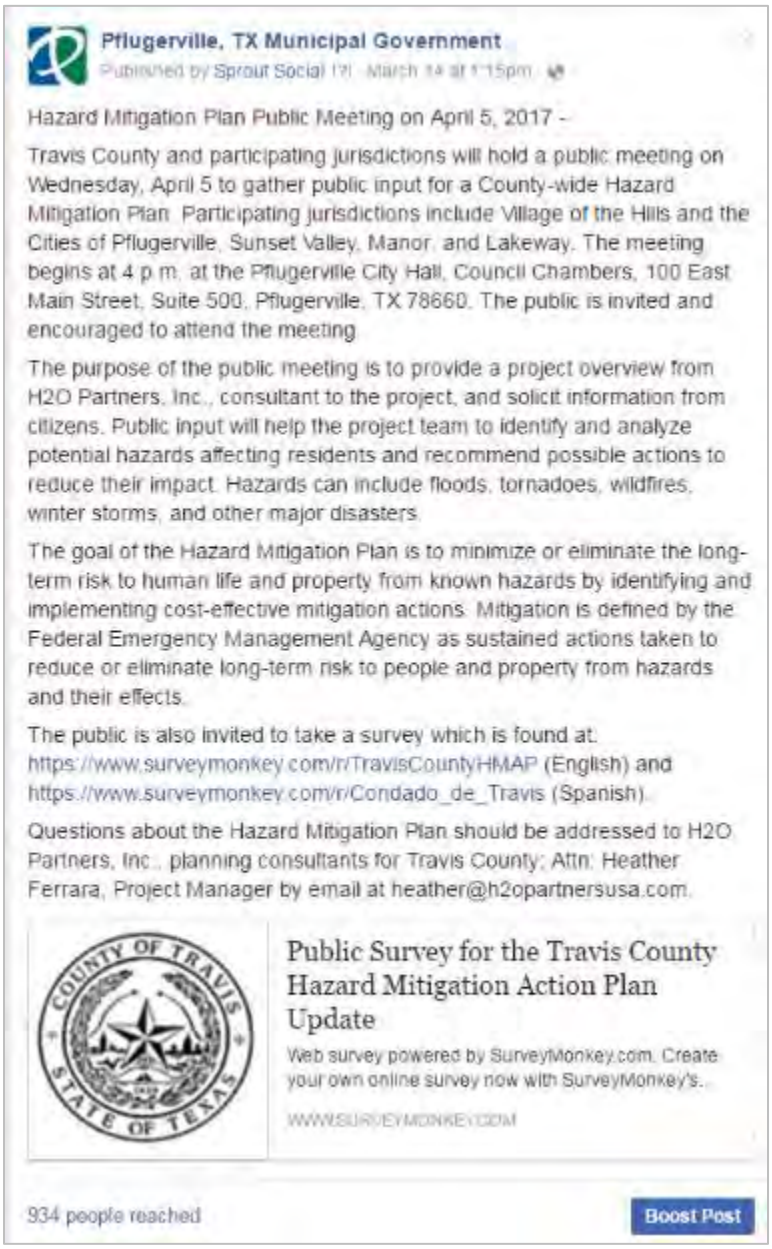


Figure E-23. Pflugerville Facebook Posting, 03.14.17 Public Meeting and Survey Invitations



Pflugerville, TX Municipal Government
Published by Sprout Social [?] · March 14 at 1:15pm

Hazard Mitigation Plan Public Meeting on April 5, 2017 -

Travis County and participating jurisdictions will hold a public meeting on Wednesday, April 5 to gather public input for a County-wide Hazard Mitigation Plan. Participating jurisdictions include Village of the Hills and the Cities of Pflugerville, Sunset Valley, Manor, and Lakeway. The meeting begins at 4 p.m. at the Pflugerville City Hall, Council Chambers, 100 East Main Street, Suite 500, Pflugerville, TX 78660. The public is invited and encouraged to attend the meeting.

The purpose of the public meeting is to provide a project overview from H2O Partners, Inc., consultant to the project, and solicit information from citizens. Public input will help the project team to identify and analyze potential hazards affecting residents and recommend possible actions to reduce their impact. Hazards can include floods, tornadoes, wildfires, winter storms, and other major disasters.

The goal of the Hazard Mitigation Plan is to minimize or eliminate the long-term risk to human life and property from known hazards by identifying and implementing cost-effective mitigation actions. Mitigation is defined by the Federal Emergency Management Agency as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects.

