



CITY OF AUSTIN

HAZARD MITIGATION PLAN UPDATE



September 2010



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For more information, visit our website at:

www.ci.austin.tx.us/oem

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Background

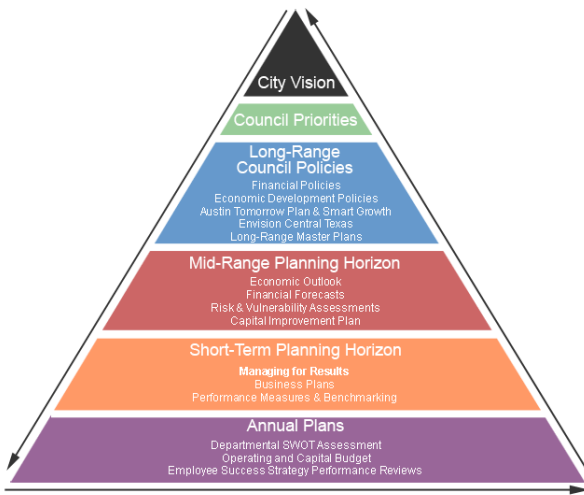
The City of Austin is the Capital of Texas. It is a vibrant community known for arts, culture, education and music. Austin’s vision is to become the most livable city in the country. This vision is supported through: city council priorities; organizational values; comprehensive planning; and corporate initiatives.



The City of Austin is committed to providing the highest level of service to its citizens, and comprehensive planning is integral in realizing the City’s vision.

Austin’s comprehensive planning structure is established as a pyramid. The first three layers of the pyramid focus on overarching long-term planning efforts: city vision, council priorities and long-range council policies and plans. This level of detail provides the framework for the mid and short-range planning documents that are more responsive to changes in the environment and are easily refined and revisited on a regular basis. Moving down the planning pyramid, more flexibility is allowed while modifications stay confined to the vision and council priorities.

Section 1 – Introduction



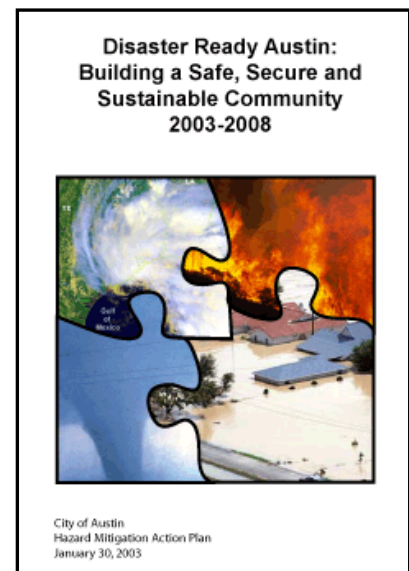
One objective to meeting the city council priority of maintaining a healthy and safe city is protecting lives and property. The City accomplishes this through wise planning, including the development of mitigation plans, commonly referred to as Hazard Mitigation Action Plans (HMAP).

Despite the planning mechanisms that the City currently has in place, Austin can be subject to natural and man-caused

or technological hazards. These life-threatening hazards can destroy property, disrupt the economy and lower the overall quality of life for individuals. While it is impossible to prevent a hazard event from occurring, the impact of hazards can be lessened in terms of their effect on people and property. 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*¹. Communities participate in hazard mitigation by developing hazard mitigation plans. The Texas Division of Emergency Management (TDEM) and FEMA have authority to review and approve of hazard mitigation plans through the Disaster Mitigation Act of 2000.

The City of Austin initially developed a Hazard Mitigation Action Plan in 2003, which was one of the first mitigation plans approved by FEMA in 2004 for the State of Texas. This plan, titled, “Disaster Ready Austin: Building a Safe, Secure and Sustainable Community²” was developed between the city and the Lower Colorado River Authority (LCRA).

The mitigation planning regulation of the Disaster Mitigation Act requires that mitigation plans be



¹www.fema.gov

² The 2004 FEMA-approved plan can be found at:
<http://www.ci.austin.tx.us/disasterready/mitplan.htm>

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reviewed and revised within five years of approval to maintain eligibility for mitigation grant funding³ Since FEMA originally approved the Austin HMAP in 2004, the City began the process of developing a Hazard Mitigation Action Plan Update (hereinafter “Update” or “Plan Update”) in order to maintain eligibility for grant funding within the five-year window by applying for a Hazard Mitigation Grant Program (HMGP) planning grant in 2008. The City was awarded grant funds in September of 2008 and selected the consultant team of H2O Partners, Inc. and subcontractor Post, Buckley, Schuh & Jernigan, Inc. (PBS&J) to write and develop the Update, which provides an opportunity for the City to evaluate successful mitigation actions and explore opportunities to avoid future disaster loss.

It is widely accepted that the most effective 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 mitigation plans addresses hazard vulnerabilities that exist today and in the foreseeable future. Therefore it is essential that projected patterns of future development are evaluated and considered in terms of how that growth will increase or decrease a community’s overall hazard vulnerability. The Office of Homeland Security and Emergency



HSEM
**OFFICE OF HOMELAND SECURITY
AND EMERGENCY MANAGEMENT**

Management (HSEM) is responsible for overseeing the development of the Plan Update for the City of Austin.

Scope

This Hazard Mitigation Action Plan Update for the City of Austin, Texas is intended as a blueprint for future hazard mitigation. This Plan Update is designed to help maintain a sustainable community that, when confronted by natural or man-caused disasters, will sustain fewer losses and recover more quickly.

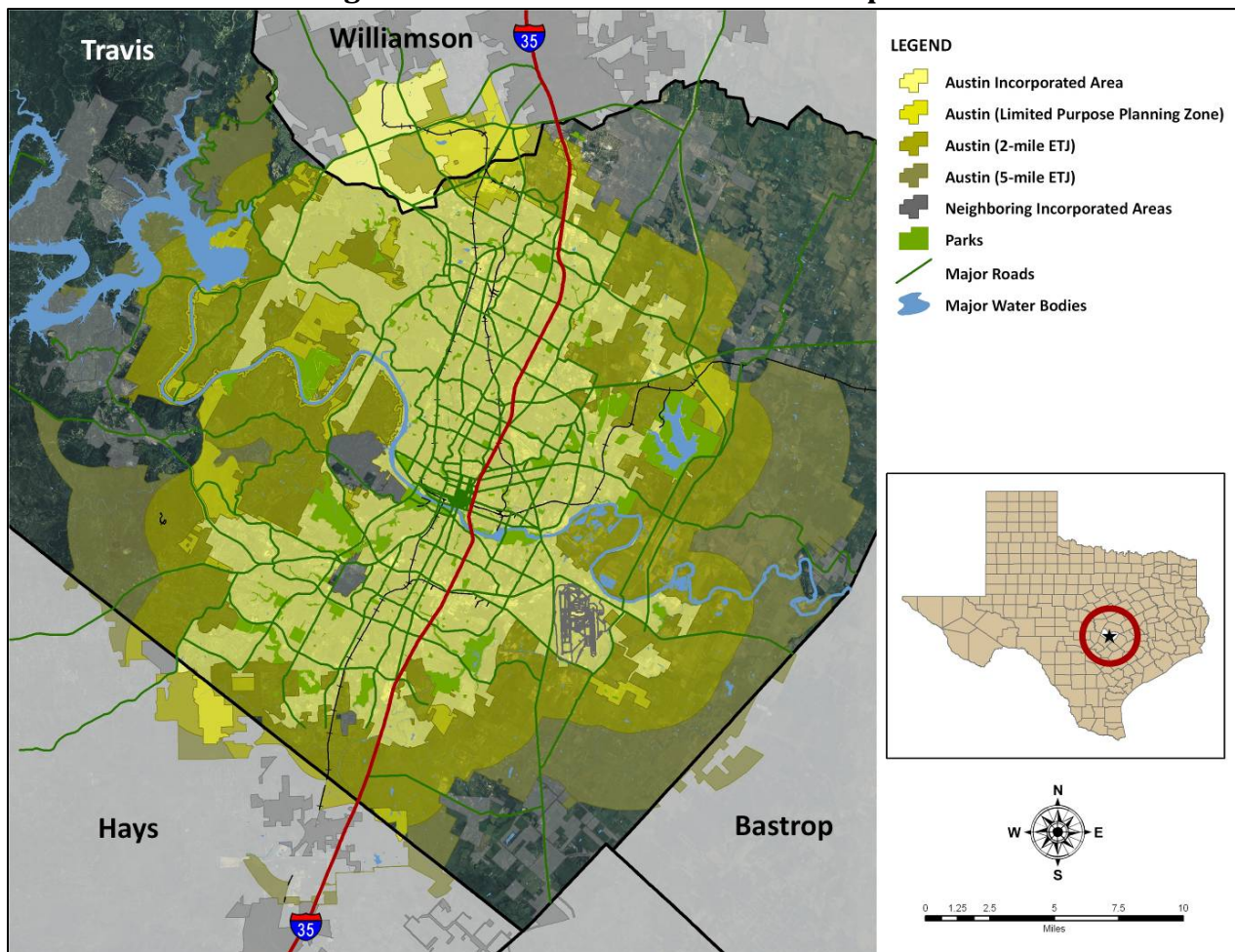
³ 44 CFR §201.6(d)(3)

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The focus of the Plan Update is to mitigate those hazards classified as “high” or “moderate” risk as determined through a detailed hazard risk assessment conducted for the City of Austin. Hazards that pose a “low” or “negligible” risk will continue to be evaluated during future updates to the plan, but they may not be fully addressed until they are determined to be of high or moderate risk. This enables the City to prioritize mitigation actions based on hazards which are understood to present the greatest risk to lives and property.

The geographic scope (i.e., the planning area) for the Plan Update includes all areas within the City of Austin and its extraterritorial jurisdictions⁴ as displayed in Figure 1-1 below.

Figure 1-1. Area Covered in the Plan Update



⁴ Texas allows cities to make certain decisions about the land beyond a their incorporated limits.

Purpose

The overarching goal of the Update is to minimize or eliminate long-term risks to human life and property from known hazards by identifying and implementing cost-effective mitigation actions. The purpose of the Update is twofold: to protect people and structures, and to minimize the costs of disaster response and recovery.

Through this update process, the City seeks to:

- Provide a comprehensive update to the 2004 HMAP;
- Minimize disruption to the City of Austin following a disaster;
- Streamline disaster recovery by articulating actions to be taken before a disaster strikes 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 the city to take advantage of rapidly developing mitigation grant opportunities as they arise; and
- Ensure that the City of Austin maintains its eligibility for the full range of future Federal disaster relief.

The Mission Statement for the Update is, “*Maintaining a secure and sustainable future through the revision and development of targeted mitigation actions to protect life and property.*”

Authority



FEMA

The updated plan will be tailored specifically for the City of Austin and its planning partners⁵, and will reflect conditions that have changed since the completion of the 2004 plan. When complete, the Plan Update will comply with all requirements promulgated by the TDEM and all applicable provisions of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390), and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108-264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al).

⁵ For a full list of planning partners, see Appendix A.

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It will also comply with FEMA’s February 26, 2002 Interim Final Rule (“the Rule”) at 44 CFR Part 201 which specifies the criteria for approval of mitigation plans required in Section 322 of the DMA 2000. The updated plan will also be developed in accordance with FEMA’s Community Rating System (CRS) Floodplain Management Plan standards and policies.

Summary of Sections

Sections 1 and 2 of the Plan Update outline the purpose and the process of development. Section 3 describes the City as a whole in terms of population and demographics, economy and education. This section is designed to provide a snapshot of the community and planning area to assist officials in recognizing factors that play a role in determining community vulnerability to hazards.

Section 4 identifies the people and property at risk as well as hazards facing the City, including the process of identification and risk assessment methodologies utilized. Sections 5 and 6 complete the Risk Assessment by profiling, analyzing and assessing the natural and man-caused hazards that present an overall risk to the City of Austin. The Risk Assessment builds on available historical data from past hazard occurrences, establishes detailed profiles for each hazard, and culminates in a hazard risk ranking based on conclusions about the frequency of occurrence, spatial extent and potential impact of each hazard. Section 6 also identifies repetitive loss properties.

Through an inventory of existing plans as well as a detailed questionnaire submitted by local officials, a Capability Assessment was developed to assess and examine the city’s capabilities, including: planning and regulatory capability; staff and organizational (administrative) capability; technical capability; fiscal capability; and political capability. Information from surveys and previous plans was compiled and analyzed to determine any existing gaps in planning capabilities. This information is found in Section 7.

Section 8 discusses mitigation strategy and consists of broad mitigation goal statements as well as an analysis of hazard mitigation techniques for the City to consider in reducing hazard vulnerabilities.

The specific local mitigation actions are found in Section 9. This section contains not only new mitigation actions, but also all previous mitigation actions from the

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2004 Plan. For previous actions, a brief analysis is included after each action stating whether the action has been completed, is deferred for the Update, or should be deleted for feasibility reasons. Section 9 also includes mitigation actions to maintain compliance with the National Flood Insurance Program (NFIP).

Section 10 identifies plan maintenance procedures. This includes the measures that the City will take to ensure the continuous long-term implementation of the Update. The procedures also include the manner in which the Plan Update will be regularly evaluated and updated to remain a current and meaningful planning document.

Appendix A contains a list of Planning Team members and stakeholders. Public survey results are analyzed in Appendix B. Appendix C contains a list of toxic sites for the area, and Appendix D lists critical facilities⁶. Appendix E contains documentation of meetings in the form of newspaper ads, sign in sheets and online announcements⁷. Appendix F lists grant funding opportunities for the City through state and federal programs.



⁶ Information contained in these appendices are exempt from public release under the Freedom of Information Act (FOIA).

⁷ Ibid.

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Plan Preparation and Development

Mitigation planning involves bringing together multiple components and players to create a more disaster-resistant community. This section provides an overview of the planning process, highlighting key steps as well as providing detailed descriptions of how stakeholders and the public were involved.

Overview of the Plan Update

The City of Austin received funding under the Hazard Mitigation Grant Program (HMGP) to complete an update for their 2004 HMAP. The purpose of this Plan Update is to meet FEMA’s requirement to provide updated hazard mitigation plans every five years.

Although many of the current natural and man-caused disasters that affect the City of Austin are the same as those identified for the 2004 Plan, an update is necessary

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to take into account all modified or revised data from the past five years, including evolving demographics and mitigation strategies. This 2009 Update began in January of 2009 with a Kickoff Workshop at the Office of Homeland Security and Emergency Management (HSEM).

Figure 2-1. Mitigation Planning Process

At this workshop and later meetings, the following factors were taken into consideration when reviewing and updating the 2004 Plan:

- Whether the goals address current and expected conditions;
- If the nature or magnitude of risks have changed;
- If there are current resources available for implementing the Plan;
- Whether implementation problems, such as technical, political, legal or coordination issues hinder development;
- If outcomes have occurred as expected; and
- How communities, agencies and partners participated in the implementation process.



Planning Team

The planning team was established using a direct representation model. Key members of H2O Partners, Inc. developed the plan, corresponding with HSEM who acted as Direct Representatives for the City of Austin. Several partners in planning were also instrumental at meetings throughout the process. These team members included representatives from the Austin Independent School District, the Seton Hospital System, Austin Community College and the Austin Climate Protection Program under Austin Energy. These planning team members as well as a list of stakeholders can be found in Appendix A. Some of the responsibilities of the planning team included: providing input regarding the identification of hazards, revising mitigation goals to reflect modified conditions, and developing new mitigation strategies.

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Planning Process

The process used to prepare this Plan Update included four major steps beginning in January of 2009. Each of these planning steps resulted in critical work products and outcomes that collectively make up the updated plan. Documentation for participation at each workshop is found in Appendix E¹.

Kickoff Workshop

The initial Kickoff Meeting was held at HSEM offices on January 7, 2009. This initial meeting was an opportunity to inform participants about the planning process, develop a timeline, solicit input about the previous plan and collect critical information. In addition to the Kickoff presentation, all team members received presentation folders with the following information:

- background paperwork about the plan update;
- public participation survey for distribution²; and
- capability assessment survey for completion



Members of the Planning Team at the Kickoff Workshop

Hazard Identification

Planning team members developed the list of significant hazards included in this Plan Update by reviewing: the 2004 Plan; the State of Texas Hazard Mitigation Plan; and initial results from reputable sources such as federal and state agencies. Based on this initial analysis, the team identified a total of 14 natural and man-caused hazards that could affect the area.

Risk Assessment

An initial risk assessment for the City was completed in April of 2009, with the final product produced in September of 2009. The results of the initial assessment were presented at workshop for the City held on April 27, 2009. Participants and

¹ This appendix will not be disclosed to the public as it is exempt from public release under the Freedom of Information Act (FOIA).

² This survey was also posted on the city's website and promoted from January 2009 to October 2009.

Section 2 – Planning Process

stakeholder groups were invited to the Risk Assessment Workshop. At this workshop, the characteristics and consequences of each hazard were evaluated to determine how much of the area would be affected, in terms of potential danger to property and citizens.

Potential dollar losses from each hazard were estimated, using the Federal Emergency Management Agency’s Hazards U.S. (HAZUS) Multi-Hazards (MH) Model (HAZUS-MH) and other HAZUS-like modeling techniques. The assessments examined the impact of various hazards on the built environment, including general building stock (e.g., residential, commercial, industrial), critical facilities, lifelines, and infrastructure. The resulting risk assessment profiled hazard events, provided information on previous occurrences, estimated probability of future events, and detailed the spatial extent and magnitude of impact on people and property. Each participant was also given a risk ranking sheet to determine the level of risk for each hazard in terms of the probability or frequency of occurrence, extent of spatial impact, and magnitude of impact. The assessments were also used to set priorities for mitigation based on potential dollar losses and loss of lives.

Mitigation Review and Development

The mitigation strategy development for the Plan Update involved revising mitigation goals included in the 2004 Plan, providing analyses for past actions and developing new mitigation actions. A Mitigation Workshop was held at the HSEM office on July 8, 2009.

At the Mitigation Workshop, after an initial presentation regarding types and examples of actions and the importance of mitigation planning, participants were asked to review the mitigation goals and objectives from the 2004 Plan and determine what changes, if any, should be made. Though the team decided to keep the same goals as the 2004 Plan, the order and priority of the goals were revised. This change is reflected in Section 8.

Each participant and appropriate City department received a copy of the mitigation actions submitted for the 2004 Plan and provided an analysis for the 2009 Update. This analysis included stating whether each past action had been completed, should be deleted or would be deferred for the Plan Update. If an action was determined impracticable or unattainable, comments were included to explain the deletion of the action. The analysis of each action can be found in Section 9 along with the newly-developed actions.

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An inclusive and structured process was used to develop and prioritize new mitigation actions for this Plan Update, which included the following steps:

- Review of the mitigation goals and objectives from the 2004 Plan.
- A “menu” of optional mitigation actions was developed based on plan reviews, studies, and interviews with Federal, state and local officials. The participants reviewed the optional mitigation actions and narrowed the list down to those that were most applicable to their area of responsibility, most cost-effective in reducing risk, most easily implemented, and most likely to receive institutional and community support.
- Potential federal and state funding sources to assist implementing proposed actions were inventoried. 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, matching requirements, application deadlines, and a point of contact. The information appears in the Funding Guide presented in Appendix F.
- Mitigation team members considered benefits that would result from the mitigation actions versus the cost of those projects. Detailed cost-benefit analyses were beyond the scope of this Update. However, economic evaluation was one factor that helped team members select one mitigation action from competing actions.
- Team members then selected and prioritized mitigation actions.

Each team member evaluated and prioritized actions based on FEMA’s STAPLE+E criteria, which includes considering the social, technical, administrative, political, legal, economic and environmental factors necessary for the implementation of each action. As a result of this exercise, an overall priority was assigned to each mitigation action. The overall priority was denoted within each action by team members identifying actions as High (H), Moderate (M), or Low (L) as shown in Section 9.

Team members developed action plans identifying proposed actions, costs and benefits, the responsible organization(s), effects on new and existing buildings, implementation schedule, priority, and potential funding sources.

On December 7, 2009, the draft of the Plan Update was made available on the HSEM website for review and comment by team members, stakeholders and the general public.

Review and Incorporation of Existing Plans

A variety of existing studies, plans, reports, and technical information were reviewed as part of the planning process. Sources of the information included FEMA, the United States Army Corps of Engineers (USACE), Centers for Disease Control and Prevention (CDC), the Texas Forest Service, the U.S. Fire Administration, the National Oceanic and Atmospheric Administration (NOAA), the Texas Water Development Board (TWDB), the Texas Commission on Environmental Quality (TCEQ), the State Comptroller, the Texas State Data Center, the Texas Railroad Commission and information provided by the Texas Division of Emergency Management (TDEM).

The hazard-specific sections of the Update (Sections 4-6) summarize the findings from sources such as the National Climatic Data Center (NCDC) through NOAA’s website, which provide histories of disasters in the area. Studies from the USACE the TWDB were reviewed for grant funding and included at Section 7.

Materials from FEMA and the TDEM were reviewed and referred to throughout the planning process for guidance on plan development requirements. Existing plans were also reviewed by planning team members as a source of hazard information and potential mitigation actions.

Public and Stakeholder Involvement

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

Public Participation

Public involvement in the development of the City of Austin Hazard Mitigation Plan Update was sought at three separate periods of the planning process³: (1) during the beginning of the planning process; (2) during the drafting stage of the Plan; and

³ Documentation of meeting attendance and notices for meetings is found at Appendix E

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(3) upon completion of a final draft Plan but prior to official plan approval and adoption. Public input was sought using three methods: (1) open public meetings; (2) survey instruments; and (3) making copies of draft Plan Update deliverables available for public review on the City’s website.

Locations and Notification of Public Meetings

Three series of open public meetings were held during the development of this Update. For each series, four separate meetings were held throughout Austin. During each series of meetings, presentations were given at the following libraries: Oak Springs Branch Library in East Austin; Manchaca Branch Library in South Austin; Spicewood Springs Branch Library in North Austin; and the Howson Branch Library in West Austin.



Community Members at a Public Meeting in Feb. 2009

The meetings were advertised through a variety of means including: notices in the *Austin American-Statesman*; notices on the City of Austin HSEM website, Austin 360.com, craigslist.org and neighborhood association websites; invitations sent via e-mail to community members; notices posted at Senior Activity Centers; flyers posted at libraries; and notices on Channel 6 and the News 8 Neighborhood Events Calendar.

Further, a press conference was held on the morning of April 23, 2009 where City Council Members Laura Morrison and Mike Martinez and City Manager Marc Ott discussed the importance of mitigation planning and informed citizens of upcoming public meetings. The press conference was aired on Channel 6, the City of Austin Government access channel.

First Series of Public Meetings

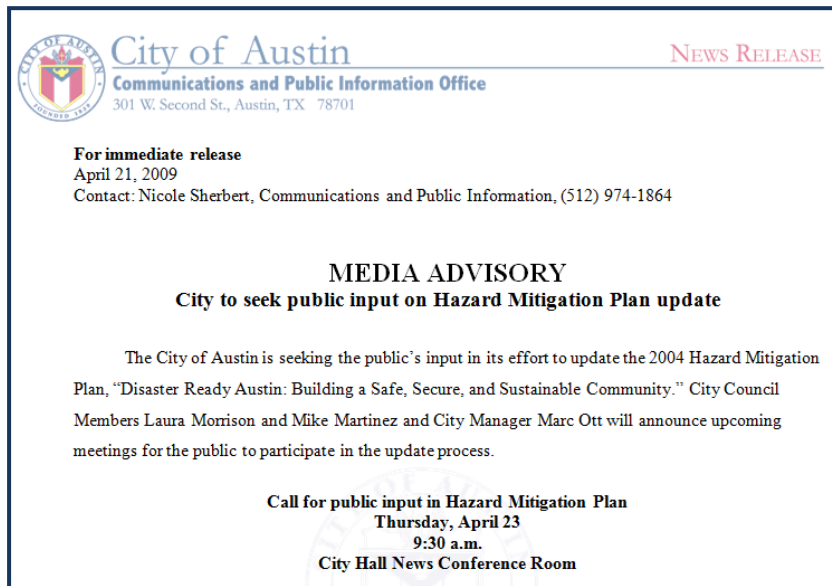
The first series of open public meetings were held on February 10 and 11 at four locations throughout the City. These meetings were scheduled specifically for seeking public and stakeholder input. Topics of discussion for this first series of

Section 2 – Planning Process

meetings included: the purpose of hazard mitigation; the reason for the update; and options for hazards both natural and man-made.

Second Series of Public Meetings

**Figure 2-2. Press Release for Apr. 23
Conference/Meetings**



The second series of open public meetings were held on April 26 and April 27. These meetings were scheduled specifically for seeking public and stakeholder input. Like the first series of meetings, the second series of meetings were held at four library branches throughout the city. Attendees from the first series of meetings were invited via e-mail as well as community

members who included contact information on public surveys filled out online. As this series of meetings coincided with the Risk Assessment Workshop, the topics discussed included overall hazard rankings as well as the preliminary results from public surveys collected⁴.

Third Series of Public Meetings

The third series of open public meetings were conducted at the same libraries as the first and second series on July 7 and July 8, with the exception of the Howson Branch Library. This library was unavailable and the meeting was held at the Yarborough Branch Library. The dates selected coincided with the Mitigation Workshop. For this series of meetings, the consultant team provided an update on the planning process and mitigation actions considered. Attendees were asked to provide comments on the mitigation goals selected by the planning team and to suggest areas where mitigation activities would be needed.

⁴ See Appendix B for final survey results.

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Public Participation Survey

In addition to the open public meetings, the City was able to solicit input from citizens and stakeholders through the use of a public participation survey. This survey was designed to obtain data and information from residents in the City of Austin.

Copies of the public participation survey were distributed at each of the public meetings held throughout the process and made available online on the HSEM website. A total of 156 responses to the survey were received either from hard copies filled out, or surveys completed online. The information received provided valuable input in the development of the Plan Update, and a summary of the survey findings is provided in Appendix B.

Figure 2-3. Wildfire Awareness Invite

Stakeholder Involvement

Stakeholders provide an essential service in hazard mitigation planning; therefore, throughout the planning process, members of state and federal agencies, community groups, local businesses, schools, and hospitals were invited to workshops held throughout the planning process.

An initial stakeholder meeting was held on February 11, 2009 at City Hall. At this meeting attendees were informed of the process and invited to the Risk and Mitigation Workshops as well as all future public meetings.



Input from stakeholders was also sought during Wildfire Awareness Week. The consultant team attended an event on April 4, 2009 during Wildfire Awareness Week to promote wildfire awareness through demonstrations, lectures and educational activities at the Austin and Nature Science Center. Public surveys were distributed and groups such as U.S. Fish and Wildlife and the Texas Forest Service were informed of the planning process and asked to participate at the Risk

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Assessment and Mitigation Workshops. A full list of stakeholder members that were invited to meetings can be found at Appendix A.

Representatives from the stakeholder groups of Austin Community College and the Seton Hospital System joined the planning team after attending the first stakeholder meeting on February 11, 2009⁵. The list of planning team members is also found in Appendix A.

Figure 2-4. Screenshot: Public Meeting Notice – West Austin Neighborhood Group

The screenshot shows the homepage of the West Austin Neighborhood Group (WANG). The header includes the group name, the tagline "Preserving and Protecting West Austin", and the WANG logo which features a compass rose and the letters "WANG". Below the header is a large photograph of a person rappelling down a cliff face over a river. A navigation menu is located below the photo, listing: Home, Contact, Parks, Support Local Businesses, About, Join WANG, Green Building, Topics, and Links.

The main content area features a "2009 Hazard Mitigation Plan Update" article. The article text reads: "The City of Austin will hold a series of public meetings to get input on the 2009 Hazard Mitigation Plan update. Residents are encouraged to attend and share their concerns for potential hazards and ideas for mitigation in their neighborhoods and in Austin at large." It also includes a link to an online survey at www.ci.austin.tx.us/oem/ and lists "PUBLIC MEETINGS for 2009 HAZARD MITIGATION PLAN" on Monday, April 27 at 5:30 – 6:30PM.

On the right side of the page, there is a "Search WANG" section with a search box containing the text "To search, type and hit enter". Below that is an "Upcoming Events" section with a calendar for April 2009. The calendar shows the days of the week (M, T, W, T, F, S, S) and the dates 1 through 12.

At the bottom of the browser window, the address bar shows "Internet | Protected Mode: On" and the page zoom is set to 100%.

⁵ Attendance for meetings, including the stakeholder meeting on February 11 can be found at Appendix E.

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Overview

This section looks at a general profile of the City as a whole, providing data where available for a more comprehensive update, including the following:

- History and Government;
- Geography and the Environment;
- Population and Demographics;
- Housing and Household Income; and
- Economy and Industry

History and Government

History

The City of Austin, founded in 1839, is the capital of Texas and the county seat for Travis County. What was initially a small settlement began to grow with the construction of the permanent capitol building and Governor’s Mansion in the 1850s and the arrival of the Houston and Texas Central Railway in 1871¹. Soon thereafter the Austin skyline began to take shape with the establishment of the University of Texas in 1883 and the opening of the Driskill Hotel in 1886.



Along with the changing skyline, the population of Austin became more diverse in the early and mid 1900s when large numbers of Germans, Swedes and Mexicans migrated to the area. Several neighborhood communities began to spring up in the early part of the 19th century, including the community of Clarksville, which was settled by Charles Clark, a freeman, in 1871. The Clarksville area became the heart of the African-American community². This community later migrated east of downtown, and had a significant influence in the development of jazz and blues clubs and Austin’s early music scene³.

In 1918 the City acquired Barton Springs, a spring-fed pool that is still a popular tourist attraction today. In 1924 the City adopted a council-manager government, focusing on city planning and beautification. After the development of the City Plan in 1928, Austin passed a bond that provided for the funding of streets, sewers, libraries, hospitals and multiple parks. This offer of profuse parks, pools and recreational areas, combined with the development of the first municipal airport in 1930, attracted many to the area. By 1936 the student population for the University of Texas had



Barton Springs

¹ Source: Handbook of Texas Online, available at: <http://www.tshaonline.org/handbook/online/articles/AA/hda3.html>

² Source: Handbook of Texas Online, available at: <http://www.tshaonline.org/handbook/online/articles/CC/hpc1.html>

³ Source: Austin Visitor Center, available at: http://www.austintexas.org/visitors/about_austin/history__heritage/

Section 3 – Community Profile

almost doubled from its inception, and the City had funded more municipal projects than any other city in Texas.

As Austin continued to grow, it soon became known as a leader in music, film and most recently, technology. Austin has gained worldwide attention, not only from businesses and entrepreneurs, but families, musicians, artists and students as well.

It is a green and welcoming community, appropriately referred to as the “Live Music Capital of the World” as it is home to over 200 live music venues and festivals such as the Austin City Limits Festival and the South by Southwest (SXSW) Festival, which is a film, music and interactive festival. The city also has a strong theatre and film culture with dozens of theatre companies and notable festivals such as the annual Austin Film Festival. This combination of music, art, film, technology and abundant natural resources attracts 19 million tourists to the area annually⁴.



Image of State and Paramount Theatre – SXSW Festival.
Photo by Eugene Hernandez/IndieWire

Government

The City of Austin is a home rule city, meaning that the City Charter operates as the Constitution for the city and creates structure for all city ordinances. The City Charter for Austin also establishes the community as a council/manager form of government. The Austin City Council is made up of six members plus the Mayor, all of whom are elected at large to a three-year term. The Mayor and Council Members may serve in their respective seats for a maximum of six years, or two consecutive terms. The City Manager is appointed by the City Council, and has overall responsibility for the management of all city employees and the administration of all city affairs.

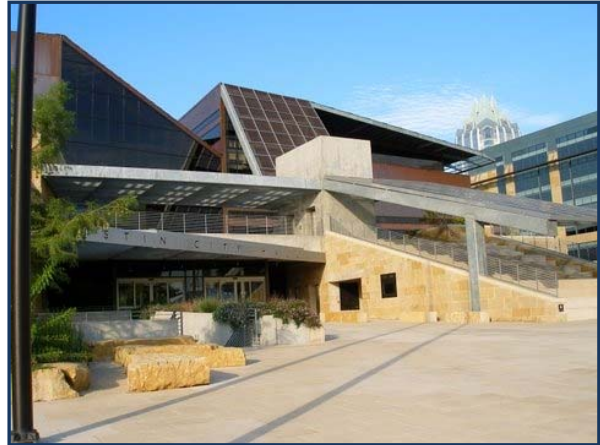
⁴ Source: Austin Visitor Center, available at: http://www.austintexas.org/visitors/about_austin//

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There are no political subdivisions in the City of Austin, but the City has over 30 different departments organized under six broad service categories:

- Capital Improvement/Management;
- Development and Environmental Services;
- Community Services;
- Transportation Services;
- Public Safety; and
- Financial/Administrative Support

The various departments are either financed from an Enterprise fund, set up like a business where customers are charged a fee for services, or through a General fund, financed through taxes and fees.



Austin City Hall

Geography and the Environment

Geography

Austin is located primarily in Travis County, although part of the City extends into



View from Mt. Bonnell

Williamson and Hays Counties. It is situated on the Colorado River and is located at the eastern edge of the Hill Country and Edwards Plateau, about 236 miles from the Mexican Border. Due to its situation by the Hill Country, the western portion of Austin is made up of scenic rolling hills and limestone rock, whereas the eastern portion is more flat. Interstate 35 runs through the City, which occupies

Section 3 – Community Profile

a total land area of 301.86 square miles⁵ in the Central Texas Hill Country. The City is approximately 541 feet above sea level⁶ and is known for its parks and green space, including greenbelts, lakes, including three man-made lakes within the city limits: Lady Bird Lake, Lake Austin, and Lake Walter E. Long. Additionally, the foot of Lake Travis, including Mansfield Dam, is located within the city's limits. The City contains a mixture of soils from silty clays to fine sandy loams and clay loams over limestone. A popular limestone formation is Mount Bonnell, which overlooks Lake Austin on the Colorado River and is approximately 780 feet above sea level.

Austin is also within the Lower Colorado River Basin, which encompasses 21,000 square miles of contributing drainage area, and receives an average of 30 to 40 inches of rain per year. A total of 123 watersheds exist in Austin, of which 13 are urban and 120 are in surrounding, non-urban areas. Of these 123 watersheds, 50 are monitored as part of the Environmental Integrity Index (EII), which measures water quality with parameters such as chemical, recreational, aesthetics, and macroinvertebrates scores.⁷

Environment

One of the priorities of the City Council under the vision for the City of Austin is to be a Green community.⁸ To meet this goal the city has begun a Green City Initiative, which is “a partnership between the City of Austin and the community, with the goal of preserving and protecting Austin's environment.”⁹



Environmental accomplishments¹⁰ for the City include, but are not limited to:

- Reducing carbon dioxide emissions by 16.5 tons with the development of “green” buildings;
- Reducing electrical consumption at the airport by 12 percent annually;
- Installing over 66 miles of bike lanes;

⁵ City of Austin Demographer, available at: <http://www.ci.austin.tx.us/demographics>

⁶ Source: United States Census Bureau

⁷ City of Austin Watershed Development

⁸ See Section 1 for a discussion of the City of Austin’s Vision.

⁹ City of Austin website, available at: <http://www.ci.austin.tx.us/greencityfest/default.htm>

¹⁰ *Ibid*, available at: <http://www.ci.austin.tx.us/greencityfest/gcaccomplishments.htm>

Section 3 – Community Profile

- Shifting to alternatively-fueled mowers for the Parks and Recreation Department;
- Implementing a smoking ban in public places;
- Planting thousands of trees annually to ensure a healthy urban forest and mitigation the urban heat island effect;
- Reducing the annual total of sewage overflow from 13 million gallons to about 1 million;
- Banning coal tar-based pavement sealants to cut the use of polycyclic aromatic hydrocarbons in half;
- Increasing recycling through the innovative Pay-As-You-Throw Program;
- Diverting yard waste from landfills through the use of brush chipping; and
- Providing educational programs and festivals to encourage environmental protection within the community.

Austin has established over 20 environmental programs to help maintain a sustainable community, conserve energy and protect: the climate of the city; the health of citizens; air and water quality; and the landscape and habitat. Representatives from one these programs, the Austin Climate Protection Program (ACPP), participated actively as a stakeholder group throughout the planning process.

The ACPP's goal is to establish Austin as a leading city in the fight against climate change.¹¹ To meet this goal, ACPP has begun implementing the Austin Climate Protection Plan, which was passed by the City Council in 2007. Part of the plan includes creating a Climate Action Team with representatives from all City of Austin departments and working with the community to reduce greenhouse gas emissions.



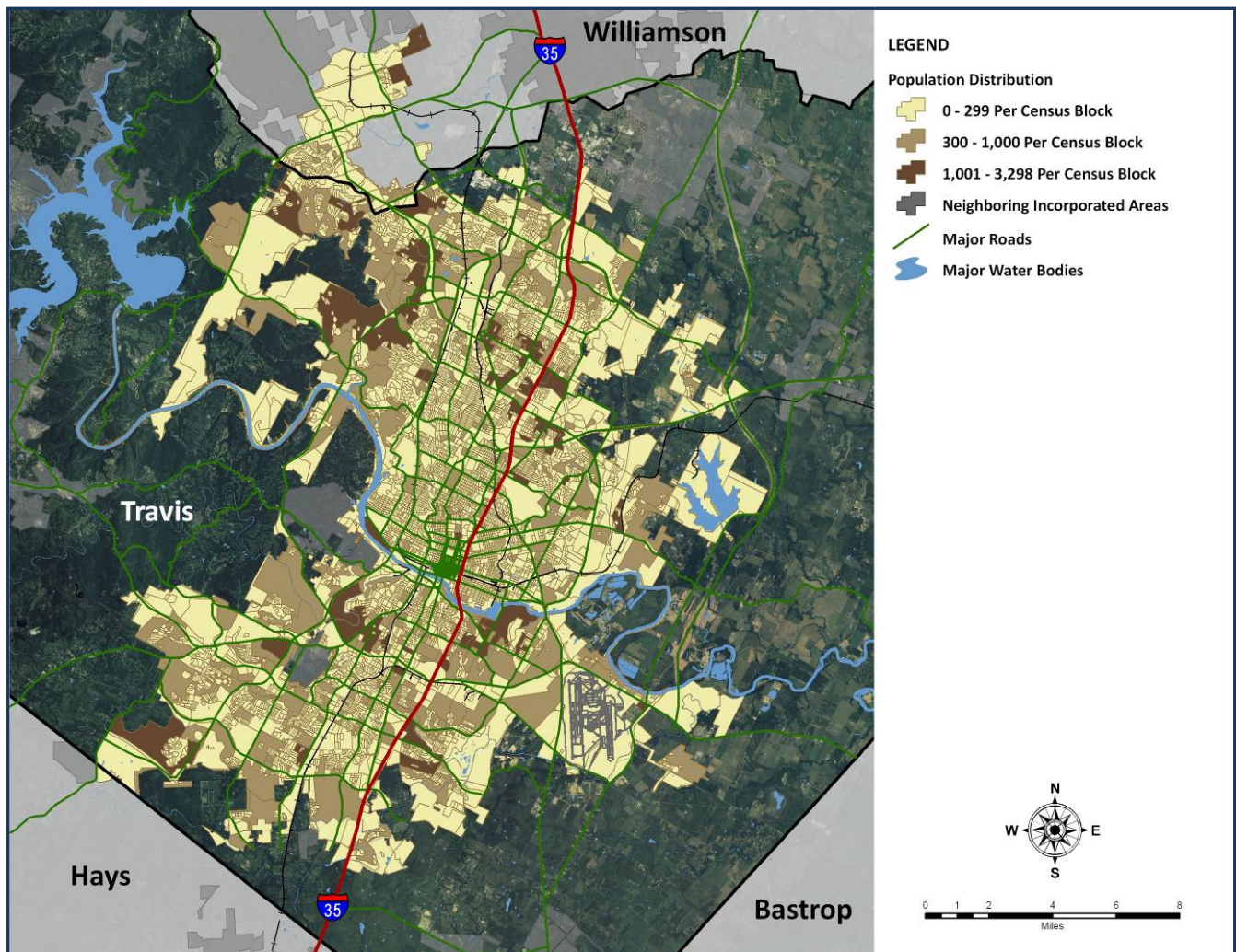
¹¹ ACPP website, available at: <http://www.ci.austin.tx.us/acpp/acpp.htm>

Population and Demographics

According to the U.S. Census Bureau American Community Survey (ACS), the 2008 population estimate for the City of Austin is 757,688, and the City of Austin Demographer estimates the population at 782,967 as of the September of 2009. For the purposes of the Risk Assessment (found in Sections 4-6), however, the population total from the 2000 U.S. Census, 691,986 will be used.

Figure 3-1 shows the extent of the core study area (the incorporated limits of the City of Austin) along with the population distribution in this area at the census block level (based on Census 2000 population data derived from HAZUS-MH MR3).

Figure 3-1. Population Distribution



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A numeric breakdown of the population, including two groups of special needs populations: elderly (persons over the age of 65) and low income (less than \$20,000) is shown in Table 3-1.

Table 3-1. Population Distribution/Special Needs Populations

TOTAL POPULATION (CENSUS 2000)	SPECIAL NEEDS POPULATIONS	
	Elderly (Over 65)	Low Income (< \$20,000)
691,986	18,352	25,046

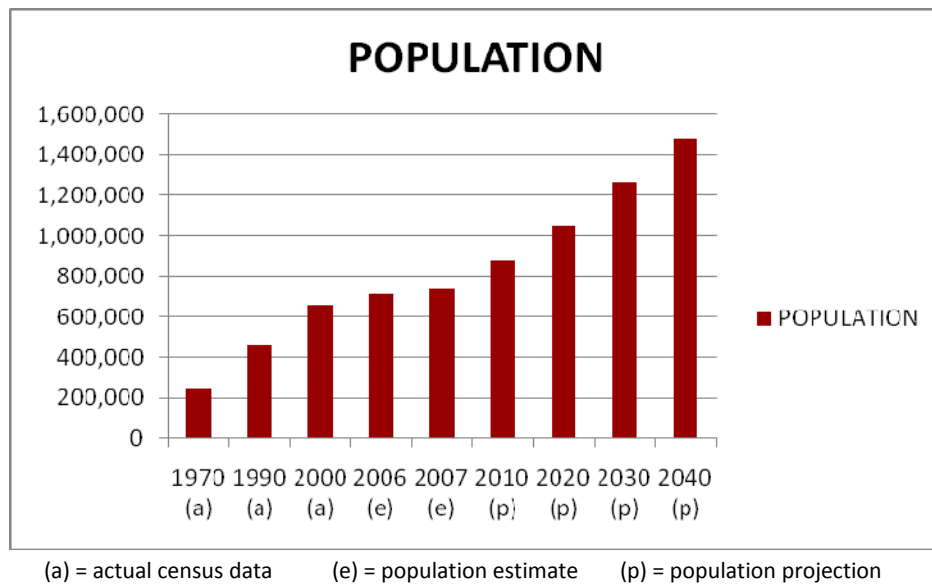
Population estimates from 1970 to 2007 and population projections from 2010 to 2040 are listed in Table 3-2 and illustrated in Figure 3-2, as provided by the U.S. Census Bureau. Over the past four decades the City of Austin has become increasingly more developed and urbanized (92 percent urban as of 2005). The City’s total population in 1970 was 251,808 and increased by 38 percent to 656,562 by 2000. Between 2000 and 2006, the population increased 7.6 percent. (The percent change for the state of Texas between 2000 and 2006 was 12.7 percent.) By 2040, the City’s population is projected to nearly double the 2007 population, for a projected population count of 1,476,783. Austin is one of the top five fastest growing metropolitan areas in the U.S.

Table 3-2. City of Austin Census Totals, Population Estimates, and Projections

YEAR	POPULATION	POPULATION DENSITY (PER SQ MILE)
1970 (a)	251,808	969
1990 (a)	465,622	1,791
2000 (a)	656,562	2,526
2006 (e)	709,893	2,731
2007 (e)	743,074	2,859
2010 (p)	878,670	3,380
2020 (p)	1,050,991	4,043
2030 (p)	1,263,254	4,860
2040 (p)	1,476,783	5,681

(a) = actual census data (e) = population estimate (p) = population projection

Figure 3-2. City of Austin Census Totals, Population Estimates, and Projections



Age and Sex

According to the ACS, males make up 52.2 percent of the City of Austin’s population, a slight majority over females at 47.8 percent. Even though males make up a majority of the population overall, females make up the majority of the population age 65 and older. According to the 2008 ACS estimates, 58.6 percent of the population of people 65 and older is female. The median age for the city is 31.4, with 71.2 percent of the population over the age of 21.

Ethnicity

The demographic components of Austin’s rapid population growth are transforming it into an urban place that hosts four racial groups: Caucasian, Hispanic, African American, and Asian. The Hispanic share of Austin’s total population increased from 30.5 percent in 2000 to 35.9 percent in 2008, and the Asian share of the total population went from 4.7 percent in 2000 to almost 5.5 percent in 2008.

As estimated by the US Census projections in 2000, Austin is becoming a Majority-Minority city. Eventually there will not be a single ethnic or demographic group

Section 3 – Community Profile

that makes up a majority of the population, as the city’s Caucasian population drops below 50 percent.¹²

While there has been growth in the total number of Anglo households in Austin, other ethnic groups have outpaced that growth. Figure 3-3, below, depicts this ethnicity trend. Table 3-3 displays the percentage of language spoken at home other than English among Austin, the State of Texas and the U.S.

Figure 3-3. City of Austin Ethnicity Shares History and Forecast¹³

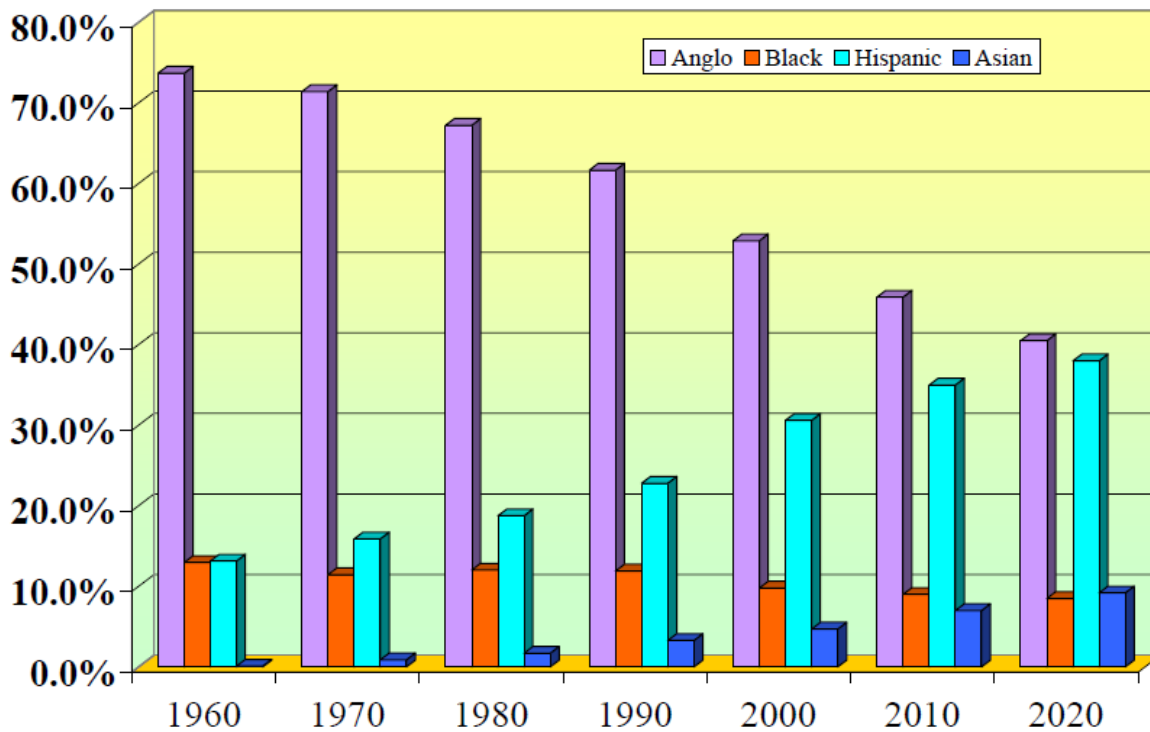


Table 3-3. Language Spoken at Home Other than English¹⁴

Austin MSA	Texas	United States
34.4%	33.5%	19.5%

¹² R. Robinson, “Top Ten Big Demographic Trends in Austin, Texas”, City of Austin Demographer

¹³ City of Austin Demographer

¹⁴ U.S. Census Bureau

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Education

The American Community Survey for 2008 estimates that 83.2 percent of the population of Austin, age 25 and older have a high school diploma or higher. While the United States and Texas each have a higher percentage for high school



University of Texas at Austin

graduates and those with some college or an Associate’s degree among citizens age 25 and older, the City has a higher percentage of citizen’s that have obtained a Bachelor’s, graduate or professional degree. Among those residents age 25 and older, 26.1 percent have a Bachelor’s degree or higher, while 16.1 percent have a graduate or professional degree, which is almost double the percentage for the state as a whole. Table 3-4 below

depicts educational attainment for residents age 25 and older for the City of Austin compared with Texas and the U.S. The largest educational institutions for the City are depicted in Table 3-5.

Table 3-4. Educational Attainment – Ages 25 and Older

Educational Level	Austin MSA	Texas	United States
High School Graduate	17.5%	26.5%	29.6%
Some college/Associate’s Degree	23.5%	27.5%	27.5%
Bachelor’s Degree	26.1%	16.9%	17.3%
Graduate/Professional Degree	16.1%	8.2%	10.1%

Table 3-5. Austin’s Largest Institutions of Higher Education¹⁵

University of Texas at Austin
Austin Community College
St. Edward’s University
Concordia University at Austin
ITT Technical Institute
Huston-Tillotson College
Austin Business College

¹⁵ Institutions are listed from largest enrollment (University of Texas) to smallest.

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Allied Health Careers
Austin Presbyterian Theological Seminary
Southern Careers Institute
DeVry University
Capital City Trade and Technical School
Episcopal Theological Seminary

Housing and Household Income

According to estimates by the ACS, there were 303,355 housing units for the city in 2008. This number is expected to increase to 311,035 in 2010 according to the City of Austin Demographer.

The average household size for the City of Austin is 2.4 people, compared with 2.7 for the state¹⁶. For family households, the city also maintains a lower number with 53.3 percent compared to 71 percent for Texas. An emerging trend for the City is the decline in the number of households consisting of families with children.¹⁷ Even though the overall number of families has increased, the total number of households consisting of families with children has decreased.¹⁸ The percentage of families with children has declined from a little over 32 percent in 1970 to just fewer than 14 percent in 2000¹⁹.

Median home values in Austin are the highest in Texas at \$178,800. Statewide, median home values in metropolitan areas are \$113,800, compared to \$181,800 nationally (Table 3-6).

Table 3-6. Median Value of Owner-Occupied Housing - 2007

Austin MSA	Texas	United States
\$178,800	\$113,800	\$181,800

According to a 2008 study by the City of Austin Demographer, the Austin MSA median family income is \$69,100, which is down 0.3 percent from 2007, yet still above the state and national median income as shown in Table 3-7.

¹⁶ U.S. Census Bureau

¹⁷ R. Robinson, “Top Ten Big Demographic Trends in Austin, Texas”, City of Austin Demographer

¹⁸ *Ibid.*

¹⁹ *Ibid.*

Table 3-7. Median Family Income, 2008

Austin MSA	Texas	United States
\$69,100	\$57,511	\$67,019

Economy and Industry

While the Austin economy fared better than many cities in the recent economic recession, the unemployment rate reached 7.3 percent in July of 2009. However, there are many indicators that the City is still faring well as the rate of unemployment is below both state and national rates as shown in Table 3-8. In June, the City was named the third strongest metropolitan economy based on an evaluation of changes in employment, wages, output and housing by the Brookings Institute.²⁰

Table 3-8. Unemployment Rate – Summer 2009²¹

Austin MSA	Texas	United States
7.3%	7.9%	9.4%

Despite a temporary downturn in the economy, the future outlook for Austin’s economy is positive. Employment opportunities grew 14.8 percent from 2004 to 2008, and in June of 2009, Austin was named the best city for recession recovery²². Austin’s resiliency throughout the recession stems from the fact that it is home to the University of Texas, the state government, and has a diverse labor base with a large percentage of high tech industries. In addition the city was mostly protected from the real estate collapse and is expected to see future growth in business sectors dealing with health care and education.²³

Another factor that has helped the local economy is Austin’s leadership in wireless technology. The City was named one of the hottest wireless cities by *Newsweek* magazine in 2004. Drawing on the same expertise in high technology and innovation, the City is venturing into the biomedical and pharmaceuticals industry. The University of Texas at Austin is a primary asset in this arena. It has world-

²⁰ Austin Business Journal

²¹ Austin Chamber of Commerce

²² Source: “*The Best and Worst Cities for Recession Recovery*”, Forbes.com, June 2009.

²³ *Ibid.*

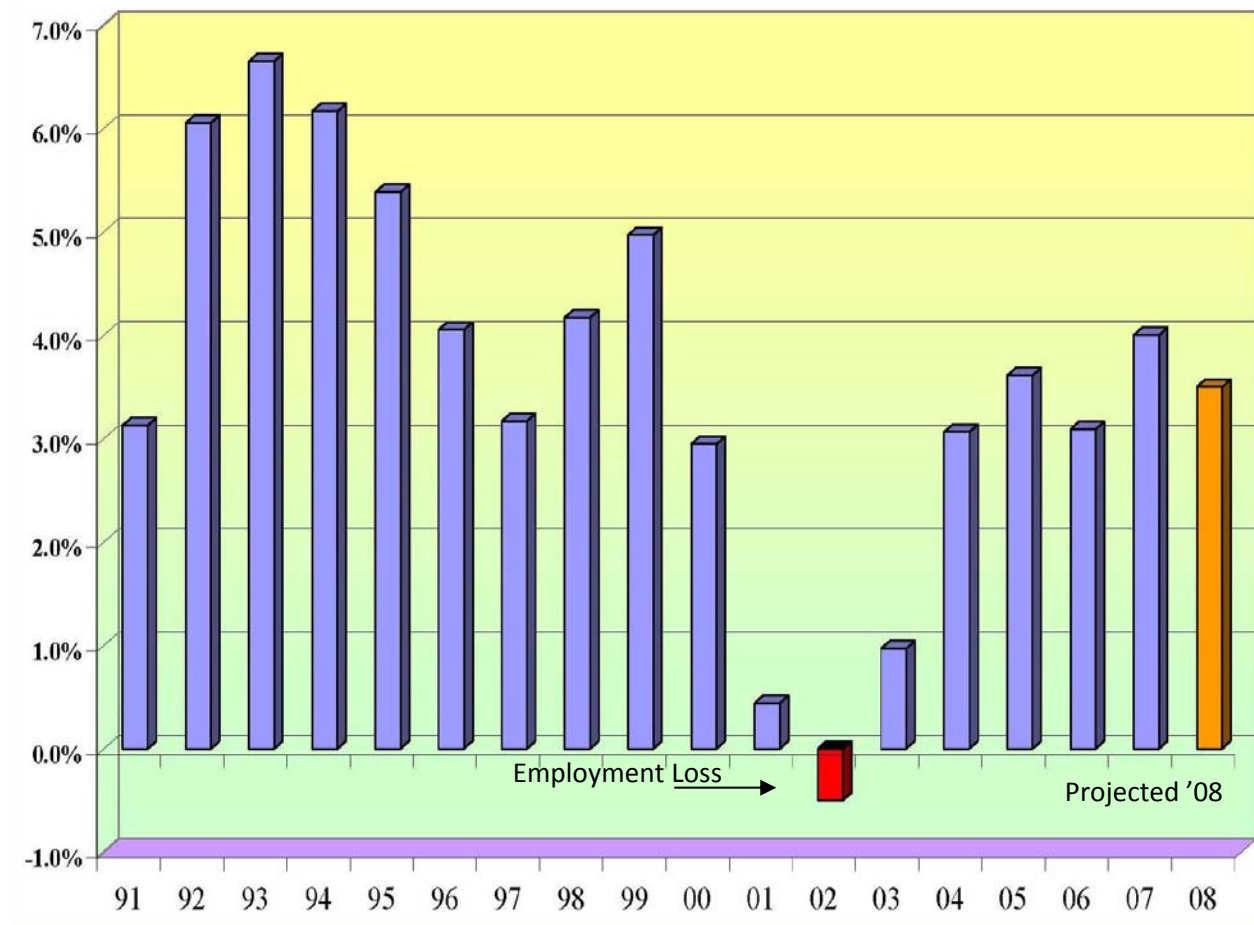
Section 3 – Community Profile

class programs in bioengineering and pharmaceutical research, and is a leader in the number of science and engineering doctoral degrees it awards.

Austin also has a history of success in striving to attract regional offices and national headquarters. Dell Inc. is not only based in the Austin area, it is one of the area's largest employers (See Table 3-9). A diverse array of companies also elected to make Austin their headquarters from National Instruments Corp. to Whole Foods Market, Inc.

Figure 3-3 below illustrates the growth rate for jobs in Austin from 1991 to 2008 (projection).

Figure 3-3. Austin Job Growth: 1991-2008²⁴



²⁴ City of Austin Demographer

Section 3 – Community Profile

Austin strives to serve citizens by influencing and increasing economic development. To this end the City has established an Economic Growth and Redevelopment Services Office (EGRSO). EGRSO is directed by the City Council and is responsible for implementing economic development policy to increase economic viability.

In 2005, the City developed an economic policy to outline measures adopted by the City Council and evaluate projects based on fiscal impact and the impact on City services. In 2007 the City evaluated its economic context and forecast, which showed that indicators of job growth, tax revenue and building activity were all positive.

The City also offers incentive programs such as tax abatements, enterprise zone exemptions, public utility incentives and financing programs for new and existing companies.

Table 3-9 lists major employers for the City, while Figures 3-4 and 3-5 illustrate major industries for males and females in 2007.

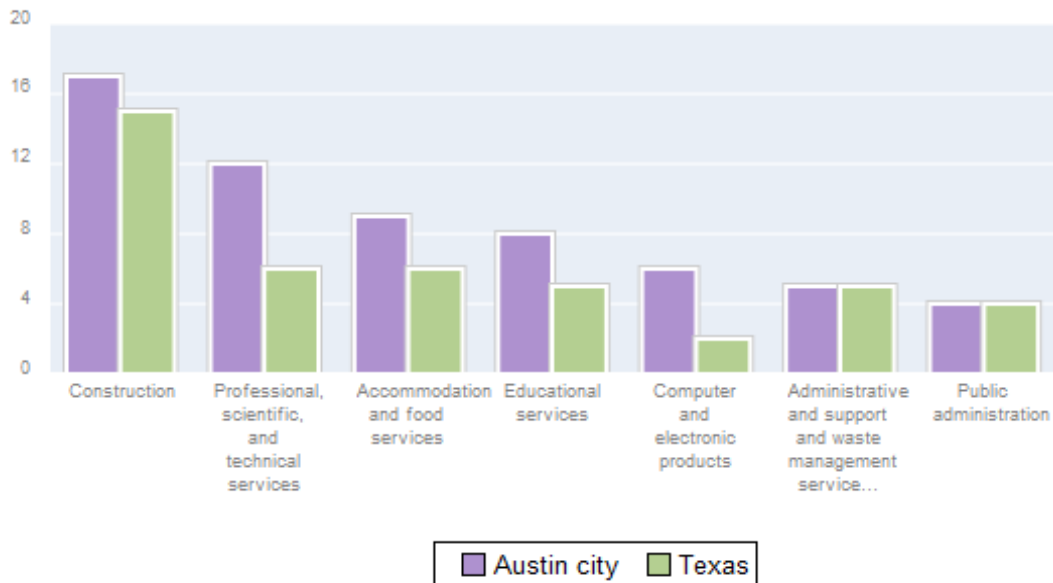
Table 3-9. Major Employers for the City of Austin²⁵ (employees of 6,000 or more)

Employer	Business Type
University of Texas at Austin	Higher Education
Dell Computer Corp.	Personal Computer Systems
City of Austin	City Government
Austin Independent School District	Education
St. David’s Healthcare Partnership	Healthcare
IBM Corporation	Circuit cards, hardware and software
Seton Healthcare Network	Healthcare
IRS/Austin Center	Income tax return processing
H-E-B Austin Regional Office	Supermarket

²⁵ Austin Chamber of Commerce

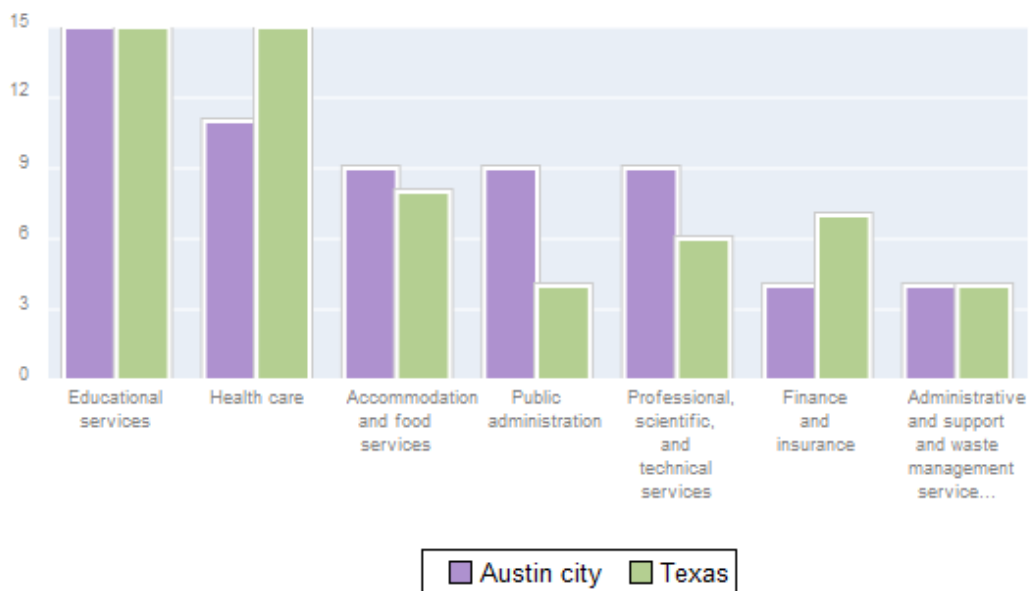
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Figure 3-4. Major Industries Among Males (Austin/State) - 2007



As Figure 3-4 illustrates, the most popular industry for males is construction with approximately 17 percent, followed by professional, scientific and technical services at 12 percent. In contrast the second largest industry for females is healthcare, as shown in Figure 3-5, which did not have a high enough percentage to rank among males.

Figure 3-5. Major Industries Among Females (Austin/State) - 2007



HAZARD IDENTIFICATION

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Disaster Declarations.....	1
State and Local Plan Review	2
Hazard Descriptions	4

This is the first section of the risk assessment, which also includes hazard profiles found in Section 5 and the vulnerability assessment found in Section 6. The purpose of this section is to provide background information for the hazard identification process as well as descriptions for the natural and technological hazards identified.

Hazards Considered

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, the City has identified fourteen hazards that are to be addressed in the Plan Update. These hazards were identified through an extensive process utilizing input from planning team members, research of past disaster declarations, review of the 2004 Plan and a review of the current State of Texas Hazard Mitigation Plan (“State Plan”). Readily available online information from reputable sources such as federal and state agencies was also evaluated to supplement information as needed.

Disaster Declarations

In order to identify risks to the area, an examination of historic trends was conducted for relevant background information. This included reviewing disaster declarations for the area.

The State of Texas claims the highest number of disaster declarations, at 83, for any state or territory from 1953 to 2008. From 2000 to 2008, the state experienced fifteen declared disasters, including Hurricanes Dolly and Ike. In 2008 alone the

Section 4 – Hazard Identification

state suffered 36 fatalities, 103 injuries and over 15 million dollars worth of property damage.

The City of Austin, located in Travis County, has had a significantly lower amount of declarations than the state as a whole. Table 4-1 lists disaster declarations from 1991 to 2009 for Travis County.¹

Table 4-1. Disaster Declarations for Travis County, Texas (1991-2009)²

Year	Event	Declaration Number
2007	Severe Storms/Floods	DR 1709
2006	Extreme Wildfire Threat	DR 1624
2005	Hurricane Rita ³	DR 1606
2002	Severe Storms/Floods	DR 1425
1998	Fall Floods	DR 1257
1996	Central Texas Floods	DR 1179
1991	Christmas Flood	DR 0930

State and Local Plan Review

In addition to the Presidential Disaster Declarations depicted in Table 4-1, the City of Austin has experienced many small-scale hazards. Because these smaller scale disasters threaten public safety and can cost the city government, businesses and residents millions of dollars in direct and indirect damages, an extensive range of hazards were considered in the identification process. This included an evaluation of the 2004 Plan, the State Plan, and federal and state resources.

Table 4-2 on the following page lists the full range of natural and technological hazards initially identified for consideration. The table documents the evaluation process used for determining the significance of each hazard. Only hazards identified as significant were included in the Plan Update. Hazards not identified for inclusion at this time may be addressed during future evaluations and updates.

¹ Disaster Declarations are recorded by county rather than by place.

² Data is unavailable for declarations by county prior to 1991.

³ Travis County was not directly affected by Rita, but all counties in Texas were declared for Public Assistance for debris removal and emergency protective measures.

