



## MEMORANDUM

**TO:** Mayor and Council

**CC:** Marc A. Ott, City Manager; Michael McDonald, Deputy City Manager; Sue Edwards, Assistant City Manager; Robert Goode, Assistant City Manager; Anthony Snipes, Assistant City Manager; Rey Arellano, Assistant City Manager; Bert Lumbreras, Assistant City Manager; Ray Baray, Assistant to the City Manager; Larry Weis, Austin Energy General Manager; Greg Meszaros, Austin Water Director; Victoria Li, Watershed Protection Department Director; Sara Hensley Parks and Recreation Department Director

**FROM:** Lucia Athens, Chief Sustainability Officer  
Zach Baumer, Climate Program Manager

**DATE:** June 30<sup>th</sup> 2014

**SUBJECT:** RESPONSE TO CLIMATE RESILIENCE RESOLUTION 20140522-048

On November 21, 2013, City Council passed resolution 20131121-060 directing the City Manager to analyze climate change projections, determine how departmental planning efforts integrate future impacts of climate change, and identify a process for performing departmental vulnerability assessments. The Office of Sustainability worked closely with department stakeholders and reported back to Council on May 12, 2014. In response to staff recommendations in that report, City Council passed resolution 20140522-048 directing the City Manager to develop cost estimates associated with 1) more detailed climate projections, and 2) detailed climate change vulnerability assessments related to specific departmental needs identified by Austin Energy, Austin Water Utility, Watershed Protection Department, and Parks and Recreation Department.

- 1) **Climate Projections.** It is estimated that the cost of obtaining additional, detailed climate change projections would be approximately **\$50,000**. The Office of Sustainability would be responsible for working with consultants to collect this data. This is not currently included in the Office of Sustainability budget.
- 2) **Vulnerability Assessment Costs & Timeframes.** Office of Sustainability staff worked closely with department stakeholders to identify the methodologies, estimated timelines, and resources required to complete these vulnerability assessments, as shown in the summary table below. Details from each Department are included in the following pages.

<b>DEPARTMENT-SPECIFIC VULNERABILITY ASSESSMENTS</b>			
<b>Department</b>	<b>Methodology</b>	<b>Timeline</b>	<b>Preliminary Cost Estimate</b>
<b>Office of Sustainability</b>	Detailed Climate Change Projections	6 months (starting Q2 2015)	\$50,000
<b>Austin Energy</b>	FHWA Framework	1 year (starting Q1 2015)	\$293,000
<b>Austin Water Utility</b>	EPA's CREAT	1 year (starting Q2 2015)	\$160,000
<b>Watershed Protection</b>	FHWA Framework	1 year (starting Q1 2015)	\$50,000
<b>Parks and Recreation</b>	FHWA Framework	6 months (starting Q1 2015)	\$100,000
<b>TOTAL:</b>			<b>\$653,000</b>

### **Background on Vulnerability Assessment Methodology**

In early 2013, the Office of Sustainability in partnership with Capital Area Metropolitan Planning Organization (CAMPO) was selected as a recipient for a Federal Highway Administration (FHWA) grant to conduct a climate change vulnerability assessment for the Central Texas region's transportation infrastructure and systems. The assessment framework identified as part of the FHWA grant includes the following steps:

1. Determine critical infrastructure assets.
2. Identify specific climate thresholds for that infrastructure.
3. Obtain detailed climate projections specific to the Central Texas region.
4. Complete a detailed risk assessment for each asset based on the likelihood of a risk occurring, balanced by the magnitude of that risk.
5. Communicate which assets are vulnerable, how they are vulnerable, and approaches to make existing and new assets more resilient to climate change.

Austin Energy, Watershed Protection, and Parks and Recreation have chosen to utilize the FHWA framework to complete department-specific vulnerability assessments and have used this information to develop cost estimates and timeframes. Austin Water is investigating a new Environmental Protection Agency (EPA) tool called the Climate Resilience Evaluation & Awareness Tool (CREAT) with resources specific to water utilities for their vulnerability assessment.