The public is also invited to take a survey which is found at: https://www.surveymonkey.com/r/TravisCountyHMAP (English) and https://www.surveymonkey.com/r/Condado_de_Travis (Spanish).

Questions about the Hazard Mitigation Plan should be addressed to H2O Partners, Inc., planning consultants for Travis County; Attn: Heather Ferrara, Project Manager by email at heather@h2opartnersusa.com.

Public Survey for the Travis County Hazard Mitigation Action Plan Update

Web survey powered by SurveyMonkey.com. Create your own online survey now with SurveyMonkey's...

WWW.SURVEYMONKEY.COM

934 people reached

Boost Post

Figure E-24. Manor Facebook Posting, 03.14.17 Public Meeting and Survey Invitations

FOR IMMEDIATE RELEASE
March 16, 2017

Hazard Mitigation Plan Public Meeting on April 6, 2017

Travis County and participating jurisdictions will hold a public meeting on Thursday, April 6th to gather public input for a County-wide Hazard Mitigation Plan. Participating jurisdictions include Village of the Hills and the Cities of Pflugerville, Sunset Valley, Manor, and Lakeway. The meeting begins at 6:00 p.m. at the Manor City Hall Council Chambers, 105 E. Eggleston St., Manor, Texas 78653. The public is invited and encouraged to attend the meeting.

The purpose of the public meeting is to provide a project overview from H_2O Partners, Inc., consultant to the project, and solicit information from citizens. Public input will help the project team to identify and analyze potential hazards affecting residents and recommend possible actions to reduce their impact. Hazards can include floods, tornadoes, wildfires, winter storms, and other major disasters.

The goal of the Hazard Mitigation Plan is to minimize or eliminate the long-term risk to human life and property from known hazards by identifying and implementing cost-effective mitigation actions. Mitigation is defined by the Federal Emergency Management Agency as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects.

The public is also invited to take a survey which is found at
https://www.surveymonkey.com/r/TravisCountyHMAP (English) and
https://www.surveymonkey.com/r/Condado_de_Travis (Spanish).

Questions about the Hazard Mitigation Plan should be addressed to H_2O Partners, Inc., planning consultants for Travis County; Attn: Heather Ferrara, Project Manager by email at

Figure E-25. City of Lakeway Facebook Posting, 03.14.17 Public Meeting

City of Lakeway
Like This Page · March 14

Travis County and participating jurisdictions will hold a public meeting to gather public input for a County-wide Hazard Mitigation Plan at 4 p.m. April 13 at Lakeway City Hall, 1102 Lohmans Crossing. Participating jurisdictions include the cities of Lakeway, Pflugerville, Sunset Valley and Manor and the Village of The Hills.
The public is invited and encouraged to attend the meeting.
The purpose of the public meeting is to provide a project overview from H2O Partners Inc., consultant to the project, and solicit information from citizens. Public input will help the project team to identify and analyze potential hazards affecting residents and recommend possible actions to reduce their impact. Hazards can include floods, tornadoes, wildfires, winter storms and other major disasters.
The goal of the Hazard Mitigation Plan is to minimize or eliminate the long-term risk to human life and property from known hazards by identifying and implementing cost-effective mitigation actions. Mitigation is defined by the Federal Emergency Management Agency as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects.
The public is also invited to take a survey which is

Figure E-26. Sunset Valley Web Page, 03.14.17 Public Meeting and Survey Invitations

APPENDIX F: CAPABILITY ASSESSMENT

Overview 1

Travis County Capability Assessment 2

City of Lakeway Capability Assessment 4

City of Manor Capability Assessment 6

City of Pflugerville Capability Assessment 8

City of Sunset Valley Capability Assessment 10

Village of the Hills Capability Assessment 12

OVERVIEW

The Planning Team completed a Capability Assessment Survey at the beginning of the planning process. The completed Capability Assessment Checklist, included in Appendix F, provides information on existing policies, plans, and regulations for Travis County and the participating jurisdictions.

A Capability Assessment is an integral component of the Plan Update 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.