Section 4 – Hazard Identification

Table 4-2. Hazard Identification Process

Hazard Considered	Identified as Significant	Reason for Determination
Dam Failure	YES	Included in the State Plan and 2004 Plan. Although the risk is low, the hazard should be included as the City is exposed to four dams.
Drought	YES	Included in the State Plan and 2004 Plan. Drought can occur throughout the state and Austin experienced a period of extreme drought in 2009.
Earthquake	NO	According to the State Plan, an earthquake occurrence for the South Central Region, where Austin is located, is considered rare. Although a small event is possible, it would pose little to no risk for the area.
Expansive Soils	NO	While expansive soils are listed as a threat in the State Plan for coastal counties, the impact of this hazard is limited and the frequency is occasional.
Extreme Heat	YES	Included in the State Plan and 2004 Plan; high frequency of occurrence.
Flood	YES	Included in the State Plan and 2004 Plan; high frequency of occurrence.
Hail	YES	Included in the State Plan and 2004 Plan; high frequency of occurrence.
Hurricane Wind	YES	The City has a potential risk for hurricane winds.
Land Subsidence	NO	There is no historical occurrence of land subsidence for the City. The impact would be limited and the frequency of occurrence is unlikely according to the State Plan.
Thunderstorm	YES	Included in the 2004 Plan; high frequency of occurrence.
Tornado	YES	Included in the State Plan and 2004 Plan; high frequency of occurrence.
Winter Storm	YES	Review of the State Plan, the NOAA National Climatic Data Center (NCDC) and the 2004 Plan indicate that winter storms are a significant threat.
Wildfire	YES	Included in the State Plan and 2004 Plan; high probability of occurrence.
Windstorm	NO	The NCDC does not list a historical hazard windstorm event for the region separate from hurricane winds or winds associated with severe thunderstorms.
Infectious Disease	YES	Communicable diseases can occur at any geographic location. In addition, Austin has been affected by the 2009

Section 4 – Hazard Identification

Hazard Considered	Identified as Significant	Reason for Determination
		outbreak of H1N1 (“Swine Flu”).
Hazardous Materials Release	YES	Hazardous Material Releases were included in the 2004 Plan, and also in this Update as toxic releases can have a substantial impact. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage.
Pipeline Failure	YES	Fuel pipelines are located throughout the City, and frequent incidents of pipeline failure occur according to the Texas Railroad Commission.
Terrorism	YES	Although there has been no past occurrence in the City, the potential impact of a Terrorism event could be great.

Hazard Descriptions

The fourteen hazards identified as significant according to Table 4-2 are divided into two main categories: natural and technological. Natural hazards include hazards categorized as atmospheric, hydrologic, and other.

Atmospheric hazards are events or incidents associated with weather generated phenomenon. Atmospheric hazards identified as significant from Table 4-2, include: extreme heat; hail; hurricane wind events; thunderstorms; tornadoes; and winter storms. 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 include drought and inland flooding. For the purposes of the risk assessment, “other” natural hazards consist of wildfire and infectious disease.

The term “technological hazards” refers to the origins of incidents that can arise from human activities such as the construction and maintenance of dams; the use of gas and oil pipelines; the manufacture, transportation, storage, and use of hazardous materials; and an act of terrorism. These hazards are distinct from natural hazards primarily in that they originate from human activity. While the risks presented by natural hazards may be increased or decreased as a result of human activity, they are not inherently human-induced.

Section 4 – Hazard Identification

Table 4-3 provides descriptions for each of the natural and technological hazards included in the Plan Update.

Table 4-3. Hazard Descriptions

Hazard	Description
ATMOSPHERIC	
Extreme Heat	Extreme heat is the condition whereby temperatures hover ten degrees or more above the average high temperature in a region for an extended period.
Hailstorm	Any storm that produces hailstones that fall to the ground; usually used when the amount or size of the hail is considered significant.
Hurricane Wind	Hurricanes and tropical storms are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) with a diameter averaging 10 to 30 miles across. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation and tornadoes. Coastal areas are also vulnerable to the additional forces of storm surge, wind-driven waves and tidal flooding which can be more destructive than cyclone wind. Due to the distance from the coast, only hurricane wind will be considered for the City of Austin.
Thunderstorm	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 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,

Section 4 – Hazard Identification

Hazard	Description
	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.
Flood	The accumulation of water within a water body, which results in the overflow of excess water onto adjacent lands, usually floodplains. The floodplain is the land adjoining the channel of a river, stream, ocean, lake or other watercourse or water body that is susceptible to flooding. Most floods fall into the following three categories: riverine flooding, coastal flooding, or shallow flooding.
OTHER	
Infectious Disease	Illness due to a specific infectious agent or its toxic products that arises through transmission of that agent or its products from an infected person, animal, or reservoir to a susceptible host, either directly or indirectly through an intermediate plant or animal host, vector, or the inanimate environment.
Wildfire	An uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase the risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by human factors.
TECHNOLOGICAL	
Dam Failure	Dam failure is the collapse, breach, or other failure of a dam structure resulting in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream of the dam.
Hazardous Materials Release	Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. A hazardous material (HAZMAT) incident involves a substance outside normal safe containment in sufficient concentration to pose a threat to life, property, or the environment.
Pipeline Failure	An estimated 2.2 million miles of pipelines in the United States carry hazardous materials such as oil and natural gas. Pipelines are out of sight and unnoticed, yet have caused fires and explosions that have killed more than 200 people and injured more than 1,000 people nationwide in the last decade.

Section 4 – Hazard Identification

Hazard	Description
Terrorism	Terrorism is the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion, or ransom. Terrorists often use threats to create fear among the public, to try to convince citizens that their government is powerless to prevent terrorism and to get immediate publicity for their causes.

HAZARD PROFILES

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- Infectious Disease 51
- Dam Failure..... 58
- Hazardous Materials Release 63
- Pipeline Failure 67
- Terrorism 77

Overview

This section contains profiles for the natural and technological hazards identified in Section 4. Each hazard is discussed in terms of location, extent, historical occurrences and probability of future events, including any specific or detailed items noted by the planning team as it relates to historical hazard information. A full vulnerability assessment for each is included in Section 6.

The detailed profiles in this section are discussed according to category, and included in the following order:

- Atmospheric
 - Extreme Heat
 - Hail
 - Hurricane Wind
 - Thunderstorm
 - Tornado

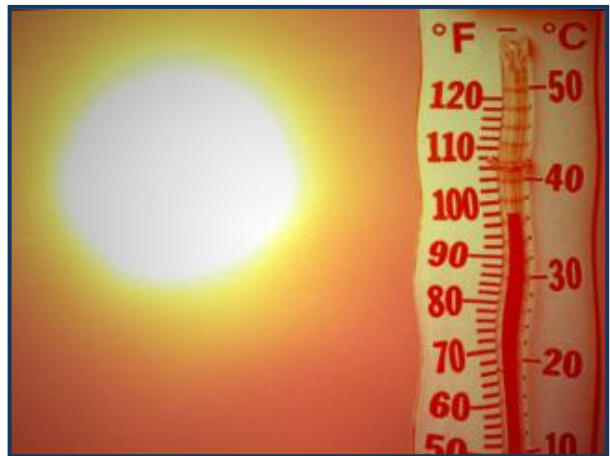
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- Winter Storm
- Hydrologic
 - Drought
 - Flood
- Other Natural Hazards
 - Infectious Disease
 - Wildfire
- Technological / Man-Caused
 - Dam Failure
 - Hazardous Materials Release
 - Pipeline Failure
 - Terrorism

Extreme Heat

Austin has a humid subtropical climate, characterized by humid summers, where temperatures average around 90 degrees Fahrenheit. The combination of high temperatures mixed with humidity leads to heat waves or periods of extreme heat. Although heat can damage buildings and facilities, it presents a more significant threat to the safety and welfare of citizens and animals.

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 infirm, 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 care for their well being.



Location

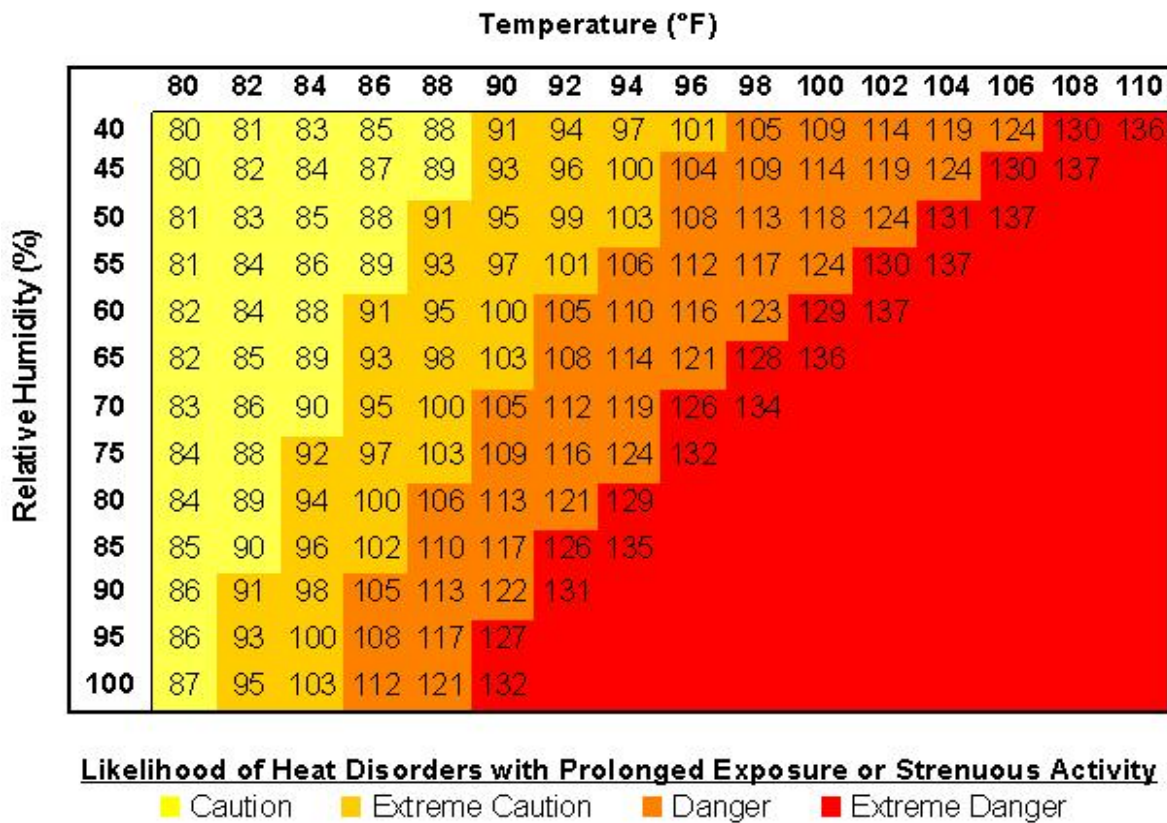
Though injuries or deaths from extreme heat have been recorded at different locations throughout the city, there is no specific geographic scope to the extreme heat hazard. Extreme heat could occur at any area of the city.

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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 5-1. This index measures how hot it feels outside when humidity is combined with high temperatures.

Figure 5-1. Extent Scale for Extreme Summer Heat



The extent scale in Figure 5-1 displays varying degrees of caution depending on the relative humidity combined with the temperature. For example, when the temperature is at 90 degrees Fahrenheit 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 level of intensity where fatigue due to heat exposure is possible. “Extreme Caution” indicates that sunstroke, muscle cramps or heat exhaustion are possible, whereas a

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“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 Table 5-1.

Table 5-1. Extreme Summer Heat Warnings

Warning	Detailed Description
Heat Advisory	Heat Index is expected to exceed 105 °F to 110 °F.
Excessive Heat Warning	Heat Index above 105 °F for 3 hours or more during the day and at or above 80 °F at night.

Due to its location, and its urban makeup, the City of Austin 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 for prolonged periods of time. Due to the abundance of concrete and metal infrastructure, the effects of an extreme heat event can be intensified. Concrete and metal absorb heat energy and emit that energy at night, thereby trapping heat, and causing the temperature to feel as much as 10 degrees higher than surrounding areas. This is known as the “heat island” effect.

Previous Occurrences

From 1999-2004, there were 258 deaths reported among Texas residents with exposure to excessive natural heat as the underlying cause of death¹. Of these 258, 17 deaths occurred in Travis County as shown in Table 5-2.

¹ Texas Department of State Health Services

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Table 5-2. Deaths due to Extreme Heat

COUNTY OF DEATH	1999	2000	2001	2002	2003	2004	TOTAL
TEXAS	67	81	42	58	62	53	363
TRAVIS	3	5	0	3	5	1	17

Although the Texas Department of State Health Services does not provide a breakdown of injuries or fatalities by place, Austin experienced record heat in the summers of 1980, 1998, 1999, 2000 and 2009, according to the National Climatic Data Center (NCDC).

Previous occurrences for extreme heat and all other natural hazards for this Plan Update are derived from the NCDC. The NCDC is a national data source organized under NOAA. The NCDC is the largest archive available for climate data; however, the only incidents recorded are those that are reported to the NCDC. 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 City. In addition, property damage estimates are not always available. When this occurs, estimates are provided. Where an estimate has been provided in a table for losses, the dollar amounts have been altered to indicate the damage in 2009 dollars.

According to heat related incidents located solely within the City of Austin from the NCDC reports, three fatalities were reported in the summer of 1999 from incidents on July 29, August 14 and August 16. Victims from two of these fatalities were over the age of 75. Another three fatalities were reported in the City the following summer, which also marked a record high temperature of 112 degrees with another two deaths occurring in the county. On July 5, 2000 a 26-year old man died from heat stroke after working outdoors for a prolonged period. A two-year old boy, who was left unattended in a sun room, and a 72-year old woman, were also victims to extreme heat in July, 2000.

Although no fatalities or injuries were reported for 2001 for the City or Travis County, the City experienced a record heat wave of 21 consecutive days of temperatures at or above 100 degrees.

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The summer of 2009 marked another period of extreme heat for the City. Warnings were issued at the end of June of 2009 due to almost two weeks of continuous 100 degree or higher temperatures. One fatality was reported to the NCDC on July 15, 2009.

Probability of Future Events

The likelihood or future probability of excessive summer heat in the City of Austin is high, meaning there is more than a 50 percent chance of an event in any given year.

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 the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until having developed sufficient weight they fall as precipitation—as balls or irregularly shaped masses of ice greater than 0.75 inches in diameter. The size of hailstones is a direct function 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 result of the intensity of heating at the Earth’s surface. Higher temperature gradients relative to elevation above the surface result in increased suspension time and hailstone size.

Location

Hailstorms can vary greatly in terms of size, location, intensity and duration but are considered frequent occurrences throughout the City of Austin. It is assumed that the entire City is uniformly exposed to hailstorms.

Extent

The National Weather Service classifies a storm as severe if hail of $\frac{3}{4}$ of an inch in diameter or greater is imminent based on radar intensity or seen by observers. The intensity of a hailstorm depends on the damage potential related to size as depicted in the NCDC Intensity Scale at Table 5-3.

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Table 5-3. NCDC Hailstorm Intensity Scale (H0 to H10)

	Intensity Category	Typical Hail Diameter (in) ²	Description	Probable Kinetic Energy, J-m ²	Typical Damage Impacts
H0	Hard Hail	Up to 0.33	Pea	0-20	No damage
H1	Potentially Damaging	0.33 – 0.60	Marble	>20	Slight general damage to plants, crops
H2	Significant	0.60-0.80	Dime	>100	Significant damage to fruit, crops, vegetation
H3	Severe	0.80-1.2	Nickel	>300	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	1.2-1.6	Half Dollar	>500	Widespread glass damage, vehicle bodywork damage
H5	Destructive	1.6-2.0	Ping	>800	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	2.0-2.4	Hen’s Egg		Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	2.4-3.0	Golf Ball		Severe roof damage, risk of serious injuries
H8	Destructive	3.0-3.5	Hen’s Egg		Severe damage to aircraft bodywork
H9	Super Hailstorms	3.5-4.0	Tennis Ball		Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>4.0	Baseball		Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

The scale in Table 5-3 extends from H0 to H10 with increments of intensity or damage potential related to hail size (distribution and maximum), texture, amount, fall speed, speed of storm translation, and strength of the accompanying wind.

² Approximate range (typical maximum size in bold), since other factors (e.g. number and density of hailstones, hail fall speed and surface wind speeds) affect severity.

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The City experienced two of the worst hailstorms in its history in May of 2008 and March of 2009. Reports indicate that the magnitude of the March 25, 2009 event was close to an H8 or H9 in terms of size and may have caused up to \$160 million dollars in damages. The May 2008 event caused approximately \$50 million dollars in damages with a magnitude of H9. Although both storms were rare, they indicate the potential destructiveness and danger of an intense hailstorm.

Previous Occurrences

Historical evidence shows that most of the City is vulnerable to hail events, which typically result from severe thunderstorm activity. Figure 5-2 presents a map of historical hail events by size that impacted the City of Austin and the surrounding area between 1993 and 2008, and Table 5-4 shows details for hail events specifically associated with the City of Austin³.



Table 5-4. Historical Hail Occurrences (1993-2008)- NCDC

DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (IN 2009 DOLLARS)	CROP DAMAGE (IN 2009 DOLLARS)
03/25/1993	5:32 PM	0.75 in.	0	0	\$0	\$7,770
03/25/1993	5:37 PM	1.75 in.	0	0	\$77,700	\$0
03/25/1993	5:39 PM	1.00 in.	0	0	\$0	\$0
03/25/1993	5:40 PM	1.25 in.	0	0	\$0	\$0
03/25/1993	5:55 PM	1.75 in.	0	0	\$776,996	\$0

³ As referenced in the previous section, in some instances, historical occurrence data may appear to contain duplicate entries. However, when all fields of the NCDC records are compared, there are differences (such as unique spatial coordinates or hand-written accounts) that establish these as individual events. Similarities in dollar losses and magnitudes can likely be attributed to estimations made at the time the event was reported.

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DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (IN 2009 DOLLARS)	CROP DAMAGE (IN 2009 DOLLARS)
03/25/1993	6:25 PM	0.88 in.	0	0	\$0	\$7,770
03/25/1993	6:30 PM	2.00 in.	0	0	\$116,549,469	\$7,770
04/05/1994	3:00 PM	0.75 in.	0	0	\$757,242	\$75,724
04/20/1995	3:00 PM	1.75 in.	0	0	\$0	\$0
05/11/1995	11:30 AM	1.50 in.	0	0	\$0	\$0
11/01/1995	1:00 AM	0.75 in.	0	0	\$0	\$0
04/20/1996	11:20 AM	0.75 in.	0	0	\$0	\$0
09/20/1996	12:01 AM	1.00 in.	0	0	\$0	\$0
10/17/1996	4:42 PM	1.50 in.	0	0	\$28,593	\$0
10/17/1996	4:45 PM	0.00 in.	0	0	\$14,297	\$0
06/17/1997	4:10 AM	1.75 in.	0	0	\$0	\$0
06/17/1997	4:15 AM	1.75 in.	0	0	\$0	\$0
06/17/1997	4:20 AM	1.00 in.	0	0	\$0	\$0
02/25/1998	10:10 PM	0.75 in.	0	0	\$0	\$0
05/01/1998	3:40 PM	0.75 in.	0	0	\$0	\$0
05/01/1998	4:00 PM	1.00 in.	0	0	\$0	\$0
03/16/2000	5:18 PM	1.75 in.	0	0	\$0	\$0
04/07/2000	7:05 PM	0.75 in.	0	0	\$0	\$0
04/11/2000	11:50 PM	1.00 in.	0	0	\$0	\$0
10/22/2000	4:25 PM	1.75 in.	0	0	\$0	\$0
10/20/2002	11:05 PM	1.75 in.	0	0	\$614,937	\$0
03/25/2003	8:05 PM	0.75 in.	0	0	\$0	\$0
06/13/2003	5:59 PM	0.75 in.	0	0	\$0	\$0
08/11/2003	7:10 PM	1.75 in.	0	0	\$119,405	\$0
04/10/2004	3:15 PM	0.75 in.	0	0	\$0	\$0
05/31/2004	4:08 PM	1.00 in.	0	0	\$0	\$0
05/31/2004	4:10 PM	1.75 in.	0	0	\$0	\$0
05/31/2004	4:25 PM	1.75 in.	0	0	\$0	\$0
06/28/2004	4:37 PM	0.75 in.	0	0	\$0	\$0
11/23/2004	8:55 AM	0.75 in.	0	0	\$0	\$0
03/19/2005	4:55 PM	0.88 in.	0	0	\$0	\$0
03/25/2005	9:10 PM	1.50 in.	0	0	\$0	\$0
03/25/2005	9:15 PM	1.00 in.	0	0	\$0	\$0
03/25/2005	9:23 PM	0.75 in.	0	0	\$0	\$0
03/25/2005	9:25 PM	1.75 in.	0	0	\$0	\$0
03/25/2005	9:30 PM	0.75 in.	0	0	\$0	\$0

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DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (IN 2009 DOLLARS)	CROP DAMAGE (IN 2009 DOLLARS)
03/25/2005	9:30 PM	0.88 in.	0	0	\$0	\$0
03/25/2005	9:35 PM	1.75 in.	0	0	\$0	\$0
03/25/2005	9:40 PM	2.00 in.	0	0	\$0	\$0
04/05/2005	7:32 PM	1.00 in.	0	0	\$0	\$0
04/05/2005	7:35 PM	0.75 in.	0	0	\$0	\$0
04/05/2005	7:45 PM	1.00 in.	0	0	\$0	\$0
04/05/2005	7:55 PM	1.00 in.	0	0	\$0	\$0
04/10/2005	11:25 PM	0.75 in.	0	0	\$0	\$0
04/11/2005	12:30 AM	1.00 in.	0	0	\$0	\$0
05/29/2005	7:40 PM	1.75 in.	0	0	\$0	\$0
05/29/2005	8:02 PM	1.00 in.	0	0	\$0	\$0
05/29/2005	8:09 PM	1.75 in.	0	0	\$0	\$0
04/18/2006	9:03 PM	1.00 in.	0	0	\$0	\$0
04/18/2006	9:25 PM	0.75 in.	0	0	\$0	\$0
04/20/2006	2:20 PM	1.00 in.	0	0	\$0	\$0
04/20/2006	2:30 PM	1.00 in.	0	0	\$0	\$0
04/20/2006	3:50 PM	3.00 in.	0	0	\$0	\$0
04/20/2006	3:53 PM	2.00 in.	0	0	\$0	\$0
04/20/2006	4:00 PM	1.00 in.	0	0	\$0	\$0
04/20/2006	4:00 PM	2.50 in.	0	0	\$0	\$0
04/20/2006	4:20 PM	1.75 in.	0	0	\$0	\$0
04/20/2006	4:40 PM	1.75 in.	0	0	\$0	\$0
05/02/2006	4:17 PM	1.00 in.	0	0	\$0	\$0
05/04/2006	9:00 PM	1.00 in.	0	0	\$0	\$0
05/04/2006	9:31 PM	1.25 in.	0	0	\$0	\$0
05/04/2006	9:50 PM	1.25 in.	0	0	\$0	\$0
05/06/2006	2:01 AM	0.88 in.	0	0	\$0	\$0
05/06/2006	6:00 PM	0.88 in.	0	0	\$0	\$0
05/06/2006	6:30 PM	1.00 in.	0	0	\$0	\$0
05/06/2006	6:40 PM	1.00 in.	0	0	\$0	\$0
09/23/2006	4:35 PM	1.00 in.	0	0	\$0	\$0
05/03/2007	12:11 AM	0.88 in.	0	0	\$0	\$0
04/04/2008	6:50 AM	0.75 in.	0	0	\$0	\$0
04/04/2008	7:00 AM	0.75 in.	0	0	\$0	\$0
04/04/2008	7:03 AM	0.75 in.	0	0	\$0	\$0

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DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (IN 2009 DOLLARS)	CROP DAMAGE (IN 2009 DOLLARS)
04/04/2008	7:03 AM ⁴	0.75 in.	0	0	\$0	\$0
04/04/2008	7:07 AM	0.88 in.	0	0	\$0	\$0
04/04/2008	7:10 AM	0.75 in.	0	0	\$0	\$0
04/25/2008	8:50 PM	0.88 in.	0	0	\$0	\$0
04/25/2008	9:02 PM	0.88 in.	0	0	\$0	\$0
05/10/2008	6:15 PM	1.75 in.	0	0	\$0	\$0
05/10/2008	6:20 PM ⁵	1.25 in.	0	0	\$0	\$0
05/10/2008	6:20 PM ⁶	1.25 in.	0	0	\$0	\$0
05/10/2008	6:22 PM	1.50 in.	0	0	\$0	\$0
05/10/2008	6:25 PM	1.00 in.	0	0	\$0	\$0
05/10/2008	6:27 PM	1.00 in.	0	0	\$0	\$0
05/10/2008	6:27 PM	2.00 in.	0	0	\$0	\$0
05/10/2008	6:27 PM	2.25 in.	0	0	\$0	\$0
05/10/2008	6:30 PM	1.75 in.	0	0	\$0	\$0
05/10/2008	6:38 PM	1.75 in.	0	0	\$0	\$0
05/10/2008	6:40 PM	2.50 in.	0	0	\$0	\$0
05/10/2008	6:41 PM	1.75 in.	0	0	\$0	\$0
05/14/2008	8:30 PM	2.50 in.	0	0	\$0	\$0
05/14/2008	11:27 PM	1.00 in.	0	0	\$0	\$0
05/14/2008	11:30 PM ⁷	2.75 in.	0	0	\$103,000	\$0
05/14/2008	11:30 PM ⁸	2.75 in.	0	0	\$103,000	\$0
05/14/2008	11:30 PM ⁹	1.75 in.	0	0	\$1,030	\$0
05/14/2008	11:30 PM ¹⁰	2.00 in.	0	0	\$103,000	\$0
05/14/2008	11:35 PM	1.75 in.	0	0	\$0	\$0
05/14/2008	11:45 PM ¹¹	1.75 in.	0	0	\$0	\$0
05/14/2008	11:45 PM ¹²	4.00 in.	0	0	\$1,030	\$0
05/15/2008	12:15 AM	1.00 in.	0	0	\$0	\$0

⁴ This entry is not a duplicate. Although it is from the same storm system, this report is from Austin Camp Mabry, while the previous entry is from North, Northwest Austin.

⁵ This storm was located one mile North of Austin

⁶ This is not a duplicate, but the report from the storm as it reached Northeast Austin.

⁷ Location: One mile East of the former airport (Robert Mueller Municipal Airport)

⁸ Location: Mueller Airport

⁹ Location, North to Northwest Austin

¹⁰ Location: One mile East of Austin Camp Mabry

¹¹ Location: Two miles West, Northwest of Mueller Airport

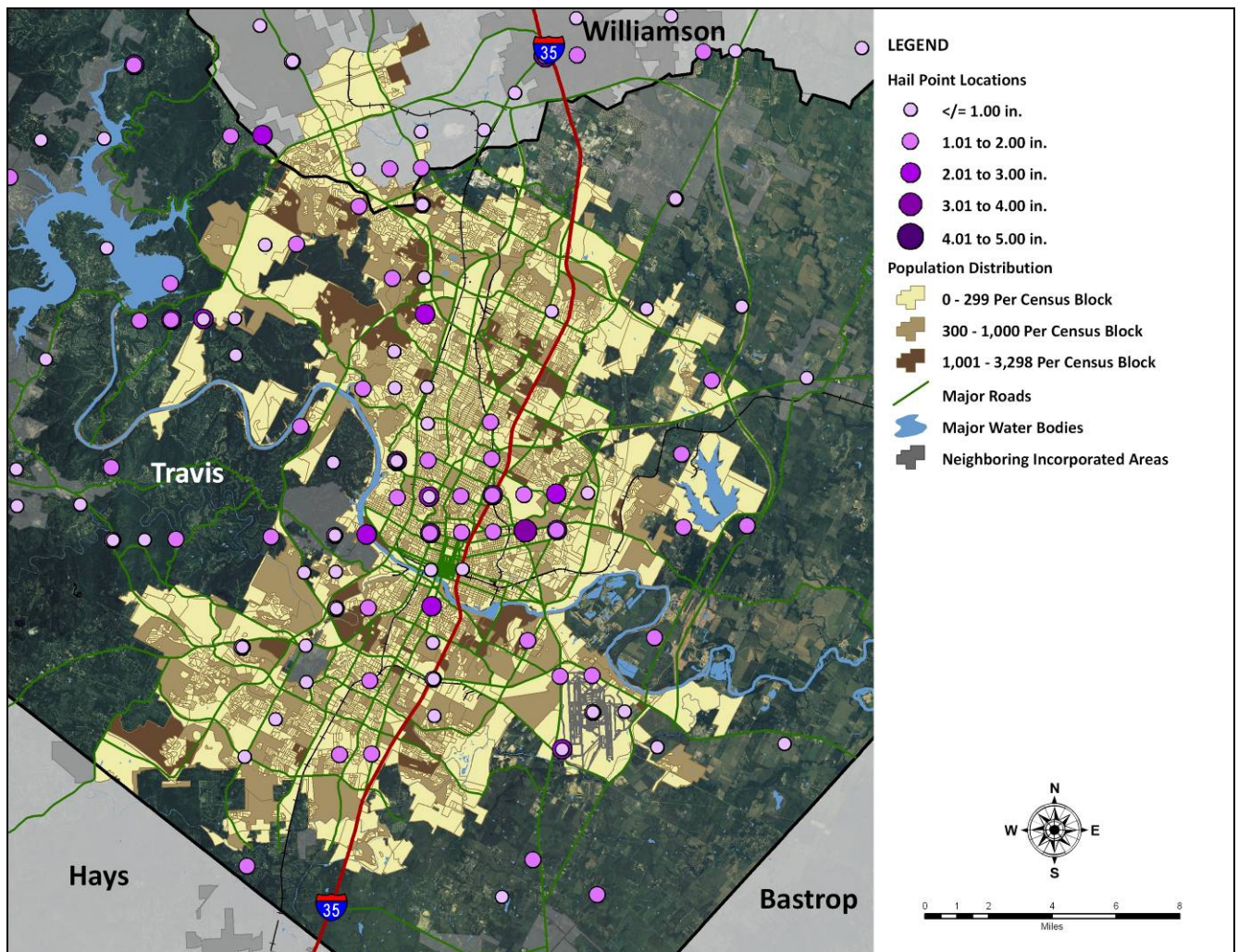
¹² Location: One mile Southwest of Mueller Airport

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DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (IN 2009 DOLLARS)	CROP DAMAGE (IN 2009 DOLLARS)
TOTALS	-	-	0	0	\$119,249,699	\$99,034

The May 14, 2008 hail event resulted in damage across the city. An event of similar magnitude occurred on March 25, 2009. With little to no warning time, areas of the city were inundated with golf ball sized hail, damaging more than 22,000 vehicles, 15,000 homes and causing an estimated \$160 million in damages.

Figure 5-2. Historical Locations (1993-2008) – NCDC



Probability of Future Events

Because severe thunderstorm events will remain a frequent occurrence in the City of Austin, the probability of future occurrences of hail is also highly probable, meaning that an event is expected to occur yearly. It can be expected that future hail events will continue, at the very least, to cause minor damages to property and vehicles throughout the city. Most hailstorms occur during the spring months of March, April, and May and in the fall during the month of September.

Hurricane Wind

As an incipient hurricane develops, the barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Scale (Table 5-4), which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense.

Location

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States, and while coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland. Although Austin is far from the coast, it is still susceptible to the accompanying hazard effects of extreme wind, flooding and tornadoes. Since there are no exact geographic boundaries for hurricane wind, an event could occur throughout the City.

Extent

Table 5-5 describes the intensity of a hurricane in terms of wind speed, surface pressure and storm surge. Since the City would not experience a storm surge due to its distance from the coast, magnitude will be measured in terms of wind speeds.

Table 5-5. Saffir-Simpson Scale

Category	Maximum Sustained Wind Speed (MPH)	Minimum Surface Pressure (Millibars)	Storm Surge (Feet)
1	74–95	Greater than 980	3–5
2	96–110	979–965	6–8

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Category	Maximum Sustained Wind Speed (MPH)	Minimum Surface Pressure (Millibars)	Storm Surge (Feet)
3	111–130	964–945	9–12
4	131–155	944–920	13–18
5	155 +	Less than 920	19+

Source: National Hurricane Center

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure and storm surge potential, which are combined to estimate potential damage. Categories 3, 4, and 5 are classified as “major” hurricanes, and though hurricanes within this range comprise only 20 percent of total tropical cyclone landfalls, they account for over 70 percent of the damage in the United States.

Previous Occurrences

The City has not been directly impacted by a hurricane, but narrowly dodged intense winds from Hurricane Ike in September of 2008.

Probability of Future Events

Table 5-6 profiles the potential wind speeds in miles per hour (MPH) that could be expected in the City of Austin during a hurricane event for various return periods (ranging from a 10-year event to a 1,000-year event).

Table 5-6. Average Hurricane Wind Speeds in the City of Austin by Return Period

WIND SPEED [MPH] PER RETURN PERIOD						
10-YEAR	20-YEAR	50-YEAR	100-YEAR	200-YEAR	500-YEAR	1,000-YEAR
0	41-53	53-72	64-78	70-90	63-99	75-104

Source: HAZUS-MH MR3

Thunderstorm

Severe storms are generally considered a common occurrence in the City of Austin. Typical thunderstorms are 15 miles in diameter and lasts an average of 30 minutes. Despite the short time span, thunderstorms can be extremely dangerous as they are often strong and fast in their approach and can be accompanied by flash flooding, lightning, hail, tornadoes, and high winds.

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Lightning damage can result in electrocution of humans and animals; vaporization of materials along the path of the strike; fire caused by the high temperature produced by the strike, and sudden power surges that can damage electrical and electronic equipment. Millions of dollars of direct and indirect damages result from lightning strikes on

electric utility substations and distribution lines. While property damage is the major hazard associated with lightning, it should be noted that lightning strikes kill nearly 100 people each year in the United States¹³.

Location

Thunderstorms occur randomly, and therefore it is impossible to predict where they will strike within the City. Thus, it is assumed that the City of Austin is uniformly exposed to the threat of thunderstorms.

Extent

A severe thunderstorm event is typically defined by NCDC based on wind magnitude. It is also important to note that high wind events associated with other hazards such as tornadoes, hurricanes, and winter storms are included in those respective sections. Table 5-7 depicts intensity for thunderstorms according to wind magnitude published by the World Meteorological Organization (WMO).

Table 5-7. Beaufort Wind Scale

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

¹³ National Weather Service

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Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects
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

According to the available data for previous occurrences, high winds are common to the Austin area when accompanied by thunderstorms (See Table 5-8). If another Beaufort event of 10 or higher were to occur, the City would be susceptible to structural damage to structural facilities, especially roofs and windows. Injuries may also occur as a result of debris that is carried by strong gusts or twigs and branches that are broken off from the force of the wind. Traffic disruptions may also occur as traffic lights could be damaged or flying debris could cause accidents on the road. This would hinder the ability of critical services staff to travel to and from work. The spatial extent of the damages could affect 25% to 50% of the population of Austin.

Previous Occurrences

Table 5-8 presents information on severe historical thunderstorm events reported to NCDC from 1993 to 2008.

Table 5-8. Severe Historical Thunderstorm Events (NCDC 1993–2008)

DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (IN 2009 DOLLARS)	CROP DAMAGE (IN 2009 DOLLARS)
05/30/1993	6:59 AM	51 kts.	0	0	\$0	\$7,770

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DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (IN 2009 DOLLARS)	CROP DAMAGE (IN 2009 DOLLARS)
10/19/1993	11:25 PM	NR ¹⁴	0	0	\$7,770	\$7,770
05/29/1994	10:52 PM	53 kts.	0	0	\$75,724	\$7,572
05/30/1994	3:00 PM	NR	0	0	\$75,724	\$7,572
11/04/1994	11:55 PM	57 kts.	0	0	\$7,572	\$0
03/08/1995	1:39 AM	72 kts.	0	0	\$73,619	\$0
09/07/1995	7:46 PM	56 kts.	0	0	\$0	\$0
09/07/1995	8:00 PM	NR	0	7	\$4,417,117	\$0
09/07/1995	8:03 PM	65 kts.	0	0	\$0	\$0
04/28/1996	10:15 PM	57 kts.	0	0	\$0	\$0
06/04/1996	4:05 AM	57 kts.	0	0	\$0	\$0
09/20/1996	8:55 PM	NR	0	0	\$28,593	\$0
04/04/1997	6:15 PM	51 kts.	0	0	\$0	\$0
04/04/1997	6:30 PM ¹⁵	58 kts.	0	0	\$0	\$0
04/04/1997	6:30 PM ¹⁶	NR	0	0	\$279,521	\$0
04/04/1997	6:32 PM	51 kts.	0	0	\$0	\$0
05/27/1997	4:15 PM	56 kts.	0	0	\$0	\$0
03/07/1998	5:50 PM	NR	0	0	\$206,426	\$0
04/26/1998	7:50 PM	NR	0	0	\$110,094	\$0
05/17/1999	9:27 PM	60 kts.	0	0	\$0	\$0
05/26/1999	5:25 PM	NR	0	0	\$94,074	\$0
05/26/1999	5:26 PM	51 kts.	0	0	\$0	\$0
04/11/2000	11:42 PM	51 kts.	0	0	\$26,095	\$0
05/27/2000	9:01 PM	50 kts.	0	0	\$0	\$0
05/27/2000	9:22 PM	51 kts.	0	0	\$0	\$0
03/12/2001	1:30 AM	NR	0	5	\$190,016	\$0
05/20/2001	8:30 PM	57 kts.	0	0	\$0	\$0
09/03/2001	8:05 PM	NR	0	0	\$63,339	\$0
11/15/2001	5:39 PM	54 kts.	0	0	\$0	\$0
06/16/2002	2:00 AM	NR	0	0	\$61,494	\$0
06/26/2002	7:08 PM	56 kts.	0	0	\$0	\$0
06/26/2002	7:20 PM	NR	0	0	\$122,987	\$0
12/23/2002	6:25 AM	NR	0	0	\$12,299	\$0

¹⁴ NR indicates “not reported.”

¹⁵ Location: One mile Southwest of Austin

¹⁶ Location: Mueller Airport

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DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (IN 2009 DOLLARS)	CROP DAMAGE (IN 2009 DOLLARS)
06/13/2003	3:45 PM	56 kts.	0	0	\$119,405	\$0
08/08/2003	3:23 PM	57 kts.	0	0	\$119,405	\$0
08/11/2003	7:05 PM	60 kts.	0	0	\$716,431	\$0
06/27/2004	10:13 AM	50 kts.	0	0	\$0	\$0
06/28/2004	4:40 PM	60 kts.	0	0	\$23,185	\$0
03/25/2005	9:15 PM	50 kts.	0	0	\$0	\$0
03/31/2005	6:15 PM	60 kts.	0	0	\$0	\$0
05/29/2005	8:25 PM	70 kts.	0	0	\$0	\$0
07/07/2005	7:00 PM	60 kts.	0	0	\$0	\$0
04/20/2006	8:30 PM	60 kts.	0	0	\$0	\$0
05/04/2006	9:18 PM	63 kts.	0	0	\$0	\$0
05/04/2006	9:25 PM	70 kts.	0	0	\$0	\$0
05/04/2006	9:30 PM	64 kts.	0	0	\$109,273	\$0
10/10/2006	6:17 AM	55 kts.	0	0	\$109,273	\$0
04/13/2007	8:30 PM	55 kts.	0	0	\$53,045	\$0
06/03/2007	8:10 PM	65 kts.	0	0	\$0	\$0
05/14/2008	11:30 PM ¹⁷	70 kts.	0	0	\$51,500,000	\$0
05/14/2008	11:30 PM ¹⁸	51 kts.	0	0	\$0	\$0
05/14/2008	11:30 PM ¹⁹	70 kts.	0	0	\$0	\$0
05/15/2008	12:00 AM	55 kts.	0	0	\$0	\$0
TOTALS	-	-	0	12	\$58,602,481	\$30,684

Probability of Future Events

The probability of occurrence for future thunderstorms in Austin is highly probable, meaning there is greater than a 75 percent chance of a storm occurring in any given year. According to the NCDC reported historical occurrences, the City experiences a severe storm twice a year. Given this regular frequency of occurrence, it can be

¹⁷ Location: Central Austin

¹⁸ Location: One mile East, Southeast of Camp Mabry

¹⁹ Location: One mile Northeast of Camp Mabry

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expected that future thunderstorms will continue to threaten life and cause minor²⁰ property damages throughout the City of Austin.

Tornado

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes and other tropical storms) when cool,



dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, accompanied by lightning or large hail. According to the National Weather Service, tornado wind speeds normally range from 40 to more than 300 miles per hour. The most violent tornadoes have rotating winds of 250 miles per hour or more and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles.

On average, over 800 tornadoes are reported nationwide each year, resulting in an average of 80 deaths and 1,500 injuries (NOAA, 2007). They are more likely to occur during the months of March through May and can occur at any time of day, but are most likely to form in the late afternoon and early evening. Most tornadoes are a few dozen yards wide and touch down briefly, but even small short-lived tornadoes can inflict tremendous damage. Highly destructive tornadoes may carve out a path over a mile wide and several miles long.

Location

Tornadoes occur randomly, and therefore it is impossible to predict where they will strike within the City. Therefore, it is assumed that the City of Austin is uniformly exposed to this hazard.

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,

²⁰ Minor damages mean the potential to destroy or substantially damage more than ten percent of property or shutdown facilities for one week. For more detail, please see Table 6-4 in Section 6.

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particularly mobile homes. It should be noted that tornado magnitudes prior to 2005 were determined using the traditional version of the Fujita Scale (Table 5-9). Tornado magnitudes that were determined in 2005 and later were determined using the Enhanced Fujita Scale (Table 5-10).

The Enhanced Fujita Scale for Tornadoes was developed to measure tornado strength and associated damages (Table 5-10).

Table 5-9. The Fujita Scale (Effective Prior to 2005)

F-SCALE NUMBER	INTENSITY	WIND SPEED	TYPE OF DAMAGE DONE
F0	GALE TORNADO	40–72 MPH	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
F1	MODERATE TORNADO	73–112 MPH	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	SIGNIFICANT TORNADO	113–157 MPH	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	SEVERE TORNADO	158–206 MPH	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
F4	DEVASTATING TORNADO	207–260 MPH	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	INCREDIBLE TORNADO	261–318 MPH	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.
F6	INCONCEIVABLE TORNADO	319–379 MPH	These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars and refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies.

Source: National Weather Service

Table 5-10. The Enhanced Fujita Scale (Effective 2005 and Later)

EF-SCALE NUMBER	INTENSITY PHRASE	3 SECOND GUST (MPH)	TYPE OF DAMAGE DONE
F0	GALE	65–85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
F1	MODERATE	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 the roads; attached garages may be destroyed.
F2	SIGNIFICANT	111–135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	SEVERE	136–165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
F4	DEVASTATING	166–200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	INCREDIBLE	Over 200	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.

Source: National Weather Service

Previous Occurrences

It is important to note that only reported tornadoes have been factored into this risk assessment. It is likely that a high number of occurrences have gone unreported over the past 58 years.

Figure 5-3 presents a map of historical tornado point locations that hit the City of Austin study area from 1950 to 2008. 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 typically smaller, high frequency

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period can emerge in the fall during the brief transition between the warm and cold seasons.

Figure 5-3. Point Locations for Historical Tornado Events (NCDC 1950–2008)

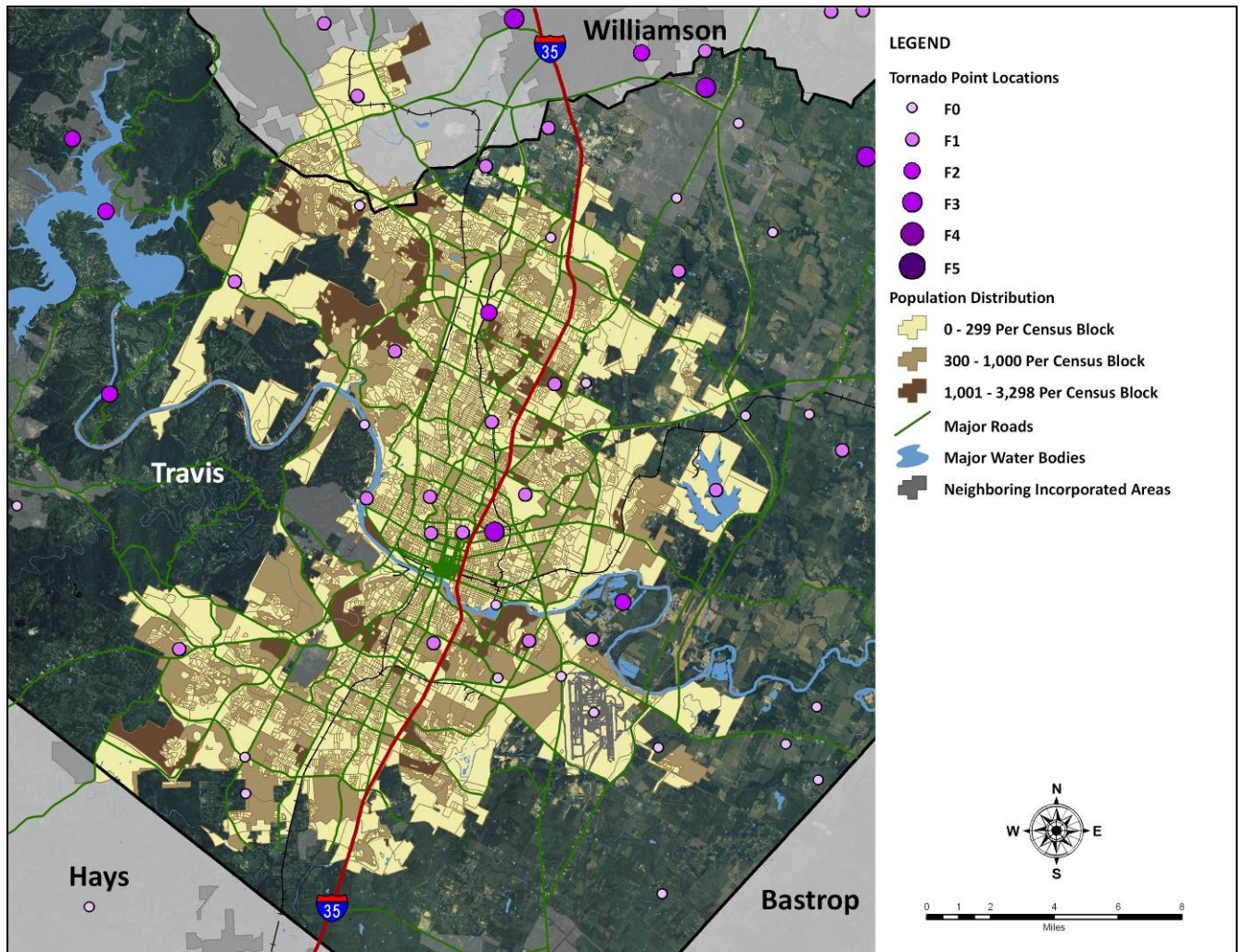


Table 5-11 shows details for 28 tornado events specifically associated with the City of Austin.²¹

²¹ In some instances, historical occurrence data may appear to contain duplicate entries. However, when all fields of the NCDC records are compared, there are differences (such as unique spatial coordinates or hand-written accounts) that establish these as individual events. Similarities in dollar losses and magnitudes can likely be attributed to estimations.

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Table 5-11. Historical Tornado Occurrences (NCDC 1950²²–2008)

DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE (IN 2009 DOLLARS)	CROP DAMAGE (IN 2009 DOLLARS)
10/23/1953	1:00 AM	F1	0	0	\$210,246	\$0
10/20/1956	12:56 PM	F1	0	0	\$0	\$0
03/31/1957	9:05 AM	F2	0	0	\$1,996,751	\$0
05/10/1959	3:20 PM	F3	0	0	\$1,931,991	\$0
04/16/1964	3:00 PM	F0	0	0	\$0	\$0
05/17/1965	1:30 AM	F1	0	0	\$0	\$0
09/20/1967	10:00 AM	F0	0	0	\$20,136	\$0
09/20/1967	10:00 AM	F1	0	0	\$20,136	\$0
09/20/1967	10:00 AM	F1	0	1	\$20,136	\$0
08/03/1972	11:10 AM	F0	0	0	\$134,368	\$0
03/06/1973	8:05 AM	F1	0	0	\$0	\$0
03/10/1973	5:45 AM	F1	0	2	\$1,262,962	\$0
05/05/1975	1:25 PM	F0	0	0	\$0	\$0
05/23/1975	3:15 PM	F0	0	0	\$0	\$0
05/29/1975	7:00 AM	F1	0	0	\$0	\$0
05/12/1976	7:50 PM	F1	0	0	\$0	\$0
05/01/1979	9:33 AM	F0	0	0	\$0	\$0
08/10/1980	2:50 PM	F0	0	0	\$680,797	\$0
06/13/1981	3:00 PM	F1	0	0	\$61,730	\$0
05/18/1983	11:15 AM	F1	0	0	\$6,765	\$0
05/18/1990	5:25 PM	F0	0	0	\$0	\$0
05/27/1997	3:15 PM	F1	0	0	\$6,988	\$0
03/16/2000	4:20 PM	F0	0	0	\$0	\$0
11/15/2001	3:50 PM	F1	0	0	\$126,677	\$0
11/15/2001	4:45 PM	F0	0	0	\$38,003	\$0
11/15/2001	5:30 PM	F1	0	0	\$101,342	\$0
11/15/2001	5:44 PM	F0	0	0	\$19,002	\$0
06/08/2004	7:45 PM	F0	0	0	\$173,891	\$0
TOTALS	-	-	0	3	\$6,811,921	\$0

Source: NCDC

²² Although data from the NCDC records begins in 1950, no incidents were reported until 1953.

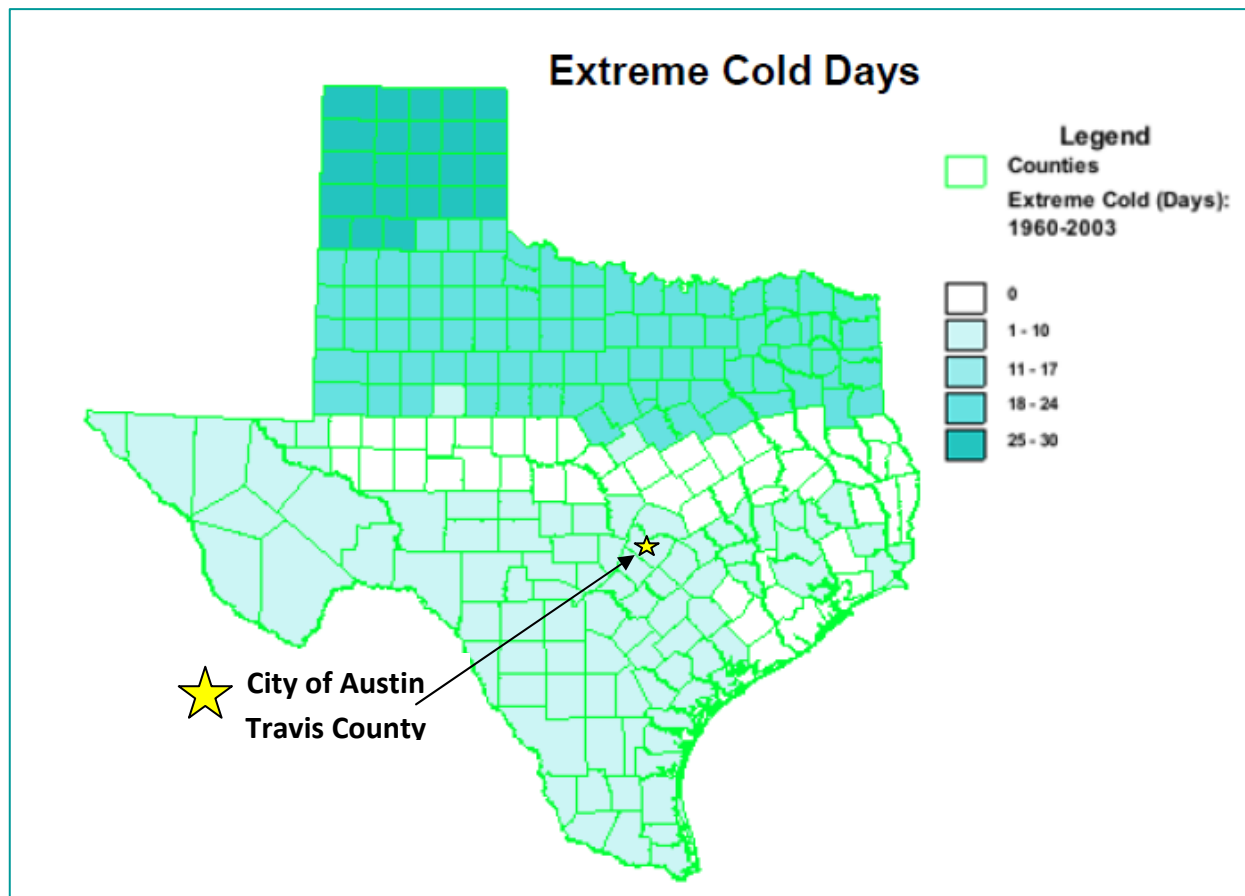
Probability of Future Events

The likelihood or future probability of occurrence of a tornado in the City of Austin is low, with a 25 percent possibility of an event occurring in any given year.

Winter Storm

Winter storms that threaten the City of Austin usually begin as powerful cold fronts that push south from central Canada. Although the City is at risk to ice hazards and extremely cold temperatures, as well as snow, the effects and frequency of winter storm events are generally mild and short-lived. As indicated in Figure 5-4, on average, the area experiences less than 10 extreme cold days a year, meaning less than 10 days at or around freezing temperatures. During these times of ice and snow accumulation response times will increase until public works road crews are able to assist in making the major roads passable.

Figure 5-4. Extreme Cold Days 1960-2003 (NWS)



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Location

Because winter storm events are not confined to specific geographic boundaries, all existing and future buildings, facilities and populations are considered to be exposed to this hazard and could potentially be impacted.

Extent

Table 5-12 below displays the magnitude of severe winter storms. The wind-chill factor is further described in Figure 5-5 on the following page. This is an index developed by the National Weather Service, although the chart is not applicable when temperatures are over 50° or winds are calm.

Wind chill temperature is a measure of how cold the wind makes real air temperature feel to the human body, similar to the heat index for extreme heat (Figure 5-1). Since wind can dramatically accelerate heat loss from the body, a blustery 30° day would feel just as cold as a calm day with 0° temperatures.

Table 5-12. Extent Scale for Severe Winter Storm

Winter weather advisory	This alert may be issued for a variety of severe conditions. Weather advisories may be announced for snow, blowing or drifting snow, freezing drizzle, freezing rain, or a combination of weather events.
Winter storm watch	Severe winter weather conditions may affect your area (freezing rain, sleet or heavy snow may occur separately or in combination).
Winter storm warning	Severe winter weather conditions are imminent.
Freezing rain or freezing drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice glaze on roads and all other exposed objects.
Sleet	Small particles of ice, usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.
Blizzard warning	Sustained wind speeds of at least 35 mph are accompanied by considerable falling or blowing snow. This alert is the most perilous winter storm with visibility dangerously restricted.
Frost/freeze warning	Below freezing temperatures are expected and may cause significant damage to plants, crops and fruit trees.
Wind chill	A strong wind combined with a temperature slightly below freezing can have the same chilling effect as a temperature nearly 50 degrees lower in a calm atmosphere. The combined cooling power of the wind and temperature on exposed flesh is called the wind-chill factor.

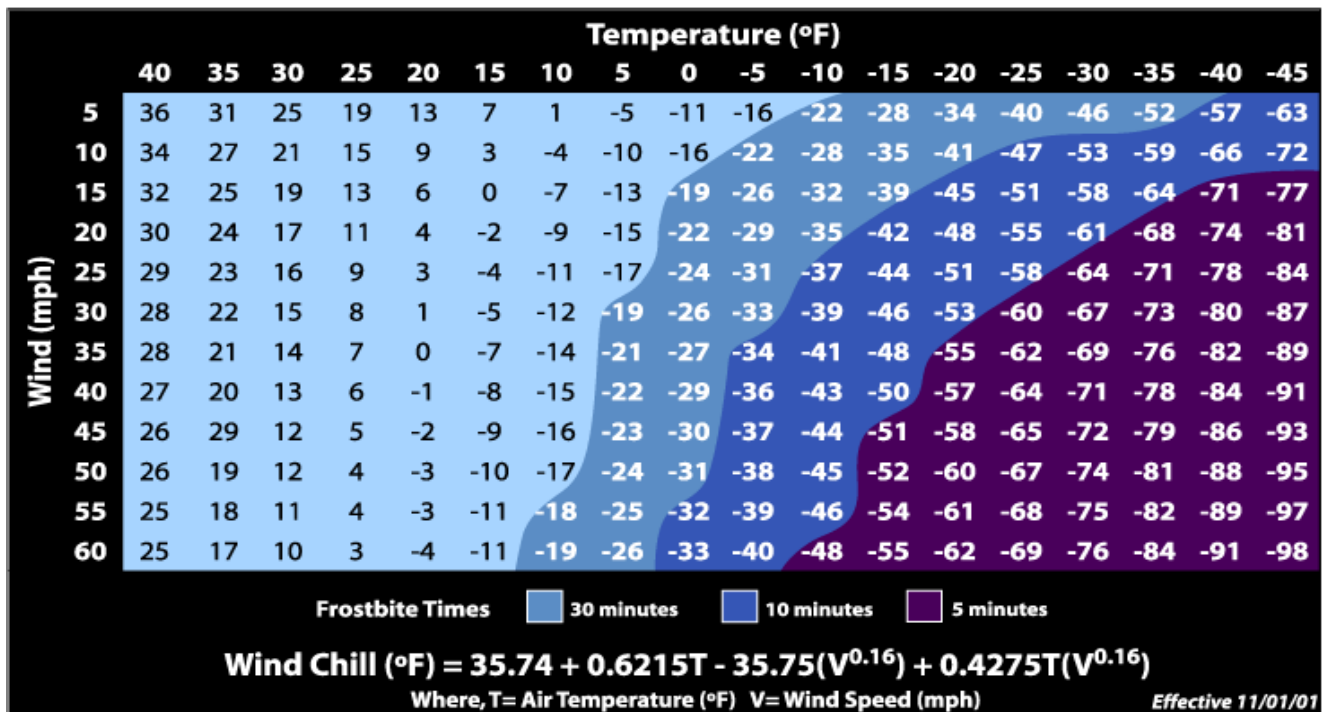
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The City of Austin has never experienced a blizzard, but based on previous occurrences, has been subject to winter storm watches, warnings, freezing rain, sleet, snow and wind chill. In January of 2007 and 2009 (see Table 5-12), the city experienced icing on the roadways due to freezing rain. Schools were closed for periods of two to three days to prevent traffic collisions. Road closures were also instigated to mitigate property damage and injury, resulting in a minor disruption to city operations.

Figure 5-5. Wind Chill Chart



Wind Chill Chart



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Previous Occurrences

Table 5-13 presents information on historical winter storms reported to NCDC. These events were recorded at the county level, as severe winter weather typically impacts a geographic area greater than the City’s incorporated limits.

Table 5-13. Historical Winter Storms

DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE (IN 2009 DOLLARS)	CROP DAMAGE (IN 2009 DOLLARS)
02/01/1996	1:40 AM	0	0	\$2,144,510	\$71,484
01/07/1997	8:00 AM	0	0	\$6,988,030	\$139,761
01/11/1997	8:00 PM	0	0	\$1,397,606	\$27,952
12/23/1998	2:00 AM	0	0	\$0	\$0
12/12/2000	2:00 PM	0	0	\$0	\$0
11/28/2001	7:00 AM	0	0	\$0	\$0
02/24/2003	7:00 PM	0	0	\$0	\$0
12/07/2005	9:00 PM	0	0	\$0	\$0
01/15/2007	3:00 PM	0	0	\$0	\$0
01/27/2009	6:00 PM	0	0	\$0	\$0
TOTALS	-	0	0	\$10,530,146	\$239,197

Source: NCDC

According to the Texas Department of State Health Services From 1999-2004, there were 137 deaths reported among Texas residents with exposure to excessive natural cold as the underlying cause of death. This table is included to supplement the information reported to the NCDC in Table 5-13. Information from the Texas Department of State Health Services is only available at the county level as shown in Table 5-14.

Table 5-14. Cold-Related Deaths by County

COUNTY OF DEATH	1999	2000	2001	2002	2003	2004	TOTAL
TEXAS	21	29	21	29	21	21	142
TRAVIS	1	2	1	3	3	1	11

Probability of Future Events

The probability of occurrence of a severe winter storm is possible, meaning that one is possible in the next 4-5 years. If a winter storm does occur, the spatial extent would be limited.

Drought

Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall, and is considered a major threat to Texas agricultural industries and water supplies. Drought is the consequence of a natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length.



Droughts can be classified as meteorological, hydrologic, agricultural, and socioeconomic. Table 5-15 presents definitions for these different types of drought.

Table 5-15. Drought Classification Definitions

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

Drought can occur throughout the City and is not confined to any specific location.

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Extent

Droughts are slow-onset hazards, but over time can have very damaging effects to crops, municipal water supplies, recreational activities, and wildlife. If droughts extend over a number of years, the direct and indirect economic impact can be significant. The Palmer Drought Severity Index (PDSI), developed by W. C. Palmer in 1965, measures the extent or magnitude of drought for the area as depicted in Table 5-16. The classifications for soil conditions are based on a soil moisture algorithm that takes into account temperature, precipitation and the available water content of the soil.

Table 5-16. Palmer Drought Severity Index (PDSI)

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 +2.00	+3.00 to +3.00	+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 +2.00	+3.00 to +3.00	+4.00 and above

Source: U.S. Drought Monitor

Even when a drought is not localized for the City of Austin, the City can be affected if the state is experiencing drought. According to the U.S. Drought Monitor, in a summit for drought conditions, the Central Texas region is considered the hardest-hit region for Texas and the nation as a whole. Drought conditions now affect 97.4 percent of Texas.



From May of 2008 to October of 2009, the City experienced periods of moderate, severe and extreme drought, both agricultural and hydrological, according to the PDSI classifications and U.S. Drought Monitor. In response to a drought of this magnitude, the City had to enforce stricter watering restrictions for residential and commercial buildings. The surrounding lakes were at their

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lowest levels in over 20 years, resulting in reduced recreational use. The real danger with drought of this magnitude is the amount of crop failure and the potential for wildfire outbreaks.

Previous Occurrences

Figure 5-6 shows historical drought in the Texas Gulf Basin, and Table 5-17 depicts occurrences of drought for Travis County.

Figure 5-6. Drought in the Texas Gulf Basin

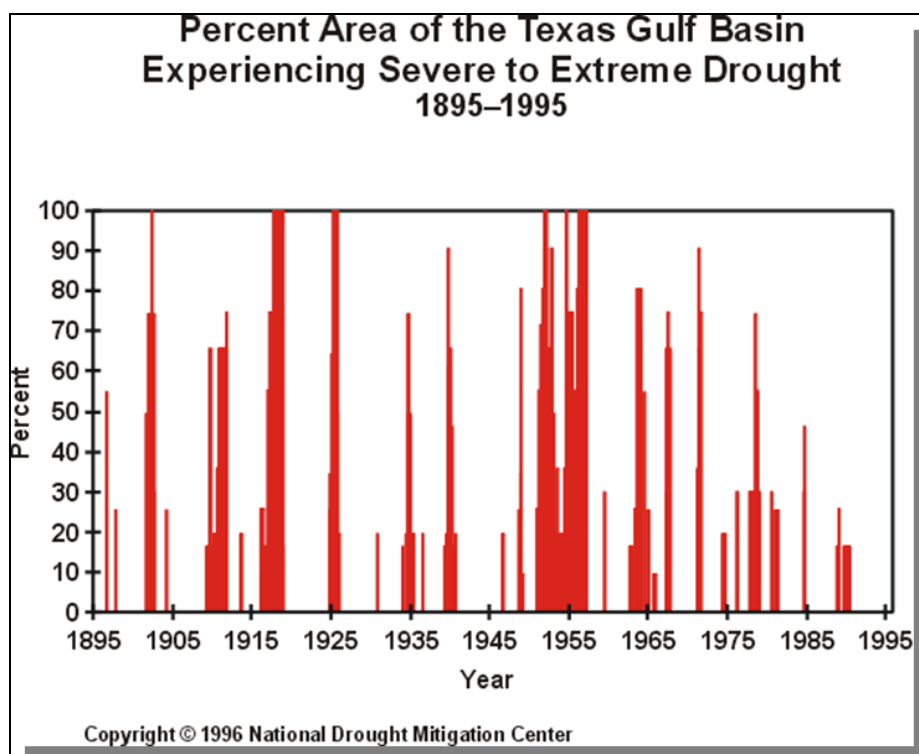


Table 5-17. Historical Drought (1996-2008)

DATE	DEATHS	INJURIES	PROPERTY DAMAGE (IN 2009 DOLLARS)	CROP DAMAGE (IN 2009 DOLLARS)
04/01/1996 ²³	0	0	\$0	\$0
05/01/1996	0	0	\$20,000,000	\$40,000,000
06/01/1996	0	0	\$20,000,000	\$40,000,000
07/01/1996	0	0	\$20,000,000	\$40,000,000

²³ Monthly damages for the drought of 1996 are estimated based on a total of 2.4 billion in damages to the agriculture across Texas.