## AUSTIN ENERGY CLIMATE VULNERABILITY ASSESSMENT

Austin Energy is committed to delivering clean, affordable, and reliable energy, as well as excellent customer service to subscribers. Climate change and related extreme weather events may impact the ability of Austin Energy to meet these objectives.

The Electric Reliability Council of Texas (ERCOT) region's all-time record peak load occurred on August 3, 2011, when consumer demand hit 68,305 megawatts due to widespread high temperature extremes. The highest loads approached the amount of available electricity generation on the grid. Future temperature extremes throughout Texas might result in short-term generation capacity issues, which would then force ERCOT to implement rolling blackouts for all users throughout the grid.

Extreme temperatures and drought conditions can also affect the efficiency of existing power plants, while extreme weather events may impact existing transmission and distribution infrastructure. Flash floods and severe storms can cause damage to substations, poles and lines. Drought conditions may weaken or kill vegetation near power lines, which could increase infrastructure damage and outages due to tree failure.

**Assessment Methodology:** To provide a comprehensive risk assessment on energy infrastructure and assets, Austin Energy would use an all-hazard approach that combines both a physical security and a climatological/environmental assessment of risks.

**Scope of Assessment:** Austin Energy has 16 facilities that require risk assessments, including:

- 4 chiller plants
- 8 box structures (5 of these include warehouse/laydown yards)
- 2 power plants
- 2 dams

Austin Energy also has 92 substations with corresponding distribution and transmission lines from power plants to customers. A risk assessment should be completed for at least 10 of these critical infrastructures to develop a sound sampling of vulnerabilities.

**Resources Needed:** Based on the cost of the Federal Highway Administration (FHWA) risk assessment of 6 total assets for \$150,000, the 26 assets that Austin Energy has identified would entail a cost of \$650,000. Austin Energy also requested cost estimates from Vendors for planning purposes, resulting in an average of \$225,000 to perform these vulnerability assessment services. It is also anticipated that there would need to be at least one Project Manager assigned to this project to ensure risk assessment quality and integrity. Based on a mid-range Project Manager salary plus overhead, the cost would be an additional \$64,100.

Based on all of the above, Austin Energy estimates that the cost for conducting a climate change vulnerability assessment would range between **\$293,000 and \$715,000**, depending on final bids from consultants, number of assets studied, and the range of risks considered.

**Schedule:** Austin Energy anticipates a 6 months to 1 year timeframe to complete this vulnerability assessment. The assessment process would begin in early 2015 if funding is approved.

## AUSTIN WATER CLIMATE VULNERABILITY ASSESSMENT

Climate change will impact Austin Water most directly in terms of both water supply and water demand. Austin Water is currently developing plans to address water security for short, medium, and long-term scenarios that include projected climate conditions that fall within the scope of a robust vulnerability assessment. These potential vulnerabilities include temperature-related changes in water quality that would require treatment process changes; flooding and inundation of infrastructure; and extreme temperature impacts on equipment and personnel, among others. In some of these scenarios, Austin Water has prepared all-hazards planning Standard Operating Procedures.

**Assessment Methodology:** Austin Water staff is currently participating in a working group led by the Environmental Protection Agency (EPA) to develop a climate resilience planning tool for water utilities. This tool will offer the advantage of sector-specific content, a framework for conducting a water utility vulnerability assessment, and a process for developing resilience strategies. Depending on the timing for climate resilience planning at the City, the EPA tool may be ready for use, in which case Austin Water would likely use it. If the tool is not ready, the FHWA framework would be used instead to identify critical assets and climate variables and to conduct a vulnerability assessment and risk analysis.

**Scope of Assessment:** The scope of this initial vulnerability assessment would be to review existing Austin Water assets and operations. Insights gained from the assessment would be shared with planners and designers to inform the development of future assets.

**Resources Needed:** Austin Water estimates a need for 1-2 FTEs to complete this assessment, based on the experience of other utilities who have piloted earlier versions of the EPA planning tool. Costs are estimated to be approximately \$80,000 per FTE per year, for a total of **\$160,000** for the first year.