TRAVIS COUNTY CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST		
Planning/Regulatory Tools/Policies	**In Place**	**Under Development**
Building Code	X	
Capital Improvements Plan	X	
Community Wildfire Protection Plan	X	
Comprehensive/Master Plan	X	
Continuity of Operations Plan		X
Economic Development Plan		
Emergency Operations Plan	X	
Evacuation Plan		X
Flood Response Plan		X
Floodplain Management Plan	X	
Floodplain Ordinance	X	
Hazard Mitigation Plan	X	
Historic Preservation Plan		
Land Use Plan		X *floodplain only
Local Waterfront Protection Plan		
Open Space Plan	X	
Post-Disaster Recovery Plan	X	
Property set-back Ordinance (water/wildfire/other hazard)		
Real Estate Disclosure Requirements		
Redevelopment Plan		X

COMMUNITY CAPABILITY CHECKLIST		
Site Plan Review Requirements	X	
Steep Slope Ordinance		
Stormwater Management Plan	X	
Stormwater Ordinance	X	
Subdivision Regulations	X	
Transportation Plan		X
Watershed Protection Plan		
Zoning Ordinance/Land Use Restrictions	X	X
Administrative and Technical Capability		
Planners	X	
Engineers	X	
Emergency Manager	X	
Floodplain Manager	X	
Personnel skilled in Geographic Information Systems (GIS)	X	
Resource development staff or grant writers	X	
Financial Resources		
Capital Improvement Programming	X	
Community Development Block Grants (CDBG)	X	
Stormwater Utility Fees	X	
Development Impact Fees		
Partnering Agreements or Intergovernmental Agreements	X	

CITY OF LAKEWAY CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST		
Planning/Regulatory Tools/Policies	**In Place**	**Under Development**
Building Code	X	
Capital Improvements Plan	X	
Community Wildfire Protection Plan		
Comprehensive/Master Plan		
Continuity of Operations Plan		
Economic Development Plan	X	
Emergency Operations Plan	X	
Evacuation Plan	X	
Flood Response Plan		
Floodplain Management Plan		
Floodplain Ordinance	X	
Hazard Mitigation Plan	X	
Historic Preservation Plan	X	
Land Use Plan		
Local Waterfront Protection Plan		
Open Space Plan		
Post-Disaster Recovery Plan	X	
Property set-back Ordinance (water/wildfire/other hazard)	X	
Real Estate Disclosure Requirements		
Redevelopment Plan		

COMMUNITY CAPABILITY CHECKLIST		
Site Plan Review Requirements	X	
Steep Slope Ordinance	X	
Stormwater Management Plan		
Stormwater Ordinance	X	
Subdivision Regulations	X	
Transportation Plan	X	
Watershed Protection Plan		
Zoning Ordinance/Land Use Restrictions	X	
Administrative and Technical Capability		
Planners	X	
Engineers	X	
Emergency Manager	X	
Floodplain Manager	X	
Personnel skilled in Geographic Information Systems (GIS)	X	
Resource development staff or grant writers		
Financial Resources		
Capital Improvement Programming		
Community Development Block Grants (CDBG)		
Stormwater Utility Fees		
Development Impact Fees		
Partnering Agreements or Intergovernmental Agreements		

CITY OF MANOR CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST		
Planning/Regulatory Tools/Policies	**In Place**	**Under Development**
Building Code	X	
Capital Improvements Plan	X	
Community Wildfire Protection Plan		
Comprehensive/Master Plan		X
Continuity of Operations Plan		X
Economic Development Plan		X
Emergency Operations Plan	X	
Evacuation Plan		
Flood Response Plan		
Floodplain Management Plan	X	
Floodplain Ordinance	X	
Hazard Mitigation Plan		X
Historic Preservation Plan		
Land Use Plan	X	
Local Waterfront Protection Plan		
Open Space Plan	X	
Post-Disaster Recovery Plan		
Property set-back Ordinance (water/wildfire/other hazard)	X	
Real Estate Disclosure Requirements		
Redevelopment Plan		

COMMUNITY CAPABILITY CHECKLIST		
Site Plan Review Requirements	X	
Steep Slope Ordinance		
Stormwater Management Plan	X	
Stormwater Ordinance	X	
Subdivision Regulations	X	
Transportation Plan	X	
Watershed Protection Plan		
Zoning Ordinance/Land Use Restrictions	X	
Administrative and Technical Capability		
Planners	X	
Engineers	X	
Emergency Manager	X	
Floodplain Manager	X	
Personnel skilled in Geographic Information Systems (GIS)	X	
Resource development staff or grant writers	X	
Financial Resources		
Capital Improvement Programming		
Community Development Block Grants (CDBG)		
Stormwater Utility Fees		
Development Impact Fees	X	
Partnering Agreements or Intergovernmental Agreements	X	