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DATE	DEATHS	INJURIES	PROPERTY DAMAGE (IN 2009 DOLLARS)	CROP DAMAGE (IN 2009 DOLLARS)
08/01/1996	0	0	\$20,000,000	\$40,000,000
07/01/2000	0	0	\$0	\$0
08/01/2000	0	0	\$0	\$0
09/01/2000	0	0	\$0	\$0
10/01/2000	0	0	\$0	\$0
TOTALS	0	0	\$80,000,000	\$160,000,000

In Table 5-17, the amount of damage for the drought of 1996 is estimated based on the total damage for the State of Texas as a whole as reported to the NCDC. Because specific reporting was unavailable for individual communities throughout Texas, an estimate for damages was used. In addition to the events reported to the NCDC in Table 5-17, the City of Austin and the state as a whole experienced record drought in the summer of 2009. High temperatures, combined with rainfall 20 inches below normal levels resulted in a hydrologic and agricultural drought that did not begin to wane until October of 2009. Although estimates are not available at this time for damage to the City alone, Texas farmers and ranchers suffered approximately \$3.6 billion in economic damage.

Probability of Future Events

The likelihood or future probability of a drought occurrence in the City of Austin is “Likely”, with an event probable in the next two to three years. The spatial extent of drought is “Large,” expected to affect more than fifty percent of property in the city.

Flood

Flooding is generally considered to be the most serious natural hazard for the Austin area and constitutes a year-round threat. Flooding due to rainfall alone depends on basin topography, precipitation amounts, dominating weather patterns, soil moisture conditions, and the amount of permeable surface available to absorb the rain. Floods resulting from excessive precipitation can be classified under two categories: general floods, precipitation over a given river basin for an extended period of time combined with storm-induced wave or tidal action; or flash floods, the product of heavy localized precipitation in a short time period.

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The primary types of general flooding include riverine, coastal and urban flooding²⁴. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. 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.

Urban flooding occurs where manmade development has obstructed the natural flow of water and decreased the ability of natural groundcover to absorb and retain surface water runoff. Urban flooding occurs as land is converted from fields or woodlands to roads, buildings and parking lots and when the natural land loses its ability to absorb rainfall. Urbanization changes the natural hydrologic systems of a basin, increasing runoff two to six times over what would occur on natural terrain. During periods of urban flooding, streets can become swift-moving rivers, while highway underpasses and underground parking garages can become death traps as they fill with water.

Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. However, flash flooding events may also occur from a dam or levee failure within minutes or hours of heavy amounts of rainfall, or from a sudden release of water held by a retention basin or other stormwater control facility. Although flash flooding occurs most often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

Location

For mapping purposes, Digital Q3 Flood Data is also shown for neighboring counties of Hays and Bastrop as well as the Austin area as a whole in Figure 5-7. The Digital Flood Insurance Rate Map (DFIRM) data provided by FEMA for Travis County shows the following flood hazard areas:

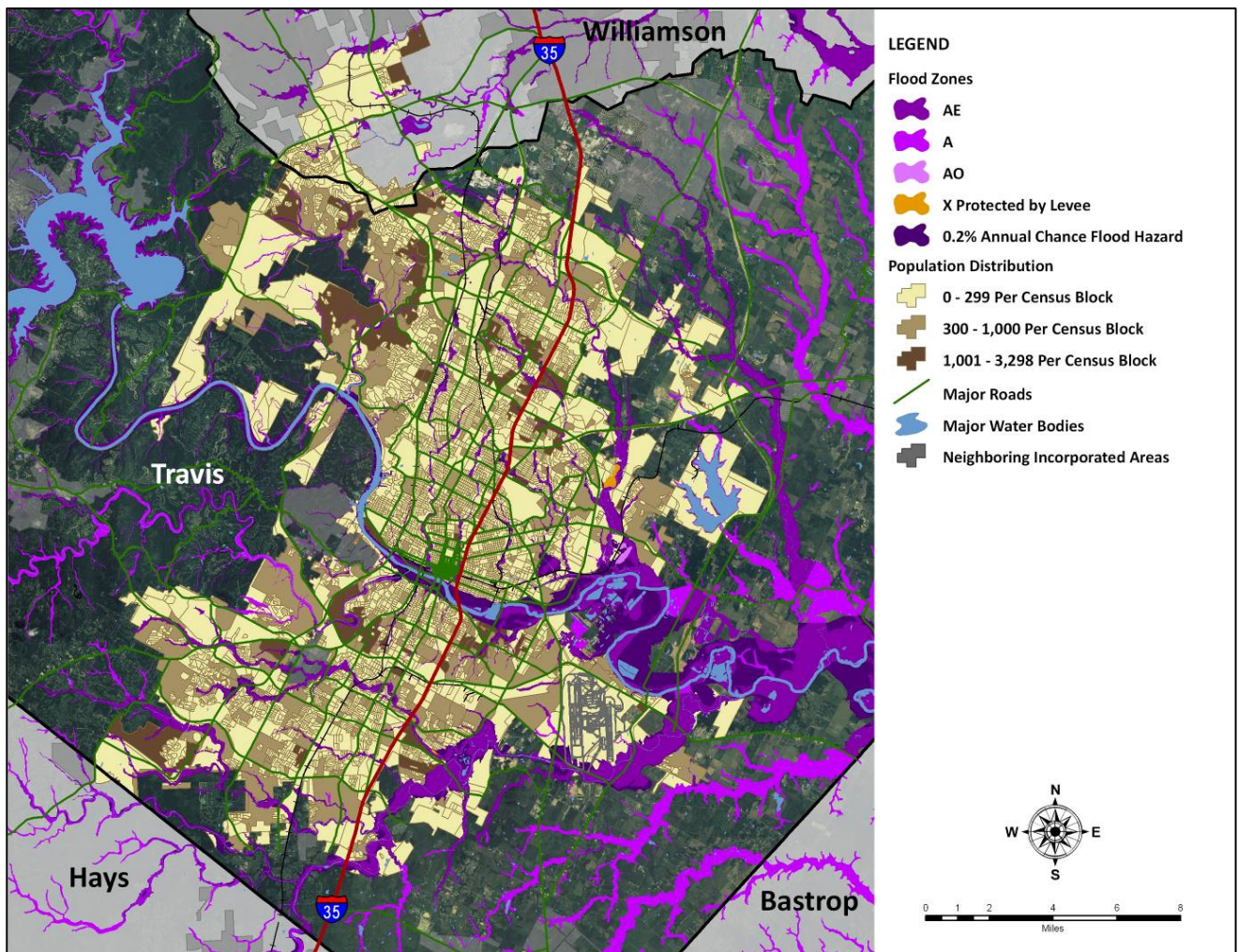
- **Zone A:** Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance requirements and floodplain management standards apply.

²⁴ Coastal flooding will not be discussed herein as only riverine and urban flooding affect the Austin area.

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- Zone AO: Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply.
- Zone X Protected by Levee: Areas protected from the 1-percent-annual-chance flood hazard by a levee system. These areas are now indicated on the Flood Insurance Rate Map (FIRM) and DFIRM panels as Zone X (shaded) and are typically considered to be at moderate risk of flooding.
- 0.2% Annual Chance Flood Hazard: This is the boundary of the flood that has a 0.2 percent chance of being equaled or exceeded in any given year.

Figure 5-7. Inland Flooding Potential



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Table 5-18 provides a description of flood zones as indicated below.

Table 5-18. Flood Zones

Flood Zones		
Zone A	The 100-year or Base Floodplain. There are six types of A zones:	
	A	The base floodplain mapped by approximate methods, i.e., BFEs are not determined. This is often called an unnumbered A zone or an approximate A 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 BFE (old format).
	AE	The base floodplain where base flood elevations are provided. AE zones are now used on new format FIRMs instead of A1-30 zones.
	AO	The base floodplain with sheet flow, ponding, or shallow flooding. Base flood depths (feet above ground) are provided.
	AH	Shallow flooding base floodplain. BFE's are provided.
	A99	Area to be protected from base flood by levees or Federal flood protection systems under construction. BFEs are not determined.
	AR	The base floodplain that results from the de-certification of a previously accredited flood protection system that is in the process of being restored to provide a 100-year or greater level of flood protection
Zone V and VE	V	The coastal area subject to velocity hazard (wave action) where BFEs are not determined on the FIRM.
	VE	The coastal area subject to velocity hazard (wave action) where BFEs are provided on the FIRM.
Zone B and Zone X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100-year and the 500-year floods. B zones are also used to designate base floodplains or lesser hazards, such as areas protected by levees from the 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.	
Zone C and Zone X (unshaded)	Area of minimal flood hazard, usually depiction FIRMs as exceeding the 500-year flood level. Zone C may have ponding and local drainage problems that do not warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood.	

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Flood Zones	
Zone D	Area of undetermined but possible flood hazards.

Source: Understanding Your Risks, identifying hazards and estimating losses, FEMA 386-2

Extent

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

A 100-year flood or one-percent-annual chance constitutes a threat to the City of Austin. Structures built in the Special Flood Hazard Area are subject to damage by rising waters and floating debris. Moving flood water exerts pressure on everything in its path and causes erosion of soil and solid objects. Utility systems, such as heating, ventilation, air conditioning, fuel, electrical systems, sewage maintenance systems and water systems, if not elevated above base flood elevation, may also be damaged.

Many people do not understand the risk of living in a floodplain. There is a 26 percent chance that a non-elevated home in the floodplain will be damaged during a 30-year mortgage. The chance that a major fire will occur during the same period is only one percent.

Table 5-19 below details the extent of large-scale flood events for the City of Austin. Where available, damages and estimates of structures destroyed are included and detailed descriptions are found in the section on previous occurrences that follows.

Table 5-19. Extent of Large-Scale Flood Events

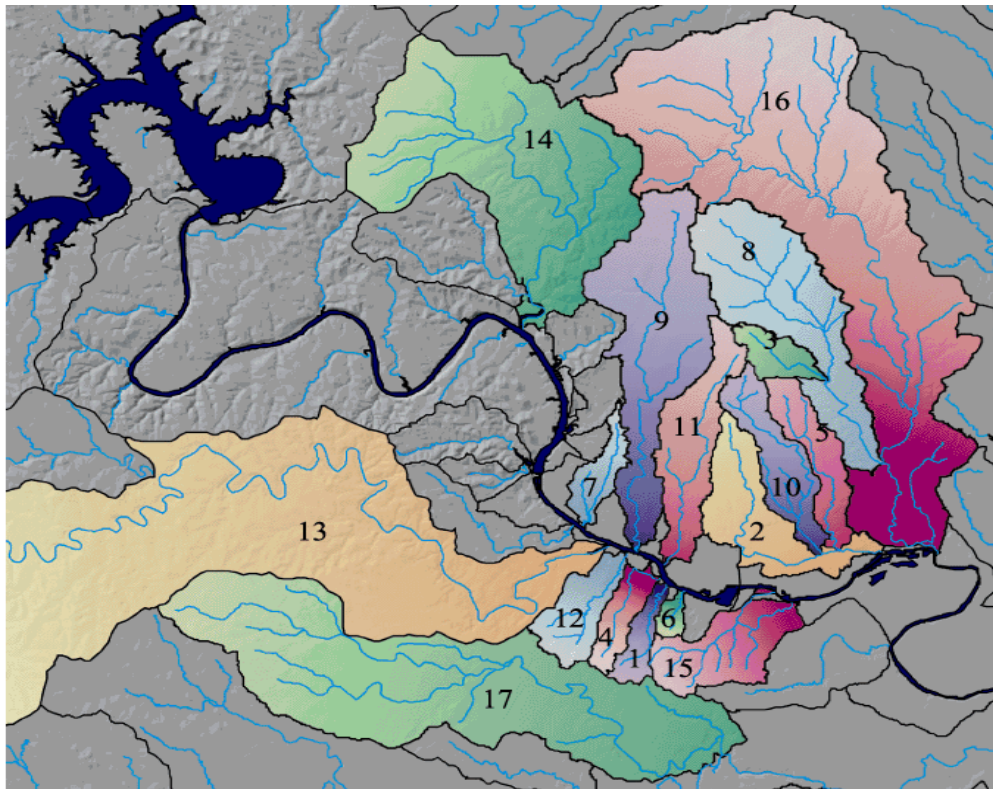
DATE	WATERSHED(s)	EXTENT
6/15/35	Boggy Creek	Approximately 3,000 structures destroyed.
10/28/60	Boggy Creek	\$2.3 million in damages; approximately 200 structures destroyed.
5/24/81	Shoal Creek, Walnut Creek, Little Walnut Creek, Bee Creek,	\$36 million in damages and 13 deaths

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DATE	WATERSHED(s)	EXTENT
	Waller Creek	
12/20/1991	Shoal Creek, Williamson Creek, Bull Creek, Walnut Creek	Approximately 200 homes were completely destroyed in this flood and damages were in millions of dollars.
10/17/1998	West Bouldin Creek, Walnut Creek, Shoal Creek, Little Walnut Creek, Williamson Creek, Onion Creek	Total of \$1 billion in damages; six single family homes destroyed; 53 homes sustained major damage; 45 homes suffered minor damage; 133 structures (commercial and residential) affected.
11/15/2001	East Bouldin Creek, West Bouldin Creek	17 structures (commercial and residential) received minor flood damage; Eight residential properties received major damage.
Damage Definitions	Destroyed	More than four feet of water; over 12 inches for mobiles homes
	Major	Two feet to Four feet of water; six to 12 inches for mobile homes
	Minor	Six inches to two feet of water; less than six inches for mobile homes
	Affected	Less than six inches of water

A map of Austin watersheds is included on the following page at Figure 5-8 for a visual comparison of areas affected by extreme flood events.

Figure 5-8. Austin Watershed Study Area



URBAN WATERSHEDS		NON URBAN WATERSHEDS
1. BLUNN (BLU)	7. JOHNSON (JOH)	13. BARTON (BAR)
2. BOGGY (BOG)	8. LITTLE WALNUT (LWA)	14. BULL (BUL)
3. BUTTERMILK (BMK)	9. SHOAL (SHL)	15. COUNTRY CLUB (CNT)
4. EAST BOULDIN (EBO)	10. TANNEHILL (TAN)	16. WALNUT (WLN)
5. FORT BRANCH (FOR)	11. WALLER (WLR)	17. WILLIAMSON (WMS)
6. HARPER'S BRANCH (HRP)	12. WEST BOULDIN (WBO)	

Previous Occurrences

The following events describe major flood occurrences for the City. Where available, data is included showing the extent of each flood in Table 5-19.

July 6, 1869

There were no dams in the City of Austin; therefore, the Colorado River was referred to as a stream. In July there was heavy rainfall throughout the City and

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centered on the Colorado River. Several storms during July caused the river to rise over 51 feet and overflow at a fast rate. No damages were recorded for this event.

April 7, 1900

This storm began in North Texas, filling the Colorado River and sending torrents of rain through the City of Austin as well as Bastrop. The flooding and rain broke through the McDonald Dam, and this event became known as “The Day the Dam Broke.” There were several fatalities for this major flood event, but no records or details of damages were recorded.

April 23, 1915

Flash flooding occurred primarily in the Waller Creek Watershed, resulting in the deaths of 35 people. Many people drowned in their homes and properties were destroyed. Primary watersheds affected were Shoal and Waller Creek, which overflowed, sending homes, livestock and people into the Colorado River. Detailed data in terms of structure damage is unavailable for this event.

September 8-10, 1921

This record storm is known as “The Great Thrall/Taylor Storm”. It lasted for 18 consecutive hours. This storm began in the Gulf Coast of Texas as a hurricane then moved north, centering on Thrall and Taylor. Across Central Texas counties, including Travis County, a total of 224 fatalities were recorded. Austin received 18 inches of rain in 24 hours, which resulted in six fatalities. Onion Creek watershed was hit the hardest with the rains washing out three steel bridges. Walnut Creek watershed also received damage in the form of washed out roads. Property damages were not recorded for this event.

June 15, 1935

In three hours, Austin received 22 inches of rain during this event. Between 2,500 and 3,000 residents in East Austin were left homeless after waters receded. South Congress Avenue between Barton Springs Road and the Texas School for the Deaf was demolished.



Damage from the 1935 Flood

Infrastructure and commercial properties also suffered: bridges, sewer lines, water

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lines and businesses were destroyed.

April 24, 1957

This rain event ended drought conditions for the City, but quickly turned dangerous, dropping up to 10 inches of rain in a very short amount of time. April 24 became known as “The Day of the Big Cloud.” Rains poured on the City for a total of 32 days resulting in numerous floods. Barton Springs Pool was destroyed, and in the 1970s a flood diversion tunnel was built to mitigate future flood damages. No property damage or fatalities report.

October 28, 1960

The October storm occurred in the evening, which resulted in more damage and injury because there was no warning. Torrential rains poured on the City, resulting in eleven fatalities. Property damage was valued at \$2.3 million dollars and 200 people were left homeless. Several low-water crossings were washed out.

November 23, 1974

Area thunderstorms dropped between four and ten inches of rain over Central Texas. There was widespread minor and major flooding throughout the City of Austin. Total fatalities were reported at 13 in the Austin area, but there are no records or data for property damage for this event.

May 24, 1981

This flood event is known as “The Memorial Day Flood.” It was an intense storm, but short in duration, dumping over 10 inches of rain in four hours and resulting in \$36 million in damages and 13 deaths. Watersheds affected include: Shoal Creek, Walnut Creek, Little Walnut, Waller, and Bee Creek.

December 20, 1991

This storm caused record peak discharges along many creeks in Central Texas during a week of heavy rains. Flooding occurred in Lake Travis, Shoal Creek, Williamson, Bull Creek, and Walnut Creek. Approximately 200 homes were destroyed.

October 17, 1998

Large scale flooding occurred across the state and hit Austin on October 17, 1998. Property damage and losses statewide reached almost one billion dollars. As shown in Table 5-19, 237 structures were damaged, including six that were destroyed.

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November 15, 2001

On November 15, 2001 a slow-moving storm system remained over west Austin and moved up Interstate 35, leaving rainfall totaling five to eight inches. Isolated cells of the storm dropped more than 15 inches of rain in some areas within a six-hour period. Several creeks overflowed their banks. There was widespread flood damage as indicated in Table 5-19, and one fatality.

July 2007

The flash flooding in July of 2007 resulted in Presidential Disaster Declaration DR-1709 for neighboring Burnet County when 20 inches of rain fell on the area in a 24-hour period. Although Austin was not affected to that great of an extent, the City still experienced residential and commercial property damage. An event of lesser magnitude caused far worse damage in 1935. In both April and May of 1935, about 9 inches of rain fell on the area. Due to the lack of run-off channels the results were far-reaching. Floodwaters caused the Colorado River to crest at 50 feet in Austin, overwhelming the Congress Avenue Bridge, practically cutting the City in half.

The flood hazard is one of the most frequent hazard events for the City of Austin. The following historical occurrences reported from the NCDC are depicted in Table 5-20 below.

Table 5-20. Historical Occurrences of flooding (1996-2008) – NCDC

Location	Date	Type	Magnitude	Death	Injury	Property Damage	Crop Damage
North Austin	08/24/1996	Flash Flood	N/A	0	0	10K	0
Austin	08/24/1996	Flash Flood	N/A	0	0	30K	0
Austin	05/27/1997	Flash Flood	N/A	1	0	5K	0K
Austin	06/17/1997	Flash Flood	N/A	0	0	10K	0
Austin	07/30/1997	Flash	N/A	0	0	50K	0

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Location	Date	Type	Magnitude	Death	Injury	Property Damage	Crop Damage
		Flood					
Austin	08/31/2001	Flash Flood	N/A	0	0	20K	0
Austin	06/27/2004	Flash Flood	N/A	0	0	0	0
Austin	09/14/2004	Flash Flood	N/A	0	0	0	0
Austin	11/01/2004	Flash Flood	N/A	0	0	0	0
Austin	11/01/2004	Flash Flood	N/A	0	0	0	0
Austin	07/27/2005	Flash Flood	N/A	0	0	0	0
Austin	08/10/2005	Flash Flood	N/A	0	0	0	0
Austin	03/28/2006	Flash Flood	N/A	0	0	0	0
Austin	05/06/2006	Flash Flood	N/A	0	0	0	0
Austin	01/13/2007	Flash Flood	N/A	0	0	OK	OK
Austin	01/13/2007	Flood	N/A	0	0	OK	OK
Austin	01/13/2007	Flood	N/A	0	0	OK	OK
Beecaves	07/06/2007	Flash Flood	N/A	1	0	OK	OK
Austin	07/21/2007	Flood	N/A	0	0	OK	OK
Austin	07/26/2007	Flash Flood	N/A	0	0	OK	OK

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Location	Date	Type	Magnitude	Death	Injury	Property Damage	Crop Damage
Austin	07/26/2007	Flood	N/A	0	0	OK	OK
Beecaves	08/16/2007	Flash Flood	N/A	0	0	OK	OK
Austin	09/11/2007	Flash Flood	N/A	0	0	OK	OK
Austin Mabry	04/25/2008	Flash Flood	N/A	0	0	OK	OK
Austin	04/27/2008	Flash Flood	N/A	0	0	OK	OK
Austin Mabry	06/11/2009	Flash Flood	N/A	0	0	OK	OK
Austin	06/11/2009	Flash Flood	N/A	0	0	\$2M	OK
TOTALS			N/A	2	0	2.125M	OK

Probability of Future Events

The probability of future occurrences of flood events is highly probable, with more than a 75 percent chance of a flood event occurring in any given year. Flooding occurs in seasonal patterns. Thunderstorms form when warm, moist air collides with cooler, drier air. Since these masses tend to come together during the transition from summer to winter, most thunderstorms and resulting flooding occur during the spring months of April, May and June and fall months of October, November, and December.

Wildfire

Texas has seen a huge increase in the number of wildfires in the past 30 years. More and more people are placing their homes in woodland settings in or near forests, rural areas, or remote mountain sites. Many of these homes are nestled along ridgelines, cliff-edges, and other fire-interface hazard zones. There, homeowners enjoy the beauty of the environment, but they also face the very real danger of wildfire. Years of fire suppression have significantly disturbed natural fire occurrences—nature’s renewal process. The result has been the gradual accumulation of understory and canopy fuels to levels of density that can feed high-energy, intense wildfires and further increase the hazards from and exposure to interface problems.

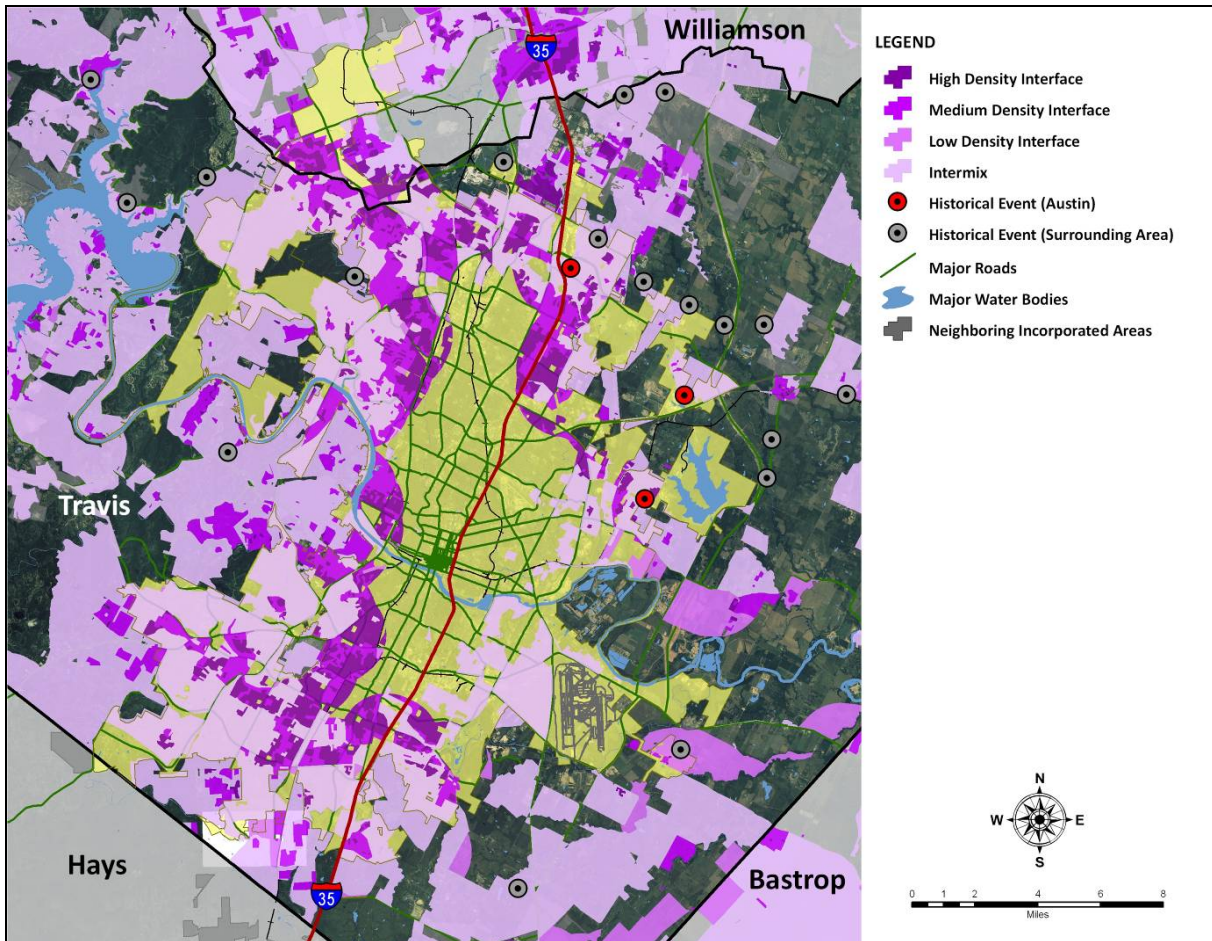
Location

Figure 5-9 graphically illustrates the potential wildfire hazard areas listed above and provides an indication of where there is potential for damage to property and loss of life in the City of Austin. Known historical wildfire occurrences, in and around the city, are also shown in Figure 5-10.

GIS data depicting the Federal Register definition of the wildland-urban interface in Texas based on the integration of U.S. Census and USGS National Land Cover Data was used to identify the following areas of possible concern:

- High Density Interface
- Medium Density Interface
- Low Density Interface
- Intermix

Figure 5-9. Wildland Urban Interface (WUI) Areas and Known Historical Events Greater Than 10 Acres (2008)

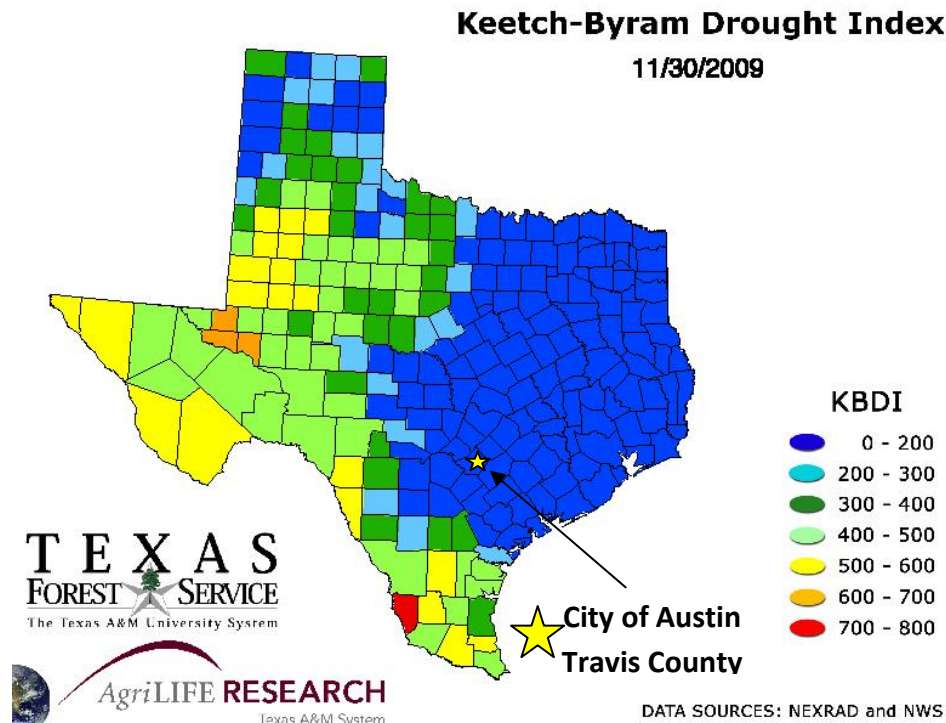


Extent

Fire risk is measured in terms of magnitude and intensity using the Keetch-Byram Drought Index (KBDI), a mathematical system for relating current and recent weather conditions to potential or expected fire behavior.

The KBDI determines forest fire potential and is based on a daily water balance, where a drought factor is balanced with precipitation and soil moisture (assumed to have a maximum storage capacity of 8-inches) and is expressed in hundredths of an inch of soil moisture depletion.

Figure 5-10. KBDI County Averages – November 2009



Each color on the map represents the drought index at that location. The drought index ranges from 0 to 800, where a drought index of 0 represents no moisture depletion, and an index of 800 represents absolutely dry conditions.

These numbers correlate with potential fire behavior as follows:

- **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 still not readily ignite and burn. Expect smoldering and the resulting smoke to carry into and possibly through the night.
- **400 - 600** Fire 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

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thorough the night and heavier fuels will actively burn and contribute to fire intensity.

From the extent scale in Figure 5-10, the City of Austin is located in an area with a KBDI of 0-200 for the fall of 2009. The soil and fuel moisture are high resulting in low risk for ignition. Although this is a relatively low level of risk, it does not indicate that there is an absence of risk. There is still the capacity for fuels to burn with sufficient sunlight. Fuels could burn, but not readily.

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

Figure 5-11 o details regional risk levels and intensity. The City of Austin, located in the Central Region, is at Risk Level II where fire is a possibility, but large fires are rare. No long term severity or control problems would be expected. The different levels of risk are identified in Table 5-21.

Figure 5-11. Regional Fire Risk Levels

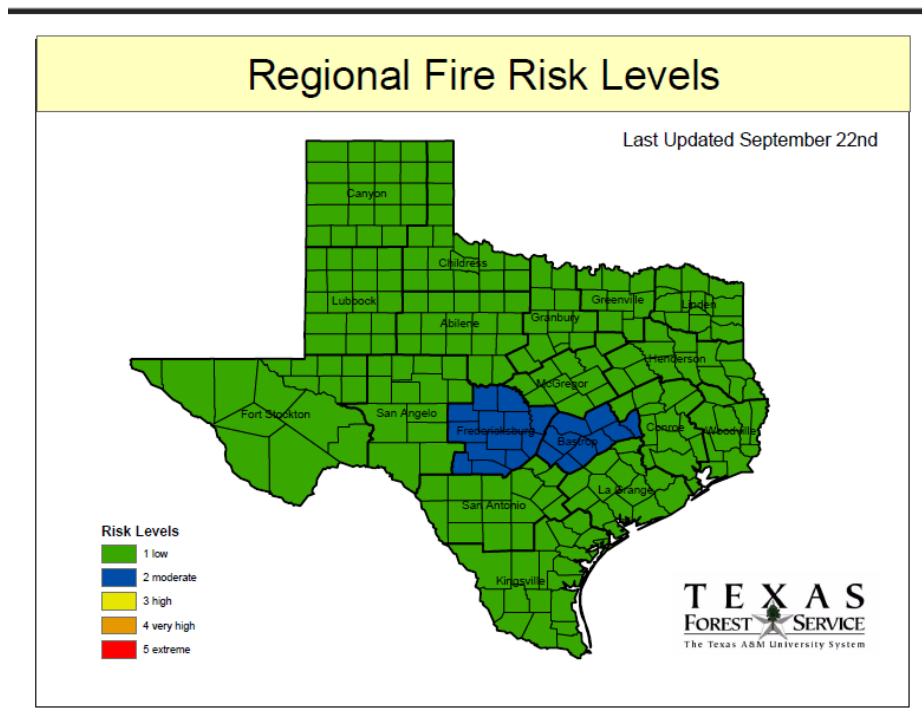
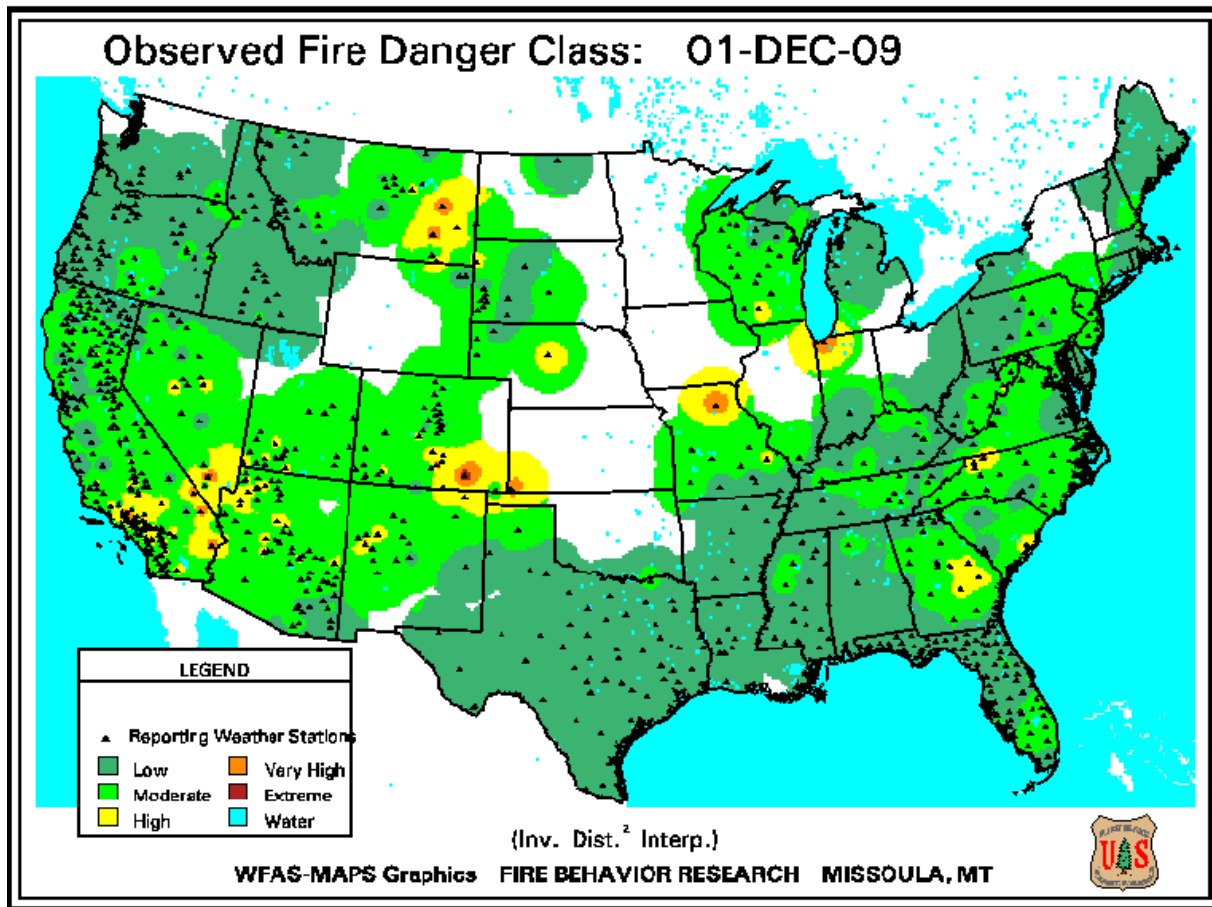


Table 5-21. Regional Fire Risk Levels

Fire Risk Level	Description
Level I	Low fire danger: occasional fire possible with no control problems. No long term severity.
Level II	Moderate fire danger: occasional multiple fire days; normal control problems; large fires are rare. No long term severity.
Level III	High fire danger; multiple fire days are common with initial attack fails; occasional night fires and large fires; region moving into long term severity
Level IV	Very high fire danger; multiple large fires; difficulty to control fires; long term severity
Level V	Extreme fire danger; extreme fire occurrence; long term severity

Figure 5-12. Fire Danger Class



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The City is currently at a Class 1 as indicated by Figure 5-12. The Fire Danger Rating System is established by NOAA and characterizes fire danger by evaluating the approximate upper limit of fire behavior in a fire danger rating area during a 24-hour period. The calculation is based on fuels, topography and weather. All of the classes are described in Table 5-22.

Table 5-22. Fire Danger Rating (NOAA)

National Fire Danger Rating System		
Rating	Basic Description	Detailed Description
CLASS 1: Low Danger (L) COLOR CODE: Green	fires not easily started	Fuels do not ignite readily from small firebrands. Fires in open or cured grassland may burn freely a few hours after rain, but wood fires spread slowly by creeping or smoldering and burn in irregular fingers. There is little danger of spotting.
CLASS 2: Moderate Danger (M) COLOR CODE: Blue	fires start easily and spread at a moderate rate	Fires can start from most accidental causes. Fires in open cured grassland will burn briskly and spread rapidly on windy days. Wood fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel – especially draped fuel -- may burn hot. Short-distance spotting may occur, but is not persistent. Fires are not likely to become serious and control is relatively easy.
CLASS 3: High Danger (H) COLOR CODE: Yellow	fires start easily and spread at a rapid rate	All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High intensity burning may develop on slopes or in concentrations of fine fuel. Fires may become serious and their control difficult, unless they are hit hard and fast while small.
CLASS 4: Very High Danger (VH) COLOR CODE: Orange	fires start very easily and spread at a very fast rate	Fires start easily from all causes and immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high-intensity characteristics - such as long-distance spotting - and fire whirlwinds, when they burn into heavier fuels. Direct attack at the head of such fires is rarely possible after they have been burning more than a few minutes.
CLASS 5: Extreme (E) COLOR CODE: Red	fire situation is explosive and can result in extensive property damage	Fires under extreme conditions start quickly, spread furiously and burn intensely. All fires are potentially serious. Development into high-intensity burning will usually be faster and occur from smaller fires than in the Very High Danger class (4). Direct attack is rarely possible and may be dangerous, except immediately after ignition. Fires that

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National Fire Danger Rating System		
Rating	Basic Description	Detailed Description
		develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions, the only effective and safe control action is on the flanks, until the weather changes or the fuel supply lessens.

The City of Austin is currently at a low risk based on the extent scales in Figures 5-10 to 5-12. As the magnitude of an event can change based on the weather, it's important to maintain awareness of the Fire Danger Class, KBDI and Regional Fire Risk Levels to mitigate against future wildfire occurrences.

Previous Occurrences

A total of 95 acres of land are reported to have burned in 2008 as a result of three wildfire events greater than 10 acres each (Table 5-23). According to the City of Austin Office of Homeland Security and Emergency Management²⁵, Austin is at risk for wildfire year-round and the highest wildfire risk is considered to be in west Austin where houses mix with wooded, hilly areas.

Table 5-23. Historical Wildfire Events Within the City of Austin Greater Than 10 Acres (2008)

EVENT NAME	START DATE	TYPE	ACRES BURNED	REPORTED CAUSE
"Brush Tech R/WCanyon R"	02/11/2008	Wildfire	70	Miscellaneous ²⁶
"Brush Loyola/Went"	03/24/2008	Wildfire	10	Miscellaneous
"Mutual BlueGoose/Aus-Tx"	03/25/2008	Wildfire	15	Miscellaneous

Source: Texas Forest Service

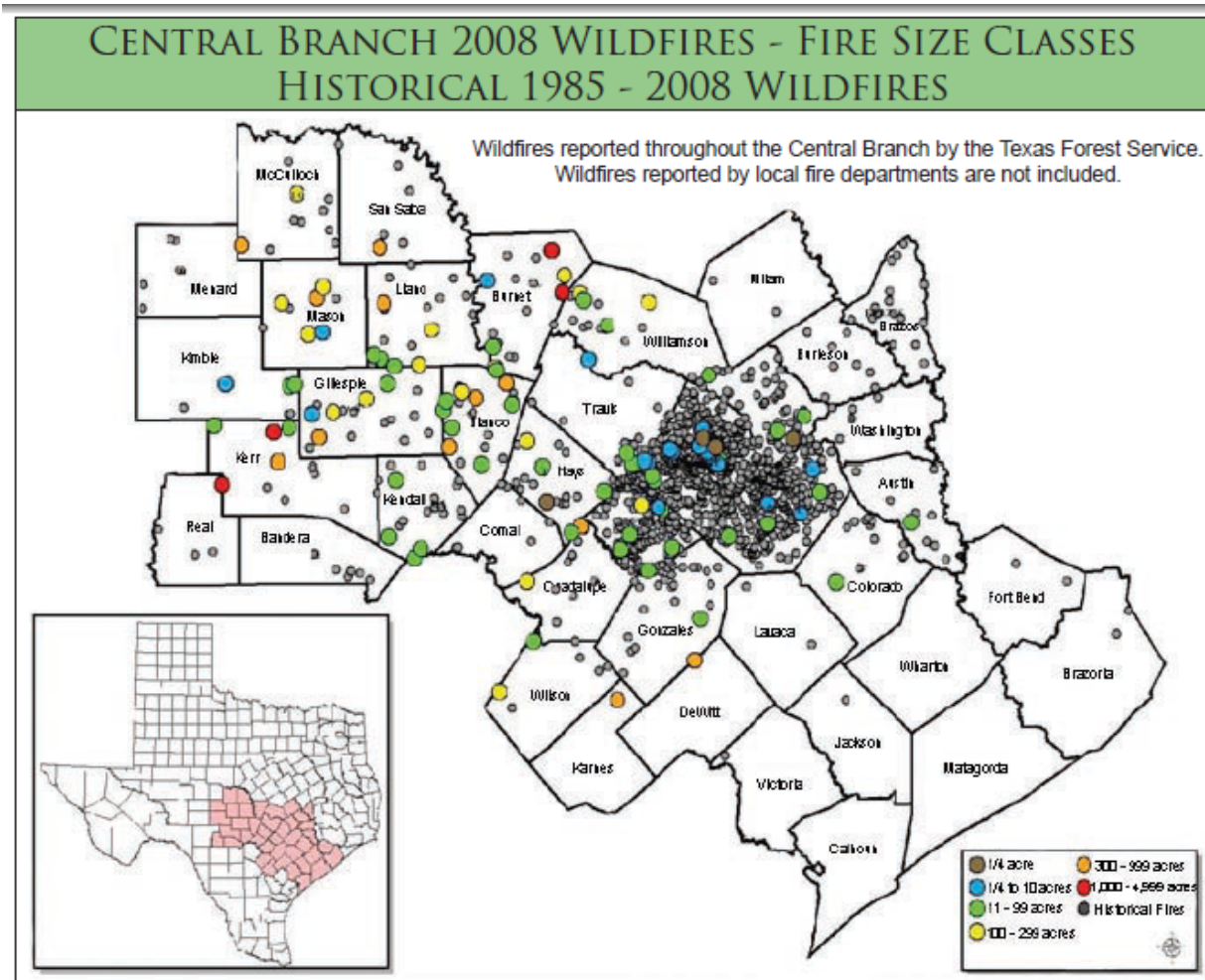
²⁵ <http://www.ci.austin.tx.us/disasterready/aboutwildfire.htm>

²⁶ A miscellaneous cause includes fires of an origin other than lightning, campfire, smoking, debris burning, incendiary/arson, equipment use, railroads, and children.

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While exact incidents were not reported, historic occurrences for the Central Region are illustrated by county in Figure 5-13 from 1985 to 2008.

Figure 5-13. Historical Wildfires, 1985-2008



Probability of Future Events

Wildfires can occur at any time of the year. 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 these types of fires. The intensity of fires and the rate at which they spread are directly related to wind speed, temperature, and relative humidity. Due to these factors, the probability for a wildfire occurrence for the City of Austin is highly likely, meaning that an event is probable in the next year or expected to occur on an annual basis.

Infectious Disease

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

Infectious disease is usually classified as endemic, epidemic or pandemic. An endemic is present at all times at a low frequency (e.g., chicken pox in the United States). An epidemic is a sudden severe outbreak of disease (e.g., the bubonic plague during Medieval times) and a pandemic is an epidemic that becomes very widespread and affects a whole region, a continent, or the world (e.g., the 1957 flu pandemic caused at least 70,000 deaths in the United States and 1-2 million deaths worldwide). The term “pandemic” refers to geographic scope rather than intensity. A flu virus can become a pandemic depending on the geographic spread of the virus, and can occur when a new flu virus emerges.

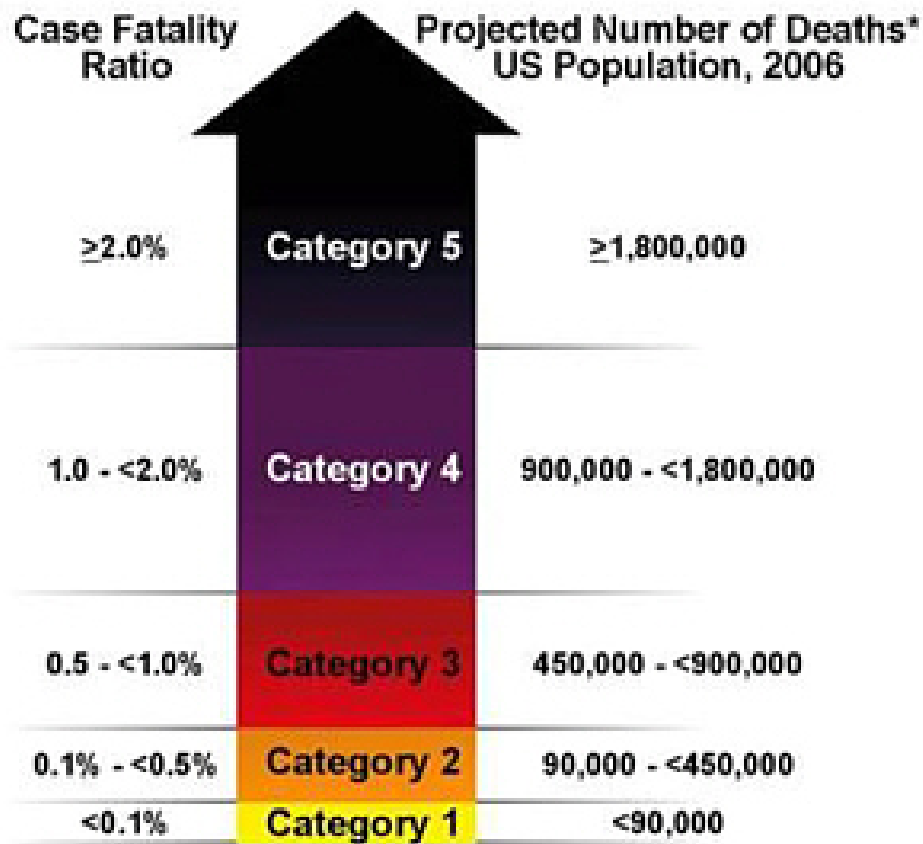
Location

Pandemics are random, with a few happening every century. Wherever and whenever it starts, the disease impacts all areas of the world, and all areas are vulnerable. Third world countries have fewer resources to fight disease and may be more vulnerable than more industrialized nations. In the United States, the public health system works at the federal, state and local levels to monitor diseases, plan and prepare for outbreaks and prevent epidemics where possible. But, in the age of air travel and worldwide shipping, it is becoming increasingly difficult to contain localized outbreaks as infected or exposed people travel and work, sending the disease across the globe in a matter of hours.

Extent

The severity index for infectious disease is measured in terms of projected number of deaths or the case-fatality ration (CFR) as shown in Figure 5-14.

Figure 5-14. Intensity Scale – Infectious Disease

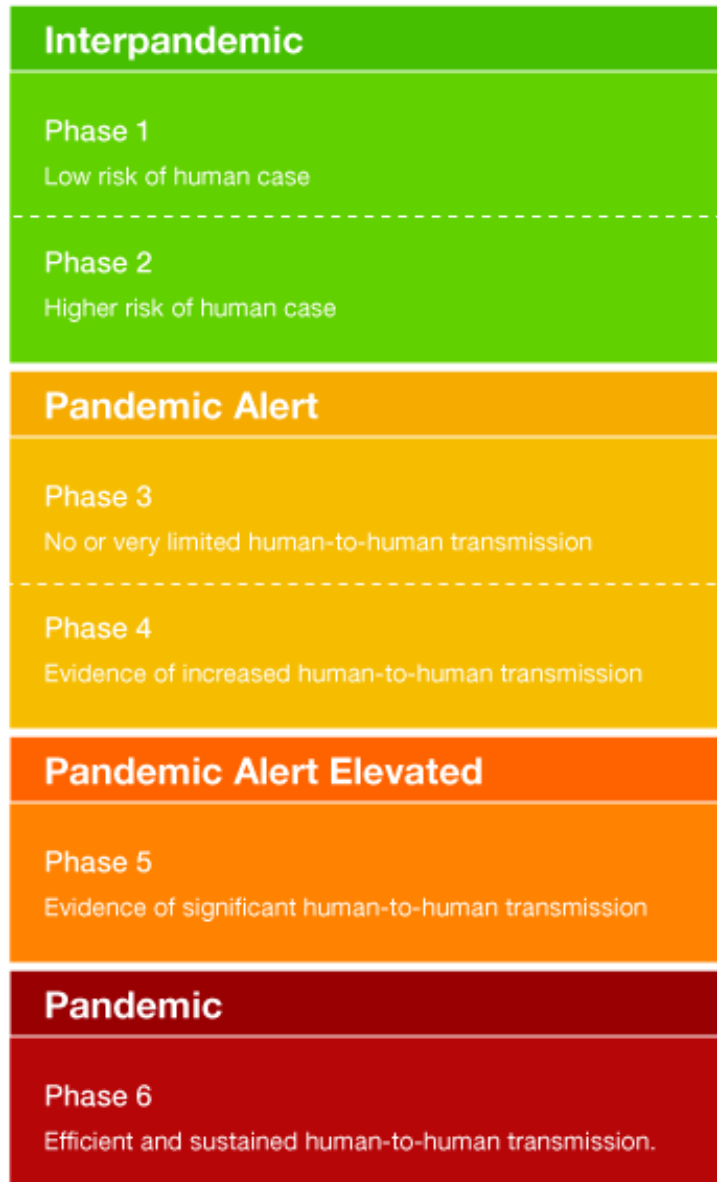


*Assumes 30% illness rate and unmitigated pandemic without interventions

The severity of a pandemic virus can be evaluated from two perspectives: that of the infected individual and from the population level – that is, how many complications and deaths might be expected as a whole. Measuring severity from either perspective in real time is a major challenge. The most common measure of severity is the case-fatality rate (CFR) as depicted in Figure 5-14.

The magnitude of a pandemic event is also evaluated from the population level in terms of warnings. Figure 5-15 illustrates the various warning levels for pandemic. Dr. Margaret Chan, Director General of the World Health Organization (WHO) announced in June of 2009 that H1N1 had reached Phase 6, Pandemic.

Figure 5-15. Risk levels for Pandemic (World Health Organization)



Previous Occurrences

The top 11 infectious diseases according to the World Health Organization based upon number of deaths are presented in Table 5-24.

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Table 5-24. Worldwide Mortality Due to Infectious Disease

RANK	CAUSE OF DEATH	APPROXIMATE WORLDWIDE DEATHS IN 2002	PERCENTAGE OF ALL DEATHS WORLDWIDE
1	Lower Respiratory Infections	3.9 million	6.9%
2	HIV/AIDS	2.8 million	4.9%
3	Diarrheal diseases	1.8 million	3.2%
4	Tuberculosis (TB)	1.6 million	2.7%
5	Malaria	1.3 million	2.2%
6	Measles	600,000	1.1%
7	Pertussis	290,000	0.5%
8	Tetanus	210,000	0.4%
9	Meningitis	170,000	0.3%
10	Syphilis	160,000	0.3%
11	Hepatitis B	100,000	0.2%

Source: World Health Organization

The Austin/Travis County Health and Human Services Department has compiled a report on infectious disease from 2004 to 2007. The results of the report are included at Table 5-25. Rates for each year were configured using the number of cases per 100,000 total population. Rates based on fewer than 20 cases are likely to be unstable and imprecise.

Table 5-26 shows the number of cases per year for HIV/AIDS and other Sexually Transmitted Diseases (STDs) for the City of Austin from 1989 to 1999 according to the Texas Department of Health.

Table 5-25. Historical Infectious Disease for Austin and Travis County (2004-2007)

Disease	2007		2006		2005		2004	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Aseptic Meningitis	113	12.3	111	12.3	133	14.9	110	12.6
Bacterial	4	0.4	12	1.3	15	1.7	6	0.7

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Disease	2007		2006		2005		2004	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Meningitis								
Campylobacteriosis	150	16.3	71	7.8	57	6.4	111	12.7
Cryptosporidiosis	11	1.2	41	4.5	17	1.9	4	0.5
Hepatitis A	10	1.1	11	1.2	10	1.1	25	2.9
Hepatitis B	32	3.5	23	2.5	13	1.5	23	2.6
Malaria	10	1.1	4	0.4	6	0.7	5	0.6
Measles	0	0.0	0.	0.0	0	0.0	0	0.0
Meningococcal Disease	3	0.3	1	0.1	0	0.0	X ²⁷	X
Mumps	0	0.0	5	0.6	0	0.0	1	0.1
Pertussis	113	12.3	143	15.8	491	55.2	70	8.0
Rubella	0	0.0	0	0.0	0	0.0	0	0.0
Salmonellosis	128	13.9	134	14.8	108	12.1	74	8.5
Shigellosis	61	6.6	152	16.8	240	27.0	124	14.2
Streptococcus	153	16.6	147	16.2	26	2.9	57	6.5
Tuberculosis	55	6.0	44	4.9	43	4.8	63	7.2
Varicella (Chicken Pox)	409	44.4	495	54.7	530	59.5	684	78.2

Table 5-26. Sexually Transmitted Diseases, Austin (1989-1999²⁸)

Disease	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Syphilis	109	115	291	247	247	221	111	72	48	41	58
Gonorrhea	1696	2026	1833	1500	1424	1499	1726	1462	1669	2049	1889
Chlamydia	1852	2559	3095	2234	2598	3096	3333	3118	3404	3681	3872
AIDS	242	216	213	338	622	425	328	276	228	294	284

1918 Pandemic Flu

The 1918 Pandemic Flu, often referred to as the “Spanish Flu”, lasted from March of 1918 until June or 1920, resulting in approximately 50 million deaths worldwide²⁹. Although speculation still exists as to the exact origins of the 1918

²⁷ Disease added to the report in 2005.

²⁸ Texas Department of Health

²⁹ Centers for Disease Control and Prevention. Jeffery K. Taubenberger and David M. Morens. [1918 Influenza: the Mother of All Pandemics](#), January, 2006

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Pandemic, a large factor contributing to the spread of the disease was worldwide travel and modern transportation.

The first case appeared in Austin at Camp Mabry on September 27, 1918, but by early October, 900 cases were confirmed³⁰. The City took action by closing schools, churches and theaters, and eventually adopting an ordinance that banned all public gatherings³¹. By the beginning of November the cases had begun to decline for the City and areas statewide, and the City’s ban on public gatherings was repealed, effective November 3, 1918³². In total, it is estimated that 277 people died from the 1918 flu in Austin and Travis County³³.

H1N1

In March of 2009, a novel strain of Influenza A (H1N1 or “Swine Flu”) virus was detected in Mexico and the United States. The virus has since spread worldwide. As of September 27, 2009, more than 340,000 cases of Swine Flu have been confirmed worldwide and approximately 4,100 deaths have been reported³⁴.

The most commonly reported symptoms include cough, fever, sore throat and gastrointestinal symptoms such as vomiting and diarrhea. Most cases with H1N1 did not require hospitalization and had symptoms that lasted approximately four days³⁵.

Since June 9, 2009, the Center for Disease Control (CDC) has reported antigenic characterization results from 25 novel influenza A (H1N1) viruses and 1 seasonal influenza A (H1N1) virus received from the Texas Department of State Health Services (DSHS) Laboratory since April 26, 2009.

Figure 5-16 illustrates the percentage of visits to Texas hospitals for influenza-like symptoms. Figure 5-17 displays nationwide influenza activity.

³⁰ City of Austin Office of Emergency Management, Atkins, Billy, *No Just Cause for Alarm*, available at: <http://www.ci.austin.tx.us/pandemicflu/downloads/1918flu.pdf>

³¹ Ibid.

³² Ibid.

³³ Ibid.

³⁴ World Health Organization

³⁵ Carrat, F. et al. *Timelines of Infection and Disease in Human Influenza: A Review of Volunteer Challenge Studies*. *American Journal of Epidemiology*, 2008, 167: 775–785.

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Figure 5-16. Percentage of Visits Due to Flu-Like Illness, Texas (2006-2010 Seasons)

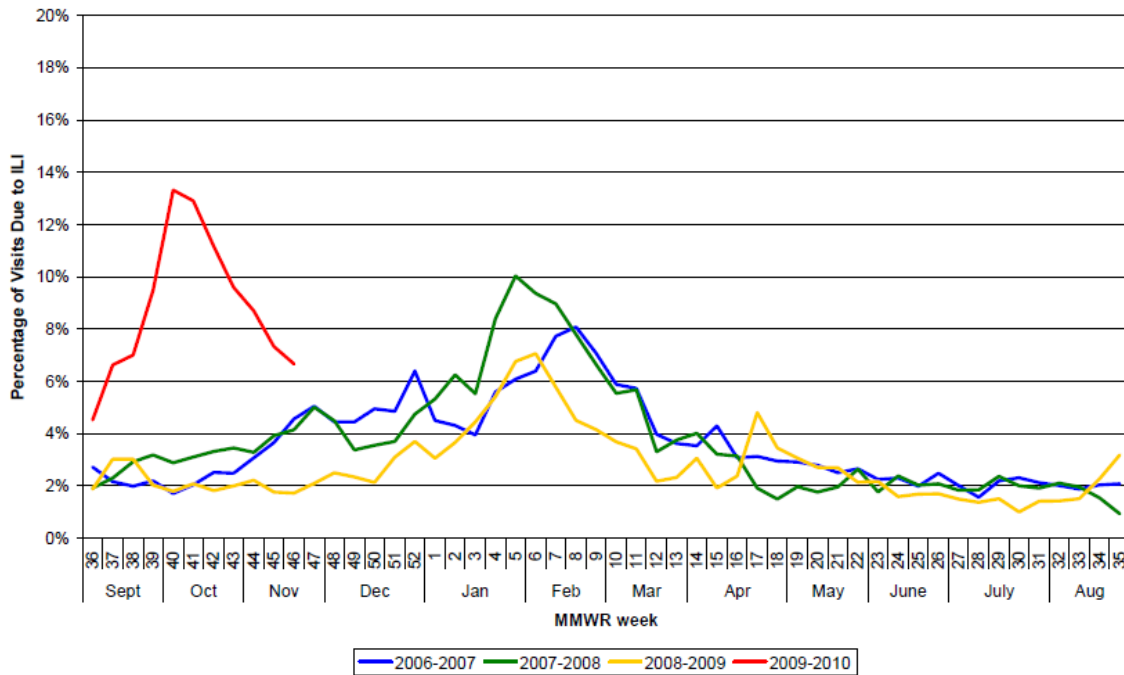
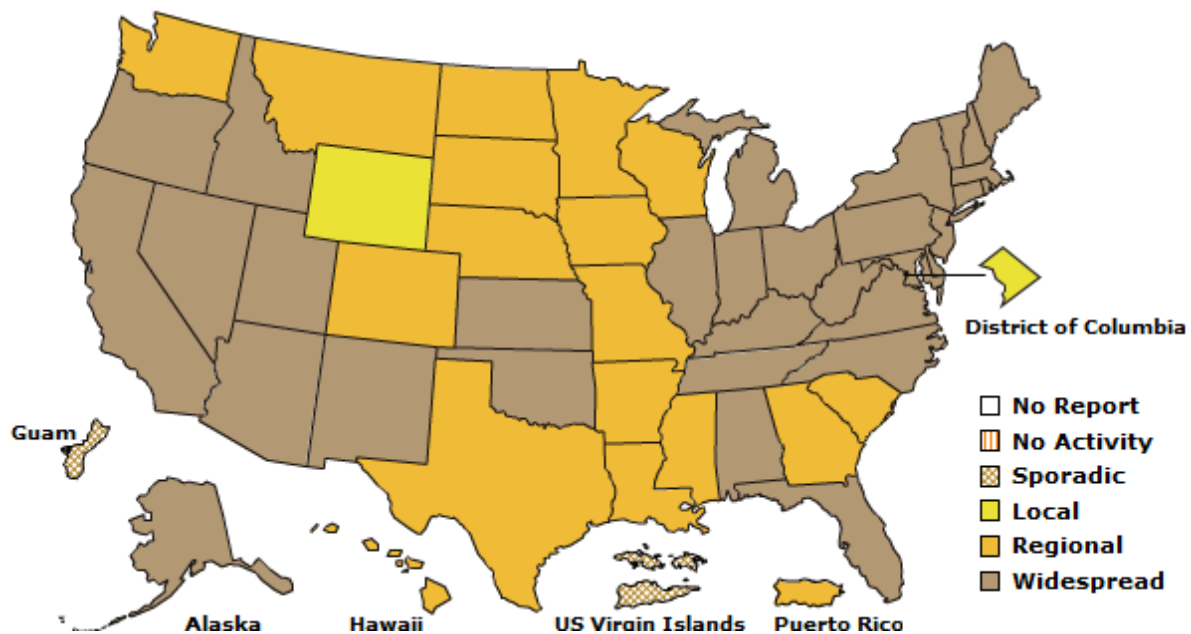


Figure 5-17. Influenza Summary by State – Activity Estimates, Nov. 2009



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Figure 5-17 depicts influenza activity by state as reported to the Center for Disease Control (CDC), but it does not reflect the severity of that activity.

As of August 1, 2009, H1N1 case totals for Travis County include 36 hospitalized and six deaths related to influenza. The Austin/Travis County Health and Human Services Department no longer reports the cases of novel H1N1 influenza as the data and case counts have become less reliable. For example, many people may have contracted and recovered from a mild case of H1N1 without seeking treatment. In addition, some reports were only included from hospitalized patients. The city and county are now conducting more routine surveillance to focus on illness, hospitalizations and death³⁶.

Probability of Future Events

Historical evidence shows that the population of City of Austin is vulnerable to disease outbreak, and the probability of future infectious disease or pandemic events is possible. Local public health officials maintain surveillance in hopes of identifying disease prominence and containing potential threats before they become epidemics. Of particular concern is the reduction and treatment of H1N1 flu virus.

Dam Failure

Dams are water storage, control, or diversion barriers that impound water upstream in reservoirs. Dam failure is a collapse or breach in the structure. While most dams have storage volumes small enough that failures have little or no repercussions, dams with large storage 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 flows;
- 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;

³⁶ The City of Austin and the Austin/Travis County Health and Human Services Department have developed a preparedness and response plan for pandemic influenza, available at: http://www.ci.austin.tx.us/pandemicflu/downloads/flu_plan.pdf

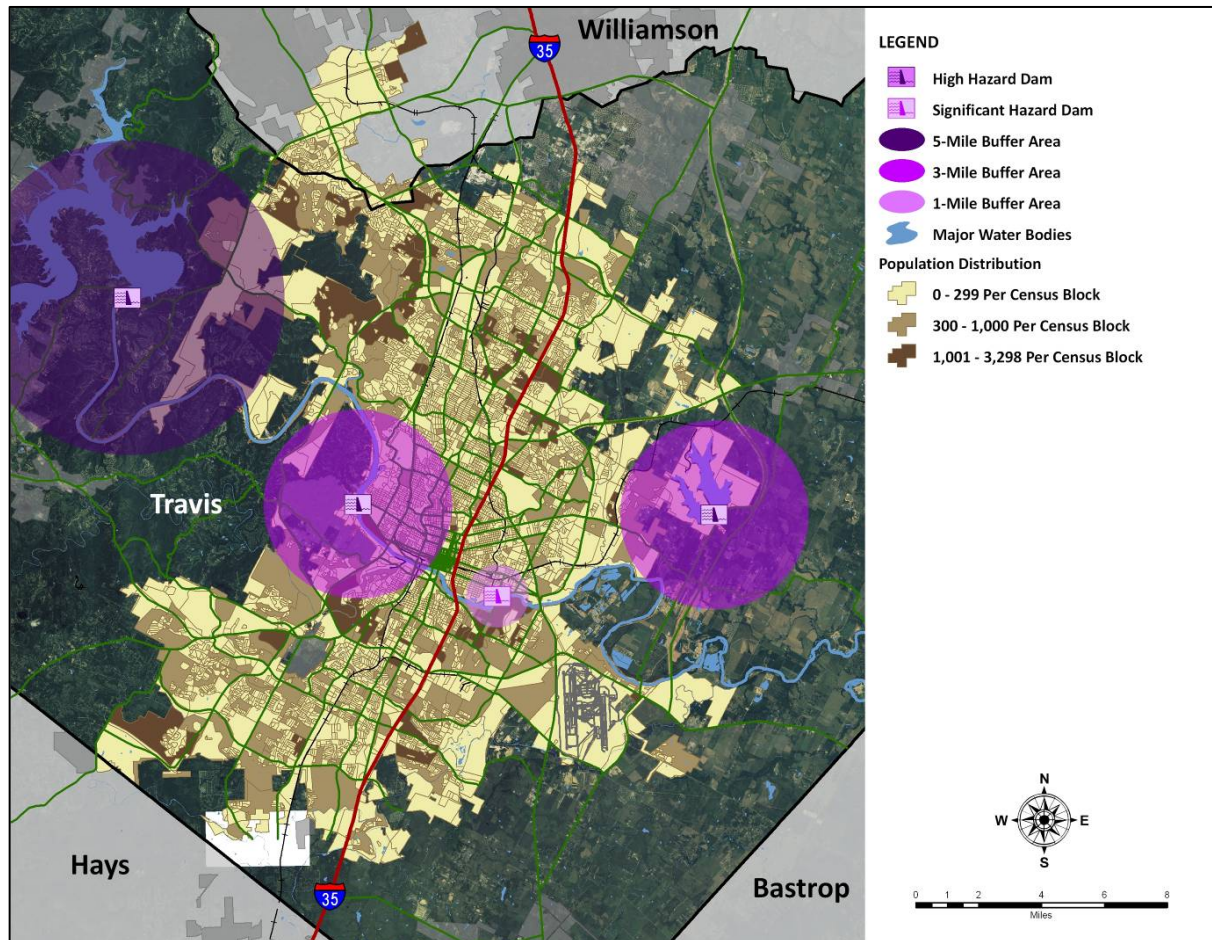
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- Improper design, such as use of improper construction materials;
- Failure of upstream dams in the same drainage basin;
- Landslides into reservoirs, which cause surges that result in overtopping;
- High winds, which can cause significant wave action and result in substantial erosion;
- Earthquakes, which typically cause longitudinal cracks at the tops of the embankments, leading to structural failure.