CITY OF PFLUGERVILLE CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST		
Planning/Regulatory Tools/Policies	**In Place**	**Under Development**
Building Code	X	
Capital Improvements Plan	X	X
Community Wildfire Protection Plan		
Comprehensive/Master Plan	X	
Continuity of Operations Plan		
Economic Development Plan		X
Emergency Operations Plan	X	
Evacuation Plan		
Flood Response Plan		
Floodplain Management Plan	X	
Floodplain Ordinance	X	
Hazard Mitigation Plan	X	
Historic Preservation Plan		
Land Use Plan	X	
Local Waterfront Protection Plan		
Open Space Plan	X	
Post-Disaster Recovery Plan		
Property set-back Ordinance (water/wildfire/other hazard)		
Real Estate Disclosure Requirements		
Redevelopment Plan		

COMMUNITY CAPABILITY CHECKLIST		
Site Plan Review Requirements	X	
Steep Slope Ordinance		
Stormwater Management Plan	X	
Stormwater Ordinance	X	
Subdivision Regulations	X	
Transportation Plan	X	
Watershed Protection Plan		
Zoning Ordinance/Land Use Restrictions	X	
Administrative and Technical Capability		
Planners	X	
Engineers	X	
Emergency Manager	X	
Floodplain Manager	X	
Personnel skilled in Geographic Information Systems (GIS)	X	
Resource development staff or grant writers		
Financial Resources		
Capital Improvement Programming	X	
Community Development Block Grants (CDBG)	X	
Stormwater Utility Fees	X	
Development Impact Fees	X	
Partnering Agreements or Intergovernmental Agreements	X	

CITY OF SUNSET VALLEY CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST		
Planning/Regulatory Tools/Policies	**In Place**	**Under Development**
Building Code	X	
Capital Improvements Plan	X	
Community Wildfire Protection Plan	X	
Comprehensive/Master Plan	X	
Continuity of Operations Plan	X	
Economic Development Plan		X
Emergency Operations Plan	X	
Evacuation Plan	X	
Flood Response Plan	X	
Floodplain Management Plan	X	
Floodplain Ordinance	X	
Hazard Mitigation Plan	X	
Historic Preservation Plan	X	
Land Use Plan	X	
Local Waterfront Protection Plan	X	
Open Space Plan	X	
Post-Disaster Recovery Plan	X	
Property set-back Ordinance (water/wildfire/other hazard)	X	
Real Estate Disclosure Requirements	X	
Redevelopment Plan	X	

COMMUNITY CAPABILITY CHECKLIST		
Site Plan Review Requirements	X	
Steep Slope Ordinance	X	
Stormwater Management Plan	X	
Stormwater Ordinance	X	
Subdivision Regulations	X	
Transportation Plan	X	
Watershed Protection Plan	X	
Zoning Ordinance/Land Use Restrictions	X	
Administrative and Technical Capability		
Planners		
Engineers		
Emergency Manager	X	
Floodplain Manager	X	
Personnel skilled in Geographic Information Systems (GIS)	X	
Resource development staff or grant writers		
Financial Resources		
Capital Improvement Programming		
Community Development Block Grants (CDBG)		
Stormwater Utility Fees	X	
Development Impact Fees	X	
Partnering Agreements or Intergovernmental Agreements		

VILLAGE OF THE HILLS CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST		
Planning/Regulatory Tools/Policies	**In Place**	**Under Development**
Building Code	X	
Capital Improvements Plan		X
Community Wildfire Protection Plan	X	
Comprehensive/Master Plan		
Continuity of Operations Plan		
Economic Development Plan		
Emergency Operations Plan	X	
Evacuation Plan		
Flood Response Plan		
Floodplain Management Plan	X	
Floodplain Ordinance	X	
Hazard Mitigation Plan	X	
Historic Preservation Plan		
Land Use Plan		
Local Waterfront Protection Plan		
Open Space Plan		
Post-Disaster Recovery Plan		
Property set-back Ordinance (water/wildfire/other hazard)	X	
Real Estate Disclosure Requirements	X	
Redevelopment Plan		

COMMUNITY CAPABILITY CHECKLIST		
Site Plan Review Requirements	X	
Steep Slope Ordinance	X	
Stormwater Management Plan	X	
Stormwater Ordinance	X	
Subdivision Regulations	X	
Transportation Plan		
Watershed Protection Plan	X	
Zoning Ordinance/Land Use Restrictions		
Administrative and Technical Capability		
Planners		
Engineers	X	
Emergency Manager	X	
Floodplain Manager	X	
Personnel skilled in Geographic Information Systems (GIS)	X	
Resource development staff or grant writers	X	
Financial Resources		
Capital Improvement Programming	X	
Community Development Block Grants (CDBG)		
Stormwater Utility Fees		
Development Impact Fees		
Partnering Agreements or Intergovernmental Agreements	X	