Location

The City of Austin has four major dams which are addressed in this risk assessment: Decker Lake, Longhorn, Mansfield, and Tom Miller. The general location of these dams is shown at a broad scale suitable for hazard mitigation planning purposes in Figure 5-18. Also shown in Figure 5-18 are hazard area buffers explained in detail later in this section.

Figure 5- 18. General Locations of Major Dams in the City of Austin



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Table 5-27 contains general hazard-related information about each dam based on information available from the U.S. Army Corps of Engineers (USACE) National Inventory of Dams.

Table 5-27. General Hazard-Related Information on Major Dams in the City of Austin

DAM NAME	RIVER	YEAR COMPLETED	AGE OF DAM (AS OF 2009)	MAXIMUM STORAGE CAPACITY	DOWN STREAM HAZARD POTENTIAL
Decker Lake (also called Decker Creek)	Decker Creek	1967	42	45,200	High
Longhorn	Colorado River	1960	49	6,850	Significant
Mansfield (also called Marshall Ford)	Colorado River	1942	67	3,223,000	High
Tom Miller	Colorado River	1939	70	73,100	High

Source: National Inventory of Dams

Extent

Dam failure is at times difficult to mitigate due to the fact that any initial steps require determination of ownership. In Texas, there are a total of 7,590 dams. Of these 890 are high hazard dams, with another 802 as significant hazard dams. Almost 90% are over 25 years old. Responsibility for dams lies with the owners and managers of each dam.

Prior to 2009, *High-hazard-potential* dams were defined as those at which failure or mis-operation would probably cause loss of human life. *Significant-hazard-potential* dams are those at which failure or mis-operation probably would not result in loss of human life but could cause economic loss, environmental damage, disruption of lifeline facilities, or other significant damage. *Low-hazard-potential* dams are those at which failure or mis-operation probably would not result in loss of human life but would cause limited economic and/or environmental losses. Losses would be limited mainly to the owner’s property.

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Table 5-28. Previous Dam Classifications, National Inventory of Dams

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, and Lifeline Losses
Low	None expected	Low and generally limited to owner
Significant	None expected	Yes
High	Probable. One or more expected	Yes (but not necessary for this classification)

In 2008, the Texas Commission on Environmental Quality (TCEQ) proposed new rule changes including changing dam classification definitions. Effective January 1, 2009, dam classifications are labeled as shown in Table 5-29.

Table 5-29. Dam Classifications Effective January 1, 2009

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, and Lifeline Losses
Low	None expected	Minimal economic loss
Significant	Probable (1 to 6)	Economic loss appreciable
High	Loss of life expected (7 or more).	Economic loss excessive

Source: Texas Commission on Environmental Quality

The new classifications place a greater impact on high and significant hazard dams. Now a significant classification indicates a probable loss of life, whereas before no loss of life was expected in the event of dam failure. A High Hazard dam breach is now indicative of an expected loss of life of seven or more persons versus a probable chance in pre-2008 classifications.

All of the dams located in the City of Austin are either classified as “High” or “Significant” (See Table 5-27). Longhorn Dam is classified as “Significant”, meaning if the dam were to fail, the potential impact would be great with appreciable economic loss and a probable loss of life of one to six people. Decker, Mansfield and Tom Miller dams are all classified as “High” hazard dams. A dam failure event at any of these dams would result in excessive economic loss and greater than seven deaths.

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Previous Occurrences

There are about 80,000 dams in the United States today. Catastrophic dam failures have occurred frequently throughout the past century. Between 1918 and 1958, 33 major dam failures in the United States caused 1,680 deaths—an average of 42 deaths a year. From 1959 to 1965, nine major dams failed worldwide.

According to the TCEQ, there have been a total of 98 dam failures from 1970 to 2008 in the State of Texas. Of these 13 were high hazard dams, 28 were significant, and 55 were low³⁷.

Two major dam failures have affected the City of Austin. The first occurred in 1900 when the Austin Dam gave way when the Colorado River rose eleven feet after torrential rains in the area. The destruction of the dam impoverished the City of



Remnants from the Austin Dam

Austin for several years, but the dam was rebuilt in 1909 and completed in 1912. It failed again in 1915. The structure was not repaired for more than two decades until it was rebuilt by the then newly-created Lower Colorado River Authority (LCRA) in 1938 and named Tom Miller Dam.

After a series of high profile failures throughout the United States during the 1960s and early 1970s, the U.S. Congress enacted legislation mandating inspections and strict safety requirements for all governmental and privately operated dams. Since that time the number of failures and deaths has dramatically decreased.

³⁷ These dams total 96 as one of the dams that failed is no longer classified, while the other has been removed from inventory.

Probability of Future Events

Failure of a major dam for the City of Austin is an unlikely event. The frequency of occurrence for dam failure is possible, with less than ten percent chance of an occurrence in any given year.

The spatial extent is expected to be minimal, affecting less than 10 percent of people and/or property in the planning area.

Hazardous Materials Release

In a hazardous materials incident, solid, liquid and/or gaseous contaminants are released from fixed or mobile containers, although this profile focuses on fixed sites. Weather conditions will directly affect how the hazard develops.

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

- The facility falls within one of the following industrial categories: manufacturing; metal mining; coal mining; electric generating facilities that combust coal and/or oil; chemical wholesale distributors; petroleum terminals and bulk storage facilities; RCRA Subtitle C treatment, storage, and disposal (TSD) facilities; and solvent recovery services.
- Has 10 or more full-time employee equivalents.
- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year. Persistent, bioaccumulative and toxic (PBT) chemicals are subject to different thresholds of 10 pounds, 100 pounds or 0.1 grams depending on the chemical.

Tier 2 data is a publicly available database from the Texas Department of State Health Services Tier 2 Chemical Reporting Program. Under the community right-to-know program laws upheld at the state and federal level, all facilities that store

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significant quantities of hazardous chemicals must share this information with state and local emergency responders and planners. Facilities in Texas share this information by filing annual hazardous chemical inventories with the state, with Local Emergency Planning Committees (LEPCs), and with local fire departments. The Texas Tier 2 Reports contain facility identification information and detailed chemical data about hazardous chemicals stored at a facility.

A facility must report if it meets the following criteria:

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

Location

Figure 5-19 shows the locations of available georeferenced TRI and Tier 2 listed toxic sites in and around the City of Austin study area. For fixed site analysis, only toxic sites that have georeferenced data available were analyzed and the circle buffers are drawn around each hazardous material site. Two sizes of buffers, 500 and 2,500 meters are assumed in respect to the different levels of effect- immediate (primary) and secondary.

Figure 5-19. Fixed HAZMAT Analysis Locations and Buffers

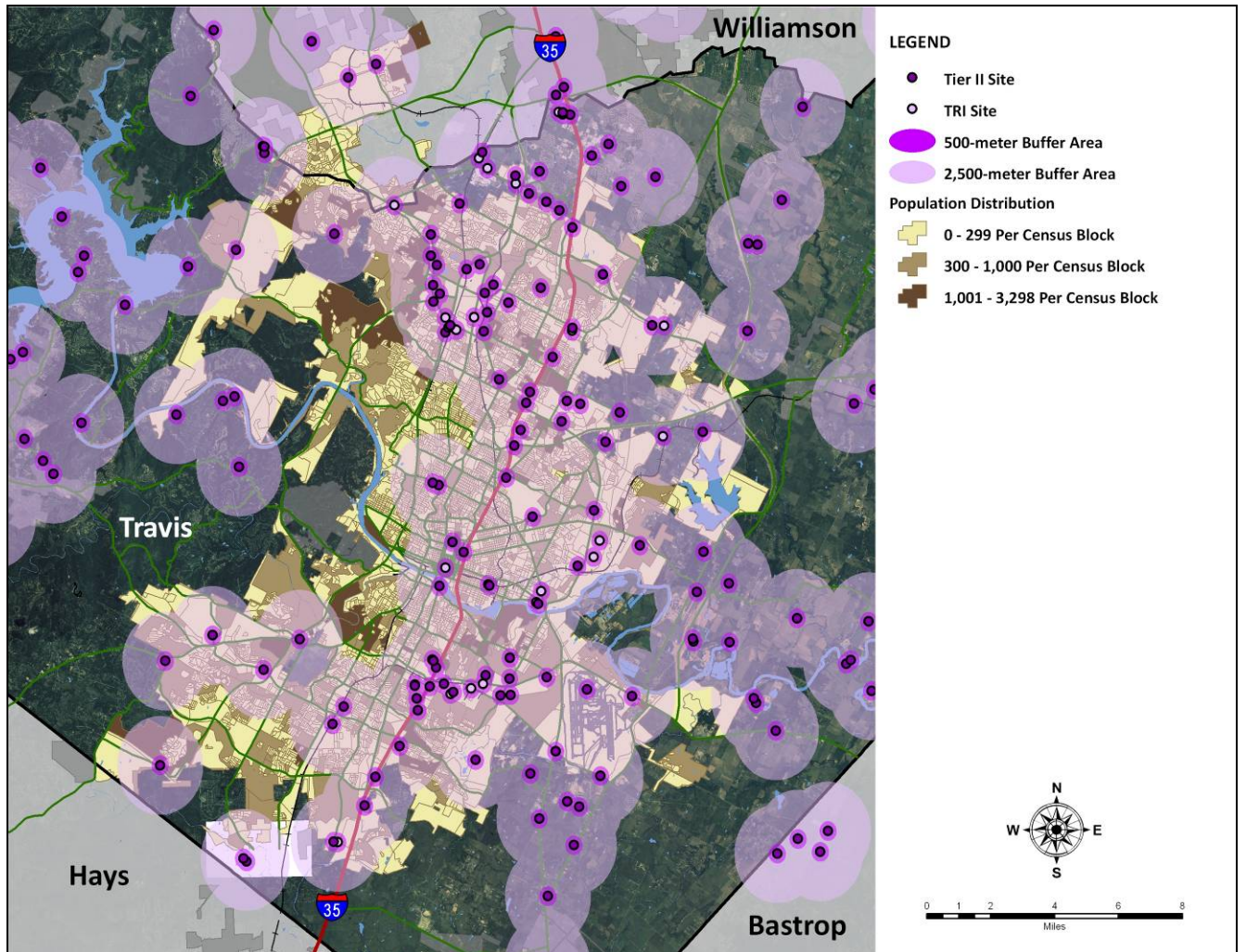
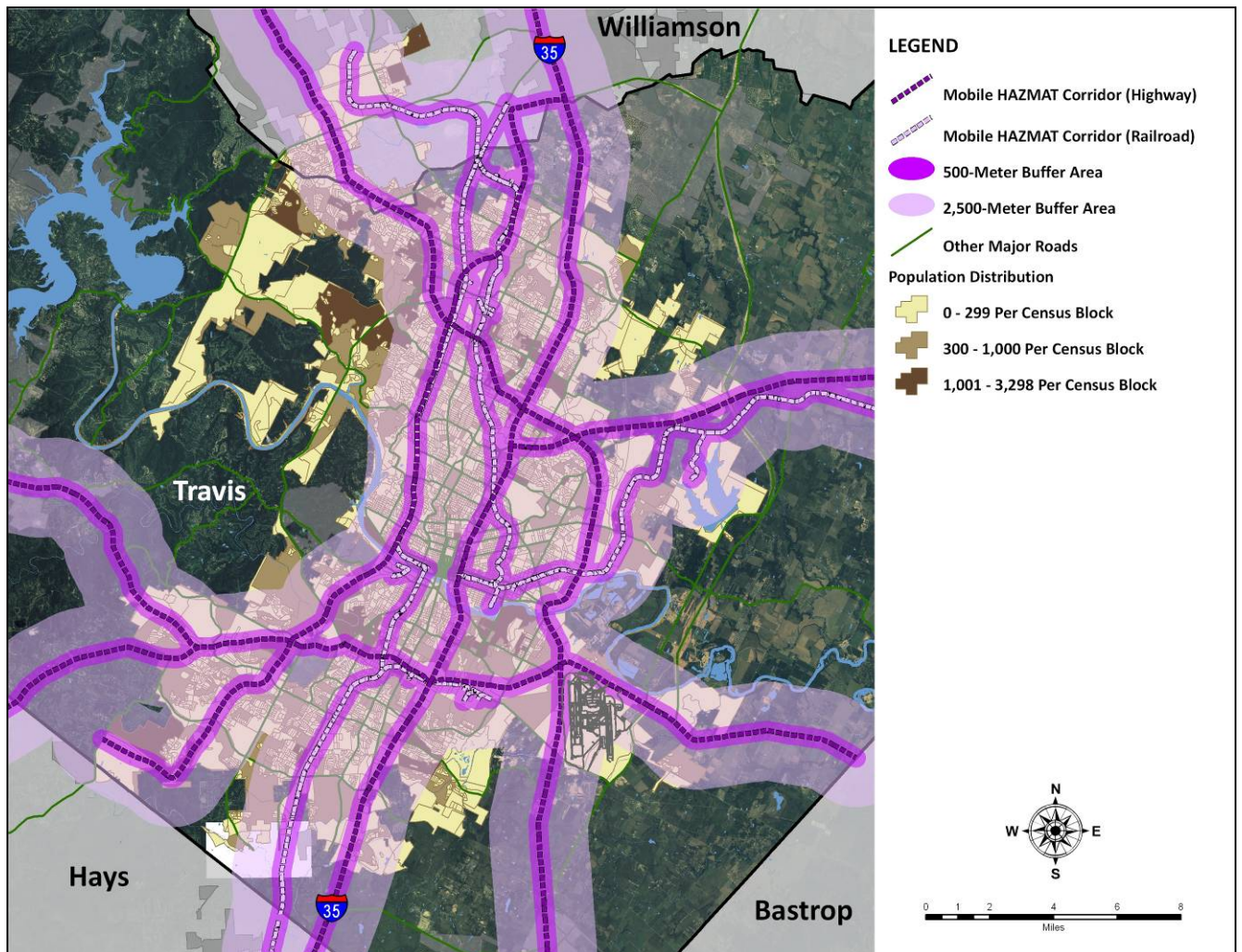


Figure 5-20. Mobile HAZMAT Analysis Corridors and Buffers



Extent

Hazardous materials or toxic releases can have substantial impact on communities. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions would directly affect how the hazard develops. The micro-meteorological effects on buildings and terrain can alter travel patterns and duration of agents. Shielding in the form of permanent shelter can protect people from harmful effects. Non-compliance with fire and building codes, as well as failure to maintain existing

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fire and containment features can substantially increase damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

Probability of Future Events

The likelihood or future probability of occurrence of a hazardous materials release in the City of Austin is low, with more than a 25 percent chance of an event occurring in a given year.

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

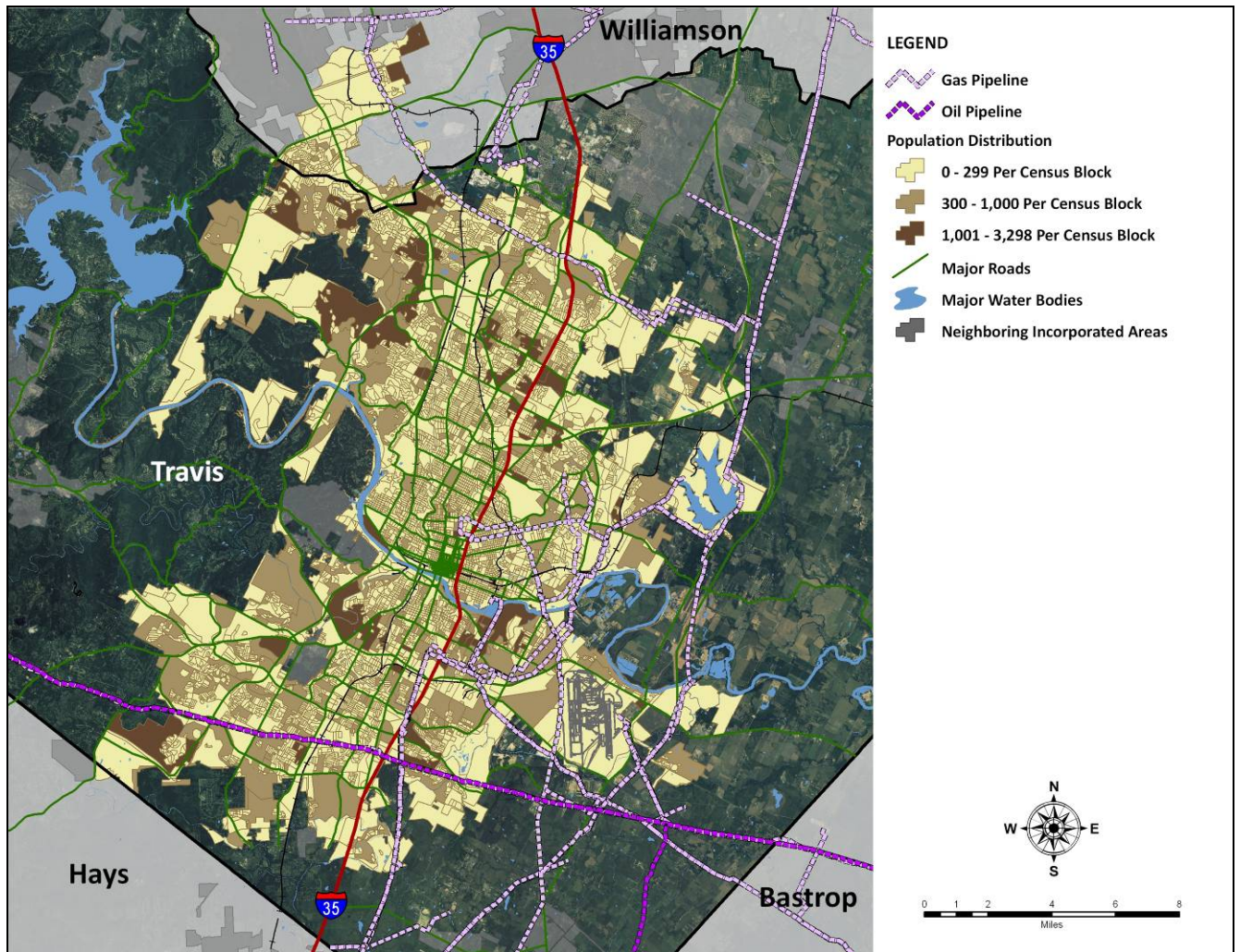
Pipeline Failure

The City of Austin has extensive exposure to a pipeline breach due to the numerous natural gas pipelines running through the city.

Location

Figure 5-21 shows the location of energy pipelines (gas and oil) in and around the City of Austin. If any of these energy pipelines, oil or gas, were to rupture, such an event could endanger property and lives in the immediate area (up to 500 meters for immediate [primary] impact and up to 2,500 meters for secondary impact).

Figure 5-21. Gas and Oil Pipelines



Extent

The spatial extent of a fuel pipeline breach is “Minimal,” expected to affect less than 10% of people and property in Austin.

Previous Occurrences

Table 5-30 summarizes the incident log of historical pipeline accidents (gas and oil combined) reported by the Railroad Commission of Texas for Travis County.

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Table 5-30. Historical Pipeline Accidents (Gas and Oil Combined) (2003-2008)

COUNTY	INCIDENT DATE	TYPE	INJURIES	DEATHS	LOSS	OPERATOR
Travis	2-Oct-03	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	7-Oct-03	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	8-Oct-03	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	9-Oct-03	GAS	0	0	Negligible	TXU GAS DISTRIBUTION
Travis	13-Oct-03	GAS	0	0	Negligible	HOUSTON PIPE LINE COMPANY
Travis	23-Oct-03	GAS	0	0	Negligible	TXU GAS DISTRIBUTION
Travis	26-Oct-03	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	31-Oct-03	GAS	0	0	\$6,000	TEXAS GAS SERVICE
Travis	5-Nov-03	GAS	0	0		TEXAS GAS SERVICE
Travis	18-Nov-03	GAS	0	0	Negligible	TXU GAS DISTRIBUTION
Travis	11-Dec-03	GAS	0	0	Negligible	TXU GAS DISTRIBUTION
Travis	5-Jan-04	GAS	0	0	>\$5,000	TEXAS GAS SERVICE
Travis	9-Jan-04	GAS	1	0	Negligible	TEXAS GAS SERVICE
Travis	13-Feb-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	26-Feb-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	5-Mar-04	GAS	0	0	\$91,000	TEXAS GAS SERVICE
Travis	8-Mar-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	10-Mar-04	GAS	0	0	Negligible	TEXAS GAS SERVICE

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COUNTY	INCIDENT DATE	TYPE	INJURIES	DEATHS	LOSS	OPERATOR
Travis	14-Apr-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	14-Apr-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	22-Apr-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	4-May-04	GAS	0	0	>\$5,000	TEXAS GAS SERVICE
Travis	7-May-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	10-May-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	26-May-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	27-May-04	GAS	0	0	>\$5,000	TEXAS GAS SERVICE
Travis	28-May-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	1-Jun-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	4-Jun-04	GAS	0	0	Negligible	TXU GAS COMPANY
Travis	4-Jun-04	GAS	0	0	\$7,000	TEXAS GAS SERVICE
Travis	23-Jun-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	24-Jun-04	GAS	0	0	N/A	KINDER MORGAN TEJAS PIPELINE, LP
Travis	1-Jul-04	GAS	0	0	N/A	KINDER MORGAN TEJAS PIPELINE, LP
Travis	2-Jul-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	12-Jul-04	GAS	0	0	>\$5,000	TEXAS GAS SERVICE
Travis	6-Aug-04	GAS	0	0	N/A	TEXAS GAS SERVICE

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COUNTY	INCIDENT DATE	TYPE	INJURIES	DEATHS	LOSS	OPERATOR
Travis	31-Aug-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	2-Sep-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	2-Sep-04	GAS	0	0	N/A	TEXAS GAS SERVICE
Travis	16-Sep-04	GAS	0	0	UNKNOWN	ATMOS ENERGY CORP., MID-TEX DIVISION
Travis	21-Sep-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	22-Sep-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	21-Oct-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	25-Oct-04	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	17-Dec-04	GAS	0	0	>\$5,000	TEXAS GAS SERVICE
Travis	17-Jan-05	GAS	0	0	N/A	TEXAS GAS SERVICE
Travis	7-Feb-05	GAS	0	0	N/A	TEXAS GAS SERVICE
Travis	8-Feb-05	GAS	0	0	N/A	TEXAS GAS SERVICE
Travis	2-Apr-05	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	5-May-05	GAS	0	0	>\$5,000 but <\$50,000	TEXAS GAS SERVICE
Travis	10-Jun-05	GAS	0	0	>\$5,000 but <\$50,000	TEXAS GAS SERVICE
Travis	15-Jun-05	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	19-Jun-05	GAS	0	0	NO GAS DAMAGES	ATMOS ENERGY
Travis	29-Jun-05	GAS	0	0	Negligible	ATMOS ENERGY
Travis	30-Jun-05	GAS	0	0	Negligible	TEXAS GAS SERVICE

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COUNTY	INCIDENT DATE	TYPE	INJURIES	DEATHS	LOSS	OPERATOR
Travis	15-Jul-05	GAS	0	0	>\$5,000 but <\$50,000	TEXAS GAS SERVICE
Travis	18-Jul-05	GAS	0	0	\$8,000	TEXAS GAS SERVICE
Travis	18-Jul-05	GAS	0	0	\$11,000	TEXAS GAS SERVICE
Travis	21-Jul-05	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	12-Aug-05	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	17-Aug-05	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	20-Aug-05	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	26-Aug-05	GAS	0	0	>\$5,000	TEXAS GAS SERVICE
Travis	2-Sep-05	GAS	0	0	>\$5,000 but <\$50,000	TEXAS GAS SERVICE
Travis	5-Oct-05	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	12-Oct-05	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	25-Oct-05	GAS	0	0	\$11,000	TEXAS GAS SERVICE
Travis	9-Nov-05	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	10-Nov-05	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	6-Dec-05	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	7-Dec-05	GAS	0	0	>\$5,000	ATMOS ENERGY CORP., MID-TEX DIVISION
Travis	7-Dec-05	GAS	0	0	UNKNOWN	TEXAS GAS SERVICE
Travis	8-Dec-05	GAS	0	0	>\$50,000	ATMOS ENERGY CORP., MID-TEX DIVISION

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COUNTY	INCIDENT DATE	TYPE	INJURIES	DEATHS	LOSS	OPERATOR
Travis	11-Dec-05	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	11-Dec-05	GAS	0	0	>\$5,000	ATMOS ENERGY CORP., MID-TEX DIVISION
Travis	6-Jan-06	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	1-Feb-06	GAS	0	0	>5,000	TEXAS GAS SERVICE
Travis	21-Mar-06	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	3-Apr-06	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	13-Apr-06	GAS	2	0	UNKNOWN (N/J)	TEXAS GAS SERVICE
Travis	21-Apr-06	GAS	1	0	>\$50,000	ATMOS ENERGY CORP., MID-TEX DIVISION
Travis	24-Apr-06	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	26-Apr-06	GAS	0	0	<\$50,000	TEXAS GAS SERVICE
Travis	30-Apr-06	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	6-Jun-06	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	30-Jun-06	GAS	0	0	>\$5,000	TEXAS GAS SERVICE
Travis	5-Jul-06	LPG ³⁸	1	0	>\$5,000	SHARP PROPANE
Travis	16-Jul-06	GAS	0	0	>\$5,000	TEXAS GAS SERVICE
Travis	3-Aug-06	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	12-Aug-06	GAS	0	0	Negligible	TEXAS GAS SERVICE

³⁸ Liquid Petroleum Gas

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COUNTY	INCIDENT DATE	TYPE	INJURIES	DEATHS	LOSS	OPERATOR
Travis	21-Aug-06	GAS	0	0	Negligible	ENTERPRISE PRODUCTS OPERATING, LP
Travis	6-Sep-06	GAS	0	0	Negligible	ATMOS ENERGY CORP., MID-TEX DIVISION
Travis	11-Sep-06	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	25-Sep-06	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	30-Oct-06	GAS	0	0	>\$5,000	TEXAS GAS SERVICE
Travis	8-Nov-06	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	10-Nov-06	LPG	0	0	>\$5,000	PETRON LLC
Travis	1-Dec-06	LPG	0	0	Negligible	DIRECT PROPANE SERVICES
Travis	14-Dec-06	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	15-Dec-06	GAS	0	0	\$10,000	TEXAS GAS SERVICE
Travis	24-Dec-06	GAS	0	0	Negligible	SHARP COMMUNITY ENERGY
Travis	4-Jan-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	11-Jan-07	GAS	0	0	\$184,000	TEXAS GAS SERVICE
Travis	18-Jan-07	GAS	0	0	\$12,000	TEXAS GAS SERVICE
Travis	29-Jan-07	GAS	2	0	UNKNOWN	ATMOS ENERGY CORP., MID-TEX DIVISION

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COUNTY	INCIDENT DATE	TYPE	INJURIES	DEATHS	LOSS	OPERATOR
Travis	16-Feb-07	GAS	0	0	UNKNOWN	ATMOS ENERGY CORP., MID-TEX DIVISION
Travis	22-Feb-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	6-Mar-07	GAS	0	0	>\$5,000	ATMOS ENERGY CORP., MID-TEX DIVISION
Travis	12-Mar-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	13-Mar-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	26-Mar-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	28-Mar-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	13-Apr-07	GAS	0	0	>\$5,000	TEXAS GAS SERVICE
Travis	26-Apr-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	3-May-07	GAS	0	0	Negligible	TEXAS COMMUNITY PROPANE
Travis	4-May-07	GAS	0	0	PENDING	TEXAS GAS SERVICE
Travis	10-May-07	GAS	0	0	>\$5,000 but <\$50,000	TEXAS GAS SERVICE
Travis	13-May-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	14-May-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	17-May-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	18-Jun-07	GAS	0	0	>\$5,000	TEXAS GAS SERVICE
Travis	27-Jun-07	GAS	0	0	Negligible	TEXAS GAS SERVICE

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COUNTY	INCIDENT DATE	TYPE	INJURIES	DEATHS	LOSS	OPERATOR
Travis	9-Jul-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	16-Jul-07	GAS	0	0	>\$5,000 but <\$20,000	TEXAS GAS SERVICE
Travis	23-Jul-07	GAS	0	0	PENDING	TEXAS GAS SERVICE
Travis	27-Jul-07	GAS	0	0	Negligible	ATMOS ENERGY CORP., MID-TEX DIVISION
Travis	28-Aug-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	31-Aug-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	14-Sep-07	LPG	4	0		EVERGREEN R.V.
Travis	17-Oct-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	24-Oct-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	2-Nov-07	GAS	0	0	\$16,000	TEXAS GAS SERVICE
Travis	5-Nov-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	26-Nov-07	GAS	0	0	Negligible	TEXAS GAS SERVICE COMPANY
Travis	5-Dec-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	9-Dec-07	GAS	0	0	Negligible	TEXAS GAS SERVICE
Travis	18-Dec-07	LPG	0	0	UNKNOWN	TERRY GARNETT PROPANE
Travis	18-Dec-07	GAS	0	0	<\$50,000	TEXAS GAS SERVICE
Travis	14-Jan-08	GAS	0	0	Negligible	TEXAS GAS SERVICE COMPANY

Section 5 – Hazard Profile

COUNTY	INCIDENT DATE	TYPE	INJURIES	DEATHS	LOSS	OPERATOR
Travis	28-Jan-08	GAS	0	0	<\$50,000	TEXAS GAS SERVICE COMPANY
Travis	22-Feb-08	GAS	0	0	Negligible	UNKNOWN
Travis	26-Mar-08	GAS	0	0	<\$50,000	UNKNOWN
Travis	12-Jun-08	GAS	0	0	<\$50,000	UNKNOWN
Travis	8-Aug-08	GAS	0	0	N/A	UNKNOWN
Travis	12-Aug-08	GAS	0	0	N/A	UNKNOWN
Travis	22-Aug-08	LPG	1	0	Negligible	UNKNOWN
Travis	24-Sep-08	GAS	0	0	Negligible	UNKNOWN
Travis	3-Oct-08	GAS	0	0	<\$50,000	UNKNOWN
Travis	7-Oct-08	GAS	0	0	>\$5,000	UNKNOWN
Travis	13-Oct-08	GAS	0	0	UNKNOWN	UNKNOWN
Travis	13-Oct-08	GAS	0	0	Negligible	UNKNOWN
Travis	17-Oct-08	GAS	0	0	>\$50,000	UNKNOWN
Travis	18-Nov-08	GAS	0	0	<\$50,000	UNKNOWN
Travis	24-Nov-08	GAS	0	0	UNKNOWN	UNKNOWN
Travis	4-Dec-08	GAS	0	0	Negligible	UNKNOWN
Travis	5-Dec-08	LPG	1	0	Negligible	UNKNOWN
Travis	11-Dec-08	GAS	0	0	UNKNOWN	UNKNOWN
Travis	11-Dec-08	GAS	0	0	<\$50,000	UNKNOWN
Travis	UNKNOWN	NG ³⁹	0	0	<\$50,000	UNKNOWN

Probability of Future Events

The likelihood or future probability of occurrence of a pipeline failure in the City of Austin is low, with more than a 25 percent chance of an event occurring in a given year.

Terrorism

The Federal Bureau of Investigation (FBI) categorizes terrorism in the United States as one of two types—domestic terrorism or international terrorism. Domestic terrorism involves groups or individuals whose terrorist activities are directed at elements of our government or population without foreign direction.

³⁹ Natural Gas

Section 5 – Hazard Profile



International terrorism involves groups or individuals whose terrorist activities are foreign-based and/or directed by countries or groups outside the United States, or whose activities transcend their national boundaries.

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

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

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

The Department of Defense estimates that as many as 26 nations may possess chemical agents and/or weapons and an additional 12 may be seeking to develop them. The Central Intelligence Agency reports that at least ten countries are believed to possess or to be conducting research on biological agents for weaponization.

Terrorist incidents – as with other natural and technological disasters – involve the application of one or more modes of harmful force to the built environment. These modes include contamination (as in the case of chemical, biological radiological or nuclear hazards), energy (explosives, arson, and even electromagnetic waves), or denial of service (sabotage, infrastructure breakdown, and transportation service disruption).

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Location

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

Extent

The Homeland Security Advisory System, issued by the U.S. Department of Homeland Security, is a color-coded terrorism warning system that sets out five threat levels. Terrorism Warning Threat Levels are described in Table 5-31.

Table 5-31. Terrorism Warning System Threat Levels⁴⁰

Color	Threat Level ⁴¹	Governmental actions to be taken
Green	Low: Low risk of attacks.	Requires “protective measures” such as regularly assessing facilities for weaknesses and finding ways to reduce them, and making sure State and local government employees are trained to handle terrorism situations.
Blue	Guarded: General risk of attacks.	Requires government agencies to review and update emergency response procedures and communications systems, as well as provide the public with necessary information.
Yellow	Elevated: Significant risk of attacks.	Includes increasing surveillance of critical locations, coordinating emergency plans with nearby jurisdictions and implementing contingency and emergency response plans.
Orange	High: High risk of attacks.	Requires coordinating necessary security efforts with armed forces or law enforcement agencies, taking additional precautions at public events, preparing to work at an alternative site or with a dispersed workforce and restricting access to essential personnel.
Red	Severe: Severe risk of	Includes assigning emergency response personnel and setting up specially trained teams; monitoring, redirecting, or constraining transportation

⁴⁰ Department of Homeland Security

⁴¹ Current threat levels can be found at:

http://www.dhs.gov/xinfoshare/programs/Copy_of_press_release_0046.shtm.

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Color	Threat Level ⁴¹	Governmental actions to be taken
Red	attacks.	systems; closing public and government facilities; and increasing or redirecting personnel to address emergency needs.

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

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

Previous Occurrences

The history of terrorism on United States soil includes the attacks of September 11, 2001, on the World Trade Center in New York and the Pentagon in Washington, D.C. and the ensuing anthrax attacks; the 1995 bombing of the Murrah Federal Building in Oklahoma City; and earlier bombing of the World Trade Center in 1993.

The City of Austin has not experienced a terrorist act. While complete prevention of an attack may not be attainable, the City can lessen the likelihood and/or the potential effects of an incident. Austin continues to improve its readiness to respond to a terrorist incident through participation in state and federal programs that provide training and equipment for agencies that would respond to a local terrorist incident, and in exercises that help to improve agency coordination and test local response plans.

Probability of Future Events

The types, frequencies, and locations of many natural hazards are identifiable and, even in some cases, predictable. The laws of physics and nature govern them. Malevolence, however, cannot be forecast with any accuracy. There is, therefore, some potential for most, if not all, types of intentional terrorist acts to occur anywhere and at any time.

VULNERABILITY ASSESSMENT

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Overview

This section builds upon the information provided in Section 5 by identifying and characterizing an inventory of assets for the City of Austin, and then assessing the potential impact and amount of damages that can be expected to be caused by each identified hazard event. The primary objective of the vulnerability assessment is to quantify exposure and potential loss estimates for each hazard. In so doing, the City and its planning partners better understand their unique risks to identified hazards, which helps when evaluating and prioritizing mitigation actions.

Section 6 – Vulnerability Assessment

This section begins with an explanation of the methodology applied to complete the hazard vulnerability assessment, followed by a summary description of the asset inventory as compiled for the City¹. The remainder of this section focuses on the results of the vulnerability assessment, and is organized by hazard as listed below.

- Atmospheric
 - Extreme Heat
 - Hail
 - Hurricane Wind
 - Thunderstorm
 - Tornado
 - Winter Storm
- Hydrologic
 - Drought
 - Flood
- Other Natural Hazards
 - Infectious Disease
 - Wildfire
- Technological / Man-Caused
 - Dam Failure
 - Hazardous Materials Release
 - Pipeline Failure
 - Terrorism

Methodology

This risk assessment was conducted using two distinct methodologies: utilizing GIS-based analysis and statistical risk assessment methodology. Each approach provides estimates for the potential impact of hazards by using a common, systematic framework for evaluation, including historical occurrence information.

A GIS-based analysis was conducted for five hazards:

- Hurricane Wind
- Flood
- Pipeline Failure
- Hazardous Materials Release

¹ Toxic Sites and Critical Facilities found in Appendix C and D are not repeated in this Section for privacy concerns.

Section 6 – Vulnerability Assessment

- Wildfire

A statistical risk assessment approach was used to analyze four hazards:

- Hail
- Thunderstorm
- Drought
- Tornado

An analysis of historical data was used to analyze five hazards:

- Extreme Heat
- Infectious Disease
- Dam Failure
- Terrorism
- Winter Storm

GIS-Based Analysis

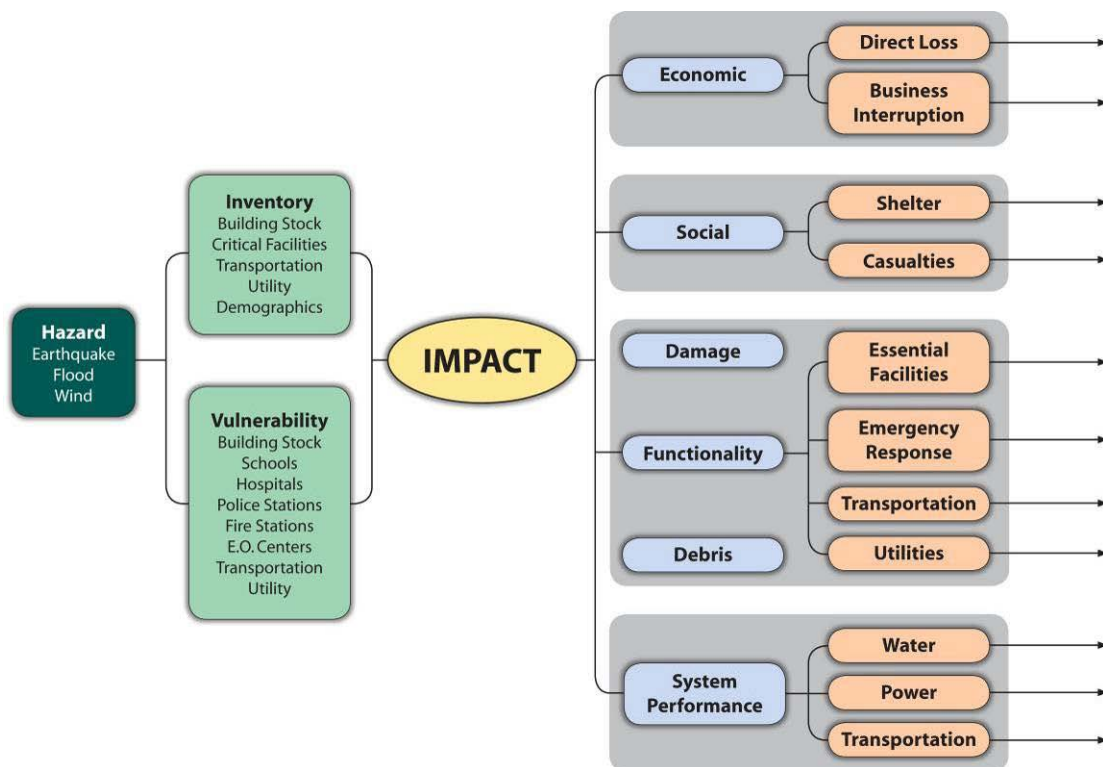
For the GIS-based assessment, geospatial data was collected from local, state and national sources, with local data being used to the maximum extent possible. ESRI® ArcGIS™ 9.2 was used to assess risk by utilizing digital data such as local tax records for individual parcels and georeferenced point locations for critical facilities. Using these types of data layers, risk was evaluated by estimating the assessed building value associated with parcels determined to be located in identified hazard areas. HAZUS-MH MR3 (September 2007) was also used to model hurricane winds and inland (riverine) flooding and estimate potential losses for these hazards. Census 2000 data (at the census block level) was derived from HAZUS-MH and used to estimate potentially exposed populations in hazard areas.

The objective of the GIS-based analysis was to determine the estimated vulnerability of people, buildings and critical facilities to the identified hazards for the City of Austin using the best available data. In so doing, local databases made available through the City of Austin, such as local tax assessor records, parcel boundaries, building footprints and critical facilities data, were used in combination with digital hazard data. The results of the analysis provided an estimated number of people, as well as the numbers and values of buildings and critical facilities determined to be potentially at risk to those hazards with delineable geographic hazard boundaries.

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HAZUS-MH is FEMA’s standardized loss estimation methodology built upon an integrated GIS platform (Figure 6-1) to conduct analysis at a regional level, rather than a structure-by-structure basis. The HAZUS-MH risk assessment methodology is parametric, in that distinct hazard and inventory parameters (e.g., wind speed and building types) were modeled using the HAZUS-MH software to determine the impact (i.e., damages and losses) on the built environment. This risk assessment applied HAZUS-MH to produce a countywide profile and estimate losses for two hazards at the jurisdictional level (flood and hurricane wind). The results of the HAZUS-MH model analysis includes annualized loss estimates. HAZUS-MH MR3 uses Census 2000 for population; Census 2000 and Dun & Bradstreet 2002 for building count; 2006 RS Means for building valuation; and 2006 Dun and Bradstreet for commercial data.

Figure 6-1. Conceptual Model of HAZUS-MH Methodology



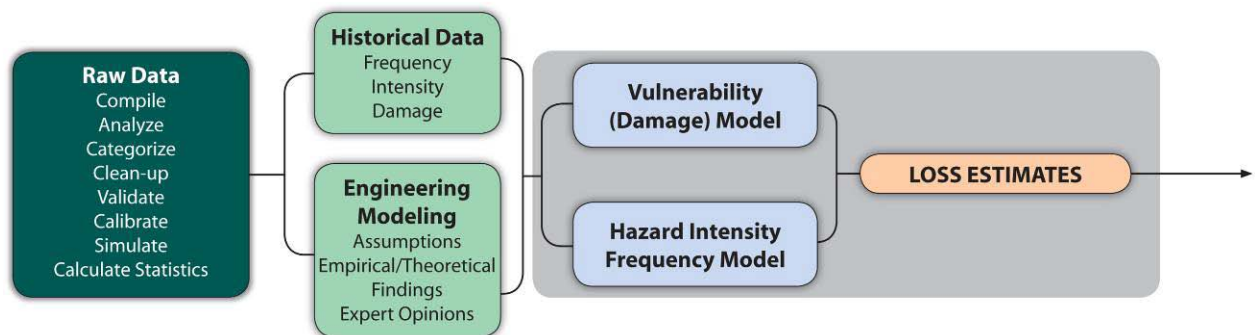
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Statistical Risk Assessment Methodology

The statistical risk assessment methodology was applied to analyze hazards of concern outside the scope of HAZUS-MH and the GIS-based risk assessment. This methodology uses a statistical approach and mathematical modeling of risk to predict a hazard’s frequency of occurrence and estimated impacts based on recorded or historic damage information. This methodology was used to assess risk to the hail, tornado, winter storm and drought hazards. Available historical data for each hazard was used and statistical evaluations were performed using manual calculations. The general steps used in the statistical risk assessment methodology are summarized below and illustrated in Figure 6-2:

1. Compile data from local, state and national sources, as well as literature.
2. Clean up data, including removal of duplicate records and update losses to account for inflation.
3. Identify patterns in frequency, intensity, vulnerability and loss.
4. Statistically and probabilistically extrapolate the patterns.
5. Produce meaningful results, including the development of annualized loss estimates.

Figure 6-2. Conceptual Model of the Statistical Risk Assessment Methodology



A significant portion of the historical data used in this risk assessment comes from the National Climatic Data Center (NCDC), a division of the National Oceanic and Atmospheric Administration (NOAA). NCDC is the world’s largest active archive of climate data.

The economic loss results are presented here using two interrelated risk indicators:

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- 1) The Annualized Loss (AL), which is the estimated long-term weighted average value of losses to property in any single year in a specified geographic area (i.e., county).
- 2) The Annualized Loss Ratio (ALR), which expresses estimated annualized loss normalized by property replacement value.

The impact for each hazard is presented in terms of annualized losses, whenever possible. For other hazards where the statistical approach was used, the computations are based primarily on the observed historical losses.

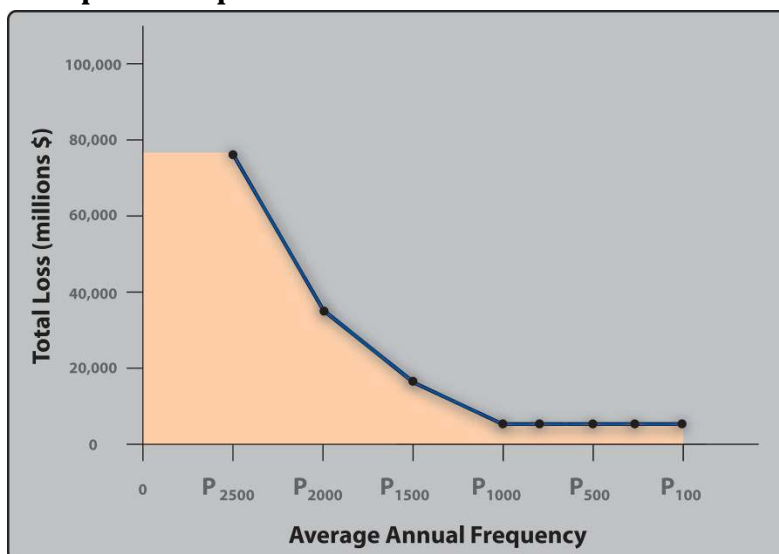
In general, presenting results in the annualized form is useful on three fronts:

1. Contribution of potential losses from all future disasters is accounted for with this approach.
2. Results in this form from different hazards are readily comparable and hence easier to rank.
3. When evaluating mitigation alternatives, use of annualized losses is the most objective approach for this purpose.

Annualized losses (for the hazards where the parametric approach is utilized) are computed in a three-step process (see Figure 6-3):

1. Compute / estimate losses for a number of scenario events with different return periods [e.g., 10-year, 100-year, 200-year, 500-year, etc...].
2. Approximate the Probability versus Loss Curve through curve fitting.
3. Calculate the area under the fitted curve to obtain annualized losses.

Figure 6-3. Graphical Representation of the Annualized Loss Methodology



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The estimated Annualized Loss (AL) addresses the key idea of risk: the probability of the loss occurring in the study area (largely a function of building construction type and quality). By annualizing estimated losses, the AL factors in historic patterns of frequent smaller events with infrequent but larger events to provide a balanced presentation of the risk. The Annualized Loss Ratio (ALR) represents the AL as a fraction of the replacement value of the local inventory. This ratio is calculated using the following formula:

$$\text{ALR} = \text{Annualized Losses} / \text{Total Exposure}$$

The annualized loss ratio gauges the relationship between average annualized loss and replacement value. This ratio can be used as a measure of vulnerability in the areas and, since it is normalized by replacement value, it can be directly compared across different geographic units such as metropolitan areas or counties.

Study Area and Asset Inventory

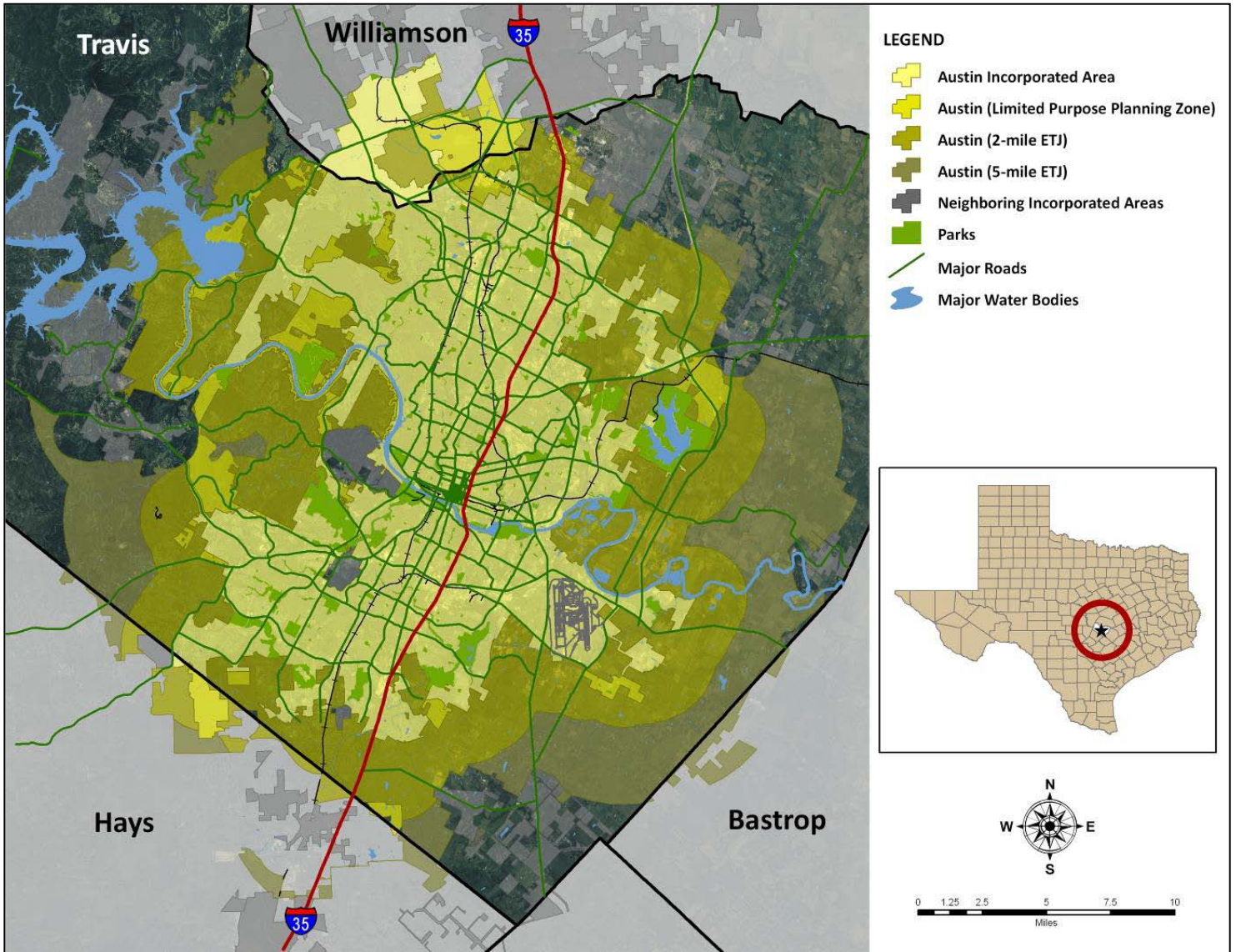
Hazard identification consists of (1) defining the study area in terms of scale and coverage; and (2) collecting and compiling a list of prevalent hazards in the study area to help narrow the focus of the analysis.

Study Area

The core study area is the incorporated limits of the City of Austin as well as three additional areas associated with the city for general reference: the Limited Purpose Planning Zone, 2-mile ETJ and 5-mile ETJ.² This study area is presented on the following page in Figure 6-4.

² An ETJ is an extraterritorial jurisdiction.

Figure 6-4. Community Profile



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Asset Inventory

Table 6-1 provides estimated parcel count and total estimated dollar exposure (i.e., improved value) of parcels in or intersecting the City of Austin.

Table 6-1. Parcel Inventory

TOTAL ESTIMATED NUMBER OF PARCELS*	ESTIMATED NUMBER OF PARCELS WITH IMPROVED VALUES	TOTAL ESTIMATED IMPROVED VALUE OF PARCELS
187,361	40,352	\$23,858,922,856

A homestead is defined by the Travis County Tax Office as a building occupied by the owner of the freehold and his or her family, with the primary intention of making it their home, together with the parcel of land on which it stands and the other improvements attached to it. The State of Texas offers a homestead exemption that essentially removes a portion of the value of the property from taxation (thus lowering the tax bill). The parcel data available for the City of Austin includes both homestead exemption values and non-homestead exemption values. For the purposes of this risk assessment, non-homestead exemption values were used. It is also worth noting that replacement values can be higher than assessed values due to the local housing market, homestead exemptions of \$51,000³ for those over 65 years of age and those with disabilities, the tendency for post-disaster construction costs to increase due to adherence to new building codes and NFIP requirements, and increases in demand for skilled contractors and building materials as the supply of both decrease.

Critical Facilities

Table 6-2 provides the total number and estimated value of critical facilities in the City of Austin (Appendix D contains a more detailed listing of these facilities). Figure 6-5 provides a map of these assets indicating their approximate locations within the planning area. It is important to note that data derived from HAZUS-MH MR3 for communications facilities, emergency operations facilities, fire departments, hospitals, police stations and schools was used for the HAZUS-based

³ Travis County Tax Office. 2009, available at:
<http://www.traviscountytax.org/goPropertiesRatesExemptions.doc>.

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analyses for hurricane wind and flood and may vary from data obtained from the City of Austin.⁴

Table 6-2. Critical Facilities (Type, Number, and Approximate Value)

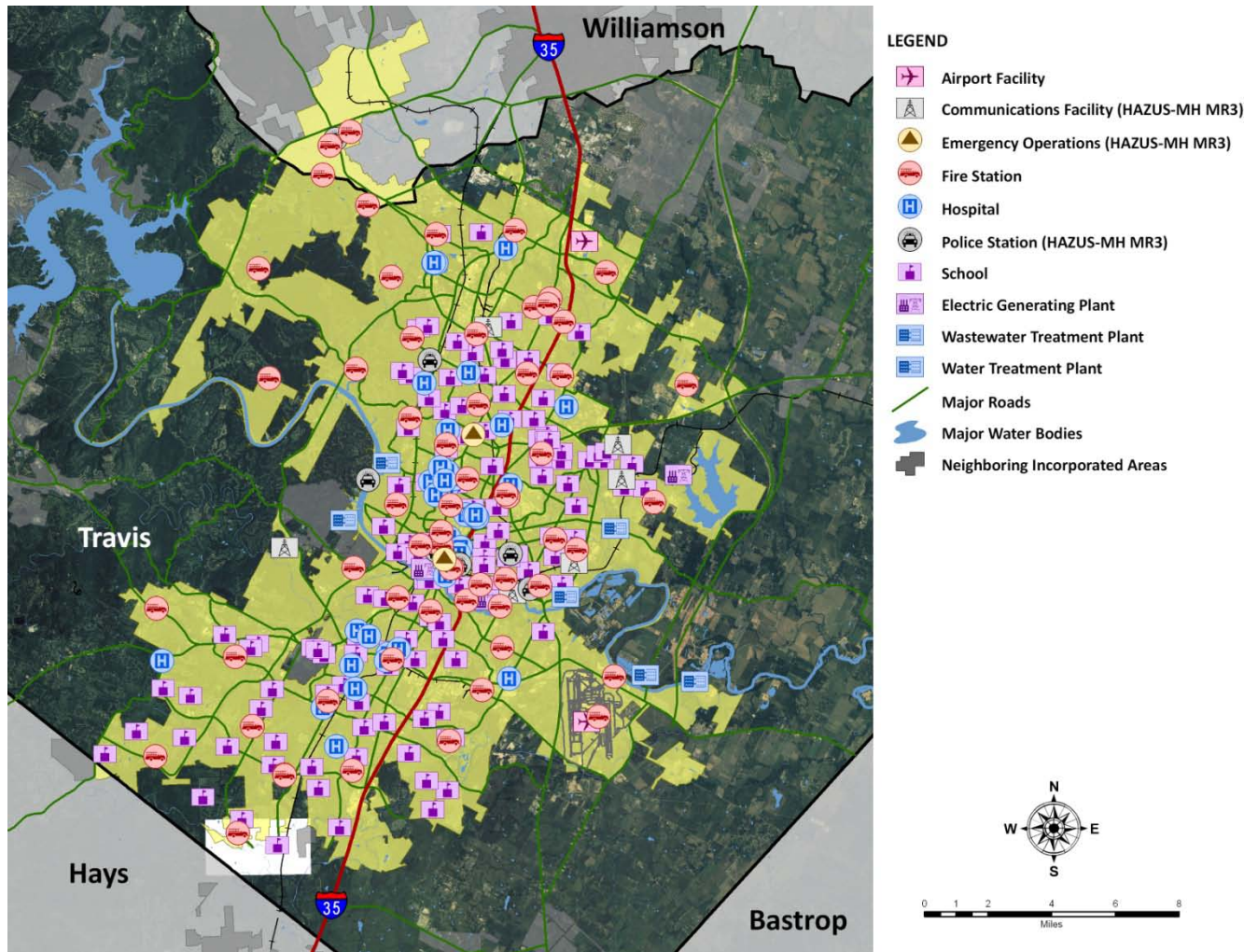
TYPE OF FACILITY	NUMBER OF FACILITIES (PRELIMINARY COUNTS)	TOTAL APPROXIMATE VALUE (PRELIMINARY VALUES)
Airport Facility	2	\$1,254,223
Communications Facility (HAZUS-MH MR3)	8	\$712,000
Emergency Operations (HAZUS-MH MR3)	2	\$1,780,000
Fire Station	48	\$2,547,498
Hospital	45	\$245,472,206
Police Station (HAZUS-MH MR3)	10	\$12,460,000
School	129	\$1,193,999,600 (HAZUS-MH MR3)
Electric Generating Plant	3	\$293,700,000 (HAZUS-MH MR3)
Wastewater Treatment Plant	4	\$1,843,741
Water Treatment Plant	3	\$177,822,000 (HAZUS-MH MR3)

Source: COA, HAZUS-MH MR3

The building counts shown in Table 6-2 and Figure 6-5 (on the following page) are based on local data except where noted.

⁴ There are essentially two reasons for this. First, the default inventory used by HAZUS may not be as current and/or accurate as data available locally. Second, the analyses for hurricane wind and flood were conducted at the census tract and census block levels respectively and the aggregation of the data at these levels may lead to minor discrepancies in building counts.

Figure 6-5. Critical Facilities (General Locations)



Infrastructure, Lifelines and Hazardous Materials

Table 6-3 includes the amount (in kilometers) of oil and gas pipelines, highways and railways, and the number of hazardous materials sites (i.e., includes georeferenced TRI and Tier II sites) in the study area.

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Table 6-3. Infrastructure, Lifelines, and Hazardous Materials⁵

INFRASTRUCTURE AND LIFELINES				HAZARDOUS MATERIALS FACILITIES
Oil Pipe (km)*	Gas Pipe (km)	Highway (km)	Railroad (km)	Number of Sites
108.35	672.09	1,072.02	161.89	97

Impact

For each of the following hazards, a description of the warning time or potential speed of onset of the hazard is included, along with city’s overall vulnerability to that hazard based on impact. Impact statements are defined in the Table 6-4.

Table 6-4. Impact Statements

Potential Severity	Description
Substantial	Multiple deaths Complete shutdown of facilities for 30 days or more. More than 50 percent of property destroyed or with major damage.
Major	Injuries and/or illnesses result in permanent disability. Complete shutdown of critical facilities for at least two weeks. More than 25 percent of property destroyed or with major damage.
Minor	Injuries and/or illnesses do not result in permanent disability. Complete shutdown of critical facilities for more than one week. More than 10 percent of property destroyed or with major damage.
Limited	Injuries and/or illnesses are treatable with first aid. Minor quality of life lost. Shutdown of critical facilities and services for 24 hours or less. Less than 10 percent of property destroyed or with major damage.

⁵ Sources: Railroad Commission of Texas; City of Austin, TRI/Tier II lists

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Extreme Heat

Because extreme heat events are not confined to specific geographic boundaries, all existing and future buildings, facilities, and populations are considered to be exposed to this hazard and could potentially be impacted.

Given the lack of historical data and limited likelihood for structural losses resulting from extreme heat occurrences in the City of Austin, annualizing potential structural losses over a long period of time would most likely yield a negligible annualized loss estimate for the city.



Typically more than twelve hours of warning time would be given before the onset of an extreme heat event. Even though only minor property damage would result, the potential impact of excessive summer heat is considered major as an event could cause permanent injuries or deaths to citizens.

Hail

Because hail events are not confined to specific geographic boundaries, all existing and future buildings, facilities, and populations are considered to be exposed to this hazard and could potentially be impacted. It is important to note that only reported hail events have been factored into this vulnerability assessment⁶ and only events with georeferenced point data have been included in the point locations map.



To estimate losses due to hail, NCDC historical hail loss data was used to develop a hail stochastic model. In this model:

- Losses were scaled to account for inflation.
- Average historic hail damageability was used to generate losses for historical hail events where losses were not reported.
- Expected annualized losses were calculated through a non-linear regression of historical data.

⁶ It is possible that additional hail events may have occurred since 1950 that were not reported to NCDC and are not accounted for in this analysis.

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- Probabilistic losses were scaled to account for would-be losses where no exposure/instrument was present at the time of the event.

Table 6-5 shows potential annualized losses for the City of Austin.

Table 6-5. Potential Annualized Losses (Hail)

TOTAL EXPOSURE*	ANNUALIZED EXPECTED PROPERTY LOSSES	ANNUALIZED LOSS RATIO
\$23,858,922,856	\$42,517,506	0.18%

*Total Exposure is improved value of parcels in the City of Austin

Warning time for a hailstorm is generally 0-3 hours or minimal. The severity of a hailstorm impact is considered to be limited since they generally result in injuries treatable with first aid, shut down critical facilities and services for 24 hours or less, and less than ten percent of affected properties are destroyed or suffer major damage.

Hurricane Wind

HAZUS-MH wind speed data, inventory and damage functions, and methodology were used to determine the annual expected loss at the census tract level for the census tracts intersecting the City of Austin incorporated limits. This includes census tracts that extend into neighboring Williamson and Hays counties. Because the analysis was conducted at the census tract level, some margin of error can be expected as some census tracts only partially intersect the core study area. Table 6-6 shows potential annualized property losses by occupancy type and Table 6-7 shows the annualized percent loss ratio.

Table 6-6. Potential Annualized Losses (Hurricane Wind)

OCCUPANCY TYPE	TOTAL	BUILDING	CONTENTS	OTHER
Residential	\$3,630,000	\$2,900,000	\$342,700	\$387,300
Commercial	\$415,000	\$213,300	\$68,300	\$133,400
Industrial	\$86,200	\$42,400	\$32,700	\$11,100
Agricultural	\$15,700	\$8,200	\$4,800	\$2,700
Religious/Non-Profit	\$26,500	\$14,400	\$3,900	\$8,200
Government	\$30,800	\$10,900	3,900	\$16,000

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OCCUPANCY TYPE	TOTAL	BUILDING	CONTENTS	OTHER
Education	\$92,300	\$44,000	\$21,000	\$27,300
TOTALS	\$4,296,500	\$3,233,200	\$477,300	\$586,000

Source: HAZUS-MH MR3

Table 6-7. Annualized Percent Loss Ratio (Hurricane Wind)

TOTAL EXPOSURE*	ANNUALIZED EXPECTED PROPERTY LOSSES	ANNUALIZED LOSS RATIO
\$23,858,922,856	\$4,296,500	0.02%

*Total Exposure is improved value of parcels in the City of Austin

Table 6-8. Residential, Commercial, and Industrial Damage Probabilities (Hurricane Wind)

OCCUPANCY TYPE	NO DAMAGE	MINOR DAMAGE	MODERATE DAMAGE	SEVERE DAMAGE	COMPLETE DAMAGE
50-YEAR RETURN PERIOD					
Residential	99%	0.5%	0.5%	0%	0%
Commercial	99%	0.5%	0.5%	0%	0%
Industrial	99%	0.5%	0.5%	0%	0%
100-YEAR RETURN PERIOD					
Residential	99%	0.5%	0.5%	0%	0%
Commercial	99%	0.5%	0.5%	0%	0%
Industrial	99%	0.5%	0.5%	0%	0%
200-YEAR RETURN PERIOD					
Residential	98%	1%	1%	0%	0%
Commercial	98%	1%	1%	0%	0%
Industrial	98%	1%	1%	0%	0%
500-YEAR RETURN PERIOD					
Residential	92%	7%	1%	0%	0%
Commercial	94%	5%	1%	0%	0%
Industrial	95%	4%	1%	0%	0%
1,000-YEAR RETURN PERIOD					
Residential	84%	13%	2.5%	0.5%	0%
Commercial	87%	10%	3%	0%	0%
Industrial	89%	9%	2%	0%	0%

Source: HAZUS-MH MR3

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Table 6-9 shows potential loss of use (in number of days) and damage state probabilities related to critical facilities for varying return periods ranging from a 50-year event to a 1,000-year event.

Based on the loss estimates and potential damage to critical facilities from a hurricane wind event, the impact would be limited, with less than 10 percent of residential, commercial and industrial property damage.

Table 6-9. Critical Facility Loss of Use and Damage State Probabilities (Hurricane Wind)

FACILITY TYPE	LOSS OF USE (DAYS)	MINOR DAMAGE	MODERATE DAMAGE	SEVERE DAMAGE	COMPLETE DAMAGE
50-YEAR RETURN PERIOD					
Emergency Operations	0	< 0.33%	0%	0%	0%
Fire Stations	0	< 1.35%	< 0.04%	0%	0%
Medical Care Facilities	0	< 0.55%	0%	0%	0%
Police Stations	0	< 0.60%	0%	0%	0%
Schools	0	< 1.36%	< 0.03%	0%	0%
100-YEAR RETURN PERIOD					
Emergency Operations	0	< 0.66%	0%	0%	0%
Fire Stations	0	< 2.97%	< 0.17%	0%	0%
Medical Care Facilities	0	< 1.10%	0%	0%	0%
Police Stations	0	< 1.55%	< 0.05%	0%	0%
Schools	0	< 2.96%	< 0.17%	0%	0%
200-YEAR RETURN PERIOD					
Emergency Operations	0	< 1.40%	< 0.03%	0%	0%
Fire Stations	</= 1	< 11.54%	< 2.77%	< 0.16%	0%
Medical Care Facilities	0	< 2.99%	< 0.12%	0%	0%
Police Stations	0	< 4.31%	< 0.45%	< 0.01%	0%
Schools	</= 1	< 11.41%	< 2.82%	< 0.15%	0%
500-YEAR RETURN PERIOD					
Emergency Operations	0	< 3.96%	< 0.26%	< 0.01%	0%
Fire Stations	</= 8	< 19.60%	< 10.47%	< 1.64%	0%
Medical Care Facilities	</= 2	< 12.29%	< 3.58%	< 0.17%	0%
Police Stations	</= 8	< 19.60%	< 10.47%	< 1.64%	0%
Schools	</= 8	< 20.57%	< 10.75%	< 1.69%	0%
1,000-YEAR RETURN PERIOD					
Emergency Operations	</= 2	< 11.68%	< 2.58%	< 0.13%	0%

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FACILITY TYPE	LOSS OF USE (DAYS)	MINOR DAMAGE	MODERATE DAMAGE	SEVERE DAMAGE	COMPLETE DAMAGE
Fire Stations	</= 18	< 23.49%	< 17.99%	< 5.07%	0%
Medical Care Facilities	</= 5	< 17.83%	< 7.86%	< 0.50%	0%
Police Stations	</= 18	< 23.49%	< 17.99%	< 5.07%	0%
Schools	</= 18	< 22.96%	< 18.42%	< 5.23%	0%

Source: HAZUS-MH MR3

Thunderstorm

Because thunderstorm events are not confined to specific geographic boundaries, all existing and future buildings, facilities and populations are considered to be exposed to this hazard and could potentially be impacted. It is important to note that only reported thunderstorms have been factored into this vulnerability assessment. As with hail, a stochastic model was developed to estimate exposure and losses. Table 6-10 shows the results in terms of potential annualized property losses for the city from a thunderstorm event.

Table 6-10. Potential Annualized Losses (Thunderstorm)

TOTAL EXPOSURE*	ANNUALIZED EXPECTED PROPERTY LOSSES	ANNUALIZED LOSS RATIO
\$23,858,922,856	\$3,101,220	0.01%

*Total Exposure is improved value of parcels in the City of Austin

Although the total annualized loss estimated for thunderstorms is slightly lower than the estimate for hurricane wind, the impact is minor. More than 10 percent of personal and commercial property could be damaged and critical facilities could be closed for more than one week.

Tornado

As with other atmospheric hazards, tornado events are not confined to specific geographic boundaries. Because all new and existing buildings could be exposed, a stochastic model was used to determine losses based on those reported to the NCDC. Table 6-11 shows potential annualized property losses the City of Austin could sustain from a tornado.

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Table 6-11. Potential Annualized Losses (Tornado)

TOTAL EXPOSURE*	ANNUALIZED EXPECTED PROPERTY LOSSES	ANNUALIZED LOSS RATIO
\$23,858,922,856	\$114,382	0.00%

*Total Exposure is improved value of parcels in the City of Austin

Warning time for the onset of a tornado is generally minimal, meaning 3 hours or less. The impact of tornadoes can be substantial. They can cause multiple deaths, completely shut down facilities for thirty days or more, and cause more than fifty percent of affected properties to be destroyed or suffer major damage.

Winter Storm

A non-linear regression of historical data was also used to estimate losses for winter storms (Table 6-12). Like tornadoes, thunderstorms and hail events, a winter storm is not confined to any specific geographic location.



Icicles on trees during a freezing rain event in Austin in Jan. 2007

Table 6-12. Potential Annualized Losses (Winter Storm)

TOTAL EXPOSURE*	ANNUALIZED EXPECTED PROPERTY LOSSES	ANNUALIZED LOSS RATIO
\$23,858,922,856	\$175,502	0.00%

*Total Exposure is improved value of parcels in the City of Austin

Warning time for winter storms is generally 6 to 12 hours. Winter storms for the City are generally mild. The severity of impact of winter storms is generally minor. Winter storms can cause injuries and completely shut down facilities for more than one week, and cause more than ten percent of affected properties to be destroyed or suffer major damage.

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Drought

Nineteen years of statistical data from the National Climatic Data Center (NCDC) and 2002 USDA agriculture data (for non-irrigated agriculture products) was used to analyze drought hazard risk and estimate potential losses at the county level.⁷ This analysis is based upon a total agricultural products exposure of \$17,116,000 yielding an annualized loss estimate (in dollars) of \$11,104,260 and a percent loss ratio of 64.88 percent for Travis County.

It is likely and worth noting that a large portion of this agricultural exposure is outside the City of Austin, but data does not currently exist to demonstrate this and indicate the exact percentage that should be allocated to the study area identified for this risk assessment. It is also important to mention that many historical drought occurrences are recorded at a regional level as droughts typically impact large geographic areas. This adds another layer of difficulty in isolating specific figures for a municipal-level study. Therefore, while the annualized loss estimate and ratio presented above are valid for Travis County as a whole, drought vulnerability for the City of Austin would be much lower.



Droughts are slow onset hazards. Warning time for drought is long, since drought events take place over long periods of time. Drought warnings are issued by the State Drought Preparedness Council, as directed by H.B. 2660, based upon input from NOAA, the Office of the State Climatologist, the U.S. Geological Service, the Texas Water Development Board, Texas Commission on Environmental Quality and the Texas Agricultural Statistics Service. Warnings utilize five “levels of concern” and take into account assessments of

⁷ This analysis was conducted at the county level due to data limitations (inherent with drought information) and to remain consistent with prevailing methodologies for assessing drought hazard risk. This county-level assessment is also consistent with information presented in the regional risk assessment conducted for the Texas Colorado River Floodplain Coalition.

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climatology, agriculture, and water availability.

The potential impact of drought is “Minor” resulting in few, if any, injuries. There is only minor property damage and minimal disruption to the quality of life. Any shutdown of facilities is temporary.

Flood

In order to assess exposure to the flood hazard, digital flood hazard data was compared with census block data and parcel information provided by the city to determine the total estimated population, total estimated number of parcels, and total improved value of parcels intersecting three flood hazard areas. The three flood hazard areas analyzed consist of the 1-percent-annual-chance flood hazard (based on mapped A and AE Zones), the 0.2-percent-annual-chance flood hazard, and the areas marked as “X protected by levee.” Table 6-13 shows the results of each analysis.

Table 6-13. Estimated Exposure of People and Parcels (Inland Flooding)

TOTAL ESTIMATED POPULATION IN CITY	TOTAL ESTIMATED NUMBER OF PARCELS IN CITY*	TOTAL IMPROVED VALUE OF PARCELS IN CITY	AT-RISK		
			Number of People At Risk**	Number of Parcels At Risk*	Value of Parcels At Risk
X PROTECTED BY LEVEE					
691,986	40,352	\$23,858,922,856	1,565	40	\$3,509,919
1-PERCENT-ANNUAL-CHANCE FLOOD HAZARD					
691,986	40,352	\$23,858,922,856	238,921	3,499	\$3,764,782,382
0.2-PERCENT-ANNUAL-CHANCE FLOOD HAZARD					
691,986	40,352	\$23,858,922,856	242,405	3,333	\$3,615,198,810
POTENTIAL AT-RISK TOTALS			482,891	6,872	\$7,383,491,111

* With improved values only.

** It is important to note that these results are not mutually exclusive, as some census blocks may intersect more than one flood zone, and therefore the population of that census block may be counted with each flood zone that it intersects. It is also important to note that this reflects more of a nighttime population than a daytime population as the census estimates are based on place of residence.

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The HAZUS analysis conducted for the flood hazard (which applies to the following three tables) was performed at the census block level. Table 6-14 shows potential annualized property losses by occupancy type resulting from this analysis and Table 6-15 shows the annualized loss ratio.

Table 6-14. Potential Annualized Losses (Inland Flooding)

OCCUPANCY TYPE	TOTAL	BUILDING	CONTENTS	OTHER
Residential	\$134,740	\$82,590	\$51,453	\$697
Commercial	\$847,373,146	\$847,338,322	\$32,569	\$2,255
Industrial	\$11,822	\$3,570	\$6,834	\$1,418
Agricultural	\$1,133	\$399	\$557	\$177
Religious/Non-Profit	\$5,678	\$1,521	\$4,112	\$45
Government	\$10,032	\$2,585	\$5,244	\$2,203
Education	\$3,661	\$894	\$2,625	\$142
TOTALS	\$847,540,212	\$847,429,881	\$103,394	\$6,937

Source: HAZUS-MH MR3

Table 6-15. Annualized Loss Ratio (Inland Flooding)

TOTAL EXPOSURE*	ANNUALIZED EXPECTED PROPERTY LOSSES	ANNUALIZED PERCENT LOSS RATIO
\$23,858,922,856	\$847,429,881	3.55%

*Total Exposure is improved value of parcels in the City of Austin

Table 6-16 shows damage probabilities for residential, commercial, and industrial occupancy types for the 1-percent-annual-chance flood event and the 0.2-percent-annual-chance flood event. For flood analysis, residential building stock is further broken down into the categories of pre-FIRM and post-FIRM. A pre-FIRM structure is one that was built prior to the effective date of the first Flood Insurance Rate Map (FIRM) for a community and is therefore considered to be more likely to be vulnerable to the flood hazard (assuming that the structure would have been built prior to the community enacting comprehensive floodplain management regulations through the National Flood Insurance Program). In the case of the City

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of Austin, 1981 was used as the threshold for pre-FIRM designation as that is the date of the community’s first FIRM.⁸

Table 6-16. Damaged Building Counts by General Occupancy (Inland Flooding)

OCCUPANCY TYPE*	TOTAL IN HAZARD AREA	NUMBER OF BUILDINGS IN EACH DAMAGE PERCENTAGE RANGE									
		1 TO 10%	11 TO 20%	21 TO 30%	31 TO 40%	41 TO 50%	51 TO 60%	61 TO 70%	71 TO 80%	81 TO 90%	91 TO 100%
1-PERCENT-ANNUAL-CHANCE FLOOD HAZARD											
Residential (Pre-FIRM)	4,315	0	95	684	307	1,536	995	5	54	177	41
Residential (Post-FIRM)	2,719	0	37	374	174	705	791	11	84	178	58
Commercial	44	0	8	1	4	9	8	6	6	0	0
Industrial	3	0	0	0	0	0	0	3	0	0	0
Government	19	0	2	0	0	0	0	0	0	9	8
Education	0	0	0	0	0	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0	0	0	0	0	0
0.2-PERCENT-ANNUAL-CHANCE FLOOD HAZARD											
Residential (Pre-FIRM)	5,296	0	53	589	363	2,031	1,679	12	49	144	129
Residential (Post-FIRM)	3,389	0	42	420	186	914	1,065	14	102	242	119
Commercial	74	0	9	6	0	2	10	15	29	3	0
Industrial	8	0	0	0	0	2	0	5	1	0	0
Government	36	0	8	7	0	0	1	1	1	1	17
Education	1	0	0	0	0	0	0	0	0	0	1
Agriculture	2	0	0	0	0	0	0	0	0	1	1

Source: HAZUS-MH MR3

When the loss estimation analysis was conducted through HAZUS-MH for the City for the 1-percent-annual-chance flood event and the 0.2-percent-annual-chance flood event, results indicated that there would not be a potential economic impact to essential facilities. This should not, however, be used to assume that damages or interruption of operation is not possible during an actual flood event, merely that

⁸ According to the NFIP Community Status Book.

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the HAZUS-MH analysis did not provide indication of potential monetary losses based on the scenarios run.

Major flooding and flash flooding events would have a “Substantial” severity of impact as floods can cause multiple deaths, completely shut down facilities for thirty days or more, and cause more than fifty percent of affected properties to be destroyed or suffer major damage.

Repetitive Loss Properties

There are 111 repetitive loss properties associated with the City of Austin (See Table 7-2 in Section 7). A repetitive loss property, as defined and tracked by the NFIP and FEMA, is any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period, since 1978.

A repetitive loss property may or may not be currently insured by the NFIP. According to City of Austin records, 21 of these 111 properties have been mitigated, leaving 90 properties presumably still at risk to future floods.



Congress Avenue during the historic floods in 1935

Wildfire

Table 6-17 also shows the number of parcels with improved values exposed to the wildfire hazard and an estimate of those values.

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Table 6-17. Estimated Exposure of People and Parcels (Wildfire)

TOTAL ESTIMATED POPULATION IN CITY	TOTAL ESTIMATED NUMBER OF PARCELS*	TOTAL IMPROVED VALUE OF PARCELS	AT-RISK		
			Number of People At Risk	Number of Parcels At Risk*	Value of Parcels At Risk
691,986	40,352	\$23,858,922,856	449,567	17,883	\$12,595,745,820

* With improved values only.



As described in Section 5, risk of wildfire varies considerably by month. Warning time for wildfire events is often minimal or none.

The severity of impact of major wildfire events can be substantial. Such events can cause multiple deaths, completely shut down facilities for thirty days or more, and cause more than fifty percent of affected properties to be destroyed or suffer major damage.

Infectious Disease

Estimated potential losses are difficult to calculate because infectious disease causes little damage to the built environment and damages generally are experienced through public health response and medical costs as well as lost wages by patients.

Therefore, it is assumed that all buildings and facilities are exposed to disease but would experience negligible damage in the occurrence of an outbreak. For example, upkeep and maintenance of buildings and facilities would fall behind due to the high absenteeism of employees or the closing of facilities. The costs to the public health sector, however, in

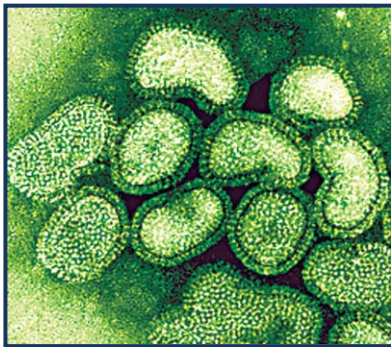


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terms of responding to an outbreak as well as impact to health as a whole, may be substantial.

Even though a pandemic event would affect mainly people, critical infrastructure services, such as emergency services, utility services, water services and telecommunications can be limited by an event. With the 2009 H1N1 pandemic, most of the people affected will have mild illness and not require hospitalization. People at the highest risk for developing complications from H1N1 include children younger than 5, adults 65 year of age and older and pregnant women. People who have medical conditions such as:

asthma, heart disease; chronic lung disease; blood, endocrine, kidney, liver or metabolic disorders; or a weakened immune system, can experience a worsening of existing conditions if they contract the H1N1 virus.



It is still yet to be determined how the 2009 H1N1 pandemic will impact not only the City, but also the state and nation. Each community is facing the challenge of limited vaccines, antiviral supplies and managing the demands of health-care resources.

Dam Failure

Total exposure to the dam failure hazard was estimated using Census 2000 population data from HAZUS-MH MR3 (at the census block level) and parcel data from the City of Austin, in combination with the location and maximum storage capacity of high hazard dams (Table 6-18). For high hazard dams with a maximum storage capacity of 100,000 acre-feet or more (i.e., Mansfield Dam), all census blocks within 5 miles were considered to be at risk to potential dam failure hazards.⁹ For high hazard dams with a maximum storage capacity between 10,000 and 100,000 acre-feet (i.e., Decker Lake Dam and Tom Miller Dam), all census blocks within 3 miles were considered to be at risk to potential dam failure hazards. For significant hazard dams with a maximum storage capacity of less than 10,000 acre-feet (i.e.,

⁹ It is important to note that Mansfield Dam is located outside the incorporated area of Austin covered in this risk assessment. Therefore, despite the larger buffer area of 5 miles used in the analysis, a smaller number of people and parcels have been determined to be at potential risk compared to the other buffer areas due to the dam's location and the limited number of census blocks and parcels that the buffer area intersects.

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Longhorn Dam), all census blocks within 1 mile were considered to be at risk to potential dam failure hazards.

Table 6-18. Estimated Exposure of People and Parcels (Dam Failure)

TOTAL ESTIMATED POPULATION IN CITY	TOTAL ESTIMATED NUMBER OF PARCELS IN CITY*	TOTAL IMPROVED VALUE OF PARCELS IN CITY	AT-RISK		
			Number of People At Risk	Number of Parcels At Risk*	Value of Parcels At Risk
SIGNIFICANT HAZARD DAM (<10,000 AF): 1-MILE BUFFER AREA					
691,986	40,352	\$23,858,922,856	19,756	980	\$322,914,081
HIGH HAZARD DAMS (10,000 TO 100,000 AF): 3-MILE BUFFER AREA					
691,986	40,352	\$23,858,922,856	78,604	4,435	\$3,296,180,958
HIGH HAZARD DAM (>100,000 AF): 5-MILE BUFFER AREA					
691,986	40,352	\$23,858,922,856	4,636	161	\$618,143,069
POTENTIAL AT-RISK TOTALS			102,996	5,576	\$4,237,238,108

Source: GIS Analysis

* With improved values only.

In the unlikely event of a failure of a major dam, the severity of impact could be substantial. It could cause multiple deaths, completely shut down facilities for thirty days or more, and cause more than fifty percent of affected properties to be destroyed or suffer major damage.

Flooding-related dam failure would most likely occur during the months of spring and fall, which are more susceptible to flood conditions. Warning time for dam failure, or the potential speed of onset, varies with the causes of dam failure, but is estimated to be three to six hours of warning.

Hazardous Materials Release

Table 6-19 uses census block data to estimate toxic release exposure of people and parcels by jurisdiction for fixed sites. Primary and secondary impact distances were selected based on guidance from FEMA 426, *Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings* and engineering judgment. Because many sites containing hazardous materials are located in densely populated areas, there are population and structures that could be susceptible to a release from more than one site.

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Table 6-19. Estimated Exposure of People and Parcels (Fixed Site Toxic Release)

TOTAL ESTIMATED POPULATION IN CITY	TOTAL ESTIMATED NUMBER OF PARCELS IN CITY*	TOTAL IMPROVED VALUE OF PARCELS IN CITY	AT-RISK		
			Number of People At Risk	Number of Parcels At Risk*	Value of Parcels At Risk
PRIMARY IMPACT AREA (500-METERS)					
691,986	40,352	\$23,858,922,856	127,808	3,748	\$7,273,904,762
SECONDARY IMPACT AREA (2,500-METERS)**					
691,986	40,352	\$23,858,922,856	474,991	31,047	\$13,379,398,057
POTENTIAL AT-RISK TOTALS			602,799	34,795	\$20,653,302,819

Source: GIS Analysis

* With improved values only.

** Does not include primary impact area.

Table 6-20 shows the estimated exposure of people and parcels to the mobile toxic release hazard.

Table 6-20. Estimated Exposure of People and Parcels (Mobile Toxic Release—Highway and Rail)

TOTAL ESTIMATED POPULATION IN CITY	TOTAL ESTIMATED NUMBER OF PARCELS IN CITY*	TOTAL IMPROVED VALUE OF PARCELS IN CITY	AT-RISK		
			Number of People At Risk	Number of Parcels At Risk*	Value of Parcels At Risk
PRIMARY IMPACT AREA (500-METERS)					
691,986	40,352	\$23,858,922,856	324,881	15,183	\$12,342,375,145
SECONDARY IMPACT AREA (2,500-METERS)**					
691,986	40,352	\$23,858,922,856	339,170	23,915	\$9,849,776,031
POTENTIAL AT-RISK TOTALS			664,051	39,098	\$22,192,151,176

Source: GIS Analysis

* With improved values only.

** Does not include primary impact area.

Hazardous materials or toxic releases can have a substantial impact. Such events can cause multiple deaths, completely shut down facilities for thirty days or more, and cause more than fifty percent of affected properties to be destroyed or suffer major damage.

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Pipeline Failure

Tables 6-21 and 6-22 show total numbers of population and parcels at risk from gas and oil pipeline accidents, respectively. The analysis for gas pipelines consists of liquid petroleum gas and natural gas. The analysis for oil pipelines consists of crude oil and natural gas liquids. The immediate (primary) area of impact for both types of pipeline accidents is a 500-meter buffer. The secondary area of impact for both types of pipeline accidents is a 2,500-meter buffer.

Table 6-21. Potential Impact Due to Gas Pipeline Accidents

TOTAL ESTIMATED POPULATION IN CITY	TOTAL ESTIMATED NUMBER OF PARCELS IN CITY*	TOTAL IMPROVED VALUE OF PARCELS IN CITY	AT-RISK		
			Number of People At Risk	Number of Parcels At Risk*	Value of Parcels At Risk
PRIMARY IMPACT AREA (500-METERS)					
691,986	40,352	\$23,858,922,856	147,312	6,235	\$3,402,309,092
SECONDARY IMPACT AREA (2,500-METERS)**					
691,986	40,352	\$23,858,922,856	267,232	18,891	\$9,613,287,442
POTENTIAL AT-RISK TOTALS			414,544	25,126	\$13,015,596,534

Source: GIS Analysis

* With improved values only.

** Does not include primary impact area.

Table 6-22. Potential Impact Due to Oil Pipeline Accidents

TOTAL ESTIMATED POPULATION IN CITY	TOTAL ESTIMATED NUMBER OF PARCELS IN CITY*	TOTAL IMPROVED VALUE OF PARCELS IN CITY	AT-RISK		
			Number of People At Risk	Number of Parcels At Risk*	Value of Parcels At Risk
PRIMARY IMPACT AREA (500-METERS)					
691,986	40,352	\$23,858,922,856	25,013	1,034	\$295,806,413
SECONDARY IMPACT AREA (2,500-METERS)**					
691,986	40,352	\$23,858,922,856	83,735	5,431	\$1,497,610,823
POTENTIAL AT-RISK TOTALS			108,748	6,465	\$1,793,417,236

Source: GIS Analysis

* With improved values only.

** Does not include primary impact area.

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Terrorism

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



Terrorist events can have a substantial severity of impact. They can cause multiple deaths, completely shut down facilities for thirty days or more, and cause more than fifty percent of affected properties to be destroyed or suffer major damage.

Development Trends

The Austin skyline has seen many recent additions with numerous condominium complexes that have sprung up in recent years—a testament to the City’s Smart Growth planning that steered development into the urban core and away from the environmentally sensitive western realm.

According to a Comprehensive Housing Market Study submitted in March 2009 to the City of Austin Neighborhood Housing & Community Development department¹⁰, Austin’s growth is expected to continue and will put pressure on housing supply. According to the study, Austin has a “very large need for affordable rentals” and it is predicted that by 2020 the City will need to have developed 12,000 rental units (1,000 per year) priced at an affordable monthly rate to meet the growing needs of low income renters.

¹⁰ Comprehensive Housing Market Study Final Report prepared for City of Austin Neighborhood Housing & Community Development by BBC Research & Consulting and submitted March 3, 2009 (http://www.ci.austin.tx.us/housing/downloads/austin_comprehensive_housing_market_study.pdf).

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In general, the study indicates that the City is at a critical juncture with regard to choosing how to address its existing and future housing needs and that there are essentially three ways of dealing with the city’s projected growth: intentional “slow growth,” increased density, and increased sprawl. Slow growth means Austin can intentionally slow down growth within its city limits and rely on communities outside of Austin to fill the demand for new housing. Increased density would mean that Austin could grow denser to accommodate increased housing demand. Increased sprawl would mean that Austin could grow out to accommodate increased housing demand, as long as developable land is available.

Hazard Ranking

Economic loss results are presented in Table 6-27 using Annualized Loss (AL) estimates (the estimated long-term value of losses to the general building stock in any single year in a specified geographic area) and Annualized Loss Ratios (ALRs) (which represent the AL as a fraction of the replacement value of the local inventory). The AL addresses the two key components of risk: the probability of the hazard occurring in the study area and the consequences of the hazard, largely a function of building construction type and quality, and of the intensity of the hazard event. By annualizing estimated losses, the AL factors in historic patterns of frequent smaller events with infrequent but larger events to provide a balanced presentation of the risk. The ALR gauges the relationship between average annualized loss and replacement value.

Table 6-27. Summary of Annualized Loss Estimates and Annualized Loss Ratios

HAZARD	ANNUALIZED LOSS ESTIMATE	ANNUALIZED LOSS RATIOS
Hail	\$42,517,506	0.18%
Hurricane Wind	\$4,296,500	0.02%
Inland Flooding	\$847,429,881	3.55%
Thunderstorm	\$3,101,220	0.01%
Tornado	\$114,382	0.00%
Winter Storm	\$175,502	0.00%

Hazard ranking depends on the severity, area of impact, and probability of occurrence (return period). Table 6-28 provides the hazard ranking for each hazard.

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Each hazard was given a rating of high (H), moderate (M), low (L), very low (VL), or not applicable (N/A) based on how vulnerable the City of Austin is to that hazard. The rating of N/A was used if the results for loss or potential impacts were zero. The rating is based on a combination of factors such as population and building exposure, or annualized loss (or ALRs) when available.

The ranking of hazards was based on a review of historical incidents, existing plans, and risk assessment results. ALRs were considered in the development of the ratings for hail, hurricane wind, inland flooding, thunderstorm, tornado, and winter storm hazards. Potential impacts were considered in the development of ratings for dam failure, HAZMAT release, fuel pipeline failure, and wildfire.

Table 6-29 portrays the results of the City’s self assessment for hazard ranking based on the preliminary results of the risk assessment as presented at the Risk Assessment Workshop in April, 2009. This table also takes into account local knowledge regarding previous occurrences and impact. Because Table 6-29 is not limited to loss results, the following additional hazards are included: infectious disease; extreme heat; and terrorism.

Table 6-28. Hazard Risk Ranking - ALR

HAZARD	RANKING
Inland Flooding**	H
Wildfire***	H
Dam Failure**	M
Hail*	M
HAZMAT***	M
Hurricane Wind*	M
Drought**	L
Pipeline***	L
Thunderstorm*	L
Tornado*	L
Winter Storm***	L

* ALR considered for ranking.

** Exposure considered for ranking.

***Potential impact considered for ranking.

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Table 6-29. Hazard Risk Ranking – City Assessment

HAZARD	RANKING
Inland Flooding	H
Wildfire	H
Hail	H
Infectious Disease (Pandemic)	M
Tornado	M
HAZMAT	M
Pipeline	M
Hurricane Wind	M
Winter Storm	M
Terrorism	M
Drought	L
Thunderstorm	L
Extreme Heat	L
Dam Failure	L

CAPABILITY

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Description

A capability assessment is an analysis tool distributed to each community in the form of a survey, the results of which are used to:

- Inventory a jurisdiction’s relevant plans, programs and ordinances;
- Identify shortfalls or weaknesses that could hinder mitigation actions;
- Implement a comprehensive mitigation strategy;
- Identify opportunities for establishing or enhancing mitigation policies, programs or projects; and
- Establish goals based on an understanding of the organizational capacity and technical capability of a community.

In addition to providing an inventory of the jurisdiction’s programs and plans in place, the capability assessment also helps communities to prioritize actions through an analysis of the social, technical, administrative, political, legal, economic and environmental considerations, collectively known as “STAPLEE” evaluation criteria. This evaluation criteria helps determine if mitigation actions are practical and likely to be implemented over time given the local planning and regulatory framework, level of administrative and technical support, amount of fiscal resources and current political climate. Further, a capability assessment highlights the positive mitigation measures already in place or being implemented at the local government level, which should continue to be supported and enhanced through future mitigation efforts.

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The capability assessment serves as a critical planning step and integral part of the foundation for designing an effective hazard mitigation strategy. When combined with the Risk Assessment, the Capability Assessment helps planning team members to specify mitigation actions and ensure that those actions are achievable given current capabilities and limitations.

Process

During the Kickoff Workshop, a detailed Capability Assessment Survey was distributed to planning team members. The survey requested information regarding existing local plans, policies, programs or ordinances that contribute to and/or hinder the ability to implement hazard mitigation actions. Other indicators included information related to each jurisdiction’s fiscal, administrative and technical capabilities, such as access to local budgetary and personnel resources for mitigation purposes. Survey respondents were also asked to comment on the current political climate with respect to hazard mitigation.

The results of the survey provide an inventory of existing plans and ordinances for the City of Austin. In addition planning team members ranked the city’s specific capabilities in a self-assessment, which is shown at Table 7-2. This allows for the identification of any gaps or weaknesses.

Assessment Findings

The findings of the capability assessment are summarized in this Plan Update to provide insight into the relevant capacity of the City of Austin to implement hazard mitigation activities. While the city has a multitude of plans and planning mechanisms in place, the focus for this survey is to identify those areas where mitigation activities could be incorporated, or where other planning mechanisms and goals can be integrated into the Plan Update. All information is based upon the input provided by planning team members through the Capability Assessment Survey.

Planning and Regulatory Capability

Planning and regulatory capability is based on the implementation of plans, ordinances and programs that demonstrate the City’s commitment to guiding and managing growth, development and redevelopment in a responsible manner, while maintaining the general welfare of the community. It includes emergency response and mitigation planning and comprehensive land use planning as well as plans to

Section 7 – Capability Assessment

protect environmental, historic and cultural resources in the community. These planning initiatives present significant opportunities to integrate hazard mitigation principles and practices into the local decision making process.

Hazard Mitigation Action Plan (HMAP)

A Hazard Mitigation Action Plan (HMAP) represents a community’s blueprint for how they intend to reduce the impact of natural and human-caused hazards on people and the built environment. Elements of a hazard mitigation plan include a risk assessment, capability assessment and mitigation strategy. In 2003 the Austin City Council approved the first HMAP for the City entitled, “Disaster Ready Austin: Building a Safe, Secure and Sustainable Community.” FEMA approved the City’s HMAP in 2004, which was one of the first plans to be approved for Texas. The City began the process of updating the plan in 2009.

Disaster Recovery Plan

A Disaster Recovery Plan serves to guide the physical, social, environmental and economic recovery of a community, including the physical reconstruction process following a disaster. The City currently has a Disaster Recovery Plan in place.

Emergency Operations Plan

An Emergency Operations Plan outlines the responsibilities of those responding to an emergency or disaster and the means by which resources are deployed. The City of Austin has an Emergency Operations Master Plan in place, which is overseen by the Office of Homeland Security and Emergency Management (HSEM). As part of this effort, the City also has an Evacuation Plan.

Continuity of Operations Plan (COOP)

A Continuity of Operations Plan establishes a clear chain of command, line of succession, and plans for backup or alternate emergency facilities in case of an extreme emergency or disaster. The City has a COOP in place.

Comprehensive Plan

A Comprehensive Plan establishes the overall vision for a community and helps to guide municipal decision making. The City has a comprehensive plan in place and is currently in the process of updating the plan¹.

¹ Updates can be found at:
<http://www.ci.austin.tx.us/compplan/>

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Capital Improvement Plan

A Capital Improvement Plan guides the scheduling of spending on public improvements. A Capital Improvement Plan can serve as an important mechanism to guide future development away from identified hazard areas. Limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments. Survey results indicate that the City has a Capital Improvement Plan.

Historic Preservation Plan

A historic preservation plan is intended to preserve historic structures or districts within a community. An overlooked aspect of the historic preservation plan is the assessment of buildings and sites located in areas subject to natural hazards to identify the most effective way to reduce future damages.² This may involve retrofitting or relocation techniques that account for the need to protect buildings that do not meet current building standards or are within a historic district that cannot easily be relocated out of a hazard-prone area. The City of Austin has a historic preservation plan, which is overseen by the City of Austin Historic Preservation Office (CHPO). The CHPO protects and enhances neighborhoods, buildings and sites that reflect elements of Austin’s cultural, social, economic, political and architectural history.



Floodplain Management Capability

Flooding represents the greatest natural hazard facing the City of Austin. At the same time, the tools available to reduce the impacts associated with flooding are among the most developed when compared to other hazard-specific mitigation techniques. In addition to the Floodplain Management Plan and Floodplain Ordinance, which provide a framework for corrective and preventative actions, the City has also established similar projects and programs under the broad goal of reducing flood-related impacts.

² See Protecting the Past from Natural Disasters. 1989. Nelson, Carl. National Trust for Historic Preservation: Washington, D.C.

Section 7 – Capability Assessment

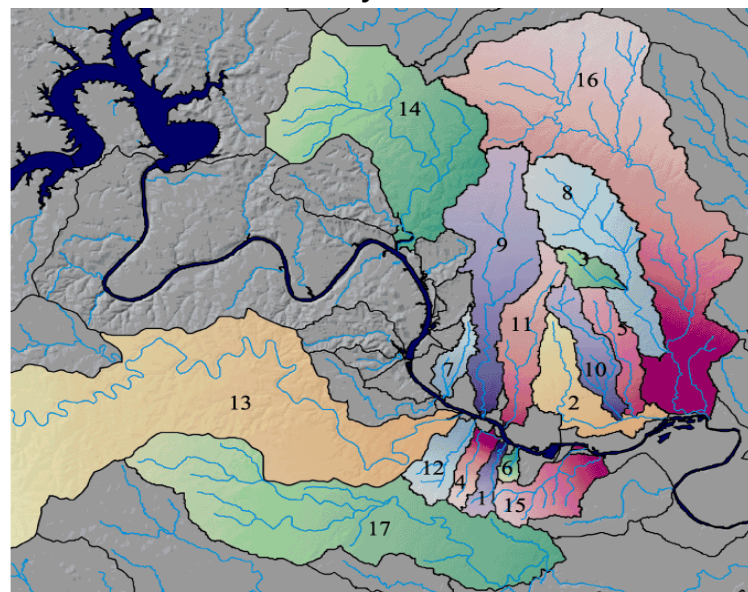
Stormwater Management Program

Stormwater management is typically focused on design and construction measures intended to reduce the impact of more frequently occurring minor urban flooding. The City of Austin follows a Stormwater Management Program that provides for the planning and design of drainage improvements to further protect against floods.

Watershed Protection Master Plan

The City of Austin Watershed Protection Department³ developed a Watershed Protection Master Plan in 2001. The purpose of this effort was to assess flood, erosion and water quality issues for seventeen watersheds throughout the City under the overarching goal of protecting lives, property and the environment. Figure 7-1 illustrates the locations of the watersheds that will be assessed in the plan. The Stream Restoration Program was developed for erosion control services including stream stability and planning to address erosion issues identified in the Watershed Protection Master Plan.

Figure 7-1. Austin Watershed Study Area – Watershed Protection Master Plan



URBAN WATERSHEDS		NON URBAN WATERSHEDS
1. BLUNN (BLU)	7. JOHNSON (JOH)	13. BARTON (BAR)
2. BOGGY (BOG)	8. LITTLE WALNUT (LWA)	14. BULL (BUL)
3. BUTTERMILK (BMK)	9. SHOAL (SHL)	15. COUNTRY CLUB (CNT)
4. EAST BOULDIN (EBO)	10. TANNEHILL (TAN)	16. WALNUT (WLN)
5. FORT BRANCH (FOR)	11. WALLER (WLR)	17. WILLIAMSON (WMS)
6. HARPER'S BRANCH (HRP)	12. WEST BOULDIN (WBO)	

³ More information is available at: <http://www.ci.austin.tx.us/watershed/masterplan.htm>

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Flood Response

In order to develop proactive remediation measures to minimize flood hardships and losses, the City of Austin has established a Flood Early Warning System (FEWS). FEWS is designed to monitor rainfall and water levels daily, providing real time gauge data⁴. If the data indicates a potential for flooding, the Office of Homeland Security and Emergency Management (HSEM) is immediately notified and appropriate actions are taken.

National Flood Insurance Program and Community Rating System

The City of Austin participates in the National Flood Insurance Program (NFIP)⁵ to allow citizens to purchase flood insurance. As an additional indicator of floodplain management responsibility, the City participates 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. CRS mitigation activities are given a range of point values. As communities complete these activities they are given a rating from 10 to 1, which results in a reduction of flood insurance (See Table 7-1). The city’s current rating is 7, which allows citizens up to a 15 percent reduction in flood insurance costs.

Table 7-1. CRS Premium Discounts

CRS Rating	Premium Deduction
1	45%
2	40%
3	35%
4	30%
5	25%
6	20%
7	15%
8	10%
9	5%
10	0

⁴ Rainfall totals by gauge are provided at: <http://www.ci.austin.tx.us/fews/rainfall.cfm>

⁵ For mitigation actions regarding the NFIP, see Table 7-3.

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Repetitive Loss

The Severe Repetitive Loss (SRL) Grant Program under FEMA provides federal funding to assist states and communities in implementing mitigation measures to reduce or eliminate the long-term risk of flood damage to severe repetitive loss residential structures insured under the NFIP. The Texas Water Development Board (TWDB) administers the SRL grant program for the State of Texas.

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

- covered under the NFIP and have at least four (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
- for which at least two (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 two (2) of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart.⁶ Table 7-2 shows repetitive loss and severe repetitive loss properties for the City.

Table7-2. Repetitive Loss and Severe Repetitive Loss Properties

Repetitive Loss #	Insured?	Building Type	Losses	Total Paid	Severe Repetitive Loss ⁷	Comments
0013093	Y	Residential	3	7,038.58		Under Flood Control Program
0117248	N	Commercial	2	27,499.86		
0068359	N	Commercial	2	47,942.80		
0100249	Y	Residential	3	6,823.20		
0043590	N	Residential	2	11,481.40		
0025371	N	Commercial	2	42,124.04		Acquisition/Demolition Program
0117262	Y	Commercial	2	8,090.87		
0025370	N	Commercial	3	158,416.35		Acquisition/Demolition Program

⁶ Source: Texas Water Development Board

⁷ In this column: “V” stands for “Validated”; “VN” stands for “Validated Nonresidential”; and “PN” stands for “Pending Nonresidential”.

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Repetitive Loss #	Insured?	Building Type	Losses	Total Paid	Severe Repetitive Loss ⁷	Comments
0117118	N	Residential	2	21,331.97		
0068360	N	Residential	3	17,573.40		
0117258	N	Commercial	2	50,403.08		
0050833	N	Residential	2	9,539.18		
0098519	Y	Residential	3	33,839.82		
0049197	Y	Commercial	3	87,217.30		
0137098	Y	Residential	2	32,751.22		
0137099	Y	Residential	2	42,613.02		
0119229	Y	Residential	2	221,765.95		
0117340	Y	Residential	2	6,125.68		
0164009	Y	Residential	2	39,169.67		
0169351	Y	Residential	2	39,472.69		
0122442	Y	Residential	2	11,711.85		
0100248	N	Residential	2	5,274.53		
0003548	N	Residential	2	3,721.91		Acquisition/Demolition Program- Vacant Lot
0099467	N	Residential	2	6,735.82		Acquisition/Demolition Program- Vacant Lot
0117155	Y	Residential	2	71,377.89		
0132888	Y	Residential	2	8,432.92		
0118364	N	Residential	4	38,227.55		
0117298	Y	Residential	2	69,004.91		
0128362	Y	Commercial	3	22,321.36		
0073496	N	Residential	3	35,791.61		
116927	Y	Residential	2	28,868.32		
0117375	N	Residential	2	58,183.70		
0097238	Y	Residential	2	22,398.68		
0100242	N	Residential	2	3,675.77		
0099462	N	Residential	3	58,226.75		
0117087	N	Residential	2	36,863.38		
0117347	N	Residential	2	28,038.36		
0098972	Y	Residential	3	68,306.95		
0117333	Y	Residential	2	20,421.75		
0099387	N	Residential	2	24,297.46		Acquisition/Demolition Program- Retention Pond
0097471	N	Residential	3	58,876.66		Acquisition/Demolition Program- Retention Pond
0099388	N	Commercial	2	21,201.85		Acquisition/Demolition Program- Retention Pond
0117427	Y	Residential	2	41,200.26		

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Repetitive Loss #	Insured?	Building Type	Losses	Total Paid	Severe Repetitive Loss ⁷	Comments
0117123	Y	Residential	2	53,321.47		
0117367	Y	Residential	2	20,433.64		
0103555	Y	Residential	2	7,284.35		
0101012	Y	Residential	2	15,831.72		
0135634	Y	Residential	2	136,428.21		
0132887	N	Residential	2	8,959.29		
0050551	Y	Residential	2	3,563.00		
0050479	N	Residential	2	6,698.13		
0117079	N	Residential	3	7,724.62		
0117119	Y	Residential	2	66,193.66		
0117150	Y	Residential	2	51,561.24		
0117086	N	Residential	2	11,116.01		
0025485	N	Commercial	5	427,106.14		Duplicated with RL #133507
0133507	Y	Commercial	2	68,255.56		Duplicated with RL #0025485
0025811	SDF ⁸	Commercial	4	109,562.13	VN	
0117602	N	Commercial	2	20,024.74		
0068355	N	Residential	4	121,788.66		
0068356	N	Commercial	3	98,386.33		
0117247	Y	Commercial	2	61,987.80		
0003594	N	Commercial	2	15,546.84		
0100245	Y	Commercial	4	66,527.39		
0057578	N	Commercial	2	102,119.59		Flood Proofed to the Base Flood Elevation (BFE)
0117387	N	Residential	2	10,282.68		
0025898	Y	Residential	5	32,644.96		
0106759	Y	Residential	3	28,767.88		
0117796	Y	Residential	2	17,155.24		
0169628	Y	Residential	2	29,996.57		
0117178	N	Residential	2	110,693.49		
0068345	N	Residential	3	79,714.67		Acquisition/Demolition Program- Vacant Lot
0100241	N	Residential	2	65,891.04		Acquisition/Demolition Program- Vacant Lot
0117151	N	Residential	2	11,331.38		
0117266	Y	Residential	2	98,125.20		
0025680	N	Residential	2	16,060.56		

⁸ Special Direct Facility (SDF) services severe repetitive loss properties separate from other NFIP policies.

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Repetitive Loss #	Insured?	Building Type	Losses	Total Paid	Severe Repetitive Loss ⁷	Comments
0098425	Y	Residential	3	16,805.29		
0025468	Y	Residential	2	13,226.60		
0134836	Y	Residential	2	3,014.38		
0068350	N	Residential	3	59,490.90		
0117426	Y	Residential	2	140,845.13		
0099316	N	Residential	3	147,986.55		
0096807	Y	Residential	3	88,511.34		
0133511	Y	Residential	2	87,378.92		
0026774	N	Commercial	2	2,421.34		
0139837	Y	Residential	2	184,808.46		
0137453	N	Residential	2	38,054.74		
0026570	SDF	Residential	6	127,612.31	V	
0068361	N	Residential	2	68,315.63		Acquisition/Demolition Program- Vacant Lot
0050443	N	Residential	2	4,093.03		Under Flood Control Program
0012972	Y	Residential	4	64,804.03		Under Flood Control Program
0048789	N	Residential	3	69,525.27		Under Flood Control Program
0025716	N	Residential	2	22,140.86		Under Flood Control Program
0118851	Y	Residential	2	39,733.60		
0049049	N	Residential	2	6,436.20		Acquisition/Demolition Program- Vacant Lot
0100244	N	Residential	2	38,036.00		Acquisition/Demolition Program- Vacant Lot
0049050	N	Residential	3	13,286.59		Acquisition/Demolition Program- Vacant Lot
0049944	N	Residential	4	28,403.62		Under Flood Control Program
0050380	N	Residential	2	18,362.51		Under Flood Control Program
0121978	N	Residential	4	24,331.66		
0050022	N	Commercial	2	3,057.71		Under Flood Control Program
0025566	N	Residential	2	10,787.58		Under Flood Control Program
0081313	SDF	Commercial	8	161,533.54	VN	
0050424	N	Commercial	2	29,306.75		Vacant Lot
0050399	N	Residential	2	79,366.00		Vacant Lot
0050425	N	Commercial	2	11,800.40		Vacant Lot
0025179	N	Commercial	3	130,075.28		

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Repetitive Loss #	Insured?	Building Type	Losses	Total Paid	Severe Repetitive Loss ⁷	Comments
0025192	SDF	Residential	4	301,673.60	PN	
0038166	N	Commercial	5	23,397.98		
0136035	Y	Residential	2	13,212.52		
0137257	N	Residential	2	74,095.04		

NFIP Compliance and Maintenance

The City also developed mitigation actions or analyzed previous action that related to either NFIP maintenance or compliance. Table 7-3 below provides the previous and new actions as well as their exact location in Section 9.

Table 7-3 NFIP Compliance and Maintenance Actions

Mitigation Action ⁹	Location in Section 9 (Page No.)
Past Action 19: Improve the methods, standards and procedures for floodplain management.	17
Past Action 20: Continue acquisition of repetitively flooded structures in the floodplain.	18
Past Action 21: Increase flood hazard protection from localized flood hazard events identified in the Watershed Master Plan of 2006, including storm drain improvement projects, creek crossing and pond inspections.	19
Past Action 22: Provide increased protection from creek flooding to 350 structures/crossings.	20
Past Action 29: Promote an increase in the number of at-risk structures covered by flood insurance through mail outs to floodprone properties; conduct outreach to the banking community and insurance agents.	25

⁹ Mitigation Actions include those regarding NFIP compliance. Previous actions are included as well if those actions were deferred and not deleted or completed. Please see Section 9 for the full action.

Section 7 – Capability Assessment

Mitigation Action ⁹	Location in Section 9 (Page No.)
Past Action 30: Develop a public outreach strategy and implementation plan for flood hazard information.	26
Past Action 32: Ensure that more city inspectors are trained in floodplain management.	27
New Action 19: Conduct public awareness campaign for realtors, insurance agents, lenders, surveyors and other professionals on benefits of flood insurance under the National Flood Insurance Program (NFIP).	97
New Action 20: Increase public awareness regarding the National Flood Insurance Program (NFIP) and Preferred Risk Policy for residents outside of the Special Flood Hazard Area (SFHA).	99

Fire Protection

In addition to general planning and floodplain management mechanisms, the City of Austin is also developing fire protection plans. These include a Wildfire Contingency Plan and a Community Wildfire Protection Plan (CWPP). The City also has a Prescribed Burn Plan in place and is developing a Strategic Plan for 2010 under the auspices of the Austin Fire Department.



Growth Management and Protection Plans

In addition to Neighborhood¹⁰ and Smart Growth¹¹ Plans, the City has developed protections programs and plans, which provide solutions for protecting land and resources for growing communities.

¹⁰ Neighborhood Plans available at: <http://www.ci.austin.tx.us/zoning/>

¹¹ More information on Smart Growth is available at: <http://www.ci.austin.tx.us/smartgrowth/>

Section 7 – Capability Assessment

Open Space Management Plan

The Open Space Management Plan describes a process and recommends strategies and solutions for handling open space issues for outdoor recreational or open habitat areas of land. The City of Austin has developed a Parks and Open Space Master Plan in order to improve the quality of downtown parks under the main goal making the City the most livable city in the country.

Austin Climate Protection Plan

As discussed in Section 3 of this Update, the Austin Climate Protection Program (ACPP) was established to protect Austin from the effects of climate change by reducing greenhouse gas emissions. The ACPP began implementing the Austin Climate Protection Plan in 2007 after the City Council passed a resolution directing the city to take action by reducing greenhouse gas emissions through five main components: a Municipal Plan, to make City of Austin facilities, fleets and operations carbon neutral by 2020; a Utility Plan, to implement the most aggressive utility greenhouse gas reduction plan in the nation through dramatic increases in conservation, efficiency and renewable programs; a Community Plan, to develop a comprehensive plan for reducing greenhouse gas emissions from sources community wide; a “Go Neutral” Plan, to provide citizens with tools to reduce their carbon footprint; and Homes and Buildings Plan, to make Austin building codes for both residential and commercial properties the most energy efficient in the nation.



Conclusions on Capability

The success of future mitigation efforts in a community can be gauged to some extent by its previous and continual planning efforts. The City of Austin has implemented a multitude of programs and plans to maintain safety and sustainability. Despite the widespread mechanisms in place to further hazard mitigation measures, planning team members still see room to grow as indicated in the Self Assessment.

Self Assessment ¹²

In addition to the inventory and analysis of specific local capabilities, the Capability Assessment Survey required planning team members to conduct their own self

¹² Information is based upon the input provided by planning team members through the Capability Assessment Survey, rather than all City employees.

Section 7 – Capability Assessment

assessment of capability to implement hazard mitigation activities by considering barriers to implementing mitigation strategies or mechanisms that could enhance mitigation strategies. Planning team members were composed of representatives from various City departments, but did not include all City employees. A description of how the planning team was composed can be found in Section 2. Team members ranked each level of capability, by marking it as “limited”, “moderate” or “high.” Table 7-4, below, summarizes the results from each returned questionnaire.

Table 7-4. Self-Assessment for Capability

Capability	Rank
Planning and Regulatory Capability	Moderate
Administrative and Technical Capability	Moderate
Fiscal Capability	Moderate
Political Capability	Moderate
Overall Capability	Moderate

The conclusions of the Risk Assessment and Capability Assessment serve as the foundation for the development of a meaningful hazard mitigation strategy. During the process of identifying specific mitigation actions to pursue, the City of Austin considered not only its level of hazard risk but also the existing capability to minimize or eliminate that risk.

MITIGATION STRATEGY

Mitigation Goals	1
Goal 1	1
Goal 2	2
Goal 3	2
Goal 4	3
Goal 5	4
Goal 6	4

Mitigation Goals

Based on the results of the risk and capability assessments, the planning team was able to develop and prioritize the mitigation strategy. This involved utilizing the results of both assessments as well as reviewing the goals and objectives that were included in the 2004 Plan.

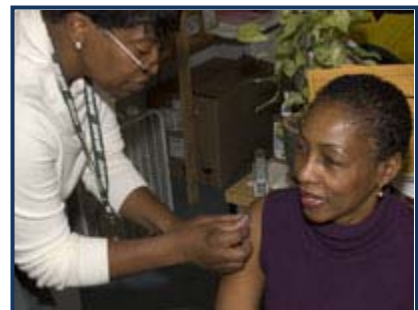
At the Mitigation Workshop in July of 2009, planning team members reviewed the mitigation strategy from the 2004 Plan. The consensus among all members present was that the strategy developed for the 2004 Plan should remain, as it identified overall improvements to be sought in the Plan Update. However, the order and priority of the goals and objectives were reorganized as depicted in this section.

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.



Section 8 – Mitigation Strategy

Objective 1.2

Maximize the 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 city planning and budgeting processes.



Goal 3

Increase public understanding, support and demand for hazard mitigation.

Objective 3.1

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

Section 8 – Mitigation Strategy

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 development will not put people in harm's way or increase threats to existing properties.



Section 8 – Mitigation Strategy

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 starting with those sites facing the greatest threat to life, health and property.

Goal 6

Promote growth in a sustainable manner.

Objective 6.1

Incorporate hazard mitigation into the 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.



MITIGATION ACTIONS

City of Austin.....	1
Previous Actions and Analysis.....	1
New Actions	61

City of Austin

As discussed in Section 2, at the mitigation workshop held for the City, the planning team and stakeholders reviewed actions included in the 2004 Plan and provided an analysis for these actions, stating whether the action was completed, should be deleted or deferred for the Update. In addition, the planning team identified and prioritized new mitigation actions, including at least two mitigation actions for every hazard.

Previous Actions and Analysis

Past Action-1	
Proposed Action:	Implement Disaster Ready Austin

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind, Tornado, Flood, Wildland Fire

Section 9 – Mitigation Actions

Priority (High, Moderate, Low):	High
Estimated Cost:	\$140,000 per year
Potential Funding Sources:	General revenue, grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2004 and ongoing

2009 Analysis:

This action will be deferred. While grant funding ended and DRA staff no longer exists, public education is still an ongoing primary mission of HSEM. HSEM is in the process of beginning a new campaign with children activity kits, which is scheduled for late 2009 as well as a campaign to promote a preparedness program to City employees.

Past Action-2

Proposed Action:	Implement and enhance a City-wide geographically-based telephone Emergency Notification System. Develop protocols for use of the system.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Flood, Tornado, Wildland Fire, Infectious Disease, Hazardous Materials Release, Pipeline Failure, Terrorism
Priority (High, Moderate, Low):	High
Estimated Cost:	\$80,000
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Austin Police Dept.
Implementation Schedule:	2003

2009 Analysis:

\$80,000 for purchase with monthly cost of maintenance and enhancement. Action has been completed.

Section 9 – Mitigation Actions

Past Action-3	
Proposed Action:	Undertake efforts to expand the existing Emergency Paging (AWACS) System to include warning and communications to other educational facilities, including other school districts in Travis County, and special needs populations, including access for the disabled. Over the long term, consideration should be given to making the system available to the public on a no-cost subscription basis.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Tornado, Flood, Wildland Fire, Infectious Disease, Hazardous Materials Release, Pipeline Failure, Terrorism
Priority (High, Moderate, Low):	Medium
Estimated Cost:	To be determined
Potential Funding Sources:	General Revenues, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2003 and ongoing

2009 Analysis:
Action has been completed in part and is in place. After an analysis it was determined that it would not be feasible to make the system available to the public.

Past Action-4	
Proposed Action:	Promote the use of NOAA “All Hazards” radios for early warning and post-event information.

MITIGATION ACTION DETAILS

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Hazard(s) Addressed:	Dam Failure, Flood, Tornado, Wildland Fire, Drought, Extreme Heat, Winter Storm, Hail, Thunderstorm
Priority (High, Moderate, Low):	High
Estimated Cost:	\$55 per radio
Potential Funding Sources:	General Revenues, grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This action is complete. Funding for the radios and distribution of the radios was completed in 2004.

Past Action-5	
Proposed Action:	Enhance the capability for visual monitoring and digital recording of emergency situations from the new Emergency Operations Center in the Combined Center.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Dam Failure, Tornado, Wildland Fire, Infectious Disease, Winter Storm, Hazardous Materials Release, Pipeline Failure, Terrorism
Priority (High, Moderate, Low):	Low
Estimated Cost:	To be determined
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2003

Section 9 – Mitigation Actions

2009 Analysis:
This action is complete.

Past Action-6	
Proposed Action:	<p>Develop evacuation plans, policies and procedures for the full range of contingencies and geographic areas of the City.</p> <ul style="list-style-type: none"> • Bring together experts in emergency planning, transportation planners and traffic engineers to develop evacuation plans, policies and procedures for the full range of contingencies that Austin may face. • Utilize the closed circuit televisions of the City of Austin and Texas Department of Transportation to help aid traffic flow during evacuations. • Develop canned messages for use with the public and the media. • Examine the need for additional legislative authority to conduct mandatory evacuations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind, Tornado, Flood, Terrorism, Infectious Disease, Hazardous Materials Release, Pipeline Failure
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$100,000
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management, Transportation, Planning and Sustainability, Fire Dept., Police Dept.
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This action will be deferred due to the size and scope of the project. A determination has been made that the most effective way to proceed would be to obtain the services of a knowledgeable consultant to assist with the project. Suitable grant funding is being identified to provide for these consulting services.

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Past Action-7	
Proposed Action:	<p>Develop a coordinated, interagency emergency debris removal plan.</p> <ul style="list-style-type: none"> • Develop a proposed command structure. • Pre-designate staging areas and dumping sites. • Pre-qualify contractors for use in large-scale disasters. • Pre-identify specialized equipment needs and develop standby lease agreements. • Provide for recycling of materials. • Cover debris removal on both public and private properties.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado, Hurricane Wind, Terrorism
Priority (High, Moderate, Low):	Medium
Estimated Cost:	Minimal - \$10,000-\$20,000
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2004

2009 Analysis:
This action has been completed.

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Past Action-8	
Proposed Action:	Establish the capability for a single, interagency mobile Incident Command Post and Mobile Communications Center.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado, Hurricane Wind, Terrorism, Infectious Disease, Pipeline Failure, Hazardous Materials Release
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$300,000-\$350,000
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Austin Police Dept., Fire Dept.
Implementation Schedule:	2003 or as funding becomes available

2009 Analysis:
The mobile unit is currently deployed under the direction of the AFD. The program is close to completion and will not be deferred.

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Past Action-9	
Proposed Action:	<p>Design and implement a comprehensive concerted protection program for critical information systems infrastructure.</p> <ul style="list-style-type: none"> • Conduct an impact analysis to determine critical applications and maximum acceptable outage durations. • Enhance disaster avoidance capabilities for critical information systems. • Enhance the standardization of information technology policies and procedures. • Harden the existing operational informational technology infrastructure.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado, Hurricane Wind, Terrorism, Infectious Disease, Pipeline Failure, Hazardous Materials Release, Drought, Wildland Fire
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1.5 - \$2 million
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Financial and Administrative Services Dept.
Implementation Schedule:	2004 and ongoing

2009 Analysis:
Action completed.

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Past Action-10	
Proposed Action:	Adopt the 2003 International Building Code

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Flood, Hurricane Wind, Hail
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Watershed Protection and Development Review
Implementation Schedule:	2004

2009 Analysis:
The 2003 International Building Code is part of a comprehensive, coordinated set of codes produced by the International Code Council (ICC) and is expected to be widely adopted by states and municipalities across the country. This action is complete and will not be deferred. The Austin City Council adopted the 2003 IBC on 12/15/2005.

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Past Action-11	
Proposed Action:	Establish a voluntary program of value-added building codes that go beyond the 2003 International Building Code requirements.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Flood, Hurricane Wind, Hail
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$8,000-\$10,000
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Watershed Protection and Development Review Dept
Implementation Schedule:	2010

2009 Analysis:
This action has been partially completed and will be deferred. The city plans to adopt the 2009 IBC in early 2010.

Past Action-12	
Proposed Action:	Improve code enforcement and inspection services.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Flood, Hurricane Wind, Hail
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$8,000-\$10,000
Potential Funding Sources:	General Revenue
Lead Agency/Department	Assistant City Manager

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Responsible:	
Implementation Schedule:	2004

2009 Analysis:
This action has been completed. On or about June 1, 2005 a comprehensive report was completed by Dr. Clarence Bibby (Austin Energy / CMO Consulting Services). In 2005, using the recommendation report, Code Enforcement was consolidated under Solid Waste Services.

Past Action-13	
Proposed Action:	Recruit and train up to three hundred Disaster Ready Austin volunteers to provide support in safeguarding the City of Austin before, during, and after any disaster.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado, Hurricane Wind, Terrorism, Infectious Disease, Pipeline Failure, Hazardous Materials Release, Drought, Wildland Fire
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$125,000 per year
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2005

2009 Analysis:
This action is complete. Program is part of CERT; as of Nov.2009, over 700 volunteers have been trained. Disaster Ready Austin merged with the HSEM CERT volunteer program which continues to train approximately 100 volunteers per year.

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Past Action-14	
Proposed Action:	Expand the Austin Police Department’s Civil Defense Battalion by two hundred trained volunteers to provide support in safeguarding the city of Austin in the event of a large-scale emergency.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado, Hurricane Wind, Terrorism, Infectious Disease, Pipeline Failure, Hazardous Materials Release, Drought, Wildland Fire
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$275,000 per year for 3 years
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Austin Police Dept.
Implementation Schedule:	2005

2009 Analysis:
Proposed action successfully completed with all volunteers trained. Grant ended in 2008.

Past Action-15	
Proposed Action:	Enhance the information base to support future hazard mitigation planning. Work with the Travis County Appraisal District to produce parcel polygon data in a HAZUS-compatible GIS format. Input localized flood data into HAZUS flood model for use in planning and in real-time disasters.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	Medium

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Estimated Cost:	\$500,000-\$1,000,000
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Emergency Mgmt, Watershed Protection and Development Review
Implementation Schedule:	Ongoing

2009 Analysis:

GIS-based parcel polygon data is vital for future planning for hazard mitigation and the use of HAZUS. GIS data is available and HAZUS model is available to staff who are trained in using the product. This action is partially complete and will be deferred.

Past Action-16

Proposed Action:	Enhance hazard mitigation planning as a factor in community development activities, including business development and long-range regional growth planning being carried out by Envision Central Texas (ECT).
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Dam Failure, Tornado, Flood, Wildland Fire, Infectious Disease, Hazardous Materials Release, Pipeline Failure, Terrorism
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000-\$75,000
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Economic Growth and Redevelopment Services and Transportation, Planning and Sustainability Department
Implementation Schedule:	Ongoing

2009 Analysis:

Action is partially complete, but ECT continues to focus on mitigation and critical issues such as land use, open space and social equity. Therefore the action is deferred as an ongoing activity. There are currently six Implementation Committees in

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place that convene educational events, develop position papers and contribute to a number of tools and ongoing projects, such as the Quality Growth Toolbox and Greenprint for Growth. ECT continues to fulfill its critical role of educating and engaging citizens in an ongoing dialogue about the challenges of growth and the opportunities to shape the region's future.

Past Action-17

Proposed Action:	Promote the Small Business Administration Pre-Disaster Mitigation Loan Program.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Dam Failure, Tornado, Flood, Wildland Fire, Infectious Disease, Hazardous Materials Release, Pipeline Failure, Terrorism
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$50,000 per year
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2004 and ongoing

2009 Analysis:

HSEM continues to promote the program through public education activities.

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Past Action-18	
Proposed Action:	<p>Implement new flood warning and response tools and develop operational plans for their use. This action will help reduce the loss of life due to flooding by providing enhanced warning and response tools.</p> <ul style="list-style-type: none"> • (1) These tools include automated low water crossing barricades at: Old Bee Caves Rd. Joe Tanner Lane, Wasson Road, Waters Park Rd., Lakewood Dr., Old Spicewood Springs Rd., Spicewood Springs Rd., Colton-Bluff Springs Rd., Old San Antonio Rd. • (2) Acquire and implement upgraded Base Station hardware and software, to include web publishing of Flood Early Warning System data and advanced alarm/decision support capability. • (3) Study FEWS field gauging equipment, computer hardware, software and procedures to include potential use of NEXRAD precipitation data in GIS; and develop recommendations for system improvements. • (4) Coordinate with OEM and APD to develop operational plans for use of automated low water crossing barricades, advanced alarm/decision support software, and use of Emergency Notification System. • (5) Migrate Flood Early Warning System base station to Austin Travis County Emergency Operations Center. • (6) Install video monitoring at selected low water crossings.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000 plus staff time
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department	Watershed protection and Development

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Responsible:	Review
Implementation Schedule:	Ongoing

2009 Analysis:

Action items 1-6 have been implemented, however, ongoing maintenance and improvements will continue following the assessment in Dr. Ford's report, which outlined improvement recommendations for FEWS.

Past Action-19	
Proposed Action:	<p>Improve the methods, standards and procedures for floodplain management.</p> <ul style="list-style-type: none"> • 1) Complete Base Mapping of digital terrain data to FEMA standards by 2003. • (2) Assist with development of the Waivers, Exceptions, and Regional Stormwater Management Program Reviews/Permits, Inspection, Environmental Reviews (WIER/PIER) database. • (3) Review current rating on Building Code Effectiveness Grading Schedule, and develop an action plan for improvement, with improvements implemented by 2006. • (4) Increase Community Rating System rating to increase flood insurance discounts in Special Flood Hazard Areas from 10- to 20-percent or more by 2006. • (5) Conduct comprehensive review by 2005 of city of Austin hydrological and hydraulic methods and procedures applicable to engineering studies for floodplain mapping, including potential for: <ul style="list-style-type: none"> • (a) use of most recent depth-duration-frequency for Texas; • (b) standard models and methods for hydrological/hydraulic studies; • (c) use of floodway; • (d) use of future conditions hydrology criteria; • (e) formalized processes for updating and maintaining floodplain mapping; and • (f) plan for code modifications to show regulatory floodplains on FEMA FIRMs. • (6) Present recommended code and technical criteria amendments to stakeholders and amend regulatory requirements as applicable, by 2006. • (7) Define future or fully developed conditions and produce an official city of Austin GIS map of conditions by 2006. • (8) Implement process improvements by 2006 to update and maintain future digital floodplain mapping, including merging city and FEMA floodplain mapping. • (9) Review and update all city and FEMA regulatory floodplain studies and maps in digital format by 2008. • (10) Deliver floodplain info to stakeholders by 2007 through use of web-based transaction.

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MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$2,000,000
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Watershed protection and Development Review
Implementation Schedule:	2006-2008

2009 Analysis:
Action is partially complete and will be deferred. Action items 1-4 complete. For Item 5, floodplain mapping studies are ongoing with most populated urban watersheds completed.

Past Action-20	
Proposed Action:	Continue acquisition of repetitively flooded structures in the floodplain.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	\$200,000 per structure
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Watershed Management and Development Review Dept.
Implementation Schedule:	2004 - 2012

2009 Analysis:
Staff training on available state and federal funding opportunities, 3 HMGP grants received, \$9.9 M of federal funding awarded, 114 flood-prone homes acquired and demolished, one HMGP grant application pending approval by FEMA to purchase up

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to 25 properties. Revisions to relocation ordinance on hold per law department. This action is partially complete and will be deferred.

Past Action-21

	Proposed Action:	Increase flood hazard protection from localized flood hazard events identified in the Watershed Master Plan of 2006, including storm drain improvement projects, creek crossing and pond inspections
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	Medium
Estimated Cost:	Per Capital Project Listing from 2004 Plan – See Table 9-1 at the end of this section.
Potential Funding Sources:	General Revenue, Bonds, Grants
Lead Agency/Department Responsible:	Watershed Protection and Development Review
Implementation Schedule:	2006-2012

2009 Analysis:

Partially completed. This action will be deferred. All work is ongoing, per Local Flood Hazard Mitigation Supervising Engineer. However, some projects will not be completed without significant increase in CIP funding.

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Past Action-22

	Proposed Action:	Provide increased protection from creek flooding to 350 structures/crossings.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	Per Capital Project Listing Table from 2004 Plan – See Table 9-1 at the end of this section.
Potential Funding Sources:	General Revenue, Bonds, Grants
Lead Agency/Department Responsible:	Watershed Protection and Development Review Department.
Implementation Schedule:	2008-2011

2009 Analysis:

Creek flooding poses a recurring city-wide risk to public safety and property. All work is ongoing. This action is deferred.

Past Action-23

	Proposed Action:	Enhance existing Regional Stormwater Management program.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$200,000

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Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Watershed protection and Development Review
Implementation Schedule:	2007-2010

2009 Analysis:
This action is partially completed and will be deferred.

Past Action-24	
Proposed Action:	Design and implement in-stream erosion stabilization projects.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	Low
Estimated Cost:	See Capital Project Listing at Table 9-1
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Watershed Protection and Development Review
Implementation Schedule:	2008 and ongoing

2009 Analysis:
This action is partially complete and will be deferred.

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Past Action-25	
Proposed Action:	Carry out long-range Capital Improvement Projects to support implementation of the Watershed Master Plan and projects recommended by the U.S. Army Corps of Engineers for Onion and Williamson Creeks.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	Moderate-High
Estimated Cost:	\$150 million
Potential Funding Sources:	Bonds, General Revenue, Grants
Lead Agency/Department Responsible:	Watershed Protection and Development Review
Implementation Schedule:	2006 2010

2009 Analysis:
<p>This action is partially complete and will be deferred as an ongoing activity. Master Plan Projects: Carson: Thorberry - low water crossing upgrade (complete), Richland Estates - buyout of homes in 25 year floodplain (complete), Hoeke/Posten - buyout of floodprone properties and upgrade of Hoeke Ln (in design) Fort Branch: Reaches 6&7 – erosion and flood control project and buyout of floodprone structures (in design) Boggy: creek flood hazard mitigation, upgrade of Manor Rd, stream bank stabilization, and water quality retrofits (in design) Bull: Lakewood Dr low water crossing upgrade (in design) Walnut: Crystalbrook detention pond (complete) Williamson: Creekbend floodwall (complete) Master Plan Flood Scores: revisions to scoring methodology, inclusion of updated data and information, evaluation of new scores, updates to priority list of problem areas USACE: Dec 2008 Technical Memorandum for Williamson Creek detailing alternatives analysis and recommendations. Partnership with the Corp to buyout ~400 floodprone properties in Onion Creek Watershed. Onion buyouts. \$145 million bond passed by voters in 2006 for drainage and water quality improvements Drainage Utility Fund rate increases proposed for 2010.</p>

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Past Action-26	
Proposed Action:	Undertake regulatory modifications to include various code and criteria changes required to improve service to the public, provide developer incentives, reduce long-term maintenance needs, and prevent the creation of new watershed problems in the future.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	Medium
Estimated Cost:	Cost dependent upon individual projects
Potential Funding Sources:	Medium
Lead Agency/Department Responsible:	Watershed Protection and Development Review
Implementation Schedule:	2003-2012

2009 Analysis:
Partially complete; this action is deferred. Easement release criteria and policy have been developed. Policies and processes refined for model distribution.

Past Action-27	
Proposed Action:	Expand Watershed Protection Master Planning efforts beyond the seventeen Phase I watersheds.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$62,000,000
Potential Funding Sources:	General Revenue, Grants

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Lead Agency/Department Responsible:	Watershed Protection and Development Review
Implementation Schedule:	2003-2010

2009 Analysis:

Phase I of the Watershed Protection Master Plan inventoried existing watershed problems and gauged the impact of future urbanization on 17 of the city's 47 watersheds. The 17 watersheds included all of the urban watersheds and five surrounding, non-urban watersheds. Technical assessments have been completed for 24 additional watersheds for water quality; 2 additional watersheds for erosion, with 4 additional studies to be completed in FY2010; for an additional 12 watersheds, flood to be completed by FY2010. This action is partially complete and will be deferred.

Past Action-28

Proposed Action:	Conduct public education on the dangers of low water crossings.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	Costs will be covered as part of the Disaster Ready Austin education and outreach initiative
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2003 and ongoing

2009 Analysis:

This is an ongoing action and is deferred. HSEM belongs to the Texas Flash Flood Alley War Council.

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Past Action-29	
Proposed Action:	Promote an increase in the number of at-risk structures covered by flood insurance through mail outs to floodprone properties; conduct outreach to the banking community and insurance agents.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	Medium
Estimated Cost:	Costs covered as part of Disaster Ready Austin
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management and Watershed Protection and Development Review Dept.
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This action is complete. More than 50,000 letters were mailed Aug. 13, 2008. Notification is completed annually as part of CRS. In 2008 the city's insurance carrier evaluated those public buildings of a higher flood risk and purchased flood insurance.

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Past Action-30	
Proposed Action:	Develop a public outreach strategy and implementation plan for flood hazard information.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	Costs covered as part of Disaster Ready Austin education and outreach
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management with the Watershed Protection and Review Department
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This is an ongoing effort, which is partially complete and therefore deferred.

Past Action-31	
Proposed Action:	Enhance readiness to carry out post-disaster flood mitigation projects such as using handheld GPS to document high water marks and immediately providing those impacted by a flood event with detailed information on rebuilding requirements.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	\$20,000-\$30,000

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Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Watershed Protection and Development Review Dept
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This action is complete. GPS units purchased in 2005 and available to document high water marks.

Past Action-32	
Proposed Action:	Ensure that more city inspectors are trained in floodplain management.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	Minimal
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Watershed Protection and Development Review dept
Implementation Schedule:	2003 and ongoing

2009 Analysis:
An ongoing program with upcoming training sessions about Elevation Certificates and Building Code has been established, therefore this action is complete.

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Past Action-33

	Proposed Action:	Design and implement a comprehensive community awareness and educational campaign on the wildland fire danger, targeted at areas of highest risk.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Wildland Fire
Priority (High, Moderate, Low):	High
Estimated Cost:	\$20,000 per year and ongoing
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Austin Fire Dept.
Implementation Schedule:	2003 and ongoing

2009 Analysis:

This action is partially complete and will be deferred. AFD participates in the annual wildfire awareness public education campaign, which is region wide with ESDs in primarily higher risk areas of county

Past Action-34

	Proposed Action:	Develop capabilities, systems and procedures to pre-deploy fire-fighting resources during times of high wildland fire hazard. Through training and education, prepare the Austin Fire Department for wildland-interface scenarios.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Wildland Fire
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$35,000 training and equipment
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department	Austin Fire Dept.

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Responsible:	
Implementation Schedule:	2003 -2011

2009 Analysis:
Action partially complete and will be deferred. Purchased additional brush trucks to total of 12; established wildland firefighting committee to participate in county initiatives.

Past Action-35	
Proposed Action:	Expand on the existing County Resource Coordinator (CRC) concept to develop and implement a coordinated, regional interagency wildland fire mitigation plan and structure.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildland Fire
Priority (High, Moderate, Low):	Medium
Estimated Cost:	To be Determined
Potential Funding Sources:	General Revenue, Grant, stakeholder contributions
Lead Agency/Department Responsible:	Austin Fire Dept.
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This action is deferred as it is ongoing. AFD participates in county wildland firefighting committee planning and initiatives.

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Past Action-36	
Proposed Action:	Upgrade and expand Geographic Information System hardware and software to support completion of wildland-fire study for the entire city and surrounding areas.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildland Fire
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$35,000
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Austin Fire Dept.
Implementation Schedule:	2003-2011

2009 Analysis:
This action is not complete and will be deferred. The AFD was unable to raise appropriate levels of funding to expand the hardware and software, but is currently working on generating staff and revenue to complete the action.

Past Action-37	
Proposed Action:	<p>Promote use of new technologies for detecting and suppressing fires.</p> <ul style="list-style-type: none"> • Give consideration to decreasing the threshold for requiring sprinkler detection systems on new construction. • Promote residential sprinkler systems. • Provide financial incentives to retrofit existing structures to enhance fire protection. • Consider an ordinance requiring sprinklers on older residential high-rise buildings.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildland Fire

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Priority (High, Moderate, Low):	High
Estimated Cost:	On a national average, residential sprinklers add 1 – 1.5 percent to the total building cost, or approximately \$0.80 per square foot.
Potential Funding Sources:	General Revenues, Grants
Lead Agency/Department Responsible:	Austin Fire Dept.
Implementation Schedule:	2003

2009 Analysis:

This action is not complete and will not be deferred. Considered high rise sprinkler ordinance for older structures, but failed to gain sufficient political support.

Past Action-38

Proposed Action:	Continue and enhance fire prevention and fire safety awareness educational efforts.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Wildland Fire
Priority (High, Moderate, Low):	High
Estimated Cost:	To be Determined
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Austin Fire Dept.
Implementation Schedule:	2003 and Ongoing

2009 Analysis:

Partially complete. No home hazard inspection program but fairly aggressive smoke detector installation program for targeted populations and neighborhoods.

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Past Action-39

	Proposed Action:	Continue to undertake an aggressive fire inspection program.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Wildland Fire
Priority (High, Moderate, Low):	Medium
Estimated Cost:	To be Determined
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Austin Fire Dept.
Implementation Schedule:	2004 and Ongoing

2009 Analysis:

The City of Austin has adopted the International Fire Code and is conducting inspections according to the 2009 International Fire Code. This action is complete.

Past Action-40

	Proposed Action:	Initiate a drought awareness and water conservation program as part of the existing water conservation campaign.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Drought
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$8,000-\$10,000
Potential Funding Sources:	General Revenues
Lead Agency/Department	Transportation Planning and Sustainability

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Responsible:	Dept.
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This action is deferred as it is an ongoing activity. The Water Conservation Program and Campaign have been implemented each year beginning in 2003.

Past Action-41	
Proposed Action:	Establish a pilot project to investigate the potential for automated Evapotranspiration technology to program irrigation systems on a voluntary basis to conserve water resources.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$50,000
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Transportation Planning and Sustainability Dept.
Implementation Schedule:	2005

2009 Analysis:
This action will be deferred.

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Past Action-42	
Proposed Action:	Develop an enforcement plan and capabilities for use in the event of mandatory water rationing.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000-\$10,000
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Transportation Planning and Sustainability Dept, Austin Police Dept.
Implementation Schedule:	2004

2009 Analysis:
An enforcement plan was needed to identify capabilities in the event of severe drought. This action is complete.

Past Action-43	
Proposed Action:	Ensure water and energy conservation at city facilities.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Priority (High, Moderate, Low):	Medium
Estimated Cost:	To be Determined
Potential Funding Sources:	General Revenue

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Lead Agency/Department Responsible:	All city departments
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This action is ongoing and is deferred.

Past Action-44	
Proposed Action:	Provide community outreach and education to individuals and businesses concerning winter storm alerts and preparatory actions for homes and businesses.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Priority (High, Moderate, Low):	Low
Estimated Cost:	Costs part of Disaster Ready Austin
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This is an on-going activity and therefore is deferred. Costs are covered as a part of HSEM. Information is made available through the HSEM website, calendar and other on-line sources.

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Past Action-45

	Proposed Action:	Conduct major tree pruning initiative along power lines
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Winter Storm
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$6,000 over two years; then on 4-year cycle
Potential Funding Sources:	General Revenues
Lead Agency/Department Responsible:	Austin Energy
Implementation Schedule:	2004 and in five year cycle

2009 Analysis:

This is an ongoing activity and will be deferred. Austin Energy is attempting to establish a five year cycle on overhead electric lines. There has been a substantial reduction in the duration and frequency of outages with normal storms in areas where tree work has been completed.

Past Action-46

	Proposed Action:	Foster the construction of “tornado safe rooms.” <ul style="list-style-type: none"> • (1) Work with builders to offer tornado safe rooms as option for new construction. • (2) Work with real estate community to show tornado safe room in model home. • (3) Promote retrofitting of existing structures to include tornado safe rooms. • (4) Incorporate benefits of tornado safe rooms into Disaster Ready Austin's community awareness and education programs.
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MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Hurricane Wind
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$3,000 - \$8,000 per structure, depending on new construction or retrofitting existing structures
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management; Watershed Protection and Development Review
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This action is not complete and will be deleted as there was no public support.

Past Action-47	
Proposed Action:	Ensure that public community facilities have severe weather action plans, conduct frequent drills and designate tornado shelter areas. Encourage the building of tornado safe community shelters.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Hurricane Wind
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$8,000-\$10,000
Potential Funding Sources:	General Revenues, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2003 and ongoing

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2009 Analysis:

This action is partially complete and will be deferred. No drills have been conducted, but HSEM continues to encourage the building of shelters through our DRA website.

Past Action-48

	Proposed Action:	Promote the use of steel connectors in new and existing construction
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Tornado, Hurricane Wind
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$450-\$500 per new structure
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2003 and ongoing

2009 Analysis:

This action requires continued outreach and is deferred. HSEM continues to encourage the use of steel connectors in new and existing construction through the HSEM website.

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Past Action-49

	Proposed Action:	Provide community outreach and education to individuals and businesses concerning actions for homes and businesses to take in preparation for hailstorms.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Hail
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000
Potential Funding Sources:	General Revenues, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2003 and ongoing

2009 Analysis:

This action is partially complete and will be deferred as an ongoing activity.

Past Action-50

	Proposed Action:	Complete the modernization of Tom Miller Dam
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Dam Failure, Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	\$22.3 Million

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Potential Funding Sources:	LCRA
Lead Agency/Department Responsible:	LCRA
Implementation Schedule:	2003-2004

2009 Analysis:
LCRA will provide the funding for this action. This action has been completed.

Past Action-51	
Proposed Action:	Undertake a comprehensive facility review of Mansfield Dam.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$45,000
Potential Funding Sources:	LCRA
Lead Agency/Department Responsible:	LCRA
Implementation Schedule:	2003-2004

2009 Analysis:
This action has been completed.

Section 9 – Mitigation Actions

Past Action-52	
Proposed Action:	<p>Establish a City of Austin dam inspection and maintenance program for small flood control dams.</p> <ul style="list-style-type: none"> • (1) Inventory existing dams and establish a priority list to meet or exceed State required inspection and review regulations. • (2) Complete dam safety analysis and preliminary engineering for each pond in priority list to achieve full compliance with Texas Commission on Environmental Quality Dam Safety Rules. • (3) Develop a yearly program to inspect existing dams. • (4) Develop a review process for proposed dams.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$2 million
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Watershed Protection and Development Review
Implementation Schedule:	2006 and ongoing

2009 Analysis:
<p>This action is almost fully completed. Action item (1) is completed, ongoing effort by 3 FTEs to maintain inventory; for item (2), the preliminary study is complete; (3) Completed, ongoing effort to implement program on yearly basis; and item (4) is completed</p>

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Past Action-53

	Proposed Action:	Provide community outreach and education to individuals and businesses concerning actions they can take in preparation for possible terrorist events.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Terrorism
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Disaster Ready Austin
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2003 and ongoing

2009 Analysis:

This action is ongoing and is deferred.

Past Action-54

	Proposed Action:	Complete water vulnerability assessments for water supply and water treatment systems and make improvements to harden security and ensure that appropriate emergency plans are in place.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Terrorism
Priority (High, Moderate, Low):	High
Estimated Cost:	\$7 million
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department	Water and Wastewater Dept.

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Responsible:	
Implementation Schedule:	2006

2009 Analysis:
This action is completed. A Vulnerability Assessment was completed by June of 2003. Original initiatives to harden completed by June 2006.

Past Action-55	
Proposed Action:	Create a built environment that is difficult to attack, resilient to the consequences of a possible terrorist attack, and protective of its occupants should an incident occur.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Terrorism
Priority (High, Moderate, Low):	High
Estimated Cost:	Cost to be determined for each facility, and the measure of security applied
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2003 and ongoing

2009 Analysis:
Project is partially complete and deferred. The costs are covered through various Homeland Security grant funds.

Section 9 – Mitigation Actions

Past Action-56

	Proposed Action:	Direct efforts towards re-routing hazardous materials not destined for the city to routes outside of the City of Austin.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Hazardous Materials Release
Priority (High, Moderate, Low):	Medium
Estimated Cost:	To be determined
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Transportation Planning and Sustainability Dept.
Implementation Schedule:	2003 and ongoing

2009 Analysis:

This action is ongoing and will be deferred

Past Action-57

	Proposed Action:	Conduct a public awareness and educational campaign to raise awareness about hazardous materials.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Hazardous Materials Release
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$5,000-\$10,000
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department	Transportation Planning and Sustainability

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Responsible:	Dept., Office of Homeland Security and Emergency Management
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This action is an ongoing outreach effort and will be deferred.

Past Action-58	
Proposed Action:	Promote increased security around fixed hazardous materials sites.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hazardous Materials Release
Priority (High, Moderate, Low):	High
Estimated Cost:	To be Determined
Potential Funding Sources:	General Revenue, Grants, Private Funding
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This is an ongoing action and is deferred. HSEM provides general information on hazardous materials on the HSEM website and uses Homeland Security grant funds to harden vulnerable sites.

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Past Action-59	
Proposed Action:	Initiate an extreme heat public awareness and educational campaign under the auspices of Disaster Ready Austin.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management, Austin Energy
Implementation Schedule:	Ongoing

2009 Analysis:
This action is deferred as an ongoing outreach activity. Austin Energy provides information to customers through a bill insert that addresses energy conservations, free weatherization programs, rebates and programs available to individuals interested in energy conservation. Austin Energy also advertises a Customer Assistance program that collects money to assist customers.

Past Action-60	
Proposed Action:	Increase tree plantings along public rights of way to reduce the Urban Heat Island effect.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Priority (High, Moderate, Low):	Low

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Estimated Cost:	\$150,000 – \$250,000
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Austin Energy, NeighborWoods Program
Implementation Schedule:	Ongoing

2009 Analysis:

This action is deferred as an ongoing activity. Austin Community Tree program is part of the Austin Climate Protection Plan through Austin Energy.

Past Action-61

Proposed Action:	Utilize digital automated electric power meters.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Extreme Heat
Priority (High, Moderate, Low):	Low
Estimated Cost:	To be Determined
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Austin Energy
Implementation Schedule:	2004-2011

2009 Analysis:

This action will enable Austin Energy to obtain the information necessary to charge more for electric power during peak periods of demand, thus helping to foster energy conservation. This action is partially completed and will be deferred. Austin Energy is currently deploying AMRs throughout the service territory.

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Past Action-62	
Proposed Action:	Ensure that potential risk information on the location of hazardous pipelines is available to builders, excavators, the banking and real estate industry, and current and potential property owners.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Pipeline Failure
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$25,000
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management; Watershed Protection and Development Review, Austin Fire Dept
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This action is partially complete and will be deferred. Information is available on the HSEM website.

Past Action-63	
Proposed Action:	Provide “best practices” for builders and developers in building around and operating around hazardous pipelines.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Pipeline Failure
Priority (High, Moderate, Low):	Low
Estimated Cost:	N/A

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Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management, Watershed Protection and Review Dept.
Implementation Schedule:	2003 ongoing

2009 Analysis:

This action will reduce the danger of accidents and thus protect lives and property from pipeline accidents. Action is partially completed and will be deferred. City of Austin ordinance revised in 2001 to include national “best practices.” Information is also available on the HSEM website.

Past Action-64

Proposed Action:	Educate the public about pipelines safety risks, how to detect a pipeline accident, and what to do in case of a pipeline accident.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Pipeline Failure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$25,000 annually
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Office of Homeland Security and Emergency Management, Watershed Protection and Development Review, Austin Fire Dept.
Implementation Schedule:	2003 and ongoing

2009 Analysis:

This action is partially complete and deferred. Information is available on the HSEM website. This action will provide vital information to the public on how to avoid pipeline safety hazards and, if faced with an accident, how to detect it and what steps to take to save lives and property.

Section 9 – Mitigation Actions

Past Action-65

	Proposed Action:	Have in place adequate plans, procedures and capabilities to respond quickly and effectively to a pipeline accident.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Pipeline Failure
Priority (High, Moderate, Low):	Medium
Estimated Cost:	To be determined
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Austin Fire Dept., Watershed Protection and Development Review
Implementation Schedule:	October 2009

2009 Analysis:

Action complete; will not be deferred

Past Action-66

	Proposed Action:	Work with the State General Land Office, the Railroad Commission of Texas and the Federal Office of Pipeline Safety to ensure that adequate monitoring takes place on Austin’s pipelines.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Pipeline Failure
Priority (High, Moderate, Low):	Medium

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Estimated Cost:	\$10,000
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Watershed Protection and Development Review
Implementation Schedule:	2003

2009 Analysis:

This action is deferred with no immediate timetable to implement. The City of Austin is no longer working with the GLO and RRC as funding was not received. However the City is open to undertaking the action as a joint effort between HSEM, WPD and AFD.

Past Action-67

Proposed Action:	Design and implement a system for early detection of leaks and accidents to protect those most at risk.
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MITIGATION ACTION DETAILS

Hazard(s) Addressed:	Pipeline Failure
Priority (High, Moderate, Low):	Medium
Estimated Cost:	To be determined
Potential Funding Sources:	General Revenues
Lead Agency/Department Responsible:	Watershed Protection and Development Review
Implementation Schedule:	2003 and ongoing

2009 Analysis:

WPDR currently is not working on this project and recommends project be turned over to the Austin Fire Dept or Emergency Management Office. This project is deferred.

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Past Action-68	
Proposed Action:	Adopt and implement a Hazardous Pipeline Ordinance to ensure adequate insurance to cover the costs of any potential hazardous incidents; establish penalties for non-compliance; and restrict certain uses within 200 feet of a hazardous liquid pipeline; and prohibit new construction within 200 feet of a hazardous liquid pipeline.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Pipeline Failure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Austin Fire Department
Implementation Schedule:	2003 for Ordinance adoption

2009 Analysis:
This action has been completed. The ordinance was adopted in 2008.

Past Action-69	
Proposed Action:	Improve accident reporting of minor accidents and engineering investigations of collisions to determine patterns to improve signals, traffic markings, and identify educational efforts needed to reduce accidents.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Transportation Collision
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000-\$10,000
Potential Funding Sources:	General revenue, grants

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Lead Agency/Department Responsible:	Transportation Planning and Sustainability; Austin Police Dept.
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This action is deferred as no grant or program is currently underway through APD.

Past Action-70	
Proposed Action:	Enhance the use of Closed Circuit TV (CCTV) and the “Intelligent Transportation System” for use in monitoring during major emergency situations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Transportation Collision
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$300,000
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Transportation Planning and Sustainability
Implementation Schedule:	2003 and ongoing

2009 Analysis:
This action will provide a more comprehensive base of information from which to help mitigate traffic accidents and other disasters. Project partially complete with current working capacity of 680 signals. This action is deferred.

The following table includes capital improvement projects to reduce the flood hazard as included in the 2004 Plan. As these projects are referenced in the

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previous mitigation actions, the table has been included for a more comprehensive look at previous flood actions for the City.

Table 9-1. Capital Improvement Projects

Project Name	Mission	Project Description	Priority	Water-shed	Est. Total Project Cost
1134 Northwestern Ave.	Erosion	Corner of house 1 ft. from 10 ft. vertical bank; buyout	Very High	Boggy	\$450,000
1606 Summer Creek Court	Erosion	Reconstruct stream bank	Very High	West Bouldin	250,000
1803 Victoria Drive Erosion Stabilization	Erosion	Install box culvert w/ surface swale	Very High	Tannehill	750,000
3205 Manchaca	Erosion	Home threatened (3 ft. from edge of creek bank)	Very High	West Bouldin Tributary	250,000
3607 E. 12th Street	Erosion	Undermined driveway due to storm run-off safety concern; buyout.	Very High	Tannehill	150,000
Allandale Neighborhood	Localized Flooding	Storm drain improvements	Very High	Shoal	3,800,000
Arowhead Drive	Localized Flooding	Storm drain improvements	Very High	Dry	200,000
Audubon Place	Localized Flooding	Storm drain improvements	Very High	Country Club	500,000
Bannockburn Neighborhood	Localized Flooding	Storm drain improvements	Very High	Williamson	1,500,000
Bowman Avenue	Localized Flooding	Storm drain improvements	Very High	Johnson	1,100,000
Brentwood Neighborhood	Localized Flooding	Storm drain improvements	Very High	Shoal	1,000,000
Capitol Drive	Localized Flooding	Storm drain improvements	Very High	Little Walnut	900,000
Crestmont @ Hancock Branch	Erosion	Armor storm bank	Very High	Shoal	300,000
Crystal Brook Ph. 2 Flood Control Improvements	Creek Flooding	Floodwall and levee improvements	Very High	Walnut	4,500,000

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Project Name	Mission	Project Description	Priority	Water-shed	Est. Total Project Cost
Del Querto	Localized Flooding	Storm drain improvements	Very High	West Bouldin	2,100,000
Dixie Drive along Onion Creek	Erosion	22 homes are threatened by bank erosion. Buyout.	Very High	Onion	3,500,000
Dryfield Drive	Localized Flooding	Storm drain improvements	Very High	Little Walnut	800,000
East 32nd Street	Localized Flooding	Storm drain improvements	Very High	Boggy	3,700,000
East 4th Street	Localized Flooding	Storm drain improvements	Very High	Town Lake	8,000,000
Erosion Buyout 1702 S. 6th Street	Erosion	2 primary structures on outside bend, 16 ft high vertical bank; buyout	Very High	West Bouldin	300,000
FOR-1 Implementation Phase	Integrated	Design and Construction	Very High	Fort	12,000,000
Fort Branch Phase 3 and 4	Flood / Erosion	Bridge Replacement and Channel modifications.	Very High	Fort Branch	3,342,000
Fort Branch-WMA-1 Study Phase	Integrated	Preliminary Engineering and Alternatives Analysis	Very High	Fort	670,000
Grayson area	Localized Flooding	Storm drain improvements	Very High	Boggy	750,000
Jamestown Channel	Erosion	1400 ft. degraded channel due to storm run-off; safety concerns	Very High	Little Walnut Tributary	1,000,000
JJ Seabrook Drive	Localized Flooding	Storm drain improvements	Very High	Tannehill	650,000
JOH-1 Study Phase	Integrated	Preliminary Engineering and Alternatives Analysis	Very High	Johnson	600,000
Johnson Creek Neighborhood	Localized Flooding	Storm drain improvements	Very High	Johnson	7,500,000

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Project Name	Mission	Project Description	Priority	Water-shed	Est. Total Project Cost
Long Bow	Localized Flooding	Storm drain improvements	Very High	Blunn	3,900,000
Madison Avenue	Localized Flooding	Storm drain improvements	Very High	Shoal	2,500,000
Mearns Meadow	Creek Flooding	Channel enlargement and box culverts.	Very High	Little Walnut	8,000,000
Meridith Street	Localized Flooding	Storm drain improvements	Very High	Johnson	800,000
Oak Haven	Localized Flooding	Storm drain improvements	Very High	Barton	1,100,000
Oakmont Blvd.	Localized Flooding	Storm drain improvements	Very High	Johnson	1,000,000
Onion and Williamson Creeks FC/EC Implementation	Flood and Erosion	US Army Corp of Engineers project implementation	Very High	Onion and Williamson	100,000,000
Onion and Williamson Creeks Study	Flood and Erosion	US Army Corp of Engineers study project	Very High	Onion and Williamson	760,000
Onion Creek Buyouts: Little Cypress Lane & Onion Creek Dr	Creek Flooding	Buyout of 5 mobile homes in 10-year floodplain	Very High	Onion	400,000
Palm Circle	Localized Flooding	Storm drain improvements	Very High	Old Country Club	2,000,000
Pond G Detention & Erosion Control Improvements	Erosion / Flood	Erosion and Flood Control Pond	Very High	Walnut	4,148,000
Powell Circle	Localized Flooding	Storm drain improvements	Very High	East Bouldin	300,000
Ridgelea Neighborhood	Localized Flooding	Storm drain improvements	Very High	Shoal	2,000,000
Rosedale Neighborhood	Localized Flooding	Storm drain improvements	Very High	Shoal	2,500,000
Scenic Brook Flood Control	Creek Flooding	Storm Drain system improvements	Very High	Williamson	1,200,000
Shoal Creek 5th to 6th Street Bank Stabilization	Erosion	Protect bridge and reconstruct the streambank	Very High	Shoal	250,000

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Project Name	Mission	Project Description	Priority	Water-shed	Est. Total Project Cost
Stanford Lane	Localized Flooding	Storm drain improvements	Very High	Johnson	2,400,000
Tanglewood Forest Pond	Creek Flooding	Reconstruction of pond	Very High	Slaughter	970,000
Tom Green Ave.	Localized Flooding	Storm drain improvements	Very High	Waller	3,500,000
Town Lake-Guadalupe Lavaca / CSC	Localized Flooding	Storm drain improvements	Very High	Town Lake	2,800,000
Walnut Creek Regional Erosion Ponds Preliminary Engineering	Erosion Control	Preliminary Engineering and Alternatives Analysis for regional erosion control ponds	Very High	Walnut	181,000
Walnut/Wells Branch EC/FC Pond Improvements	Erosion / Flood	Erosion Prevention and Flood Control Pond	Very High	Walnut	1,200,000
West Applegate	Localized Flooding	Storm drain improvements	Very High	Little Walnut	2,000,000
West Cow Path	Localized Flooding	Storm drain improvements	Very High	Walnut	800,000
Whispering Valley Area	Localized Flooding	Storm drain improvements	Very High	Walnut	500,000
Wilshire Blvd.	Localized Flooding	Storm drain improvements	Very High	Boggy	900,000
WMS-4 Study Phase	Integrated	Preliminary Engineering and Alternatives Analysis	Very High	Williamson	605,000
2700 - 2900 Lamar	Erosion	Stabilize channel	High	Shoal	1,000,000
46th @ Speedway Erosion Stabilization	Erosion	Reconstruct storm channel	High	Waller	700,000
5300-5400 Wellington	Erosion	Reconstruct storm bank	High	Fort Branch	750,000
Chimney Hills	Creek Flooding	Channel Enlargement	High	Walnut	4,000,000
Crossing Place Culvert Improvements	Creek Flooding	Culvert Upgrade and Channel modifications.	High	Old Country Club	734,600

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Project Name	Mission	Project Description	Priority	Water-shed	Est. Total Project Cost
Drainage Infrastructure Mapping (DIG)/ GASB 34	All	GIS-based inventory of all drainage infrastructure incorporating storm drain system modeling.	High	All water-sheds	10,000,000
Dunbarton and Willamette	Creek Flooding	Channel Enlargement	High	Little Walnut	3,000,000
East Bouldin--"S" bend	Erosion	Reconstruct storm bank	High	East Bouldin	300,000
Enfield Road Storm drain improvements	Localized Flooding	Storm drain improvements	High	Johnson/Town Lake	1,000,000
Hoeke Lane Flood Control Improvements	Creek Flooding	Channel modifications and purchase of houses in the floodplain	High	Carson	2,000,000
Little Stacy Park BLU-EC8	Erosion	Reconstruct storm bank	High	Blunn	750,000
Los Indios Trail Culvert Upgrade and Pond Modification	Creek Flooding	Roadway culvert upgrade and detention pond modification	High	Rattan	1,025,000
Lower Shoal Creek L-SHL-2	Integrated	Flood bypass tunnel	High	Shoal	65,000,000
Lower Tannehill Flood Control Improvements	Creek Flooding	Channel modifications	High	Tannehill	2,000,000
Lower Waller Creek	Integrated	Flood bypass tunnel	High	Waller	53,000,000
Meadow Creek Cr & Radam Lane	Creek Flooding	Buyout and demolition of four single family repetitive loss homes in the 10-year floodplain	High	Williamson	1,000,000
Onion Creek Buyouts: Shady Cedar Dr & Thatch Lane	Creek Flooding	Acquisition and demolition of four mobile homes in the 10-year floodplain	High	Onion	320,000
Patton Avenue and Jet Lane Area	Creek Flooding	Channel Construction and House Buyouts	High	Carson	4,500,000

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Project Name	Mission	Project Description	Priority	Water-shed	Est. Total Project Cost
Quail Creek L-LWA-3	Creek Flooding	Channel Enlargement and bridge replacement	High	Little Walnut	5,000,000
Railroad grade and shed downstream of West Mary	Erosion	Reconstruct storm bank	High	West Bouldin	550,000
Shiloh Drive	Creek Flooding	Channel Enlargement	High	South Boggy	1,000,000
Stonegate Mobile Home Park	Creek Flooding	Buyout, Detention or Channel Enlargement	High	Little Walnut	1,500,000
Thornberry Road	Creek Flooding	Culvert Upgrade and Regional Detention Pond	High	Carson	850,000
Travis Country Circle-Bridge Upgrade	Creek Flooding	Bridge upgrade	High	Barton	425,000
Upper Bartholomew Park	Erosion	Reconstruct storm channel	High	Tannehill	1,250,000
Upper Boggy Creek	Creek Flooding	Floodplain house acquisition	High	Boggy	16,000,000
Waller Creek UT Intramural Field Flood Control Pond	Creek Flooding	Regional Detention Pond	High	Waller	2,800,000
Walnut Creek Regional Erosion Control Pond @ Metro Park	Erosion Control	Erosion control pond	High	Walnut	5,120,000
Walnut Creek Regional Erosion Control Pond @ Pond 2	Erosion Control	Erosion control pond	High	Walnut	1,400,000
Walnut Creek Regional Erosion Control Pond @ Waters Park	Erosion Control	Erosion control pond	High	Walnut	4,120,000
Waters Park	Creek Flooding	Acquisition and	High	Walnut	500,000

Section 9 – Mitigation Actions

Project Name	Mission	Project Description	Priority	Water-shed	Est. Total Project Cost
Road		demolition of commercial repetitive loss property			
Watershed Information Management System	All	Acquire GIS system to manage data; automation of development review, water quality, erosion and flood analyses	High	All water-sheds	100,000
Blunn Creek EC/WQ Pond #14	Integrated	St. Ed's Area - WQ and flood control pond, bridge replacements	Moderate	Blunn	7,650,000
Floodplain Studies and Digital Mapping	Flood	Develop GIS based H & H studies and digital floodplain mapping	Moderate	All	200,000/yr
GIS Base Data - Digital Terrain	All	Acquire higher resolution digital terrain data	Moderate	All water-sheds	800,000
GIS Base Data - Land Use Projections	Flood	Digital mapping of future land use projections for implementation of regulatory criteria	Moderate	All water-sheds	100,000
Phase II Master Plan	All	Technical assessments and solution development	All non Phase I water-sheds	Phase II Master Plan	

New Actions

NEW ACTION-1	
Proposed Action:	Develop a geospatially coded tool that will allow users to: use climate-related EPHI (environmental public health indicator) surveillance to plan and prioritize environmental management decisions and policy changes related to climate change; track the likely impact of policy decisions over temporal and geographic scales; assess progress toward protecting public health; and, trigger emergency alerts when identified key variables coincide.
BACKGROUND INFORMATION	
Site and Location:	Austin, Texas Travis County, Texas
History of Damages:	Extreme Heat: 8 mortalities from 1999-2000 reported to NCDC. 9 mortalities in 2002-2004 reported by TX Dept of State Health Services Department of Health Statistics. Flood: 4 mortalities, 61 injuries, \$590K property damage from 2001-2007 reported to NCDC.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildland Fire, Drought, Extreme Heat
Effect on new/existing buildings:	Extreme heat can compromise the habitability of buildings with little or no insulation, no radiant barrier, and/or lacking air conditioning. Flooding can cause structural and moisture damage.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	US EPA
Lead Agency/Department Responsible:	Austin/Travis County Department of Health and Human Services
Implementation Schedule:	2011-2013

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
<p>This would be a tool that the entire community, city staff, and stakeholders could use.</p>

Section 9 – Mitigation Actions

NEW ACTION-2	
Proposed Action:	Establish new data gathering techniques and data sharing agreements across departments to improve environmental public health surveillance.
BACKGROUND INFORMATION	
Site and Location:	Austin, Texas Travis County, Texas
History of Damages:	Extreme Heat: 8 mortalities from 1999-2000 reported to NCDC. 9 mortalities in 2002-2004 reported by TX Dept of State Health Services Department of Health Statistics. Flooding: 4 mortalities, 61 injuries, \$590K property damage from 2001-2007 reported to NCDC.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildland Fires, Drought, Extreme Heat
Effect on new/existing buildings:	Extreme heat can compromise the habitability of buildings with little or no insulation, no radiant barrier, and/or lacking air conditioning. Flooding can cause structural and moisture damage.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000 - \$2,000,000
Potential Funding Sources:	US EPA
Lead Agency/Department Responsible:	Austin/Travis County Department of Health and Human Services
Implementation Schedule:	2011-2013

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
<p>The Austin/Travis County Department of Health and Human Services is currently limited in its ability to perform public health surveillance on the potential health effects of extreme heat and flooding events on vulnerable populations due to lack of data. This action will increase availability of data by authorizing city departments to minimize firewalls that limit data sharing capacity. Additionally, the City of Austin should establish data sharing agreements with area hospitals and other health care providers around heat- and flooding-related morbidity and mortality. Finally, the City of Austin should review data collection and storage techniques to ensure that information related to socioeconomic vulnerability, building and land use patterns affecting the urban heat island effect, and structural and non-structural flooding mitigation programs – among others – is systematically collected, geospatially coded, stored, and shared with the health department to assist in the development of a robust surveillance program.</p>

Section 9 – Mitigation Actions

NEW ACTION-3	
Proposed Action:	Implement urban heat island mapping
BACKGROUND INFORMATION	
Site and Location:	Map pockets of heat throughout the area in Travis County to see where measures need to be taken to reduce the heat impact.
History of Damages:	Seasonal extreme temperature for the city leads to harmful effects to health.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	Potential for reflective or green roofs to keep existing buildings cool.
Priority (High, Moderate, Low):	High
Estimated Cost:	TBD
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Austin Climate Protection Program (ACPP)
Implementation Schedule:	Eighteen months after receipt of funding

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS

Section 9 – Mitigation Actions

NEW ACTION-4	
Proposed Action:	Develop a study to determine the relationship between allergies and climate change.
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	Allergies increase as the city experiences more extreme weather, especially extreme heat. The purpose of the study would be to determine the relationship between climate change and the increase in allergies.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Infectious Disease, Drought
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	TBD
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	ACPP in coordination with the Health Dept. and UT
Implementation Schedule:	Twelve months after receipt of funds

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS

Section 9 – Mitigation Actions

NEW ACTION-5	
Proposed Action:	Institute a tree planting program to reduce heat island impacts and flood damage
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	The city experiences seasonal flooding and extreme temperature. Planting trees will help reduce floodwaters and also reduce temperatures.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood
Effect on new/existing buildings:	Planting trees around existing buildings will help keep temperature down as well as reduce energy cost. In addition, trees can help to reduce the effect of floodwaters.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	TBD
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	ACPP
Implementation Schedule:	TBD

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS

Section 9 – Mitigation Actions

NEW ACTION-6	
Proposed Action:	Complete a study to determine the effect thermal comfort/power outages have on people
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	The city experiences high temperatures throughout the summer and is currently experiencing record heat for 2009. Although winters are milder in Austin, power outages are common.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storm
Effect on new/existing buildings:	This action would determine the effect on people rather than property
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	TBD
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	ACPP
Implementation Schedule:	TBD

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS

Section 9 – Mitigation Actions

NEW ACTION-7	
Proposed Action:	Complete a study for the Capitol Metropolitan region to downscale US climate change models to show climate change impacts expected in our region.
BACKGROUND INFORMATION	
Site and Location:	Region-wide
History of Damages:	The city is in a period of record drought for 2009 which leads to wildfires and water shortage.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Wildland Fire, Drought, Flood, Infectious Disease
Effect on new/existing buildings:	This action would determine the effect on people rather than property
Priority (High, Moderate, Low):	High
Estimated Cost:	TBD
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	ACPP
Implementation Schedule:	2011 and Ongoing

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
<p>There is currently a large study on the climate change model for the entire U.S. Impact studies are being conducted by region. This action would look at downscaling the regional study. Collaboration could be possible with the University of Texas through their research department and perhaps working with grad students.</p>

Section 9 – Mitigation Actions

NEW ACTION-8	
Proposed Action:	Develop a study to determine the relationship between infectious disease and climate change.
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	No history currently, but as we start to see climate change impacts in our region it would be useful to develop a study to prepare for potential increases in infectious diseases.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Infectious Disease, Drought
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	TBD
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	ACPP in coordination with the Health Dept. and UT
Implementation Schedule:	Twelve months after receipt of funds

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS

Section 9 – Mitigation Actions

NEW ACTION-9	
Proposed Action:	Develop Community Wildfire Protection Plan for the City of Austin and/or surrounding communities.
BACKGROUND INFORMATION	
Site and Location:	City of Austin and surrounding communities/natural areas.
History of Damages:	There is limited data on the damages resulting from wildfires and few damaging wildfires have been identified, however the potential is generally accepted to be moderate to high.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildland Fire
Effect on new/existing buildings:	Increased protection of new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	Dependent on design - \$200,000 for contract-reduced direct cost if done by city staff
Potential Funding Sources:	Dependent on design - Department budgets and/or grants
Lead Agency/Department Responsible:	Dependent on design – AFD, HSEM. and/or interagency working group
Implementation Schedule:	Dependent on design – 6 months to 1 year

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input checked="" type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input checked="" type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input checked="" type="checkbox"/>	5 <input type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input checked="" type="checkbox"/>	5 <input type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
<p>A Community Wildfire Protection Plan could clearly define the fire concerns in the Austin area and identify clear goals and objectives for all stakeholders. Currently, there are limited programs and/or resources available in the community to adequately mitigate wildland fires and/or wildland urban interface fires.</p> <p>This plan has been proven to be economically, socially, and environmentally acceptable. There would likely be limited political or legal concerns regarding the development of the plan, but there could be challenges to implementing the plan. It may be difficult to administer the plan due to the amount of coordination involved and there is insufficient technical data available at the current time to write the plan. Additional data would need to be compiled and analyzed.</p>

Section 9 – Mitigation Actions

NEW ACTION-10	
Proposed Action:	Establish an interdepartmental/interagency wildland fuels crew to implement mechanical fuel reduction projects, conduct prescribed burns, and suppress wildland fires.
BACKGROUND INFORMATION	
Site and Location:	City of Austin and surrounding communities/natural areas
History of Damages:	There is limited data on the damages resulting from wildfires and few damaging wildfires have been identified, however the potential is generally accepted to be moderate to high.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildland Fire
Effect on new/existing buildings:	Increased protection on new/existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Dependent on design - 6 person crew - \$500,000/yr plus \$200,000 start up expenses
Potential Funding Sources:	Dependent on design - Department budgets and/or external partners
Lead Agency/Department Responsible:	Dependent on design – Wildland fire management agency that follows the National Wildfire Coordinating Group (NWCG) standards
Implementation Schedule:	Dependent on design – multi-year, year round

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input checked="" type="checkbox"/>	5 <input type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input checked="" type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input checked="" type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input checked="" type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input checked="" type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

COMMENTS
<p>An interagency fuels crew that had the ability to work across jurisdictional and ownership boundaries could significantly reduce hazardous fuel loads and contribute needed resources for prescribed fire and wildland fire operations. This crew would need to be designed as a wildland fire crew with flexible hours and the ability to travel. Currently there are limited resources available in any city department (or partnering agency) to conduct wildland fire mitigation projects.</p> <p>This type of crew and their work has been proven to be technically, economically, and socially acceptable. There is likely to be some resistance ecologically based on the competing objectives of fire protection and endangered species protection. The greatest challenges would be overcoming interdepartmental and interagency financial, legal, and political barriers.</p>

Section 9 – Mitigation Actions

NEW ACTION-11	
Proposed Action:	Establish a position for an interdepartmental/interagency wildland fire and/or wildland urban interface program coordinator.
BACKGROUND INFORMATION	
Site and Location:	City of Austin and surrounding communities/natural areas
History of Damages:	There is limited data on the damages resulting from wildfires and few damaging wildfires have been identified, however the potential is generally accepted to be moderate to high.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildland Fire
Effect on new/existing buildings:	Increased protection on new/existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	Dependent on design - \$150,000/yr
Potential Funding Sources:	Dependent on design - Department budgets and/or external partners
Lead Agency/Department Responsible:	Dependent on design – AFD, HSEM, or wildland fire management agency that follows NWCG standards
Implementation Schedule:	Dependent on design – multi-year, year round

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input checked="" type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input checked="" type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input checked="" type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
<p>An interagency wildland fire or wildland urban interface coordinator that had the responsibility and accountability for the coordination of communication, suppression, fuel mitigation, and outreach between multiple jurisdictions could significantly reduce the potential damages from a wildland fire, could improve the overall safety of the community, and improve the long-term sustainability of the ecosystem. The focus of this position would be mitigation and not suppression. This individual would need to have a wide range of abilities, but must have wildland fire and wildland fuel mitigation experience. Currently there are limited resources available in any city department (or partnering agency) to conduct wildland fire mitigation projects and the work that is being done is not well coordinated.</p> <p>This type of position has been proven to be technically, economically, socially and environmentally acceptable. The greatest challenges would be overcoming interdepartmental and interagency financial, legal, and political barriers.</p>

Section 9 – Mitigation Actions

NEW ACTION-12	
Proposed Action:	Expand the capability of the city’s communication system for citizens
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	The City has a 24-hour notification system, but a new system is needed that is more interactive. The new system will allow citizens to review documents and respond to the City. This system would provide efficient/user-friendly site without a webmaster.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Hazardous Material Release, Hurricane Wind, Infectious Disease, Pipeline Failure, Thunderstorm, Terrorism, Tornado, Wildland Fire, Winter Storm
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Grant funds for a pilot program
Lead Agency/Department Responsible:	HSEM
Implementation Schedule:	2009 and ongoing

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
<p>The AISD school consortium would be involved to enhance capabilities for the school system as well.</p>

Section 9 – Mitigation Actions

NEW ACTION-13	
Proposed Action:	Conduct a large-scale public education program on the home care and treatment of individuals and family members during a pandemic influenza
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	Pandemics have occurred in 1918, 1956, 1967 and 2009

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Infectious Disease
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Unknown
Potential Funding Sources:	FEMA and CDC grants
Lead Agency/Department Responsible:	HSEM, HHSD
Implementation Schedule:	September 2009

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
<p>Create and distribute a ready reference guide for citizens to use in the event of a severe pandemic influenza event. The guide should include information on the care of the ill as well as measures for the care giver to take to lessen the possibility of infection. The goal would be to lessen the impact on the public health, medical community during a pandemic to the greatest extent possible. Target those with no medical home especially. The document/training should be educationally and culturally appropriate.</p>

Section 9 – Mitigation Actions

NEW ACTION-14	
Proposed Action:	Construct a multi-purpose structure that could provide an ongoing commercial purpose until needed, at which point it could be re-configured as a disaster-safe shelter
BACKGROUND INFORMATION	
Site and Location:	Downtown Austin
History of Damages:	The City has routinely opened shelters as a result of a CASHP activation and winter weather events

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Infectious Disease, Winter Storm
Effect on new/existing buildings:	May require new construction as well as the demolition of existing structures depending on the ultimate location of the facility
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000,000 to \$15,000,000
Potential Funding Sources:	Grants and private funding
Lead Agency/Department Responsible:	Building Services
Implementation Schedule:	18 months after receipt of funds

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
<p>The concept behind this action is to construct a large downtown parking facility in Austin in such a way that it could be converted to a shelter in response to extreme conditions. For example, when not needed, the facility can be used as a contract and special event parking facility that generates revenue. When needed, the cars can be moved and the facility configured in such a way as to serve as a shelter. This means that the facility would need to be able to be “closed off” to support a HVAC system. Additionally, the structure would need to be able to support water for showers, wastewater facilities and food service capabilities. The structure could then be used for the homeless population in the event of a winter storm or as a cooling station during an extreme heat event. The facility could also be used as a designated medical special needs shelter during an activation of a CASHP activation. Finally, the facility could be utilized as a medical surge facility in the event of a pandemic influenza.</p>

Section 9 – Mitigation Actions

NEW ACTION-15	
Proposed Action:	Retrofit AISD facilities for wind resistance/safe room
BACKGROUND INFORMATION	
Site and Location:	Austin ISD locations and critical facilities
History of Damages:	Austin ISD area schools housed evacuees from Hurricane Ike and also were minimally damaged from hurricane winds. Stronger windows are needed to resist hurricane winds and also damage from hail, ice or flooding during a hazard event.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind, Tornado, Winter Storm, Hail, Thunderstorm, Flood
Effect on new/existing buildings:	This action would strengthen current buildings by making them more resistant to hurricane and high winds.
Priority (High, Moderate, Low):	High
Estimated Cost:	TBD
Potential Funding Sources:	Federal and state grants
Lead Agency/Department Responsible:	AISD – Office of Homeland Security and Emergency Management
Implementation Schedule:	2010-2011

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
<p>This action would include a protective covering for windows for all elementary schools and also the purchase of generators in case of a power outage.</p>

Section 9 – Mitigation Actions

NEW ACTION-16	
Proposed Action:	Develop an AISD center that will also function as a disaster-safe shelter.
BACKGROUND INFORMATION	
Site and Location:	To be determined
History of Damages:	During Hurricane Ike, Austin area schools housed evacuees. Supplies were short and also there was not enough available space. A disaster-safe shelter could provide room for evacuees, a shelter for the Austin community, and also function as an auditorium or gym for AISD.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Hail, Hazardous Material Release, Hurricane Wind, Infectious Disease, Thunderstorm, Terrorism, Tornado, Wildland Fire, Winter Storm
Effect on new/existing buildings:	This action would allow for more efficient use of current buildings as well as the development of a new shelter
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,500,000
Potential Funding Sources:	Federal and state grants
Lead Agency/Department Responsible:	AISD – Office of Homeland Security and Emergency Management
Implementation Schedule:	2010-2011

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS

Section 9 – Mitigation Actions

NEW ACTION-17	
Proposed Action:	Develop an awareness campaign for extreme temperature and promote through the City of Austin Website, home safe calendar and pamphlets to neighborhood associations
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	Because the city experiences mild winter, many residents do not properly protect their property or enact home mitigation measures. In addition the city experience extreme heat every summer. Heat strokes and even fatalities can occur if citizens are unaware of the dangers of extreme heat.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storm
Effect on new/existing buildings:	Retrofit existing structures and construct new structures with double pane windows and other methods to reduce effects of extreme heat and winter storm
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000 annually
Potential Funding Sources:	Federal and state grants/ general revenue
Lead Agency/Department Responsible:	HSEM, Public Health Dept., EMS
Implementation Schedule:	2010 and ongoing

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS

Section 9 – Mitigation Actions

NEW ACTION-18	
Proposed Action:	Develop a safe room program to retrofit residences in order to protect against a tornado or hurricane wind event.
BACKGROUND INFORMATION	
Site and Location:	To be determined
History of Damages:	During Hurricane Ike the City experienced high winds and often is prone to mild tornados which cause damage to buildings and property and threaten the safety of citizens

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Hurricane Wind
Effect on new/existing buildings:	This action would strengthen existing buildings and residences by making them more resistant to damage from tornadoes and hurricane winds
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$6,000 per safe room
Potential Funding Sources:	Federal Grants
Lead Agency/Department Responsible:	HSEM
Implementation Schedule:	To be implemented after receipt of funds

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
Promote through Association of Builders/Developers to include in new construction; Safe room grants pay approximately ½, or \$3,000 of the \$6,000 cost to add a safe room to a residence.

Section 9 – Mitigation Actions

NEW ACTION-19	
Proposed Action:	Conduct public awareness campaign for realtors, insurance agents, lenders, surveyors and other professionals on benefits of flood insurance under the National Flood Insurance Program (NFIP)
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	Austin experiences flooding and flash flooding which leads to damage to property and even fatalities. The NFIP benefits those who have purchased flood insurance for their homes. More training is needed regarding policies for agents, lenders and other professionals

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on new/existing buildings:	This action would reduce the impact of flooding for existing and new structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Staff time
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Partner with other associations and groups currently providing NFIP training
Implementation Schedule:	Ongoing

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
<p>Link to Watershed Mgmt. and to GeoSpatial Emergency Management Support System (GEMSS) through the Texas Natural Resources Information System (TNRIS).</p>

Section 9 – Mitigation Actions

NEW ACTION-20	
Proposed Action:	Increase public awareness regarding the National Flood Insurance Program (NFIP) and Preferred Risk Policy for residents outside of the Special Flood Hazard Area (SFHA)
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	Austin experiences flooding and flash flooding which leads to damage to property and even fatalities. Flood insurance provides protection to those who have purchased flood insurance for their homes. Over 30% of NFIP claims occur outside of the SFHA.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on new/existing buildings:	This action would result in stronger buildings if citizens purchased flood insurance
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000 per year
Potential Funding Sources:	Grants and general revenue
Lead Agency/Department Responsible:	HSEM – partnering with organizations providing free NFIP training where available.
Implementation Schedule:	Annually

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
Advertise to neighborhood associations

Section 9 – Mitigation Actions

NEW ACTION-21	
Proposed Action:	Install perimeter lighting at Tom Miller, Decker and Longhorn Dam.
BACKGROUND INFORMATION	
Site and Location:	Tom Miler Dam – 20.294°N, 97.786°W Decker Dam – 30.285°N, 97.597°W Longhorn Dam – 30.250° N, 97.714°W
History of Damages:	The city has not experienced a major dam failure since the early 1930s. Perimeter lighting would help increase security at the above locations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Terrorism
Effect on new/existing buildings:	Prevent flood damage to existing structures within the inundation area for each dam
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	TBD
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	HSEM
Implementation Schedule:	2011

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS

Section 9 – Mitigation Actions

NEW ACTION-22	
Proposed Action:	Strengthen access restrictions at Tom Miller, Decker and Longhorn Dam.
BACKGROUND INFORMATION	
Site and Location:	Tom Miler Dam – 20.294°N, 97.786°W Decker Dam – 30.285°N, 97.597°W Longhorn Dam – 30.250° N, 97.714°W
History of Damages:	Although the last major dam failure occurrence for the City was the result of a flood in the 1930s, access restrictions are necessary in light of concerns for terrorism since 9/11.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Terrorism
Effect on new/existing buildings:	Prevent flood damage to existing structures within the inundation area for each dam
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	TBD
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	HSEM
Implementation Schedule:	2011

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS

Section 9 – Mitigation Actions

NEW ACTION-23	
Proposed Action:	Purchase communication equipment for uniform communication capability among first responders in the event of a pipeline failure or hazardous material spill.
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	The city does not have radio equipment that would be safe to use to communicate nearby a hazardous material release or pipeline failure. Technology is currently available for radios that would allow for communication even in a volatile environment.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Pipeline Failure, Hazardous Material Release, Terrorism
Effect on new/existing buildings:	This action enhances communicability between responders and does not directly impact new/existing buildings.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	TBD
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	HSEM
Implementation Schedule:	2010-2011 with replacements as needed

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS

Section 9 – Mitigation Actions

NEW ACTION-24	
Proposed Action:	Increase public awareness of the dangers of pipeline failure through the Pipeline Safety Trust, a NFP Public charity in order to promote fuel transportation safety.
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	Pipeline failure may occur due to ruptures or terrorism

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Pipeline Failure, Terrorism
Effect on new/existing buildings:	This action does not directly affect new/existing buildings.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Staff time
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	HSEM
Implementation Schedule:	2011

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
Coordinate with neighborhood associations and host public meetings.

Section 9 – Mitigation Actions

NEW ACTION-25	
Proposed Action:	Develop a public awareness campaign to encourage citizens to purchase NOAA weather radios.
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	NOAA weather radios keep citizens informed in the event of a natural disaster. These radios are available for purchase at many locations throughout the city, such as HEB.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm, Hail, Flood, Tornado, Hurricane Wind, Winter Storm
Effect on new/existing buildings:	NOAA radios allow citizens to take measures to protect their property and existing buildings in the event of a natural disaster
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	General Fund
Lead Agency/Department Responsible:	HSEM
Implementation Schedule:	To be implemented annually

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
<p>The City could use this as a tie-in with other public awareness campaigns, thereby keeping the cost at a minimum.</p>

Section 9 – Mitigation Actions

NEW ACTION-26	
Proposed Action:	Conduct study to determine specific buildings and critical facilities that could be upgraded to Green Building Status.
BACKGROUND INFORMATION	
Site and Location:	To be determined
History of Damages:	In 2007 the National Association of Home Builders (NAHB) and the International Code Council (ICC) partnered to form to establish a much-needed and nationally-recognizable standard definition of what is meant by "Green Building". This would help buildings to conserve energy, but also make critical facilities more resistant to natural hazards.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm, Hail, Extreme Heat, Winter Storm, Tornado, Flood
Effect on new/existing buildings:	This would increase energy savings and costs for existing buildings, but also affect the development of new buildings, as they are built to a higher standard
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined be determined based on the study results
Potential Funding Sources:	City funds, Grants
Lead Agency/Department Responsible:	Building Services / Green Building
Implementation Schedule:	Complete study by 2011

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
<p>This would hold builders to a higher standards as a builder, remodeler or developer must incorporate a minimum number of features in the following areas: energy, water, and resource efficiency, lot and site development, indoor environmental quality, and home owner education</p>

Section 9 – Mitigation Actions

NEW ACTION-27	
Proposed Action:	Promote the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) through the City of Austin’s Public Awareness Week.
BACKGROUND INFORMATION	
Site and Location:	Outlying and rural areas of the City of Austin
History of Damages:	Although the City experiences little snow, it is often prone to floods and hail events, the most recent in the Spring of 2009.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Thunderstorm, Winter Storm
Effect on new/existing buildings:	This action would help for monitoring rain and hail events to better report historical occurrences; thereby identifying areas and existing buildings that are not properly protected
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Negligible
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	Watershed Department in conjunction with the National Weather Service
Implementation Schedule:	Annually – every March

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
The City already works with the National Weather Service (NWS) to promote public awareness of natural hazards. This would be a great tie-in for the Public Awareness Week, which is hosted every March.

Section 9 – Mitigation Actions

NEW ACTION-28	
Proposed Action:	Install additional flashing lights at low water crossings at areas additionally annexed to the City.
BACKGROUND INFORMATION	
Site and Location:	<p>There have been several low water crossing areas that were recently annexed to Austin. The following locations need flashing warning lights:</p> <p>10140 Old San Antonio Road 6100 W. Slaughter 10100 David Moore Drive 9708 Carson Creek Boulevard 600 block of W. Dittmar at Cooper Lane (single lane bridge crossing) Slaughter Creek Drive in the Hollow at Slaughter Creek Bilbrook Place E. Dessau Road 12000 and 12100 Cameron Road Burleson Road (south of the Bergstrom Airport) S. Brodie Lane</p>
History of Damages:	Austin experiences torrential floods every year. More warnings are needed at low water crossings to prevent people from driving through dangerous areas.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm, Hail, Flood
Effect on new/existing buildings:	This would protect lives and property, but mainly vehicles rather than buildings.
Priority (High, Moderate, Low):	High
Estimated Cost:	Up to \$10,000 per crossing
Potential Funding Sources:	HMGP, CDBG, PDM grants
Lead Agency/Department Responsible:	Watershed Dept.
Implementation Schedule:	To be installed by 2012

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS

Section 9 – Mitigation Actions

NEW ACTION-29	
Proposed Action:	Create a neighborhood and community plan, including drills and exercises to educate the public regarding the location of pipelines and actions to take in the event of a hazardous material spill.
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	The city has experienced few man-caused events, but citizens should be aware of procedures and locations of hazardous areas.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Pipeline Failure, Hazardous Material Release
Effect on new/existing buildings:	This action primarily concerns protecting lives instead of directly effecting buildings.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal cost as partnering opportunities are available
Potential Funding Sources:	General Revenue and grants where available
Lead Agency/Department Responsible:	Austin Fire Department; Watershed Protection and Development Services
Implementation Schedule:	Ongoing

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
There are many groups that conduct drills and education for the public at little to no expense. Partnering opportunities with these groups would be sought.

Section 9 – Mitigation Actions

NEW ACTION-30	
Proposed Action:	Develop and implement shelter-in-place training for AISD schools and city buildings to mitigate against hazardous material releases
BACKGROUND INFORMATION	
Site and Location:	Critical infrastructure and schools throughout the city.
History of Damages:	The City has had few spill events and has not been affected by a major occurrence. However employees, students, teachers and citizens should be aware of proper procedures for shelter-in-place

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hazardous Material Release
Effect on new/existing buildings:	This activity would help to protect people in the event of a spill and would not negatively affect existing buildings
Priority (High, Moderate, Low):	High
Estimated Cost:	Minimal
Potential Funding Sources:	Staff time
Lead Agency/Department Responsible:	AISD, Building Services
Implementation Schedule:	Ongoing

Section 9 – Mitigation Actions

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:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Technically Feasible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Administratively Possible:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Politically Acceptable:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Legal:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Economically Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
Environmentally Sound:				
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>

COMMENTS
Shelter-in-place techniques and tips are available through the Department of Homeland Security. There needs to be a greater awareness and promotion of these techniques in the event of a hazardous material release.

PLAN MAINTENANCE

Overview	1
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Updating	2
Plan Amendments	2
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Incorporation	4
Evaluation.....	5
Continued Public Involvement.....	5
Public Involvement Over the Past Five Years	5
Public Involvement Going Forward.....	6

Overview

Periodic revisions of the updated plan are required to ensure that the goals, objectives, and mitigation action plans are kept current. More important, revisions may be necessary to ensure that the updated plan is in full compliance with federal regulations and state statutes. This portion outlines the procedures for completing such revisions and updates.

Monitoring

Designated Hazard Mitigation Team Members (see Appendix A) are responsible for yearly monitoring of components of the hazard mitigation plan that pertain to their respective department or organization within the City.

Updating

Plan Amendments

At any time, minor technical changes may be made to the plan to keep it updated. However, any changes to the mitigation actions or modifications in the overall direction of the Plan or the policies contained within it must be subject to formal adoption by the City Council. Any amendment to the Plan must undergo an open public process. The City will seek public comment on any material change to the Plan during a formal review and comment period of not less than 30 days.

At the end of the comment period, the proposed amendment and a summary of all comments will be forwarded to the Austin City Council. If no comments are received from the reviewing parties within the specified review period, this will also be noted. The City Council will then review the proposed amendment and comments received and vote to accept, reject, or amend the proposed change. Upon ratification, the amendment will be transmitted to the Texas Division of Emergency Management.

In determining whether to recommend approval or denial of a plan amendment request, the following factors will be considered:

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

Five (5) Year Review

The Plan will be thoroughly reviewed by the planning team at the end of three years from the date of adoption by the City Council to determine whether there have been any significant changes that necessitate changes in the types of mitigation actions proposed. New development in identified hazard areas, an increased exposure to hazards, disaster declarations, the increase or decrease in capability to address hazards, and changes to federal or state legislation are examples of factors that may affect the content of the updated plan.

Section 10 – Plan Maintenance

The plan review provides the City with an opportunity to evaluate successful actions and document potential losses avoided due to the implementation of specific mitigation measures. The plan review also provides the opportunity to address mitigation actions that may not have been successfully implemented as assigned. It is recommended that the planning team meet to review the plan at the end of three years, as grant funds may be necessary for the development of a five-year update. Due to the timelines for grant cycles, it is wise planning to begin the review process in advance of the five-year deadline.

Following the review, any revisions deemed necessary will be summarized and utilized according to the reporting procedures and plan amendment process outlined herein. Upon completion of the review and update/amendment process and after being approved by the City Council, the revised plan will be submitted to the Texas Division of Emergency Management for final review and approval in coordination with FEMA.

Implementation/Incorporation/Evaluation

Implementation

Each participating City department or team member will be responsible for the development and/or implementation of the mitigation actions in this Plan. Each action has been assigned to a specific organization within the City of Austin.

The potential funding sources listed for each identified action may be used when the planning team member(s) begins to seek 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.

Team members will integrate implementation of their mitigation action plans with other existing plans for the City, such as the Capital Improvement Plan, which is currently being updated for 2010, as well as the Emergency Operations Master Plan for the City. Existing plans for the City will be reviewed in light of the Plan Update and will incorporate any mitigation policies and actions into these plans, as appropriate. Team members will ensure that the actions in the mitigation plans are reflected in other planning efforts.

Section 10 – Plan Maintenance

Incorporation

Upon formal adoption of the Update by the City Council, team members will work to integrate the hazard mitigation strategies into existing plans as listed in Section 7 – Capability Assessment. Participating team members will conduct periodic reviews of plans and policies and analyze the need for amendments in light of the approved Plan Update. The planning team will ensure that future capital improvement planning will be consistent with the goals of this hazard mitigation plan to reduce the long-term risk to life and property from all hazards by annually reviewing active plans for consistency. Table 10-1 identifies ways in which the City will incorporate the Update into other planning mechanisms.

Table 10.1 – Examples of Incorporation

Planning Mechanism	Incorporation of Plan Update
Grant Applications	The Plan Update will be consulted by planning team members whenever grant funding is sought for mitigation projects. If a project is not in the Update, an amendment may be necessary .
Annual Budget Review	Each City department that participated in the planning process will review the Update and mitigation actions therein when conducting their annual budget review.
Emergency Planning	The Plan Update will be consulted when the City reviews or revises their Emergency Operations Plan, Disaster Recovery Plan and Continuity of Operations Plan.
Capital Improvements	The City currently has a Capital Improvement Plan (CIP) in place. Before any updates to the CIP are conducted, the City will review the risk assessment and mitigation strategy sections of the HMAP Update, as limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments.
Floodplain Management and Fire Protection	The Plan Update will be utilized in updating the Watershed Protection Plan, as the goals of both planning mechanisms are similar. As the Austin Fire Department is currently developing fire protection

Section 10 – Plan Maintenance

	plans, the Plan Update consulted in conjunction with the development of these plans for overlapping strategies.
Climate Protection	The Austin Climate Protection Program participated in the Plan Update, and will review the Plan for any actions or strategies when refining the Austin Climate Protection Plan

Evaluation

As part of the evaluation process, team members will meet quarterly (or at the call of HSEM) to:

- Assess any changes in risk and recommend additional mitigation actions as appropriate;
- Report on the implementation status of the mitigation actions in this plan; if the implementation is on schedule or if there are any implementation problems (such as technical, political, legal or coordination issues);
- Identify any changes in land development or programs that affect mitigation priorities in their respective department or organization.

Continued Public Involvement

Public Involvement Over the Past Five Years

The City has maintained public involvement since FEMA approval of the 2004 Plan in a variety of ways. The City implemented Disaster Ready Austin¹, a public education campaign that detailed the natural and man-caused or technological threats included in the 2004 Plan. The City informed the public about hazards and steps to take in preparation for a hazard event. Though grant funding is no longer available to continue some of the efforts under Disaster Ready Austin, the HSEM has implemented several public education programs and campaigns since 2004, including:

- Promoting the Small Business Administration Pre-Disaster Mitigation Loan Program;

¹ More information can be found at: <http://www.ci.austin.tx.us/disasterready/>

Section 10 – Plan Maintenance

- Educating the public about the dangers of low-water crossings and mitigation activities as part of the Texas Flash Flood Alley War Council,; and
- Training citizens for the Community Emergency Response Team (CERT), which currently has over 250 trained volunteers.

Throughout the past five years, the City has also kept the 2004 Plan available on their website for download for citizens.

Public Involvement Going Forward

Input from the public was an integral part of the preparation of this updated plan and will continue to be essential as the plan grows and changes. As noted above, a significant change to this plan will require opportunities for the public to make its views known.

This Plan will be posted on the HSEM website, <http://www.ci.austin.tx.us/oem/>, where officials and the public will be invited to provide ongoing feedback. A copy of the updated plan also will be kept for public review at the HSEM office. The City also uses social media, such as Facebook and Twitter, to keep citizens involved with mitigation planning.

If necessary, HSEM may also designate volunteer citizens or willing members of the private sectors as members of the planning team as well as utilize local media to notify the public of any maintenance or periodic review activities taking place.

APPENDIX A

Planning Team Members 1
 Stakeholders 2

Planning Team Members

As discussed in Section 2, the Plan Update was organized using a direct representative model, as the Office of Homeland Security and Emergency Management (HSEM) acted as direct representatives for the City in this effort. At the beginning of the process key members from HSEM sent notices to all City departments asking for input and participation in the process. The following organizations¹ responded to the request and participated throughout the planning process.

Table A-1 – Planning Team Members – Organization and Title

Organization	Title
Austin Climate Protection Program	Climate Change Analyst
Austin Community College	EHS Coordinator
Austin I.S.D.	Emergency Management Coordinator
Austin Water Utility – Wildland Conservation Division	Environmental Program Coordinator
Austin Water Utility – Wildland Conservation Division	GIS Specialist
Communications and Technology Management	GIS Supervisor
Homeland Security and Emergency Management	Director
Homeland Security and Emergency Management	Senior Emergency Plans Officer
Homeland Security and Emergency Management	Emergency Preparedness Manager
Homeland Security and Emergency Management	Emergency Plans Officer
Homeland Security and Emergency Management	Grants Coordinator
Homeland Security and Emergency Management	Volunteer Coordinator

¹ Titles are given rather than names as the person holding the title in the respective organization will be responsible for continual maintenance of the Update, regardless of whether that same person initially held that role in 2009.

Appendix A – Planning Team

Organization	Title
Watershed Protection Development Review Department	Flood Early Warning Engineer
Seton Family of Hospitals	Network Hazmat Safety Officer

Stakeholders

The following groups were invited to stakeholder meetings, public meetings and workshops throughout the planning process and include: City departments and groups; non-profit organizations; private businesses; hospitals; and educational groups. For a list of attendance at meetings, please see Appendix E².

Table A-2. Stakeholder Groups

University of Texas at Austin
Austin Community College
Seton Hospital System
St. David’s Hospital
Austin Climate Protection Program
Austin Fire Department
Austin Parks and Recreation
Texas Forest Service
Austin City Council
Austin Neighborhood Groups
Austin/Travis County Health & Human Services Department
Adele Houghton Consulting
Austin Water Utility
U.S. Fish & Wildlife

² Information contained in Appendix E is exempt from public release under the Freedom of Information Act (FOIA).

APPENDIX B

Overview 1
Survey Results 2

Overview

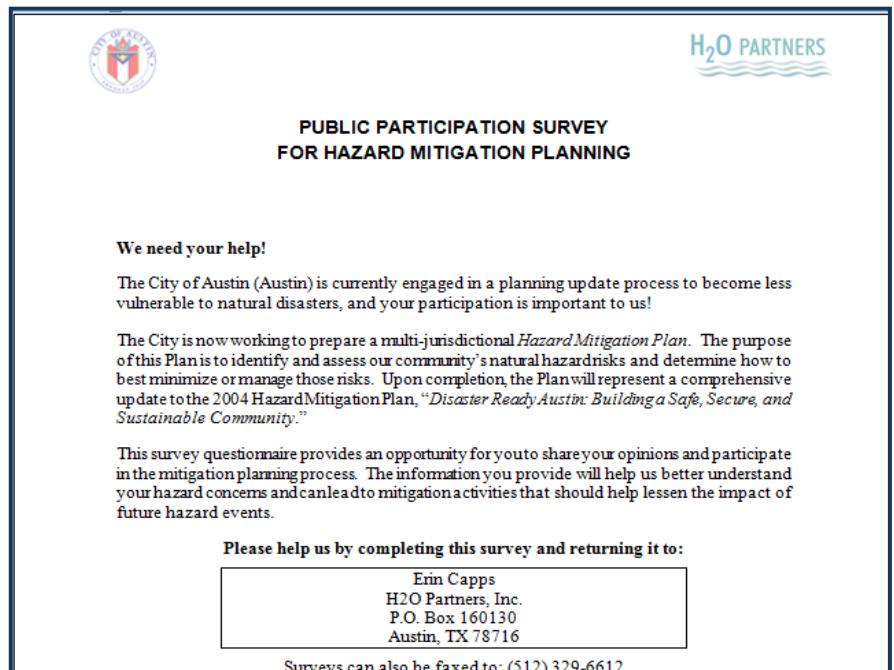
The City of Austin prepared public surveys that asked a wide range of questions concerning the opinions of the public regarding natural and man-caused hazards. This fifteen-question survey was made available on the city website, www.ci.austin.tx.us/oem. This survey was also distributed in hard copy format at public meetings and stakeholder events throughout the planning process.

A total of 156 surveys were collected, the results of which are analyzed in this Appendix. The purpose of the surveys was twofold: 1) to solicit public input during the planning process and 2) to help the city to identify any potential actions or problem areas.

Figure B-1. Public Survey

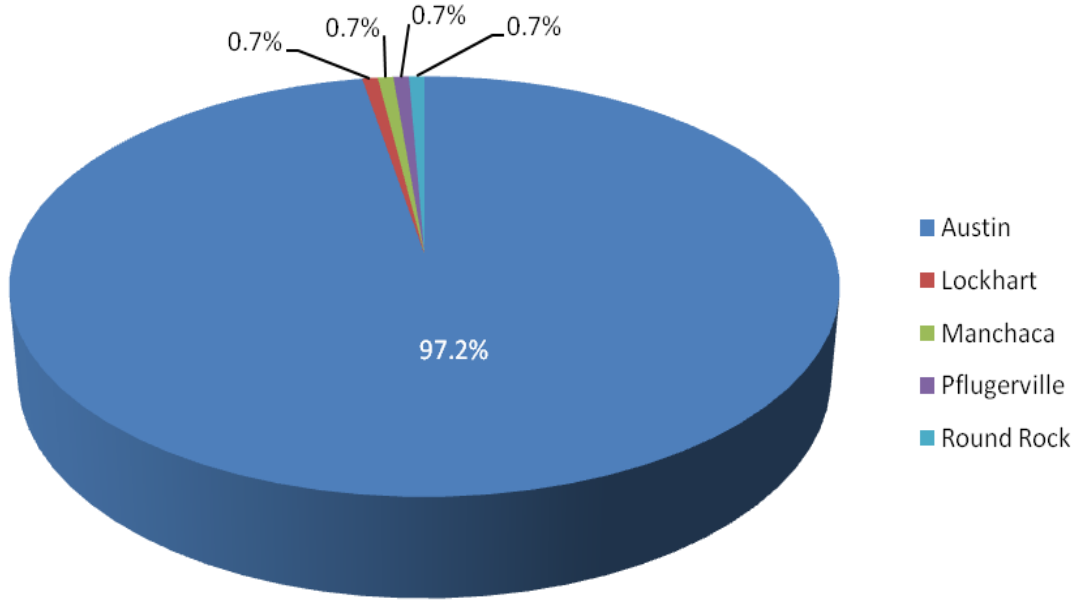
Survey results are depicted on the following pages showing the percentage of responses for each answer.

For questions that were not multiple choice, such as questions 13 and 14, or that required an explanation, such as questions 2 and 6, comments are included as they were entered on the survey itself.

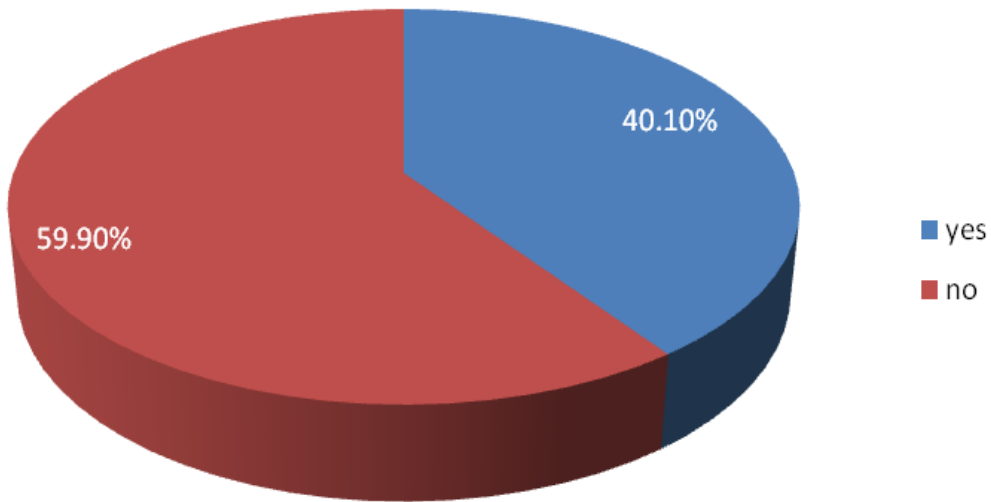


Survey Results

1. What is your home zip code?



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

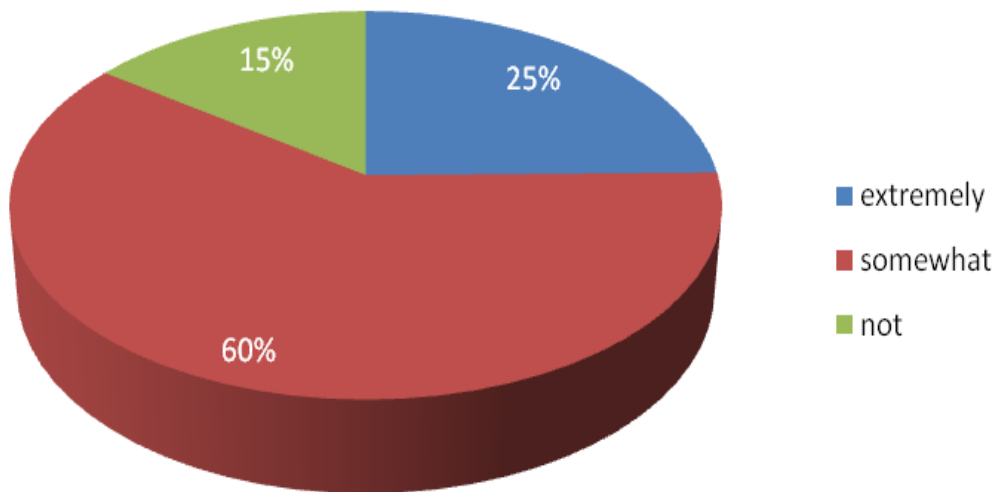


Appendix B – Survey Results

If “yes”, what hazard have you endured¹?

- Extreme Heat
- Drought
- Lightning
- Pipeline Failure
- Wind Storm
- Thunderstorm
- Urban Fire
- Hail
- Hurricane
- Tornado
- Flood

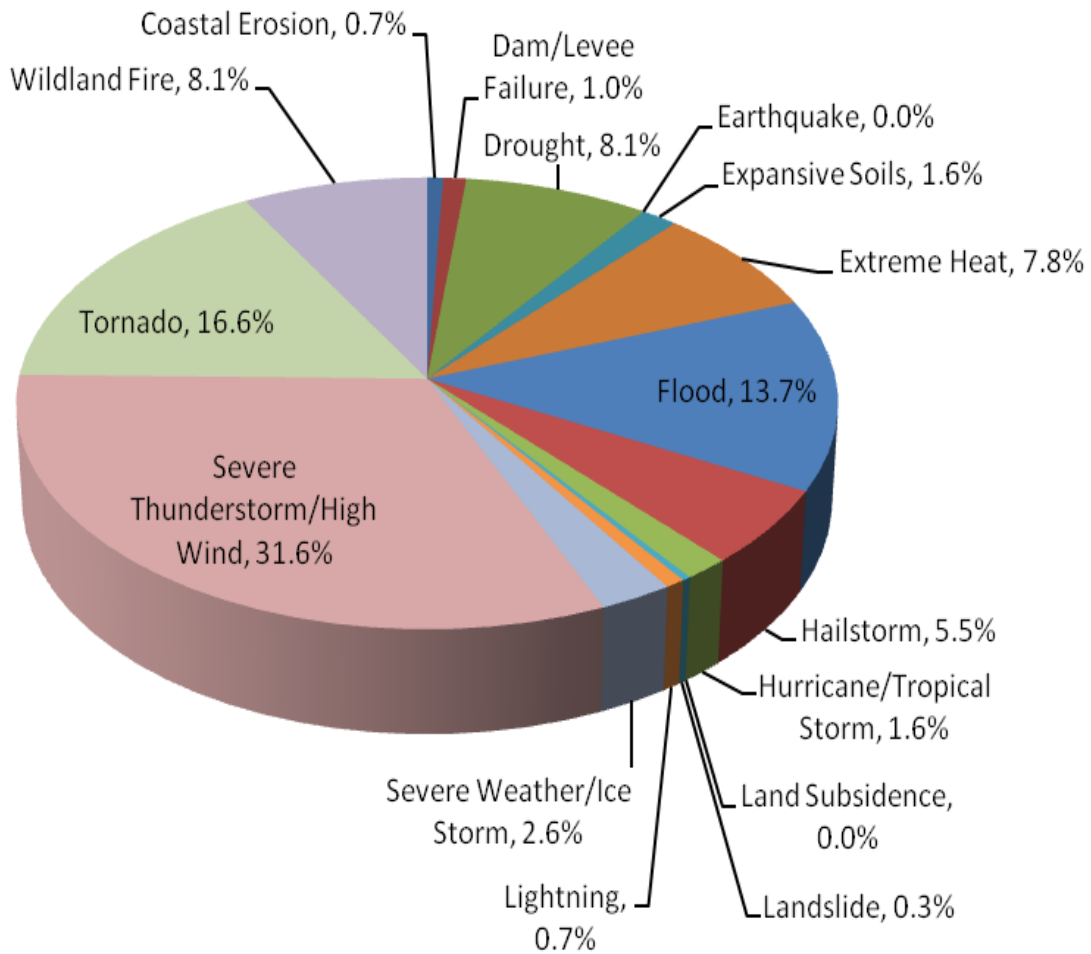
3. How concerned are you about the possibility of your community being impacted by a disaster?



¹ Responses entered may not be specific to Austin as some survey participants could have endured a hazard in another location.

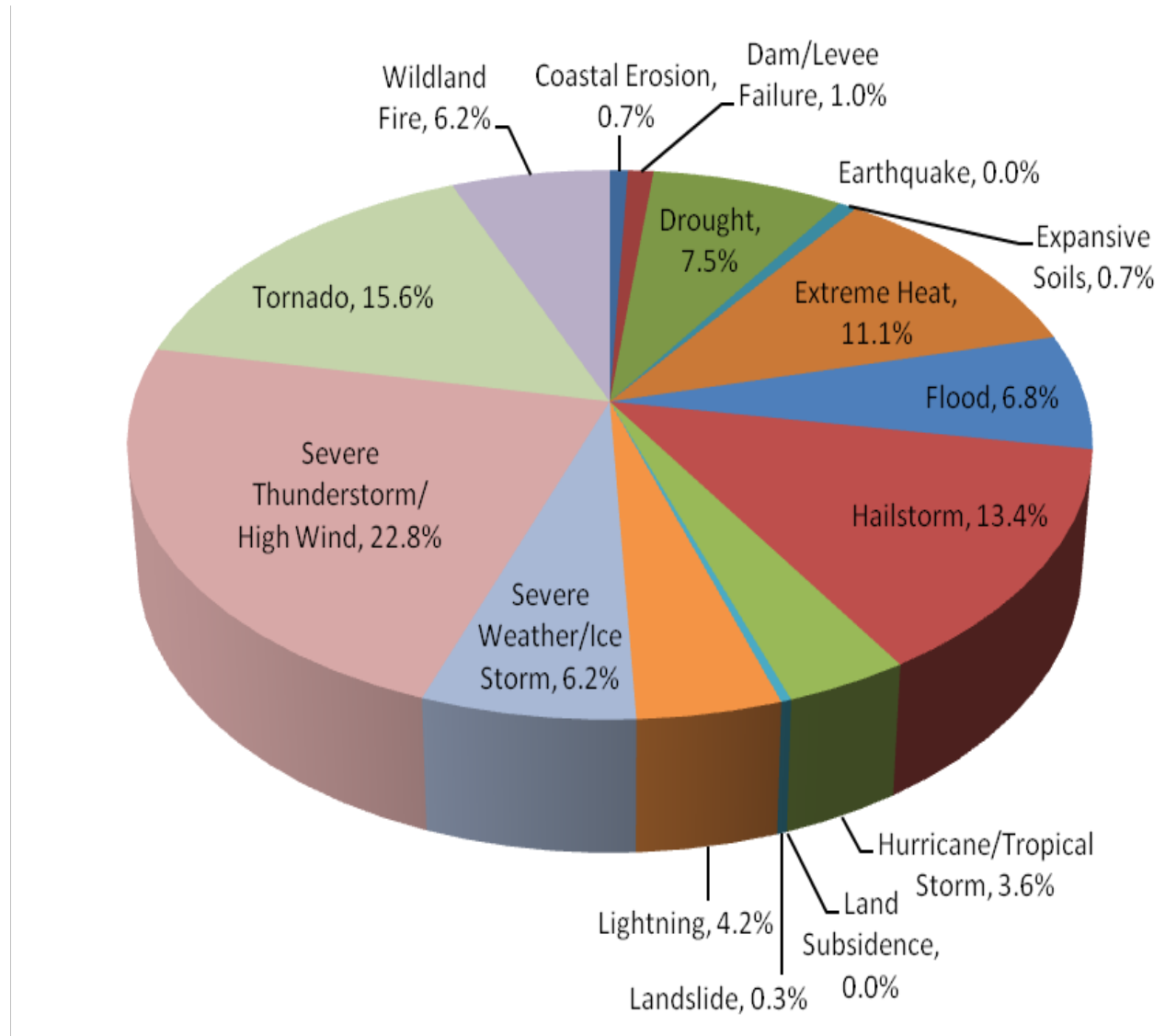
Appendix B – Survey Results

4 Please select the one hazard you think is the highest threat to your neighborhood:



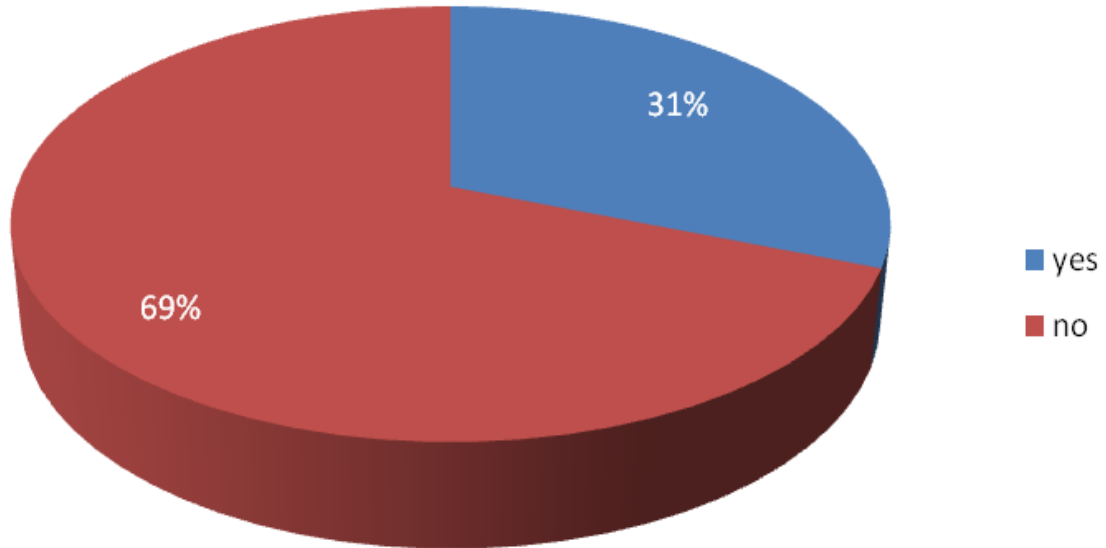
Appendix B – Survey Results

5. Please select the one hazard you think is the second highest threat to your neighborhood:



Appendix B – Survey Results

6. Is there another hazard not listed above that you think is a wide-scale threat to your neighborhood?

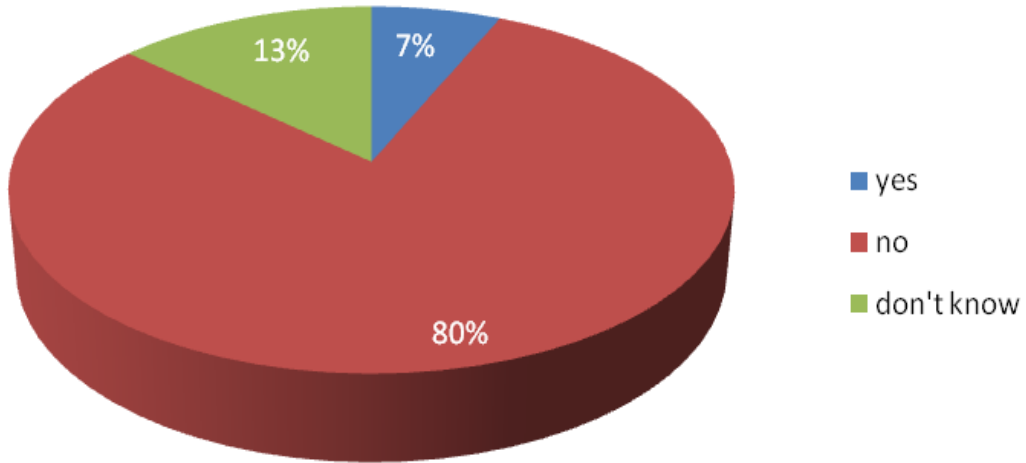


If “yes”, please explain what hazards you think are a wide-scale threat that are not listed²?

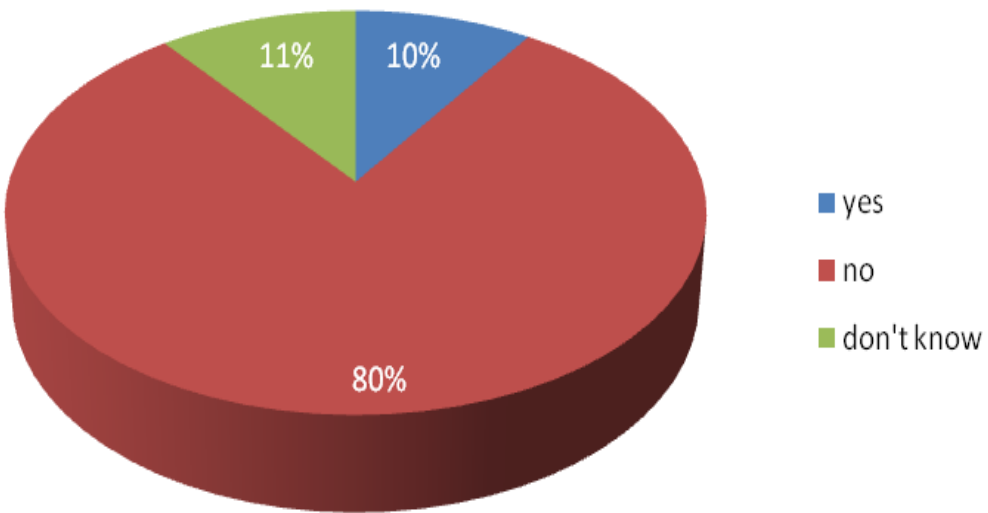
- Storm water
- Pandemic
- Riots
- Auto emissions
- Lack of evacuation corridors
- No street lights
- Urban debris
- Lack of emergency vehicle transportation clearance
- Gangs
- Train derailment
- Lack of fire hydrants

² Unless specified otherwise, open ended responses are not listed in any particular ranking order.

7. Is your home located in a floodplain?

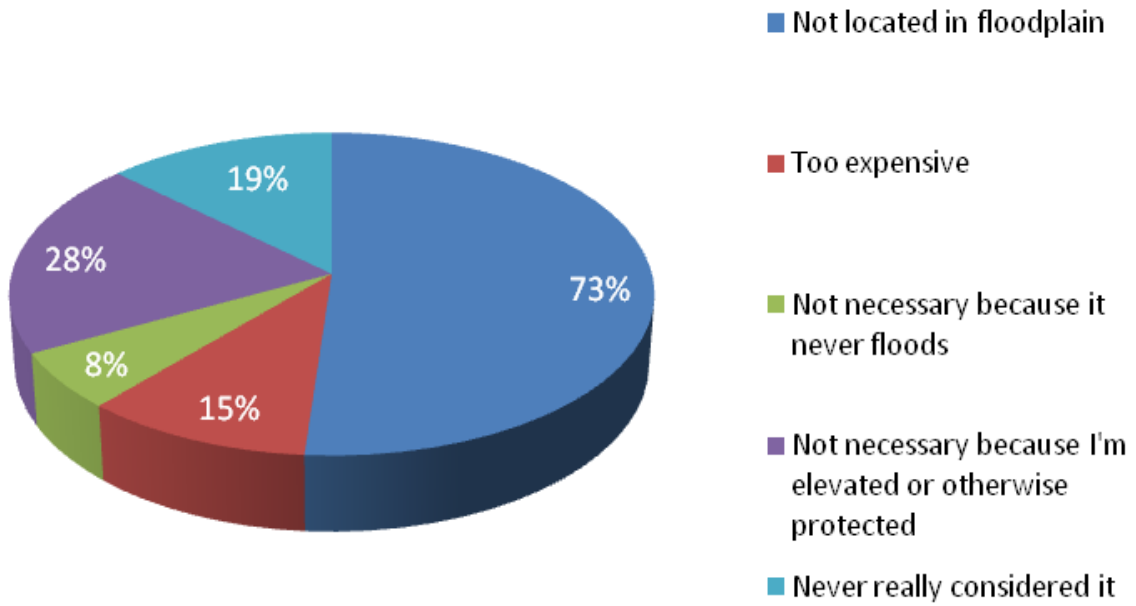


8. Do you have flood insurance?

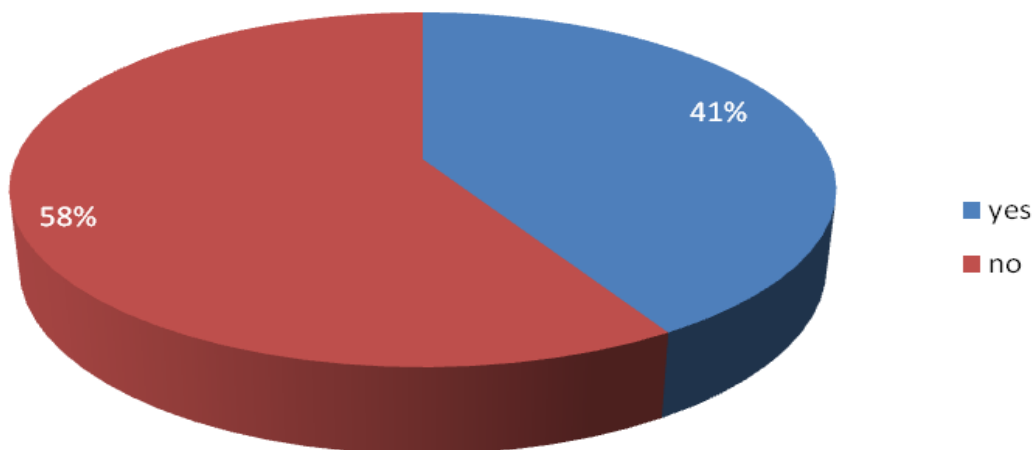


Appendix B – Survey Results

9. If you don't have flood insurance, why not?

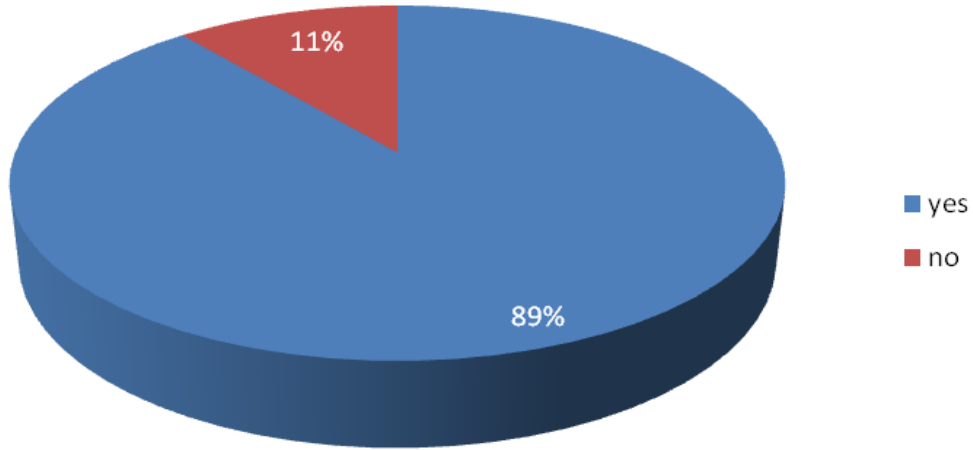


10. Have you taken any actions to make your home or neighborhood more resistant to hazards?

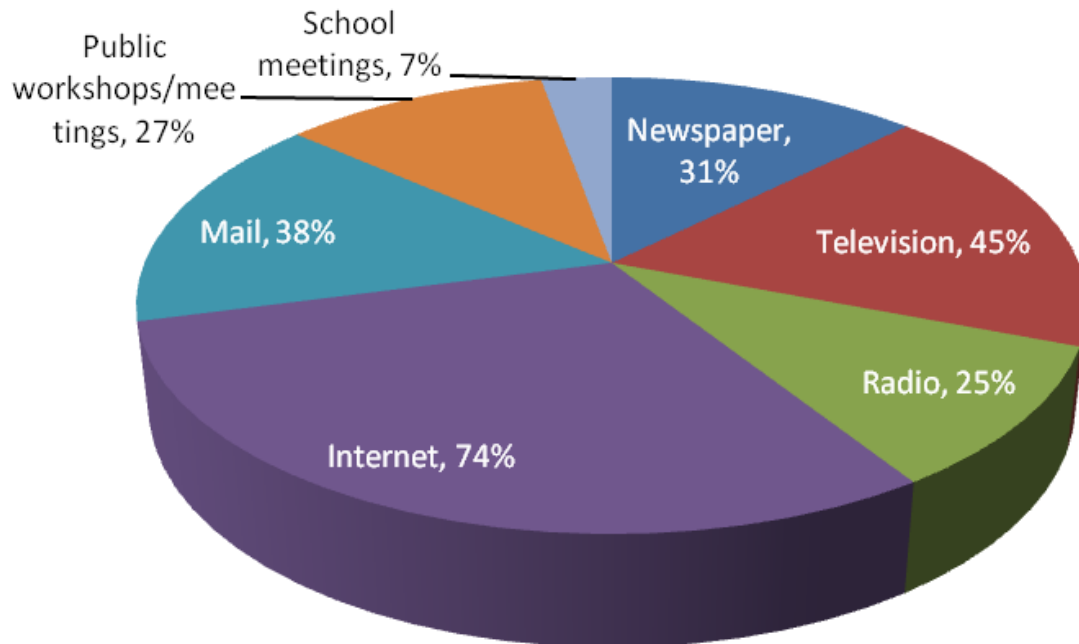


Appendix B – Survey Results

11. Are you interested in making your home or neighborhood more resistant to hazards?



12. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards³?



³ Results total more than 100 percent as participants selected more than one type of communication.

Appendix B – Survey Results

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?

- Prevention and readiness
- Provide incentives for hazard preparedness
- Educate the public
- Test reverse 911 system periodically
- Be more proactive to reduce threats
- More upstream flood control
- Stricter building codes
- Provide tips and resources to the public explaining what they can do now to mitigate
- Land use planning and zoning practices that are hazard specific. Also, stop allowing insurance to build in a hazard prone area in the first place!
- Emergency plans that are thought out, practiced and appropriate training in place for the people/departments/groups that will be responding to emergency type situations. Being prepared and trained for unexpected hazards/disasters would benefit citizens and emergency responders.
- Have a better information system (e.g. city website).
- Put the electric wires underground. That would eliminate power outages caused by trees without having to whack all the trees.
- Limit impervious cover in floodplains, stop granting variances to people in Allandale who want to infringe on the floodplain.
- Stop promoting the erosion of land by over-developing "prime real estate" in the name of economic sustainability, and preserve the natural land we have now.
- Mandate rain barrels for irrigation, offer rebates for gutters, continue to offer rebates for low-flow fixtures
- Stop encouraging excessively dense development that promotes flooding and impedes evacuation
- Create an action plan to prevent and respond to potential disasters.
- Put electric spark reduction barriers on electric pole transformers.
- Keep pruning trees around power lines. Limit development along Walnut Creek watershed that is causing erosion and flooding downstream.
- Start offering voluntary immunizations
- Better the 311 communications process
- Financial incentives for storm proofing improvements to homes

Appendix B – Survey Results

Question 13 continued...

- Reinforce all existing structures that protect against hazards (like levees). Also force apartment homes and Condos to meet strict codes for protection against tornados and other severe storms (at least do annual checks to make sure they are structurally sound).
- Reduce or eliminate the red tape that the city, county, state, and federal government has.
- This is southeast Austin, a lower-middle income, working-class neighborhood. Our local government is not very concerned with this part of town, except when it needs a place to put an airport, a city dump, or a temporary housing development for the homeless. So, the first step would be to get our city and county governments to recognize that hazard mitigation in southeast Austin is just as important as it is in the gated communities of north and west Austin. Example: We have wildfire programs to educate the owners of the million-dollar homes in the wooded areas of far west Austin but those programs don't extend to the people who live in the wooded--and much more heavily populated--areas of southeast Austin.

14. Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?

- Insurance reform and a local high-risk insurance pool to cover low-income homeowners and renters who cannot afford or who are not eligible for standard insurance coverage.
- Keep buildings out of floodplains, get all utilities underground, and fine anyone who drives into running water, especially if they then have to be rescued. Require a sticker on all 4WD vehicles explaining that they CANNOT stop faster than anyone else, they skid just as well as anyone else, and they need to slow down in bad weather just like everyone else.
- Converting older power lines to underground installations. Often power is lost due to tree damage. Overall costs to maintain trees does not fix the problem.
- Heat, lack of clean water, food supplies, structures to use as storm shelters, unavailability of medicines, over crowded hospitals, stupid people driving, communications down, generators used inside houses, panic. These are the risks as I see them. To reduce risks you need informed people in every neighborhood. To inform them I would suggest the weather band emergency radios (like those available at HEB storm season). Make emergency radios available and batteries- information booklets, maybe a central location in

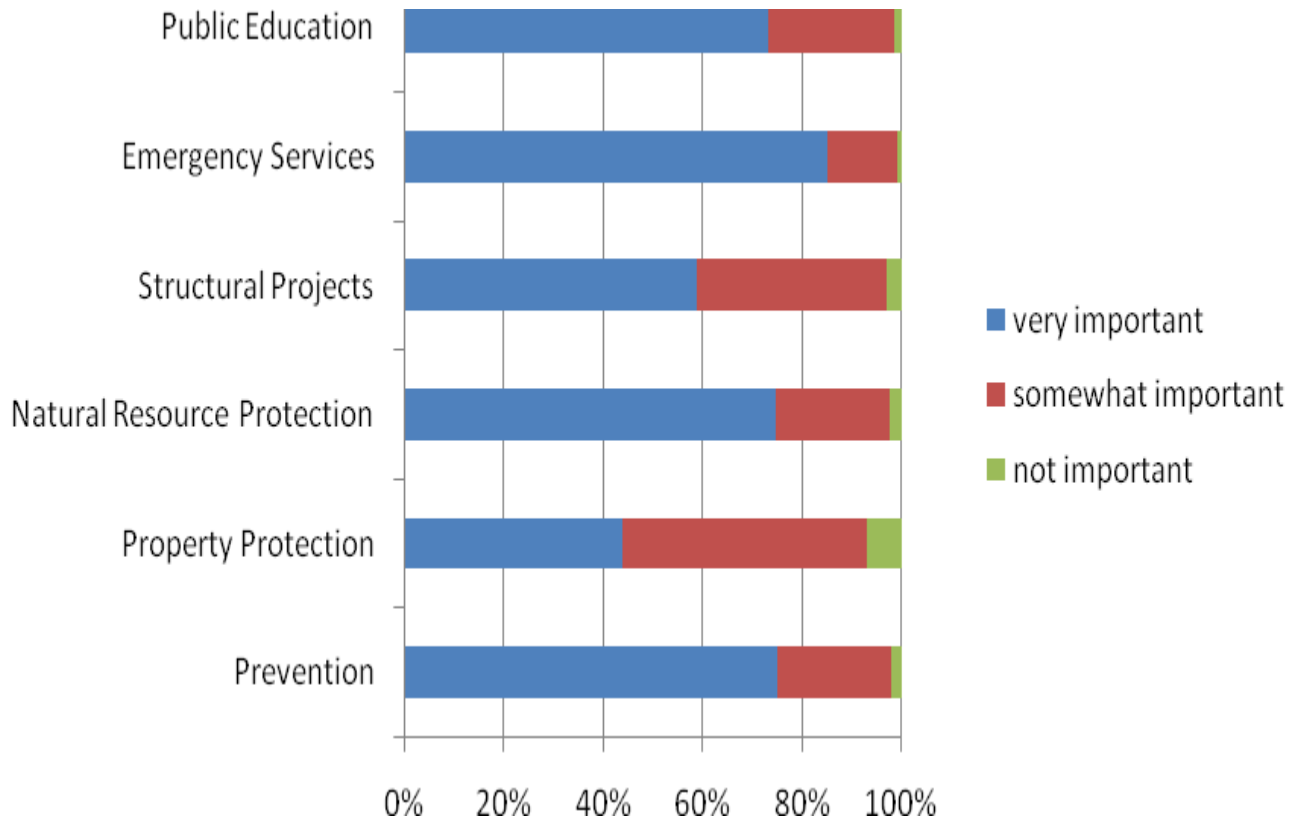
Appendix B – Survey Results

each neighborhood (like HEB or Walgreens) with a station set up with a learning room, with seats please. Broadcast for adults and kids a short to the point message, print pamphlets, stickers for kids, offer coupons for radio purchase and battery purchase (consider long life batteries). Demand long life batteries. Another option- contact the Girl Scouts of America and the Boy Scouts of America and talk about a badge to earn and make it a hard one which requires educating others. School projects for Student Counsels, same idea.

- Publically known plan for emergency services (including fire, ambulance and law enforcement) when 911 services are severed due to natural disaster.
- Yes, pass an ordinance that bans begging or panhandling and get people out of the streets and off of corners begging for money or soliciting.
- A full evaluation of all hazards that may effect the area to include man made threats such as toxic chemical release or pipeline disasters
- It seems evident that emergency services are greatly hampered when there is a loss of power for an extended period of time. Solar on hospitals, police substations, fire stations, water purification plants and at facilities that would serve as emergency shelters would add a level of security not currently in place.
- An aggressive plan for increasing xeriscape and rainwater collection.
- Prevent construction in floodplains, implement voluntary buyout program for those in floodplains coupled with regular information campaigns to make sure neighborhoods know about changing conditions and implementing an alert and evacuation plan when flooding is predicted. Reliance on structural controls produces unrealistic sense of security and structural solutions are expensive to maintain and prone to failure. And when they fail, the loss is greater because of the reliance on them as infallible.
- Less impervious cover.
- Being aware of at least 2 exit routes from your home, work, school etc

Appendix B – Survey Results

15. A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.



PUBLIC EDUCATION AND AWARENESS

Actions to inform citizens about hazards and the techniques they can use to protect themselves and their property. Examples include: outreach projects, school education programs, library materials and demonstration events.

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 emergency facilities or systems.

STRUCTURAL PROJECTS

Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include: dams, levees, seawalls,

Appendix B – Survey Results

detention/retention basins, channel modifications, retaining walls and storm sewers.

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.

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, evaluation, structural retrofits, and storm shutters.

PREVENTION

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.

APPENDIX F – FUNDING GUIDE

Guide to Funding and Technical Assistance Programs



To Support Implementation of Hazard Mitigation Plans

2010



PROTECTED PROPRIETARY INFORMATION

Introduction

A major challenge faced by local and regional governmental entities seeking comprehensive hazard-mitigation planning solutions is to secure funding in an era of constrained resources at all levels of government. A wide range of financial and technical assistance is available from the State of Texas and the Federal Government to protect public and private entities from floods and other natural and human-caused disasters and preserve and enhance the safety and security of the environment.

This Guide was prepared by H2O Partners, Inc. of Austin, Texas. It is a tool for public and private entities to use in leveraging state and federal resources to support their mitigation planning efforts. It identifies and briefly describes funding programs available to help the jurisdiction mitigate, prepare for, respond to, and recover from natural and human-caused hazards.

This guide is organized into two parts. The first includes state-authorized programs, and the second includes federally-authorized programs. Programs are listed

alphabetically by agency. The authority for each program is described, as are funding source, purpose, types of assistance and eligible projects, conditions of use, hazards or topics covered, matching requirements, application deadlines and contact points for further information. Questions or comments should be directed to:

Jo Ann Howard, President
H2O Partners, Inc.
P.O. Box 160130
Austin, Texas 78716
Phone: (888) 328-4151
Fax: 512-329-6612
Email: joann@h2opartnersusa.com
Website: www.h2opartnersusa.com

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APPENDIX F – FUNDING GUIDE

GUIDE TO FUNDING AND TECHNICAL ASSISTANCE PROGRAMS

TO SUPPORT IMPLEMENTATION OF HAZARD MITIGATION PLANS

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Texas Clean Rivers Program (CRP)	Texas Clean Rivers Act, 30 TAC 220, Subchapter A.	Texas Commission on Environmental Quality (TCEQ)	<p>To maintain and improve the quality of surface water resources within each river basin in Texas.</p> <p>The Program is a partnership involving TCEQ, other state agencies, river authorities, regional entities, local governments, industry, and citizens. It uses a watershed management approach to identify and evaluate surface water quality issues, establish priorities for corrective action, and outline strategies to implement those actions. It encourages comprehensive and cooperative watershed planning; maintains basin-wide water quality monitoring; focuses on priority issues and addresses local initiatives; identifies, analyzes, and reports on water quality issues and potential causes of pollution; and identifies and evaluates alternatives for preventing and reducing pollution.</p>		Only entities designated in the Act are eligible.	Water quality	No match required	The law mandates pass-through of funds to the River Authorities. There is no specific application process.	<p>L'Oreak Stepney, PE, MC145 TCEQ P.O. Box 13087 Austin, TX 78711-3087</p> <p>512-239-4554</p> <p>www.tceq.state.tx.us/water/quality/nps</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Clean Water State Revolving Fund	Texas Administrative Code. Sections 375.1 – 375.4; and the Federal Water Pollution Control Act, as amended	Texas Water Development Board (TWDB)	<p>To provide a perpetual fund to provide low interest loan assistance for the planning, design, and construction of wastewater treatment facilities; wastewater recycling and reuse facilities; collection systems; stormwater pollution control projects; and nonpoint source pollution control projects.</p> <p>There is a set-aside within the Clean Water State Revolving Fund for the Nonpoint Source Pollution Loan and Estuary Management Program.</p>	<p>Assistance is in the form of loans at below market interest rates, for a period not to exceed 20 years; or the purchase or refinance of bonds at below market rates; or guarantees or purchase of insurance for local debt obligations.</p> <p>Eligible projects include construction of waste treatment works and nonpoint source pollution control and abatement projects. For entities that are fully authorized to issue bonds, loans are in the form of purchase of bonds, rather than requiring entities to sell them on the open market.</p> <p>Eligible costs include: (a) preliminary planning to determine the feasibility of a project; (b) engineering, architectural, environmental, legal, title, fiscal, or economic studies; (c) the expense of any condemnation or other legal proceeding; (d) surveys, designs, plans, working drawings, specifications, procedures; and (e) the building of a project or the inspection or supervision of any of the foregoing items.</p>	<p>An approved Water Conservation Plan is required.</p> <p>The TWDB will also consider environmental, social and economic impacts and whether the proposed action is or is not detrimental to the public welfare.</p>	Water quality	<p>No match required.</p> <p>However, funds received from the Clean Water State Revolving Fund may generally be used as a non-Federal match for Federal grants, such as the EPA Nonpoint Source Grant Program (Section 319).</p>	<p>After a Pre-application Conference, TWDB solicits proposed projects for an Intended Use Plan. Then, TWDB sends Notice of Availability of Funds and solicits applications. Applicants are generally given 4 months from the Notice, or until August 31, whichever is sooner, to submit applications. Applications for Nonpoint Source projects are funded on a first-come, first-served basis until available funds are used.</p>	<p>Suzanne Lucignani, Texas Water Development Board Stephen F. Austin Bldg. P.O. Box 13231 Austin, Texas 78711-3231</p> <p>512-463-6277</p> <p>www.twdb.state.tx.us</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Research and Planning Fund Grants	Texas Water Code, Chapter 15	TWDB, Research and Planning Fund	<p>To provide financial assistance for research and feasibility studies into practical solutions to water-related problems.</p> <p>The Fund provides for three grant programs: (1) Regional Planning for Water Supply and Wastewater Treatment and Collection program provides funding to prepare plans for regional water supply and wastewater facilities. (2) Water Research Grants are dedicated to enhancing planning, management, conservation, development or protection of Texas's water resources ; and (3) Flood Protection Planning Grants provide funds for regional flood protection planning, considering the needs of the entire watershed, including upstream or downstream effects of proposed solutions.</p>	<p>Regional Planning for Water Supply and Wastewater Treatment and Collection Grants support preparation of plans to develop regional water-supply and wastewater facilities. The facilities must be regional, i.e., systems that incorporate two or more service areas or serve an area involving two or more political subdivisions. Grants have been awarded for nonpoint source pollution control, ground-water protection and recharge, plumbing retrofit programs, reuse of surface water to increase the dependable supply of a reservoir, and watershed yield augmentation.</p> <p>Eligible activities under Flood Protection Planning include studies and analyses to identify problems resulting from or relating to flooding; determining views and needs of the affected public; identifying potential solutions; estimating benefits and costs of solutions (structural and nonstructural); evaluating environmental, social, and cultural factors; and recommending feasible solutions to flooding.</p>	Flood Protection Planning Grants are only awarded to participating NFIP communities. Applicants must consider structural and non-structural flood protection measures; and plan for an entire watershed rather than localized drainage improvements.	Water quality, water supply, flooding	Grants for Regional Planning and Flood Protection are limited to 50% of total project costs, except in areas of high unemployment rates or low per-capita income. In-kind services may be used for any part of the local share. Grants may be awarded for up to 100% of the cost of a Water Research project.	As funds become available and needs are identified, TWDB publishes a notice in the <i>Texas Register</i> . Generally, applications for the Flood Protection Planning are due the first week of January.	<p>Kathleen Ligon</p> <p>Texas Water Development Board Research and Planning Fund</p> <p>1700 North Congress Avenue</p> <p>Austin, TX 78711</p> <p>512-463-8294</p> <p>kathleen.ligon@twdb.state.tx.us</p> <p>www.twdb.state.tx.us</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
State Participation and Storage Acquisition Program	Texas Water Code, Chapter 363, 31 TAC 363, Subchapters A and F	TWDB	<p>To help finance regional water or wastewater projects, including water storage facilities and flood retention basins; and to allow for “right sizing” of projects in consideration of future growth.</p> <p>Under this program, the State TWDB absorbs some of the initial costs of projects, but ultimately recovers the actual cash expenditure of funds used in providing assistance.</p>	<p>Assistance is in the form of sale, transfer or lease by the State of regional water and wastewater projects, including water storage acquisition and flood retention basins.</p> <p>The State assumes a temporary ownership interest in a regional project when local sponsors are unable to assume debt for the optimally sized facility. Loan payments that would have been required, if the assistance had been in the form of a loan, are deferred. Ultimately, the cost of funding is repaid to the State when the State’s ownership interest is bought out.</p> <p>A Master Agreement will be established with the TWDB to govern the funding arrangements, including provisions for a defined source of revenue that will be used to purchase the State’s portion of the facility.</p>	Environment-al Review and an approved Water Conservation Plan are required. The project cannot be reasonably financed without State participation assistance, and the optimum regional development of the project cannot be reasonably financed without State participation.	Flooding, water supply	TWDB’s participation is limited to a maximum of 50% of the project costs and to the portion of the project designated as excess capacity. The remaining costs of the project may be funded through other TWDB programs.	Application materials must be submitted by the first business day of the month preceding the month during which the applicant desires TWDB Board consideration. Completed applications are considered by the Board on the third Wednesday of each month.	Office of Project Finance and Construction Assistance, 512-463-7853 www.twdb.state.tx.us

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Texas Natural Resources Information System (TNRIS)	Texas Water Code	TWDB	To provide a clearinghouse and referral center for Texas natural resources information supplied by numerous State and Federal agencies, including the U.S. Census Bureau, the U.S. Geological Survey, the U.S. Federal Emergency Management Agency, and the Texas Department of Transportation.	<p>Assistance is in the form of: (1) access to information through TNRIS's hub for direct electronic access or referral to State natural resources and census data; (2) Internet map services; and (3) technical assistance on Geographical Information Systems displays and Global Positioning Systems.</p> <p>TNRIS's Strategic Mapping Program (StratMap) produces large-scale computerized base map information documenting land features such as soils, elevation and hydrography, and man-made features including political boundaries and roadways. Data provided by StratMap can be used for hydrologic modeling, vegetation analysis, transportation routing, land use planning and management, environmental assessment and monitoring, and business applications.</p> <p>TNRIS has information that can assist in developing Hazard Mitigation Plans.</p>	None	Natural resources information	No match required	N.A.	<p>Texas Natural Resources Information System, Stephen F. Austin State Building - 1700 N. Congress Ave. - Suite B40 Austin, Texas 78701-3231</p> <p>512-463-8337</p> <p>www.tnr.is.state.tx.us</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Texas Water Development Fund	Texas Water Code, Chapter 17	Texas Water Development Board, Development Fund II	To provide loans for the planning, design and construction of water supply, wastewater and flood control projects.	Loans are provided for the acquisition, improvement or construction of such water-related projects as water wells, retail distribution and wholesale transmission, pumping facilities, storage reservoirs and tanks, and water treatment plants. Financing is also provided for purchase of water rights, wastewater collection and treatment projects, and flood control projects. Flood control projects focus on basin- or watershed-wide analysis and projects that are regional in nature. Assistance includes loans for structural and nonstructural flood protection improvements such as construction of storm water retention basins, enlargement of stream channels, modification or reconstruction of bridges, acquisition of floodplain land for use in public open space, acquisition and removal of buildings located in a floodplain, relocation of residents, flood warning systems, control of coastal erosion, and the development of flood management plans.	An approved Water Conservation Plan is required.	Flood control, water supply and water quality	No match required	Applications must be submitted by the first business day of the month preceding the month during which the applicant desires consideration of the loan request by the TWDB.	Office of Project Finance and Construction Assistance, 512-463-7853 www.twdb.state.tx.us

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Texas Coastal Management Program	Coastal Zone Management Act, Sections 306 and 306A	Texas Coastal Coordination Council, chaired by the Texas General Land Office.	For planning and implementation of projects that address environmental problems affecting the coastal area and that promote sustainable economic development.	Two types of funds are provided under this program. Section 306 Administrative Funds may be used for the administration of the Coastal Management Program, to include planning, mapping, geographic information systems, and research projects. Section 306A Funds may be used for projects that meet one or more of the following: (1) preservation or restoration of coastal natural resource areas; (2) redevelopment of deteriorating and underutilized urban waterfronts and ports; (3) provision of access to public beaches and other coastal areas and to coastal waters; and (4) development of a coordinated process among state agencies to regulate and issue permits for aquaculture facilities in the coastal zone. Section 306 eligible activities include acquisition or fee simple or other interest in land; low-cost construction projects; revitalization of deteriorating or underutilized urban waterfronts or ports; engineering designs, specifications; and educational, interpretive, and other management costs.		Coastal zone management	40% non-Federal cost share required.	Grant cycles to be announced in the Texas Register.	Melissa Porter, CMP Grants Manager, General Land Office, 512-475-1393 melissa.porter@glo.state.tx.us

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Drought relief	Reclamation State Emergency Drought Relief Act of 1991	Bureau of Reclamation, Department of the Interior	To conserve and increase the supply of water during drought	Construction, management, and conservation activities conducted by Reclamation; loans	Requires official request from governor	Drilling of wells, diking and dredging, temporary installation of pumps in reservoirs to life water to outlets, and many others	NA	NA	Bureau of Reclamation, 10737 Gateway Blvd. West Suite 350 El Paso, TX 79935-4900 (915) 534-6300 http://www.usbr.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Conservation Reserve Program	Food Security Act of 1985, Title XII, Public Law 99-198, as amended; Food, Agriculture, Conservation, and Trade Act of 1990, Public Law 101-624; Federal Agriculture Improvement and Reform Act of 1996, Public Law 104-127	US Department of Agriculture, Farm Service Agency	To reduce water and wind erosion, protect the nation's long-term capability to produce food and fiber, reduce sedimentation, improve water quality, and create and enhance wildlife habitat.	The Commodity Credit Corporation enters into contracts with eligible participants to convert land to a conserving use for a period not less than 10 years and not more than 15 years in return for financial and technical assistance.	Limited to owners and operators on Conservation Reserve Program land. Land must be highly erodible, normally devoted to agricultural production, and operated for 12 months.	Erosion	At least 50 percent		County FSA office. Go to http://offices.sc.egov.usda.gov/locator/app?state=tx&agency=fsa to find county office

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Conservation Technical Assistance	Soil Conservation and Domestic Allotment Act of 1936, as amended, P.L. 74-46	Department of Agriculture, Natural Resources Conservation Service	To provide technical assistance to implement various conservation programs including disaster preparedness, soil erosion control, water quantity and quality enhancement, wildlife habitat development, and soil surveys.	Technical assistance to private land users, communities, units of state and local government, and other federal agencies.	NA	Natural resource concerns including drought.	NA	NA	Local county NRCS office. County contacts available at: http://offices.sc.egov.usda.gov/locator/app

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Cooperative Forestry Assistance	Cooperative Forestry Assistance Act of 1978, Public Law 95-313; Food, Agriculture, Conservation, and Trade Act of 1990, as amended, Public Law 101-624	US Department of Agriculture, United States Forest Service	Fire prevention	Financial and technical assistance to State Foresters	States must compete and demonstrate capability to deliver services	Forest fires, fires in wildland/urban interface areas	NA	NA	US Forest Service Southern Region office 1720 Peachtree Road NW, Atlanta, GA 404-347-4177

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Emergency Community Water Assistance Grants	Consolidated Farm and Rural Development Act, Section 306A; Food, Agriculture, Conservation, and Trade Act of 1990, Title XXIII, Public Law 101-624	US Department of Agriculture, Rural Development	To assist communities with severe water shortages	Project grants	Requires presidential disaster declaration and must be for towns with less than 15,000 population	Determined through competition	NA	NA	Texas USDA Rural Development 101 South Main Street Suite 102 Temple, TX 76501 254-742-9700 http://www.rurdev.usda.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Emergency Conservation Program	Agricultural Credit Act of 1978, Title IV, Public Law 95-334, 16 U.S.C. 2201-2205, as amended	US Department of Agriculture, Farm Service Agency	To provide cost share assistance to agricultural producers who have suffered severe damage to their farmland as a result of a natural disaster	Direct payments to producers who carry out emergency measures to control wind erosion on farmlands or rehabilitate damaged farmlands	Rehabilitation must be so costly that federal assistance is required; county must apply	Wind erosion and other damage of an infrequent nature	Cost sharing required		County FSA office Go to http://offices.sc.egov.usda.gov/locator/app?state=tx&agency=fsa to find county office

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Emergency Loans (Farming Operations)	Consolidated Farm and Rural Development Act, as amended, Subtitle C, Sections 321-330, Public Law 92-419, 7 U.S.C. 1961- 1984; Public Law 96-438; Public Law 97-35; Public Law 98-258; Public Law 99-198; Public Law 100-233; Public Law 100-387; Public Law 101-624	US Department of Agriculture, Farm Service Agency	To assist established family farmers, ranchers, and aquaculture (physical losses only)	Loans	Requires presidential declaration of disaster or emergency; applicant must have incurred substantial crop loss as a result of a natural disaster and be unable to obtain suitable credit from any other source	Crop loss due to natural disaster	NA	Application must be filed within eight months of disaster	County FSA office Go to http://offices.sc.egov.usda.gov/locator/app?state=tx&agency=fsa to find county office

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Emergency Watershed Protection Program	Public Law 104-127, as amended; Public Law 81-516, as amended; and Public Law 95-334, as amended	Department of Agriculture, Natural Resources Conservation Service	To provide relief from imminent hazards and reduce the threat to life and property in watersheds damaged by severe natural events. Hazards include floods and the products of erosion created by floods, fire, windstorms, earthquakes, drought, or other natural disasters.	Assistance includes technical and financial assistance to carry out emergency work such as debris removal from stream channels, road culverts, and bridge abutments; debris removal in upland areas following windstorms and tornadoes; reshaping and protection (hard and soft) of eroding streambanks; repair of damaged drainage facilities, levees and flood prevention structures; reseeding of burned or denuded areas; and promoting appropriate grazing practices under drought conditions to assist in watershed recovery.	Requires an imminent hazard or threat to life and property from severe natural events. However, a Presidential declaration of disaster is not required.	Mult-hazard, covering floods and erosion caused by floods, fire, windstorms, earthquakes, drought or other natural disasters.	No matching requirements for easements and technical assistance. 25% nonfederal match for other eligible measures.	Letter of request to NRCS is due 90 days from the date of the disaster.	Steven Bednarz, Assistant State Conservationist for Water Resources, Texas State Office, NRCS, 101 South Main Temple, TX 76501 254-742-9871 Steven.bednarz@tx.usda.gov www.nrcs.usda.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Environmental Quality Incentives Program	The Farm Security and Rural Investment Act of 2002 (the 2002 Act) (Public Law 107-171, May 13, 2002) re-authorized and amended the Environmental Quality Incentives Program, which had been added to the Food Security Act of 1985 (the 1985 Act) (16 U.S.C. 3801 et seq.) by the Federal Agriculture Improvement and Reform Act of 1996 (the 1996 Act) (Pub. L. 104-127).	Department of Agriculture, Natural Resources Conservation Service	To address soil, water, and related natural resource concerns on farms and ranches.	Technical, educational, and financial.	Applicant must be an agricultural producer.	Compliance with Federal and State environmental laws and enhancement of the environment.	NA	NA	Local NRCS office. Go to http://offices.sc.egov.usda.gov/locator/app to determine county contacts
Farm and Ranch Lands Protection Program	Food Security Act of 1985, as amended, 16 U.S.C. 3838h and 3838i	Department of Agriculture, Natural Resources Conservation Service	To assist farmers with a purchased agricultural conservation easement (PACE) to develop the required conservation plan.	Technical assistance.	Farms participating in a PACE.	Plan should address mitigation actions in event of drought.	NA		Claude Ross,USDA-Natural Resources Conservation Service 101 South Main Temple, TX 76501 Phone: 254-742-9800 claudeross@tx.usda.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Federal Crop Insurance Corporation	Federal Crop Insurance Act, as amended, 7 U.S.C. 1501-1520, Agricultural Adjustment Act of 1938, Title V, 52 Stat. 31; Federal Crop Insurance Act of 1980, as amended, Public Law 101-624; Federal Crop Insurance Reform Act of 1994, Public Law 103-354; Federal Agriculture Improvement and Reform Act of 1996, Public Law 104-127	US Department of Agriculture, Risk Management Agency	To improve the economic stability of agriculture	Crop insurance	Must purchase crop insurance	Production losses due to unavoidable causes such as drought, excessive moisture, hail, wind, hurricane, tornado, etc.	NA		Oklahoma City Regional office Risk Management Agency Regional Office 205 NW 63rd Street, Suite 170, Oklahoma City, OK 73116 405-879-2700 rsook@rma.usda.gov
National Fire-Danger Rating System		US Department of Agriculture, United States Forest Service	To monitor and predict conditions for wildland fires through the fire season	Technical assistance	Eligibility includes Federal, State, county, and local government agencies	Control of wildland fires	NA	NA	US Forest Service Southern Region office 1720 Peachtree Road NW, Atlanta, GA 404-347-4177

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Non-Insured Crop Disaster Assistance Programs	Federal Agriculture Improvement and Reform Act of 1996, as amended, 15 U.S.C. 714b and 714c; 7 U.S.C. 7333.	US Department of Agriculture, Farm Service Agency	To pay producers for eligible crops that are not eligible for catastrophic risk protection insurance for crop yield losses caused by natural disasters.	Direct payments equivalent to catastrophic risk protection otherwise available under Section 508(b) of the Federal Crop Insurance Act (7 U.S.C. 508 (b)).	Natural disasters, including drought, may result in payments to producers in an area suffering from prevented planting in excess of 35% or loss of yield in excess of 60%.	Commercial crops grown for food or fiber including floriculture, ornamental nurseries, Christmas trees, turf grass sod, and industrial crops. Excludes livestock.	None.		County FSA office. Go to http://offices.sc.egov.usda.gov/locator/app?state=tx&agency=fsa to find county office
Plant Materials Program	Soil Conservation and Domestic Allotment Act of 1936, as amended, Public Law 74-46.	Department of Agriculture, Natural Resources Conservation Service	To provide vegetative solutions for natural resource problems.	Technical assistance through plant science technology.	Conservation cooperators' properties in conjunction with Soil Conservation Districts, State Agricultural Experiment Stations, and State Cooperative Improvement Associations.	Field testing to determine a plants' usefulness, e.g., in resisting drought.	NA		Appropriate Plant Materials Center Go to http://plant-materials.nrcs.usda.gov/centers/ to find appropriate center
Resource Conservation and Development	Public Law 97-98, 95 Stat. 1213	Department of Agriculture, Natural Resources Conservation Service	Assist in projects developed under the Resource Conservation and Development Program.	Technical assistance and loans to finance local costs.	Public agencies or nonprofit organization in approved Resource Conservation District areas.	Drought aid, land or water conservation, water resource improvements, fire prevention, public recreation, and waste disposal.	NA		Local NRCS office Go to http://offices.sc.egov.usda.gov/locator/app to determine county contacts

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Small Watershed Program	PL-566	Department of Agriculture, Natural Resources Conservation Service	To protect watersheds and prevent floods	Technical and financial assistance	At least 20% of total benefits must be to agriculture, including rural communities	Prevention of soil erosion, retard runoff, municipal and industrial water needs	Vary, depending upon the purpose		USDA-Natural Resources Conservation Service 101 South Main Temple, TX 76501 Phone: 254-742-9800
Solid Waste Management Grants, Water and Waste Disposal Direct and Guaranteed Loans, and Water and Waste Disposal Grants	Consolidated Farm and Rural Development Act, as amended, Sections 306, 310B, Public Law 101-624, 7 U.S.C. 1932	US Department of Agriculture Rural Development,	To reduce pollution of water resources, to develop water and wastewater systems, and reduce water and waste disposal costs	Grants, loans, and technical assistance	Must be in towns with population of 10,000 or less	Enhancement of operator skills in water and waste management, identification of threats to water resources, preparation of applications for water and waste disposal systems, and development of water and waste disposal systems	Varies by program		LaVonda Pernell, Loan Specialist 202-720-9635 lavonda.pernell@wdc.usda.gov
Technical Assistance		US Department of Agriculture Rural Development	To help ensure cost-effective operation of rural water systems	Technical assistance and, for nonprofit organizations, grants		Water and waste disposal problems	NA		Anita O'Brien, Loan Specialist 202-690-3789 anita.obrien@wdc.usda.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Waste and Water Disposal Loans and Grants	Consolidated Farm and Rural Development Act, as amended, Section 306, Public Law 92-419, 7 U.S.C. 1926	US Department of Agriculture, Rural Utilities Service	To reduce water and waste disposal costs to a reasonable level for rural users	Project grants, direct loans, guaranteed loans	Available to municipalities, counties, special-purpose districts, Indian tribes, and nonprofit corporations	Water and waste disposal	Grants cannot exceed 75% of eligible project costs	NA	Rural Development field offices Go to http://www.rurdev.usda.gov/tx/olist.htm to locate field offices
Watershed Management Program		US Department of Agriculture, United States Forest Service,	To manage watersheds	Technical assistance	Available to all sectors and customers that depend upon water supplied from national forests and grasslands	Water conservation, construction of storage ponds for wildlife, and measurement of snowpack, rainfall, stream flow, groundwater levels, and other parameters	NA	NA	US Forest Service Southern Region office 1720 Peachtree Road NW, Atlanta, GA 404-347-4177

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Watershed Protection and Flood Prevention Program	Watershed Protection and Flood Prevention Act, as amended (Public Law 83-566)	Department of Agriculture, Natural Resources Conservation Service	<p>To protect, develop, and utilize the land and water resources in small watersheds of 250,000 acres or less. The program is Federally assisted and locally led.</p> <p>Projects are aimed at watershed protection, flood prevention, agricultural and non-agricultural water management, water quality improvement, erosion and sediment reduction, fish and wildlife enhancement, and water supply.</p>	<p>Assistance includes financial and technical assistance for approved watershed projects.</p> <p>Technical assistance is provided in planning, designing and installing watershed improvements. Financial assistance is provided for watershed protection, flood prevention, agricultural water management, sedimentation control, and public water based fish, wildlife, and recreation.</p> <p>Local sponsors are required to obtain land rights and perform operation and maintenance on all works of improvement.</p>		Floods, water quality and water supply	Cost share varies by purpose. No matching requirement for flood prevention; 50% required for agricultural and non-agricultural water management. Sponsors are responsible for land rights costs.	Projects that have watershed plans developed and approved by NRCS for operations are eligible for funding.	<p>Steven Bednarz, Assistant State Conservationist for Water Resources, Texas State Office, NRCS, 254-742-9871</p> <p>Steven.bednarz@tx.usda.gov</p> <p>www.nrcs.usda.gov</p>
Watershed Surveys and Planning	Watershed Protection and Flood Prevention Act, as amended (Public Law 83-566)	Department of Agriculture, Natural Resources Conservation Service	To provide planning assistance to Federal, State and local agencies for the development of coordinated water and related land resources programs in watersheds and river basins. Emphasis is on flood damage reduction, erosion control, water conservation, preservation of wetlands, and water quality improvements.	<p>Technical assistance is provided. Types of surveys and plans include watershed plans, river basin surveys and studies, watershed resource assessments, flood hazard and floodplain management studies.</p> <p>Special priority is given to upstream rural community flooding; water quality improvements from agricultural nonpoint sources; wetland preservation; and drought management and water supply for agricultural or rural communities.</p>		Floods, erosion control, water supply and water quality	None.	None. Formal request for assistance is required. If purposes qualify for Public Law 83-566 funding, the application process for Federal assistance is required.	<p>Steven Bednarz, Assistant State Conservationist for Water Resources, Texas State Office, NRCS, 254-742-9871</p> <p>Steven.bednarz@tx.usda.gov</p> <p>www.nrcs.usda.gov</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Wetlands Reserve Program	The FAIR Act of 1996	Department of Agriculture, Natural Resources Conservation Service	To protect and restore wetlands by enabling landowners to sell easements which take wetlands out of production.	<p>Assistance includes purchase by the Federal government of easements from landowners who have owned the land for one year and have farmed the wetlands, or prior converted wetlands. There are no repayment requirements.</p> <p>Landowners submit an intention to enter into the program through the USDA NRCS field office. NRCS, in consultation with the U.S. Fish and Wildlife Service, will determine eligibility and develop a wetland reserve plan of operation.</p>		Wetlands protection	The Federal government provides a lump sum payment for easements; there is a 25% cost-share for wetlands restoration.	Continuous sign-up	<p>Steven Bednarz, Assistant State Conservationist for Water Resources, Texas State Office, NRCS, 254-742-9871</p> <p>Steven.bednarz@tx.usda.gov</p> <p>www.nrcs.usda.gov</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Automated Flood Warning System	15 U.S.C. 313: 33 U.S.C. 883d	National Oceanic and Atmospheric Administration , National Weather Service, Department of Commerce	To provide funding to communities with flood or flash flood problems that affect safety of life and property to assist them in creating, renovating, or enhancing Automated Flood Warning Systems (AFWS).	Grants to States, counties, municipalities, educational institutions, and non-profit organizations.	It is strongly recommended that applicants discuss potential interactions with relevant NOAA/NWS personnel prior to submission. This program is excluded from coverage under E.O. 12372	Floods and flash floods	None		For local NWS office go to http://www.nws.noaa.gov/organization.php AFWS Operations Manager, Hydrologic Services Division, National Weather Service Eastern Region - W/ER2, Airport Corporate Center, 630 Johnson Avenue, Bohemia, NY 11716. 631-244-0112.

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Economic Adjustment Assistance Program	Public Works and Economic Development Act of 1965, as amended, Sec.209. 42 U.S.C. 3149	Economic Development Administration Department of Commerce	To alleviate long-term economic deterioration or a sudden and severe economic dislocation	Grants	Available to States, cities, institutions of higher education, and nonprofit organizations	Development of strategies and implementation of projects		NA	Economic Development Administration Regional 504 Lavaca Street Suite 1100 Austin, TX 78701-4037 512-381-8144 pgarza@eda.doc.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Disaster Relief/Urgent Needs Fund of the Texas Community Development Program (Small Cities' CDBG Program)	Housing and Community Development Act of 1974, as amended	HUD	<p>To rebuild viable communities impacted by a natural disaster or urgent, unanticipated needs posing serious threats to health and safety by providing decent housing, suitable living environments and economic opportunities.</p> <p>Funds are available to cities under 50,000 in population and to small rural communities located in counties that have a non-metropolitan population under 200,000.</p>	<p>Assistance includes Project Grants from the Disaster Relief/Urgent Needs Fund to address damages caused by natural disaster or to meet urgent water or sewer needs where there is an unanticipated, serious threat to health and safety.</p> <p>The focus is on projects that meet "basic human needs" such as safe and sanitary sewer systems, clean drinking water, adequate housing, drainage and flood control, passable streets, economic development and other eligible activities.</p> <p>This Fund may also be used for the nonfederal match for selected Federal disaster programs.</p>	<p>Disaster Relief Fund requires a disaster declaration by the President or Governor.</p> <p>Urgent Needs Fund requires an invitation to submit an application from a Committee composed of ORCA, TCEQ, and TWDB.</p>	Multiple disasters, included in a State or Federal declaration.	Urgent needs funds require 10% non-Federal match for communities with a population less than 1,500; 20% for communities with populations over 1,500.	No specific deadline	<p>Office of Community Rural Affairs 1700 N. Congress, Suite 220 Austin, TX 78701 512-936-6701</p> <p>www.orca.state.tx.us</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
<p>Texas Community Development Program</p> <p>(Small Cities' Community Development Block Grant (CDBG) Program)</p>	Housing and Community Development Act of 1974, as amended	U.S. Department of Housing and Urban Development (HUD)	<p>To build viable communities by providing decent housing and suitable living environments, and by expanding economic opportunities, principally for Texans of low and moderate income.</p> <p>CDBGs provide resources to cities under 50,000 in population and to small rural communities located in counties that have a non-metropolitan population under 200,000.</p> <p>Projects meet "basic human needs" such as safe and sanitary sewer systems, clean drinking water, disaster relief and urgent needs, housing, drainage and flood control, passable streets, and economic development.</p>	<p>Assistance includes competitive grants awarded from several funds.</p> <p>The Planning/Capacity Building Fund provides up to \$50,000 for planning to assess local needs, develop strategies to address them, and build or improve local capacity in low to moderate income communities. Emphasis is on public works and housing assistance planning.</p> <p>The Community Development Fund addresses public facility and housing needs, including sewer and water system improvements, street and drainage improvements, service projects and housing rehabilitation.</p>		Flooding, water supply and water quality	<p>A non-Federal match is required for Planning/Capacity Building Fund, on a sliding scale based on population.</p> <p>Match requirement is determined by the population of the community.</p>	Availability of funding will be announced in the Texas Register.	<p>Office of Community Rural Affairs 1700 N. Congress, Suite 220 Austin, TX 78701 512-936-6701</p> <p>www.orca.state.tx.us</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Drinking Water State Revolving Fund	Safe Drinking Water Act, Section 1452	U.S. Environmental Protection Agency (EPA) funded and administered in the State by TCEQ and the TWDB.	To finance projects for public drinking water systems that facilitate compliance with primary drinking water regulations or otherwise significantly further the health protection objectives of the Safe Drinking Water Act.	<p>The Drinking Water State Revolving Fund provides loans at below market rates for up to 20 years, although disadvantaged communities may qualify for up to 30 years.</p> <p>Loans can be used for planning, design and construction of projects to upgrade or replace water supply infrastructure, to correct exceedances of Safe Drinking Water Act health standards, to consolidate water supplies and to purchase capacity in water systems. Loan proceeds may also be used to purchase land rights integral to the project.</p> <p>Under the Source Water Protection Program, an applicant may apply for a loan to purchase land or conservation easements, if the purpose of the purchase is to protect the source water of a public water system from contamination and to ensure compliance with national primary drinking water regulations. Loans may also be used to repair, replace, or relocate community water systems damaged by flooding.</p>	<p>An approved Water Conservation Plan and environmental review are required.</p> <p>While the Drinking Water State Revolving Fund may be used to repair, replace or relocate systems damaged by flooding, a Presidential declaration of disaster is not required.</p>	Water supply and quality	None. Local municipalities receive loans and make payments to the State Revolving Fund.	Prospective applicants submit information to TWDB for inclusion in an Intended Use Plan. TCEQ prioritizes proposed projects. Loan funds are distributed based on priority rating	<p>Suzanne Lucignani Project Finance and Construction Assistance Texas Water Development Board P.O. Box 13231 Austin, TX 78711 suzanne.lucignani@twdb.state.tx.us</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Nonpoint Source Grant Program	Federal Clean Water Act, Section 319	EPA TCEQ administers the non-agricultural nonpoint source program. The Texas State Soil and Water Conservation Board (TSSWCB) administers the agricultural and silvicultural nonpoint source program.	To support implementation of management measures and programs to address the problem of nonpoint source pollution through the identification of water quality problems, developing control strategies, and implementing activities or best management practices (BMPs) to prevent or abate nonpoint source pollution problems. Funding priorities are determined, in part, based upon rankings from two lists generated by TNRCC and approved by the U.S. Environmental Protection Agency. The first is a 1998 State of Texas Water Quality Inventory under Section 305(b) of the Clean Water Act. The second is a 2000 Clean Water Act, Section 303(d) list of Impaired Water Bodies.	Competitive grants are awarded for projects such as master planning, BMP implementation, non-regulatory and regulatory programs for enforcement, technical assistance, financial assistance, education, training, technology transfer, and water quality monitoring. Watershed management projects that comprehensively address the major sources of nonpoint source pollution affecting water quality will be given priority for funding. Projects that implement storm water permit requirements under the Texas Pollutant Discharge Elimination System (TPDES) program are not eligible for funding; however, storm water management activities not required by permit may be eligible for assistance.	To be eligible for funding, a project must target nonpoint source pollution in a watershed designated in the Nonpoint Source Assessment Report and be consistent with the State of Texas Nonpoint Source Management Program. EPA will not allow funding projects that implement conditions of a permit.	Water quality	A 40% non-Federal match is required, which may be in the form of in-kind services or expenditures. Clean Rivers Program funds may be used as a non-Federal match for the Nonpoint Source Grant Program and other Federal programs.		TSSWCB P.O. Box 658, Temple, TX 76503 Richard Egg 254-773-2250, ext. 246, regg@tsswcb.state.tx.us .

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Water Protection Coordination Grants to States	Safe Drinking Water Act: Sec. 1442, Supplemental Appropriations Act of 2002 (PL 107-117))	EPA	Formula grants to support coordination activities on critical water infrastructure protection efforts that include work with water utilities as well as Federal, State, and local agencies.	Funded coordination activities include, but are not limited to: ensuring the quality of drinking water utility vulnerability assessments and related security enhancements; developing and overseeing emergency response and recovery plans; and, providing technical assistance, training and education.		Terrorism and its impact on water quality	No matching requirement.		Donna Miller, Section Chief (6WQ-AT) Phone: (214) 665-7130 Fax: (214) 665-6490 U.S. Environmental Protection Agency, Region 6 1445 Ross Avenue, Suite 1200 Dallas, Texas 75202-2733
Water Quality Cooperative Agreements	Clean Water Act, Section 104(b)(3)	EPA	For unique and innovative projects that address the requirements of the National Pollutant Discharge Elimination Systems (NPDES) program.	Assistance includes financial assistance through Cooperative Agreements with EPA for research, investigations, experiments, training, demonstrations, surveys and studies related to the causes, effects, extent, prevention, reduction, and elimination of water pollution. Special emphasis is placed on "wet weather" activities, i.e., storm water, sanitary sewer overflows, and concentrated animal feeding operations as well as projects that enhance the ability of the regulated community to deal with non-traditional pollution problems in priority watersheds.	Must address "wet weather" pollution discharge.	Water quality	5% minimum nonfederal matching requirement.		Donna Miller, Section Chief (6WQ-AT) Phone: (214) 665-7130 Fax: (214) 665-6490 U.S. Environmental Protection Agency, Region 6 1445 Ross Avenue, Suite 1200 Dallas, Texas 75202-2733

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Watershed Initiative Grants	Clean Water Act, Section 104 (b)(3)	EPA	A competitive grant program to encourage the protection and restoration of water bodies through the use of watershed approaches.	<p>Up to 20 watersheds throughout the country will be selected by EPA under a competitive process to support promising watershed-based approaches to clean water. This initiative encourages Coalition-based strategies for attaining water quality standards and improving water resource protection and restoration at the watershed level. Typical grants will range from \$300,000 to \$1.3 million, depending on appropriations. Watersheds must be nominated by Governors or Tribal Leaders. Two nominations from each State are invited.</p> <p>Eligible activities include the conduct and promotion of the coordination and acceleration of activities such as demonstrations, training, education, experiment investigations, surveys, studies, and research relating to the cause, effect, extent, prevention, reduction, and elimination of water pollution.</p>		Clean water on a watershed basis.	25% non-Federal matching requirement.		<p>Donna Miller, Section Chief (6WQ-AT) Phone: (214) 665-7130 Fax: (214) 665-6490 U.S. Environmental Protection Agency, Region 6 1445 Ross Avenue, Suite 1200 Dallas, Texas 75202-2733</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Wetlands Grants	Clean Water Act, Section 104(b)(3)	EPA	To encourage wetlands program development and build the capacity of States, Tribes, local governments or associations to effectively protect wetland and riparian resources.	Assistance includes Project Grants that are competitively awarded for development of plans and management tools for protection of wetlands resources; advancing the science and technical tools for evaluating, protecting, and restoring wetlands health; facilitating development of watershed stakeholder partnerships; and improving understanding of wetlands.		Flooding and water quality	25% nonfederal cost share		Donna Miller, Section Chief (6WQ-AT) Phone: (214) 665-7130 Fax: (214) 665-6490 U.S. Environmental Protection Agency, Region 6 1445 Ross Avenue, Suite 1200 Dallas, Texas 75202-2733

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Special Volunteer Programs and Retired and Senior Volunteer Program (RSVP)	Domestic Volunteer Service Act of 1973, as amended, Title II, Part A, Section 201, Public Law 93-113, 42 U.S.C. 5001, as amended; National and Community Service Trust Act of 1993, Public Law 103-82.	Corporation for National and Community Service	To strengthen communities and organizations in using service and volunteers to support public safety, public health and disaster relief and preparedness.	Financial assistance is available to support a volunteer program to support public safety, public health and disaster relief and preparedness. In the area of disaster relief and preparedness, volunteers may support immediate and long-term recovery efforts, as well as preparedness and mitigation. They may assist in disaster preparedness and mitigation, run emergency shelters, help law enforcement, provide food and shelter, manage donations, assess and repair damage, and help families and communities rebuild.		Multiple hazards	No minimum matching requirement for Special Volunteer Programs, although grantees must provide a non-federal contribution. For RSVP grants, there is a 10% match for the first year of the grant; 20% for the second year; and 30% for the third year.		Jerry Thompson 1106 Clayton Lane, Suite 420E 300 E. 8th St., Suite G-169 Austin, TX 78701-3220 (512) 916-7000 (512) 916-7020 tx@cns.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
All Hazards Emergency Operational Planning	2002 Supplemental Appropriations Act for Further Recovery From and Response To Terrorist Attacks on the U.S. (P.L. 107-206)	Department of Homeland Security	To provide for all-hazards emergency operational planning.	This assistance is to conduct emergency operations updating for all hazards, with a special emphasis on incidents of terrorism, including use of weapons of mass destruction. Funds may also be used to incorporate inter- and intra-state mutual aid agreements, facilitate communication and interoperability protocols, establish a common incident command system, address critical infrastructure protection, conduct assessments to determine emergency planning priorities, address continuity of operations and government, and provide for effective use of volunteers in preparedness and response activities. A total of \$100 million was available under the Supplemental Appropriations. States apply for the operations planning funds, and local governments are sub-grantees of the state. Funds are allocated to the states on the basis of population. Each state that receives grant funds will be required to pass along at least 75% of the funds to local governments.		Multiple hazards, with a special emphasis on incidents of terrorism.	No matching requirements		Federal Emergency Management Agency (FEMA) Region VI Terrorism Preparedness, 1 (940) 898-5399

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Antiterrorism and Emergency Assistance Program	Victims of Crime Act of 1984 [42 U.S.C. §10601], as amended	Department of Homeland Security	To provide assistance programs for victim needs in the aftermath of an act of mass violence or terrorism occurring within and outside the United States and a compensation program for victims of international terrorism.	<p>A. Crisis Response Grant - emergency/short-term to help rebuild adaptive capacities, decrease stressors, and reduce symptoms of trauma immediately following incident.</p> <p>B. Consequence Management Grant - Funding up to 18 months to help victims adapt to the trauma event and to restore the victims' sense of equilibrium.</p> <p>C. Criminal Justice Support Grant- Funding up to 36 months to help facilitate victim participation in an investigation and prosecution related to an act of terrorism or mass violence.</p> <p>D. Crime Victim Compensation Grant- Funding to reimburse victims for out-of-pocket expenses related to an act of terrorism or mass violence.</p> <p>E. Training and Technical Assistance- Funding to assist in identifying resources, assessing needs, coordinating services to victims, and developing strategies for responding to an act of terrorism or mass violence.</p>		Terrorism or mass violence	No matching requirements		<p>Department of Homeland Security,</p> <p>1-800-421-6770</p> <p>www.dhs.gov</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Assistance to Firefighters Grant	Defense Authorization Bill of 2001 (P.L. 106-398), as amended by Section 33 of the Fire Prevention and Control Act of 1974.	Department of Homeland Security	Competitively awarded project grants to provide direct assistance, on a competitive basis, to fire departments for the purpose of protecting the health and safety of the public and firefighting personnel against fire and fire-related hazards.	Grants may be used for (1) firefighter operations and firefighter safety, to include: training, wellness and fitness, firefighting equipment, personal protective equipment, and other equipment and supplies; (2) emergency medical services, emergency medical vehicles, training, equipment/props/supplies, transportation, contracts/consultants, and program personnel protecting the public from fire and fire-related hazards, including public awareness, public education, inspector certifications, building code development and enforcement, arson prevention and detection; (3) firefighting vehicles, including pumpers, engines, tankers/tenders, brush trucks/attack pumpers, rescue, quints, aerial apparatus, hazardous material, ambulance/transport, communications/command, foam units, boats, and equipment for the vehicle.		Fire hazard	\$485 million available nationwide in FY 2006. Cost shares vary by population served by fire department. Applicants who protect a population of 50,000 or less have a 10% non-Federal cost share. Applicants who protect more than 50,000 have a 30% non-Federal cost share.	Will be announced in the Federal Register	AFG Helpline: 1-866-274-0960 firegrants@dhs.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Citizen Corps	Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121 - 5206	Department of Homeland Security	The Citizens Corp Program supports and promotes efforts to involve a wide range of volunteer groups in activities that enhance individual, community, and family preparedness and contribute to the strengthening of homeland security.	Formula grants. See Homeland Security Grant Program. Funds provide resources to State and local communities to: 1) bring together the leadership to form and sustain a Citizens Corp Council; develop and implement a plan for the community to engage all citizens in homeland security, community preparedness and family safety; 3) conduct public education and outreach to inform the public about their role in crime prevention, mitigation, emergency preparedness and public health measures and encourage personal responsibility and action; 4) develop and implement Citizens Corp programs offering training and volunteer opportunities to support Community Emergency Response Teams, Neighborhood Watch, Volunteers in Police Service, and Medical Reserve Program; and 5) coordinate Citizens Corp activities with other DHS funded programs and initiatives.		Multiple hazards	\$20 million was obligated in FY 2006. No matching is required.	Local applications for Citizens Corp Program grants go through the Councils of Government. Contact the Criminal Justice Manager of your local Council of Government for the application deadline for 2007 funds.	Regina Chapline 512-275-9308 rchapline@txregionalcouncil.org www.txregionalcouncil.org www.citizencorps.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Community Emergency Response Teams (CERT)	Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121 - 5206	Department of Homeland Security	To assist State and local efforts to start or expand CERT training and activities that contribute to the strengthening of homeland security by enhancing individual, community, family, and workplace preparedness.	Localities receiving grants may use the funding for organizing, training, equipping, and maintaining CERTs.	CERT funds must be used for activities described in the CERT guidance materials.	Multiple hazards	No matching requirements. States are allocated funding on a formula based on legislation.	Contact the Criminal Justice Manager of your local Council of Government for the application deadline for 2007 funds.	Go to http://www.citizencorps.gov/citizenCorps/certsByState.do for local CERTS program contacts or call Regina Chapline 512-275-9308
COPS Interoperable Communications Technology Program	Homeland Security Act of 2002, Public Law 107-296	Department of Justice	To help communities develop effective interoperable communication systems for public safety and emergency services providers. Interoperable Communications Technology grants fund demonstration projects that explore uses of equipment and technologies to increase interoperability among the law enforcement, fire service, and emergency medical service communities. These projects are the result of thorough and rigorous planning, and demonstrate how new technologies and operating methods can help communities achieve interoperability.	<ul style="list-style-type: none"> - Interoperable communication equipment for multi-disciplinary and multi-jurisdictional public safety communications projects. - Providing local jurisdictions with the equipment or services they need to participate on larger public safety, commercial, or other shared networks. - Purchasing and deploying of portable gateway solutions. - Any other technology that can be demonstrated to significantly increase interoperability within the public safety community. 	Local governments nominated by State or Territory government to submit an application.	Communications	Grant awards will require a 25 percent nonfederal cost share. The source of the match funds must be identified in the grant application.	States are asked to nominal local jurisdictions.	Office of Community Oriented Police Services (COPS) Raymond Reid 202.305.0865 ask.Cops@usdoj.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Emergency Management Performance Grant (EMPG)	Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, Titles II and VI.	Department of Homeland Security	To develop comprehensive, all-hazards emergency management at the State and local levels and to improve capabilities for emergency planning, preparedness, mitigation, response and recovery.	<p>Assistance includes grant funding covering 13 key functional areas of emergency management, including: laws and authorities; hazard identification and risk assessment; hazard management; resource management; planning; direction, control and coordination; communications and warning; operations and procedures; logistics and facilities; training; exercises; public education and information; and finance and administration.</p> <p>The State of Texas will receive \$10,000,000 in FY 2007 for this program.</p>		Multiple hazards	50% nonfederal cost share	Target dates and any applicable deadlines are provided annually by the Division of Emergency Management, Texas Department of Public Safety.	<p>Texas Division of Emergency Management, 512-424-2138</p> <p>www.txdps.state.tx.us/dem</p>
Fire Management Assistance Grants	Robert T. Stafford Disaster Relief and Emergency Assistance Act	Department of Homeland Security	To provide project grants and the provision of specialized services for the mitigation, management, and control of fires that threatens such destruction as would constitute a major disaster.	Grants are used for the mitigation, management and control of any fire on publicly (non-Federal) or privately owned forestland or grassland that threatens such destruction as would constitute a major disaster. This program replaces the former Fire Suppression Assistance Program. This program may cover pre-positioning of resources for up to 21 days.	The Governor or his Authorized Representative must request a fire management assistance declaration through the FEMA Regional Director in order to trigger assistance.	Forest or grassland fire hazard	May be a 25% non-Federal cost share if total eligible costs for the declared fire exceed certain thresholds.	Requests for a fire management assistance declaration and assistance must be submitted when fire is burning uncontrolled and threatens such destruction as would constitute a major disaster.	FEMA Regional VI 800 North Loop 288 Denton, TX 76201-3698 940-898-5399

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Fire Service Hazardous Materials Preparedness and Response	Homeland Security Act of 2002, Public Law 107-296; U.S.A. Patriot Act of 2001, Public Law 107-56; Federal Emergency Management Agency, Executive Order 12127; The Federal Fire Prevention and Control Act of 1974, as amended, and various appropriation bills	Department of Homeland Security	Provide information to the fire and emergency services community, emergency managers, and other local government officials concerning issues related to the planning, mitigation, prevention, and response to hazardous materials incidents which includes acts of terrorism.	Direct Payments for Specified Use. Restricted to recipient designated by Congressional Statute or DHS, and limited in scope to the project description for the purpose of information sharing related to Hazardous Materials and acts of terrorism. Refer to project description or administering program office for specific information. Unsolicited applications for this program will not be accepted.	Restricted to designated private nonprofit institution/organization	Hazardous materials, terrorism	None	Contact headquarters for deadlines	Department of Homeland Security, U.S. Fire Administration, C/O Bldg. #410, 245 Murray Drive, SW., Washington, DC 20523 800-238-3358. http://www.dhs.gov
First Responder Counter-Terrorism Training Assistance	Omnibus Consolidated Appropriations Act of 1997 (P.L. 104-208)	Department of Homeland Security	Project grants to enhance the capabilities of first responders in managing the consequences of terrorist acts.	Training is provided through each of the 50 States through individual State fire training systems. The training is targeted to first responders, those who will come into contact with and will be forced to manage the consequences of terrorist acts.		Terrorist acts	No cost share is required.		Department of Homeland Security, U.S. Fire Administration, C/O Bldg. #410, 245 Murray Drive, SW., Washington, DC 20523 800-238-3358. http://www.dhs.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Flood Hazard Mapping Program	Code of Federal Regulations, Title 42, Chapter 50; April 30, 2002 Federal Register Notice	Department of Homeland Security	<p>To identify, publish and update information on all floodprone areas of the United States in order to inform the public on flooding risks, support sound floodplain management, and set flood insurance premium rates.</p> <p>Because flood hazard conditions change over time due to natural and manmade changes in watersheds and floodplains, FEMA provides grant funds to designated Cooperating Technical Partners (CTPs) and others to develop up-to-date flood hazard data; provide maps and data in digital format; integrate FEMA's community and State partners into the process; and raise public awareness of flood risks.</p>	<p>Assistance includes financial assistance in the form of grants to Cooperating Technical Partners and other entities; and FEMA technical assistance, support and data.</p> <p>Financial assistance is provided for activities such as refinement of Zone A boundaries; hydrologic and hydraulic analyses and floodplain mapping; Digital Flood Insurance Rate Map (DFIRM) production; and re-delineation of floodplain boundaries using updated topographic data.</p> <p>FEMA technical assistance services are provided in the form of base map inventory; digital base map data sharing; DFIRM maintenance; hydrologic and hydraulic review; assessment of community mapping needs to support the Map Needs Update Support System; and technical standards agreements.</p>	Generally, funding flows through Cooperating Technical Partners which have signed a formal agreement to work with FEMA.	Flooding	Cost shares are negotiated between FEMA and recipients; generally a 20% hard or soft match is sought.	Map needs should be included in FEMA's Mapping Needs Update Support System (MNUSS) database. Assistance is requested by letter to the FEMA Region.	<p>Jack Quarles, Mitigation Division, FEMA Region VI, 940-898-5156</p> <p>Jack.Quarles@fema.gov</p> <p>www.fema.gov</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Flood Mitigation Assistance Grants (FMA)	Section 1366 of the National Flood Insurance Act of 1968 as amended by the National Flood Insurance Reform Act of 1994	Department of Homeland Security	<p>To assist States and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured through the National Flood Insurance Program (NFIP).</p> <p>FMA Grants are aimed at reducing the number of repetitive loss structures insured through the NFIP. Emphasis is on reducing damage to properties that have experienced four or more losses, or that have experienced two or more losses where the cumulative payments exceed the property value.</p>	<p>Assistance includes Planning and Project Grants for participating NFIP communities.</p> <p>Planning Grants may be used to develop or update Flood Mitigation Plans. Project grants may be used for flood mitigation measures such as: acquisition of insured structures and real property; dry floodproofing of insured structures; and elevation of insured structures.</p>	Only activities specified in a FEMA-approved Flood Mitigation Plan are eligible for an FMA Project Grant. Eligible applicants are state emergency management agencies or a similar office.	Flooding	25% nonfederal cost share, of which up to 12.5% may be provided as an in-kind contribution		<p>Gilbert Ward, Texas Water Development Board, Research and Planning Fund, 512-463-6418</p> <p>GWard@twdb.state.tx.us</p> <p>www.twdb.state.tx.us</p> <p>Regional Director Federal Regional Center 800 North Loop 288 Denton, TX 76201-3698 940-898-5399</p>
Flood Recovery Mapping	Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended	Department of Homeland Security	To provide funds from FEMA's Disaster Relief Fund to map areas affected by disaster in order to assist in the response and recovery efforts.	<p>Assistance includes grants to Cooperating Technical Partners and other entities; and FEMA technical assistance, support and data.</p> <p>Recovery Maps can be quite detailed and the data collected as part of the recovery mapping process may ultimately be used in the process of developing or updating Flood Insurance Rate Maps.</p>	Requires a Presidential declaration of disaster	Flooding	Cost shares negotiated between FEMA and recipients	No specific deadline	<p>Jack Quarles, FEMA Region VI, 940-898-5156</p> <p>Jack.Quarles@fema.gov</p> <p>www.fema.gov</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Hazardous Materials Assistance Program (CERCLA Implementation)	Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended	Department of Homeland Security	To provide technical and financial assistance through the States to support State, local, and tribal governments in oil and hazardous materials emergency planning and exercising. To enhance State, tribal and local governments capabilities to inter-operate with the National Response System. To support the Comprehensive Hazardous Materials Emergency Response-Capability Assessment Program.	Funds are to be used for planning, exercising and educational capabilities for dealing with oil and hazardous materials releases. Certain equipment purchases are not authorized.		Hazardous materials releases	The FEMA Regional PT office determines the allocation for each applicant, based on the proposal, the FEMA/EPA Interagency Agreement, and previous funding and accomplishments.		Preparedness Division Director, FEMA Region VI, 940-898-5104 Federal Emergency Management Agency 245 Murray Lane Washington, D.C. 800-621-3363
Hazardous Materials Training Program	Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended	Department of Homeland Security	To make funding available to provide training in support of Tribal governments emergency planning, preparedness, mitigation, response and recovery capabilities. These programs must provide special emphasis on emergencies associated with hazardous chemicals.	Funds must be used for planning, exercising, and educational projects that will serve to enhance emergency management capabilities for dealing with oil and hazardous materials releases. Certain equipment purchases are not authorized.	Funds are available only to Federally-recognized Indian Tribal Governments.	Hazardous materials incidents	20% non-Federal match required		Preparedness Division Director, FEMA Region VI, 940-898-5104 Federal Emergency Management Agency 245 Murray Lane Washington, D.C. 800-621-3363.

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Hazard Mitigation Grant Program (HMGP)	Robert T. Stafford Disaster Relief and Emergency Assistance Act, Section 404	Department of Homeland Security	To provide States and local governments financial assistance to permanently reduce or eliminate future damages and losses from natural hazards through safer building practices and improving existing structures and supporting infrastructure.	<p>According to rules issued February 26, 2002 (44 CFR, Parts 201 and 206) and amended Oct. 1, 2002, to be eligible for HMGP Project Grants after November 1, 2004, a local jurisdiction must have in place a FEMA-approved local hazard mitigation plan.</p> <p>Assistance includes Planning Grants and Project Grants. Total grants to States equal up to 7.5% of obligations for Individual and Public Assistance. Project Grants are for acquisition of real property; relocation and demolition of structures; strengthening of existing structures; initial implementation of vegetation management programs; initial training of architects, engineers, building officials, etc. to facilitate the implementation of newly adopted State or local mitigation standards and codes; elevation of residential structures; elevation or dry flood-proofing of non-residential structures; and other activities that bring a structure into compliance with NFIP floodplain management requirements.</p>	Post-disaster, covering all hazards. A Presidential Declaration of disaster is required. Eligible applicants are state emergency management agencies or a similar office.	Multiple hazards	25% non-federal cost share, which can be a combination of cash, in-kind services, or materials.	Within 60 days of a disaster declaration, the State must submit a Letter of Intent to FEMA to participate in HMGP. New project proposals must be submitted for approval within 90 days after FEMA approves the State's hazard mitigation plan for the disaster.	<p>Greg Pekar, Division of Emergency Management, Texas Department of Public Safety, 512-424-2429</p> <p>Gregory.Pekar@txdps.state.tx.us</p> <p>www.txdps.state.tx.us/dem</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Homeland Security Grant Program	Department of Homeland Security Appropriations Act of 2005, Public Law 108-334.	Department of Homeland Security	To enhance the capacity of State and local emergency responders to prevent, respond to, and recover from a weapons of mass destruction (WMD) terrorism incident involving chemical, biological, radiological, nuclear, and explosive (CBRNE) devices and cyber attacks.	Formula Grants. The HSGP solicitation integrates the following five (5) programs: 1) State Homeland Security Program (SHSP); 2) Urban Areas Security Initiative (UASI); 3) Law Enforcement Terrorism Prevention Program (LETPP); 4) Citizen Corps Program (CCP); and 5) Metropolitan Medical Response System (MMRS). See each discussion of each program in this guide.	States apply for the grant funds and are responsible for distributing them to local units of government.	Terrorism, WMDs, cyber attacks, etc.	See individual programs.		Department of Homeland Security, Preparedness Directorate, Office of Grants and Training, 245 Murray Lane Bldg. #410, Washington, DC 20531. The G&T Centralized Scheduling and Information Desk (CSID) 800-368-6498 askcsid@dhs.gov .
Homeland Security Outreach, Education, and Technical Assistance	Homeland Security Act of 2002, Public Law 107-296, 6 U.S.C. 101 et. seq.	Department of Homeland Security	To provide funding for outreach, education, and technical assistance in order to raise public awareness of homeland security issues and to work with communities to help them forge partnerships across agencies and disciplines to address preparedness and response. Outreach and technical assistance may take several forms, such as the provision of written information, person-to-person exchange, seminars, workshops or training sessions.	Project grants; dissemination of technical information	Financial and non-financial assistance may be provided for the following: salaries, materials and supplies, equipment, travel, publication costs, subcontractor and supporting costs required for technical and other activities necessary to achieve the objective.	Various homeland security issues	Identified in the funding opportunity announcement	Identified in the funding opportunity announcement	Marilyn Morgan, Director, Grants and Financial Assistance Division, Office of Procurement Operations, Office of the Chief Procurement Officer. 202-772-9826. www.dhs.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Hurricane Local Grant Program	Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended	Department of Homeland Security	To enhance hurricane-related public awareness and education. This program is open to all incorporated cities and inter-jurisdictional emergency management agencies within the 22 counties in which hurricane risk areas have been identified by the State of Texas Department of Public Safety.	Assistance includes competitive grant awards. Eligible uses include one-time expenses for pamphlets, hurricane preparedness materials, hurricane-related computer software, and purchase of audio-visual equipment.		Hurricane hazards	In 2003 and subsequent years, a 50% non-Federal match may be instituted.		Division of Emergency Management, Texas Department of Public Safety, 512-424-2597
Law Enforcement Terrorism Prevention Program	U.S. Patriot Act	Department of Homeland Security	To provide law enforcement communities with enhanced capabilities for detecting, deterring, disruption, and preventing acts of terrorism.	Formula grants. See Homeland Security Grant Program. Assistance is provided for activities such as: 1) information sharing to preempt terrorist attacks; target hardening to reduce vulnerability of selected high value targets; 3) threat recognition to recognize the potential or development of a threat; 4) intervention activities to interdict terrorists before they can execute a threat; 5) interoperable communications; and 6) management and administration.		Terrorist attack	There is no non-Federal matching requirement.	States are to obligate not less than 80% of the total grant amount to local units of government within 60 days after grant award to the State.	Department of Homeland Security, Preparedness Directorate, Office of Grants and Training, 245 Murray Lane - Bldg. #410, Washington, DC 20523. 800-368-6498 askcsid@dhs.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Metropolitan Medical Response System	Public Law 104-201, National Defense Authorization Act for Fiscal Year 1997: The Defense Against Weapons of Mass Destruction Act of 1996.	Department of Homeland Security	The MMRS program funds highly populated jurisdictions to develop plans, conduct training and exercises, and acquire pharmaceuticals and personal protective equipment, to achieve the enhanced capability necessary to respond to a mass casualty event caused by a WMD with their locally controlled and operated resources, until significant external resources arrive. Key components of the program require activation/notification procedures, a concept of operations plan, the forward movement of patients (coordinated with using the National Disaster Medical System), hospital and healthcare system surge capacity management, the provision of specially trained responders and equipment through exercises and drills, public information dissemination, coordination response protocols, a bioterrorism plan including customized pharmaceuticals, and plans for the prophylaxis of an affected population for up to 1,000 chemical victims, and 10,000 biological victims.	Formula grants. See Homeland Security Grant Program.	Must not duplicate other federal funding.	WMDs	None.		Office of State and Local Government Coordination and Preparedness, Office for Domestic Preparedness (ODP) 800-368-6498 askcsid@dhs.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
National Dam Safety Program	Water Resources Development Act of 1996, Section 215	Department of Homeland Security	To encourage the establishment and maintenance of effective State programs intended to ensure dam safety, to protect life and property, and to improve State Dam Safety Programs.	Assistance includes Project Grants to States to establish and maintain effective Dam Safety Programs. While only States are eligible for financial assistance, the State program provides periodic inspections during dam construction; approval upon completion of dam construction; inspections at least every 5 years of all dams and reservoirs that would pose a significant threat to human life and property in case of failure; and a system of emergency procedures to use if a dam fails or if failure is imminent.	Pre-disaster, covering dam failures and resultant flooding hazards.	Flooding	50% nonfederal cost share required	October 1 of each year.	Warren D. Samuelson, Dam Safety Program Coordinator Texas Commission on Environmental Quality (TCEQ) MC-174 P.O. Box 13087 Austin, TX 78711 Tel: 512/239-5195 Fax: 512/239-0404 wsamuels@tceq.state.tx.us

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
National Flood Insurance Program (NFIP)	National Flood Insurance Act of 1968, as amended by the Flood Disaster Protection Act of 1973 and the National Flood Insurance Reform Act of 1994	Department of Homeland Security	To (1) provide financial protection by enabling persons to purchase insurance against physical damage to, or loss of, buildings and/or contents caused by floods, mudslide, or flood-related erosion; and (2) promote wise floodplain management practices in the Nation's flood-prone areas.	<p>Assistance includes Federally backed insurance against flooding, available to individuals and businesses in communities that participate in the NFIP.</p> <p>Insurance is sold to the public through State licensed property and casualty insurance agents and brokers. Discounted premiums are available in communities that participate in the Community Rating System.</p> <p>Increased Cost of Compliance coverage provides to help policyholders offset the costs associated with floodproofing, elevating, demolishing or relocating buildings that are substantially damaged or subject to repetitive flood loss.</p> <p>Local governments are encouraged to purchase insurance covering public facilities.</p>	<p>Pre-disaster covering losses from floods, mudslides or flood-related erosion</p> <p>Insurance must be in effect for 30 days before coverage begins.</p>	Flooding			<p>State NFIP Coordinator, Texas Water Development Board (TWDB) 512-463-8294</p> <p>www.twdb.state.tx.us</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Port Security Grant Program	DHS Appropriations Act for Fiscal Year 2005, Public Law 108-334	Department of Homeland Security	To create a sustainable program for the protection of regulated ports from terrorism, especially explosives and non-conventional threats which would result in major loss of life and severe disruption.	Project grants. In general, funds may be used for planning, organizational activities, equipment acquisitions, training, exercises, management and administrative activities, and other costs the Secretary deems appropriate.	Available for critical national seaports and terminals	Terrorism	25% of total project costs	Deadlines will be detailed in the program guidance and will also be posted on the grants.gov website	Department of Homeland Security, Preparedness Directorate, Office of Grants and Training, Transportation Infrastructure Security Division, 245 Murray Lane - Bldg. #410, Washington, DC 20523. 800-368-6498. https://www.portsecuritygrants.dotts.net/

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Pre-Disaster Mitigation Grant Program (PDM)	Robert T. Stafford Act, Section 203, as amended by Section 102 of the Disaster Mitigation Act of 2000	Department of Homeland Security	To provide funding for States and communities for cost-effective hazard mitigation activities that complement a comprehensive hazard mitigation program and reduce injuries, loss of life, and damage and destruction of property. FEMA rules are in the Federal Register (February 26, 2002, 44 CFR 201 and 206) and amendments (October 1, 2002). These rules require that local governments have a FEMA-approved local hazard mitigation plan by November 1, 2004 to be eligible to receive project funding from the Hazard Mitigation Grant Program. For the Pre-Disaster Mitigation Grant program, plans must be approved by November 1, 2003 to remain eligible for project grants. Regional watershed- or basin-wide projects involving a number of jurisdictions will get favorable consideration in the selection process.	Assistance includes Planning and Project Grants. Eligible activities include planning, risk assessment, and implementation of cost-effective loss reduction measures. Eligible activities include: management costs, information dissemination, planning, technical assistance (including risk assessments and engineering and design studies), and cost-effective mitigation projects. Mitigation projects include any actions that result in elimination or long-term reduction of damages to public or private property from natural hazards, including: property acquisition or relocation; structural and non-structural retrofitting for wildfire, seismic, wind, or flood hazards; minor structural hazard control or protection projects such as vegetative and stormwater management (culverts, floodgates, retention basins); and localized flood control projects designed to protect critical facilities.	State and local plans are required prior to approval of project grants. Major flood control projects such as dikes, levees, floodwalls, groins, dams, jetties, beach nourishment, and waterway channelization are not eligible. Eligible applicants are state emergency management agencies or a similar office.	Multiple hazards	25% nonfederal cost share, except for small, impoverished communities which have a 10% cost share		Division of Emergency Management, Texas Dept. of Public Safety, 512-424-2397 www.tceq.state.tx.us/dem

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Public Alert Radios for Schools	Department of Homeland Security Appropriations Act	Department of Homeland Security	To disseminate public alerts and warnings by providing Public Alert Radios to eligible schools. Public alerts and warnings can be disseminated nationwide, regionally, or locally. This program will: a) expand delivery of public alert services to designated schools; and b) enhance and strengthen the capability of designated schools to provide alert and warning information directly to students and the public.	NA	NA	NA	NA	NA	Information Analysis and Infrastructure Protection Directorate (IAIP), Department of Homeland Security, Special 245 Murray Lane, Bldg. # 410, Washington, DC, 202-82-8396

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Public Assistance Grants (PA)	Robert T. Stafford Disaster Relief and Emergency Assistance Act	Department of Homeland Security	To provide supplemental assistance to States, local governments, political subdivisions of the State, Indian Tribes, and certain private non-profit organizations to meet emergency needs and repair infrastructure.	<p>According to rules issued February 26, 2002 (44 Code of Federal Regulations, Parts 201 and 206), a local jurisdiction must have in place a FEMA-approved local hazard mitigation plan to be eligible for certain forms of PA grants after November 1, 2003.</p> <p>Assistance includes Project Grants for removal of wreckage and debris from private and public lands; performance of emergency protective measures; provision of emergency transportation and communications; and permanent restoration of eligible facilities.</p>	Post-disaster, covering all hazards. A Presidential Declaration of disaster is required.	Multiple hazards	25% nonfederal cost share	A request must be submitted by the applicant within 30 days of the President's emergency or major disaster declaration.	<p>Division of Emergency Management, Texas Department of Public Safety, 512-424-2445</p> <p>www.txdps.state.tx.us/dem</p>
Repetitive Flood Claims Program	Flood Insurance Reform Act of 2004 (P.L. 108-264) which amended the National Flood Insurance Act of 1968 (P.L. 108-264)	Department of Homeland Security	To assist States and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program	Grants for acquisition of properties, and either demolition or relocation of flood-prone structures, where the property is deed restricted for open space use in perpetuity	Applicant must demonstrate that the proposed activities cannot be funded under the Flood Mitigation Assistance Program. Eligible applicants include States, tribes, and territories which provide sub-grants to local governments	Floods	None	Applications for 2007 funds must be received by February 28, 2007 in the regional office.	FEMA Federal Regional Center 800 North Loop 288 Denton, TX 76201-3698 940-898-5399

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Section 406 Hazard Mitigation Funding	Robert T. Stafford Disaster Relief and Emergency Assistance Act	Department of Homeland Security	To provide discretionary funding to add hazard mitigation measures to permanent work restoration under the PA grant program, in order to enhance a facility's ability to resist similar damage in future disaster events.	<p>Section 406 Hazard Mitigation is a discretionary spending program to fund mitigation measures in conjunction with the repair of damaged facilities. The mitigation measures must be related to eligible disaster-related damages and must directly reduce the potential of future similar disaster damages to the eligible facility.</p> <p>Mitigation measures must be cost-effective. Examples include: dry floodproofing; elevation of electrical panels, machinery rooms, and emergency generators above base flood elevation; drainage structures; installing debris traps; dry floodproofing of pump stations; elevation of equipment and controls and dry or wet floodproofing of wastewater treatment plants; installation of shut-off valves so that damaged sections of underground pipelines can be isolated; strengthening base connections on above ground storage tanks; burying electric lines; and replacing damaged electrical poles with higher-class poles.</p>	<p>A Presidential Declaration of emergency or major disaster is required, with PA grant assistance provided.</p> <p>All hazards may be covered.</p> <p>Eligible work must be carried out in conjunction with the repair of disaster-related damages under the PA program.</p>	Multiple hazards	25% nonfederal cost share	60 days after Presidential disaster declaration	<p>Division of Emergency Management, Texas Department of Public Safety, 512-424-2445</p> <p>www.txdps.state.tx.us/dem</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Severe Repetitive Loss Program	Section 1361A of the National Flood Insurance Act of 1968 42 U.S.C. 4102a as amended by FIRA 2004, Public Law 108-264.	Department of Homeland Security	To reduce or eliminate the long-term risk of damage to severe repetitive loss properties and the associated drain on the National Flood Insurance Fund.	Mitigation activities that reduce or eliminate the long-term risk of flood damage to severe repetitive loss properties.	Only activities specified in a FEMA-approved Flood Mitigation Plan are eligible. Eligible applicants are state emergency management agencies or a similar office.	Flooding	Up to 75% Federal.	To be determined.	Jack Quarles, Mitigation Division, FEMA Region VI, 940-898-5156 Jack.Quarles@fema.gov www.fema.gov
State and Local Homeland Security Exercise Support	U.S.A. Patriot Act of 2001, Public Law 107-56; Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Act of 2002, Public Law 107-117; Consolidated Appropriations Resolution of 2003, Public Law 108-7; Department of Homeland Security Appropriations Act of 2004, Public Law 108-90	Department of Homeland Security	To enhance the capacity of State and local first responders to respond to a weapons of mass destruction (WMD) terrorism incident involving chemical, biological, radiological, nuclear, and explosive devices	Project grants. Eligible applicants are public or private organizations with the expertise and experience to provide assistance to State and local jurisdictions; to facilitate, conduct, and evaluate exercises; and/or to develop guidance, materials and publications related to the conduct of exercises or identification of lessons learned	Funds will be used to provide support for planning and conducting exercises at the National, State, and local levels	Terrorism	None	To be announced	Department of Homeland Security Preparedness Directorate, Office of Grants and Training, 245 Murray Drive, SW., Washington, DC 20528. 202-282-8000. http://www.ojp.usdoj.gov/odp

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
State and Local Homeland Security Training Program	Department of Homeland Security Appropriations Act	Department of Homeland Security	To enhance the capacity of State and local emergency responders prevent, protect, respond to and recover from incidents of terrorism involving weapons of mass destruction (WMD).	Project grants. The Office of Grants and Training (G&T) will maintain and expand current WMD training programs and may develop several new training programs. Training activities of the National Domestic Preparedness Consortium will continue and grow. Consortium Members include: G&T's Center for Domestic Preparedness; the Energetic Materials Research and Test Center at the New Mexico Institute of Mining and Technology; Louisiana State University; the Nevada Test Site in the Department of Energy; and the National Emergency Response and Rescue Training Center at Texas A&M University. Other training partners that provide G&T-sponsored WMD training will be notified of their eligibility to apply for training program funds.	NA	WMDs	None	NA	Department of Homeland Security, Preparedness Directorate Office of Grants and Training, 245 Murray Lane, Bldg. #410, Washington, DC, 20523. 800-368-6498 http://www.ojp.usdoj.gov/odp

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
State Domestic Preparedness Equipment Support Program	U.S.A. Patriot Act of 2001, Public Law 107-56	Department of Homeland Security	To enhance the capacity of State and local first responders to respond to terrorism incident involving chemical, biological, nuclear, radiological, incendiary, and explosive devices. The program was re-named as the State Homeland Security Grant Program (SHSGP) (97.073). SHSGP is one of the six (6) component programs which have been merged or consolidated into the Homeland Security Grant Program (97.067).	Formula grants. States will receive an allocation of funds to purchase equipment for State and local first responders, in accordance with the authorized equipment list included in the Application Kit, and an allocation to support the planning and conduct of exercises. Administrative funds will be provided to conduct comprehensive threat and needs assessments and to develop and implement a Statewide Domestic Preparedness Strategy to enhance first responder capabilities to respond to a terrorist incident.	To qualify to apply for grant funds, States were required to conduct a comprehensive threat and needs assessment and to develop a Statewide Domestic Preparedness Strategy.	Terrorism.	None.	Provided in application kits given to state agencies.	Department of Homeland Security, Office of State and Local Government Coordination and Preparedness, Office for Domestic Preparedness (ODP), 245 Murray Lane, Bldg. #410, Washington, DC 20523. 800-368-6498. http://www.ojp.usdoj.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
State Homeland Security Program	U.S. Patriot Act	Department of Homeland Security	To provide funds to enhance capability of State and local units of government to prevent, deter, respond to, and recover from incidents of terrorism involving chemical, biological, radiological, nuclear, and explosive weapons and cyber attacks. The funds support costs related to homeland security and emergency operations planning activities; the purchase of specialized equipment; the design, development and conduct of a State CBRNE and cyber security training programs and attendance at Office of Domestic Preparedness-sponsored courses; the design, development, conduct and evaluation of CBRNE and cyber security exercises; and other costs to implement the State Homeland Security Strategies. This program also provides certain funding to address agricultural security.	Formula grants. See Homeland Security Grant Program. Funding may be used in any of five categories: 1) planning; 2) equipment acquisitions; 3) training; 4) exercise; 5) management and administration. Other than a 3% cap on Management and Administration funds, there are no restrictions on allocation of funds across these categories.		Terrorist events	There is no non-Federal matching requirement.	States are to obligate not less than 80% of the total grant amount to local units of government within 60 days after grant award to the State.	Steve McCraw Director, Office of Homeland Security 512-936-1882 www.texashomelandsecurity.com

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Urban Area Security Initiative	Department of Homeland Security Appropriations Act of 2005, Public Law 108-334.	Department of Homeland Security	UASI program provides financial assistance to address the unique multi-discipline planning, operations, equipment, training, and exercise needs of high-threat, high density Urban Areas, and to assist them in building and sustaining capabilities to prevent, protect against, respond to, and recover from threats or acts of terrorism; however, in light of several major new national planning priorities, which address such issues as pandemic influenza and the aftermath of Hurricane Katrina, the allowable scope of UASI activities including catastrophic events, provided that these activities also build capabilities that relate to terrorism.	Formula grants. See Homeland Security Grant Program.	Funds provided under this grant address the unique needs of large urban areas and mass transit authorities. Funds can be used for equipment, training, exercises and planning. No more than 5 percent of the grant award may be used for management and administrative purposes. Urban Areas must utilize their Urban Area Homeland Security Strategy and the State's Program and Capability Enhancement Plan as the basis for requesting funds to support Investments identified in the Investment Justification. There must be a clear correlation between the goals, objectives, and priorities identified in the Urban Area Homeland Security Strategy and UASI program activities.	Terrorism and other catastrophic events.	None.		Department of Homeland Security, Preparedness Directorate, Office of Grants and Training, 245 Murray Lane, Bldg. #410, Washington, DC 20523 800-368-6498. http://www.dhs.gov

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Aquatic Ecosystem Restoration	Water Resources Development Act of 1996, Section 206	U.S. Army Corps of Engineers	To restore degraded aquatic ecosystems.	Assistance includes all project-related costs for feasibility studies, planning, engineering, construction, supervision, and administration for adopted restoration projects.		Flooding and habitat restoration	35% non-Federal contribution is required for project costs.	No specific application deadline. Contact the appropriate District Engineer to assist with filing the correct documentation.	Mike Mocek, Deputy District Engineer, Ft. Worth Office, U.S. ACE, 817-886-1515 Michael.J.Mocek@swf02.usace.army.mil www.usace.army.mil Arthur Janecka, Deputy District Engineer, Galveston Office 409-766-3018 Arthur.J.Janecka@usace.army.mil www.usace.army.mil
Emergency Advance Measures for Flood Prevention	Flood Control Act of 1941, as amended	U.S. Army Corps of Engineers	To protect against loss of life or damages to property given an immediate threat of unusual flooding.	Assistance includes aid from USACE for removal of waterway obstructions, and work necessary to prevent dam failure and prepare for abnormal snowmelt. Work performed must be temporary in nature and have a favorable benefit/cost ratio.	Immediate threat of flooding. A Presidential disaster declaration is not required.	Flooding	No match required	The Governor of the affected State must request assistance under an immediate threat of flooding.	Mike Mocek, Deputy District Engineer, Ft. Worth Office, U.S. ACE, 817-886-1515 Michael.J.Mocek@swf02.usace.army.mil www.usace.army.mil Arthur Janecka, Deputy District Engineer, Galveston Office 409-766-3018 Arthur.J.Janecka@usace.army.mil www.usace.army.mil

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Emergency Rehabilitation of Flood Control Works or Federally Authorized Coastal Protection Works	Flood Control Act of 1941, as amended	U.S. Army Corps of Engineers	To assist in the repair and restoration of flood control works damaged by flood, or of federally-authorized hurricane flood and shore protection works damaged by extraordinary wind, wave or water action.	Assistance includes emergency repair or rehabilitation of flood control works damaged by flood, and restoration of federally authorized coastal protection structures damaged by extraordinary wind, wave, or water action. Assistance does not extend to major improvements of flood control or federally authorized coastal protection structures, nor to reimbursement of individuals or communities for funds expended in repair or rehabilitation efforts.	Post-disaster. A Presidential disaster declaration is not required.	Flooding, including coastal flooding	20% non-Federal cost share required, in cash or in-kind services	No specific application deadline. Contact the appropriate District Engineer to assist with filing the correct documentation.	Mike Mocek, Deputy District Engineer, Ft. Worth Office, U.S. ACE, 817-886-1515 Michael.J.Mocek@swf02.usace.army.mil www.usace.army.mil Arthur Janecka, Deputy District Engineer, Galveston Office 409-766-3018 Arthur.J.Janecka@usace.army.mil www.usace.army.mil
Emergency Streambank and Shoreline Protection	Flood Control Act, as amended, Section 14	U.S. Army Corps of Engineers	To prevent erosion damages to public facilities by the emergency construction or repair of streambank and shoreline protection works.	Assistance includes studies and projects for the construction and repair of streambank and shoreline protection.	A Presidential disaster declaration is not required. However, the program emphasizes the emergency construction or repair needs.	Flooding, including coastal flooding	No cost share is required for the first \$40,000 of study costs. After \$40,000, a 35% non-Federal cost share is required. A 35% non-Federal cost share is required for project costs.	No specific application deadline. Contact the appropriate District Engineer to assist with filing the correct documentation.	Elston D. Eckhardt, Project Manager, Ft. Worth Office, U.S. ACE, 817-886-1378 Elston.D.Eckhardt@usace.army.mil www.usace.army.mil Arthur Janecka, Deputy District Engineer, Galveston Office 409-766-3018 Arthur.J.Janecka@usace.army.mil www.usace.army.mil

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Emergency Water Supply/ Drought Assistance Programs		U.S. Army Corps of Engineers	To increase water supply in shortage areas and under drought conditions	Construction of wells and transportation of water during emergencies	Requires official declaration from governor; water must be for human use and not for recreation; available only when all local sources are expended and there must be plan for long-term solution	Emergency water supply	Applicant must pay for water to be transported and repay costs of well construction	NA	Elston D. Eckhardt, Project Manager, Ft. Worth Office, U.S. ACE, 817-886-1378 Elston.D.Eckhardt@usace.army.mil www.usace.army.mil Arthur Janecka, Deputy District Engineer, Galveston Office 409-766-3018 Arthur.J.Janecka@usace.army.mil www.usace.army.mil
Environmental Protection and Restoration, Beneficial Use of Dredged Material	Water Resources Development Act of 1992, Section 204	U.S. Army Corps of Engineers	To protect, restore and create aquatic and/or wetland habitats associated with dredging for authorized projects.	Assistance includes studies and projects for the protection, restoration and creation of aquatic and/or wetland habitats associated with dredging for authorized projects.		Flooding and habitat restoration	No non-Federal match required for Initial Appraisal costs. 25% match required for Feasibility studies. 25% non-Federal cost share for project costs.	No specific application deadline. Contact the appropriate District Engineer to assist with filing the correct documentation .	Elston D. Eckhardt, Project Manager, Ft. Worth Office, U.S. ACE, 817-886-1378 Elston.D.Eckhardt@usace.army.mil www.usace.army.mil Arthur Janecka, Deputy District Engineer, Galveston Office 409-766-3018 Arthur.J.Janecka@usace.army.mil www.usace.army.mil

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Flood Plain Management Services	Flood Control Act of 1960, as amended, Section 206	U.S. Army Corps of Engineers	To promote appropriate recognition of flood hazards in land and water use planning and development through the provision of flood and floodplain related data, technical services and guidance.	<p>Assistance includes General Technical Services and Planning Guidance.</p> <p>General Technical Services include development or interpretation of site-specific data on floodplain patterns, and provision of technical information on natural and cultural floodplain resources, and flood loss potentials.</p> <p>General Planning Guidance includes studies of floodplain delineation; flood hazard evaluation; dam break analysis; hurricane evacuation; flood warning/preparedness; comprehensive floodplain management; flood damage reduction; stormwater management; floodproofing; and an inventory of floodprone structures.</p>		Flooding	No match required for services to State, regional and local governments and other non-Federal public agencies. 100% match required for services to other Federal agencies and the private sector.	No specific application deadline. Requests are made in the form of a letter to the District Engineer.	<p>Elston D. Eckhardt, Project Manager, Ft. Worth Office, U.S. ACE, 817-886-1378</p> <p>Elston.D.Eckhardt@usace.army.mil</p> <p>www.usace.army.mil</p> <p>Arthur Janecka, Deputy District Engineer, Galveston Office 409-766-3018</p> <p>Arthur.J.Janecka@usace.army.mil</p> <p>www.usace.army.mil</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Navigation Projects	River and Harbor Act of 1960, Section 107	U.S. Army Corps of Engineers	To improve navigation, including dredging of channels, widening of turning basins and construction of navigation aids.	Assistance includes studies and projects to aid navigation.		Flooding and navigation	No cost share required for the first \$100,000 of study costs. Over \$100,000, a 50% non-Federal match is required. 20% non-Federal cost share is required for project costs during construction and over a 30-year period.	No specific application deadline. Contact the appropriate District Engineer to assist with filing the correct documentation.	Elston D. Eckhardt, Project Manager, Ft. Worth Office, U.S. ACE, 817-886-1378 Elston.D.Eckhardt@usace.army.mil www.usace.army.mil Arthur Janecka, Deputy District Engineer, Galveston Office 409-766-3018 Arthur.J.Janecka@usace.army.mil www.usace.army.mil
Nonstructural Alternatives to Structural Rehabilitation of Damaged Flood Control Works	Public Law 84-99	U.S. Army Corps of Engineers	This program provides a nonstructural alternative to the structural rehabilitation of flood control works damaged in floods or coastal storms.	Direct planning and construction assistance is provided to assist in the event of damage to an existing flood control work. The project must involve damaged flood control works eligible for rehabilitation under Public Law 84-99.	A Presidential disaster declaration is not required. However, damage to flood control works is required.	Flooding	The USACE may fund 100% of the project costs, up to a project-specific cap. Costs above the cap are the responsibility of the participating State, tribal, local and/or Federal agencies.	Normally, an application is due 30 days after a river returns to bankfull conditions.	Elston D. Eckhardt, Project Manager, Ft. Worth Office, U.S. ACE, 817-886-1378 Elston.D.Eckhardt@usace.army.mil www.usace.army.mil Arthur Janecka, Deputy District Engineer, Galveston Office 409-766-3018 Arthur.J.Janecka@usace.army.mil www.usace.army.mil

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Planning Assistance to States	Water Resources Development Act of 1974	U.S. Army Corps of Engineers	To assist States, local governments and other non-Federal entities in the preparation of comprehensive plans for the development, utilization, and conservation of water and related land resources.	Assistance includes studies and technical assistance.		Flooding and water supply	50% non-Federal match required	No specific application deadline. Contact the appropriate District Engineer to assist with filing the correct documentation.	Elston D. Eckhardt, Project Manager, Ft. Worth Office, U.S. ACE, 817-886-1378 Elston.D.Eckhardt@usace.army.mil www.usace.army.mil Arthur Janecka, Deputy District Engineer, Galveston Office 409-766-3018 Arthur.J.Janecka@usace.army.mil www.usace.army.mil
Small Ecosystem Restoration	Water Resources Development Act of 1988, Section 1135	U.S. Army Corps of Engineers	To restore degraded ecosystems through modifications to U.S. Army Corps of Engineers' structures and operations of Corps structures or implementation of measures in affected areas.	Assistance includes development of a Preliminary Restoration Plan and a Project Modification Report.		Flooding and ecosystem restoration	No non-Federal match required for development of a Preliminary Restoration Plan. A Project Modification Report requires a 25% non-Federal cost share.	No specific application deadline. Contact the appropriate District Engineer to assist with filing the correct documentation.	Elston D. Eckhardt, Project Manager, Ft. Worth Office, U.S. ACE, 817-886-1378 Elston.D.Eckhardt@usace.army.mil www.usace.army.mil Arthur Janecka, Deputy District Engineer, Galveston Office 409-766-3018 Arthur.J.Janecka@usace.army.mil www.usace.army.mil

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Small Flood Control Projects	Flood Control Act of 1948, as amended, Section 205	U.S. Army Corps of Engineers	To reduce flood damages through small flood control projects not specifically authorized by Congress.	<p>Assistance includes studies and projects for the design and construction of small flood control projects by the USACE.</p> <p>Flood control projects are required to be feasible from an engineering perspective, complete within themselves, and economically justified.</p> <p>State or local government officials should consult the nearest District Engineer regarding specific problems and the possibility of a remedial project under this program.</p>		Flooding	<p>No cost share required for the first \$100,000 of planning study costs. Over \$100,000, a 50% cost share is required.</p> <p>A 35% cost share is required for project costs, of which 5% is in cash. The balance may consist of the provision of lands, easements, rights-of-way, and necessary relocations.</p>	No specific application deadline. A letter to the District Engineer is required.	<p>Elston D. Eckhardt, Project Manager, Ft. Worth Office, U.S. ACE, 817-886-1378</p> <p>Elston.D.Eckhardt@usace.army.mil</p> <p>www.usace.army.mil</p> <p>Arthur Janecka, Deputy District Engineer, Galveston Ofc., 409-766-3018</p> <p>Arthur.J.Janecka@usace.army.mil</p> <p>www.usace.army.mil</p>

Program	Authority	Funding Source	Purpose	Types of Assistance and Eligible Projects	Condition	Hazards or Topics Covered	Matching Required	Application Deadlines	Contact
Snagging and Clearing for Flood Control	Flood Control Act of 1954, as amended, Section 208	U.S. Army Corps of Engineers	Provides for channel clearing and excavation, with limited embankment construction by use of materials from the clearing operations only.	Assistance includes studies and projects for channel clearing and excavation.		Flooding	<p>No match required for study costs under \$40,000. Over \$40,000 there is a 35% non-Federal cost share.</p> <p>35% non-Federal cost share required for project costs, of which 5% is required in cash.</p>	No specific application deadline. Contact the appropriate District Engineer to assist with filing the correct documentation .	<p>Elston D. Eckhardt, Project Manager, Ft. Worth Office, U.S. ACE, 817-886-1378</p> <p>Elston.D.Eckhardt@usace.army.mil www.usace.army.mil</p> <p>Arthur Janecka, Deputy District Engineer, Galveston Office 409-766-3018</p> <p>Arthur.J.Janecka@usace.army.mil www.usace.army.mil</p>