**Schedule:** If funds are approved, Austin Water anticipates that it would take 6 months to 1 year to complete this assessment if funding is approved. The updated EPA planning tool should be available in 2015, allowing a mid-to-late 2015 completion date.

## WATERSHED PROTECTION CLIMATE VULNERABILITY ASSESSMENT

The mission of the Watershed Protection Department (WPD) is to protect lives, property and the environment by reducing the impacts of flood, erosion and water pollution. Recent heat waves and drought have dropped water tables, killed vegetation, and caused trees to shed limbs, increasing the cleanup costs and risk of greater flood impacts in the future. Extreme rain events can take lives, destroy buildings and infrastructure, and impede access to critical infrastructure.

**Assessment Methodology:** WPD would use a two-phased analysis of future weather conditions as they relate to the largest affected mission responsibility: flooding. Phase One would involve review and evaluation of future storm scenarios (provided by consultants) for their relative magnitude compared to current extreme weather models. Based upon the complexity and impact expected with future flow conditions, the extent of watersheds to be modeled in the second phase would be determined. In a worst-case scenario, Phase Two would require that all watersheds be modeled.

**Scope of Assessment:** WPD manages a wide variety of assets valued in the range of \$1 billion, any of which could be affected by extreme climate changes:

ASSET CATEGORY	VULNERABILITY
<b>Storm Sewers</b>	WPD manages over 900 miles of storm drains, 200 miles of drainage ditches, and over 30,000 inlets. These can be damaged during extreme rainfall events.
<b>Ponds</b>	WPD provides maintenance for over 800 ponds; flooding can cause erosion and possibly failure.
<b>Endangered Species Habitat</b>	Barton Springs Pool is an endangered species habitat, which can be affected by temperature or extreme events.
<b>Dams</b>	Dams which hold stormwater to a depth greater than 6 feet are considered "high hazard." The City of Austin has responsibility for over 200 high hazard dams. Floods test the design, construction, and maintenance of dams.
<b>Creeks and Streams</b>	WPD manages over 2,500 miles of creek corridors. Extreme weather could damage these assets through erosion, vegetation loss and habitat loss.

**Resources Needed:** WPD estimates that this assessment would require the coordinated effort of the Departmental Sustainability Officer, Watershed Engineering Division, and hired consultants. The maximum budget estimate for a multi-year consulting contract could approach is \$1,500,000 and would be dependent on the number of watersheds included in the analysis; however, Phase One could be completed for approximately **\$50,000**.

**Schedule:** WPD estimates that Phase One could be completed within 120 days after receipt of specific weather frequency and intensity information. Phase Two may require up to 2 years to complete. All phases would be dependent on funding approval.

## PARKS AND RECREATION CLIMATE VULNERABILITY ASSESSMENT

The mission of the Parks and Recreation Department (PARC) is to provide, protect and preserve a park system that promotes quality recreational, cultural and outdoor experiences for the Austin community. Extreme rain events can take lives, destroy buildings and infrastructure, impede access to critical assets and disrupt recreation and tourism. The 2013 Halloween Flood required the repurposed use of the Dove Springs Recreation Center as a Disaster Assistance Center for two weeks. Flooding also disrupted the use of two golf courses for several weeks, resulting in lost revenue, as well as the cancellation of the final day of the Austin City Limits Music Festival at Zilker Park.

**Assessment Methodology:** PARC would use the FHWA framework to identify critical assets and climate variables and to conduct a vulnerability assessment and risk analysis.

**Scope of Assessment:** PARC manages a variety of assets that could be affected by climate change:

ASSET CATEGORY	VULNERABILITY
<b>Parks</b>	PARC manages over 175 parks of various sizes in locations throughout Austin; several are located in major floodplains. Acres of grass land and Urban Forest are vulnerable to fire as well as drought, which may create safety risks to users of the park from falling tree limbs.
<b>Greenbelts/ Trails</b>	There are currently more than 35 designated greenbelts in Austin containing 208.43 linear miles of trails. Vegetation is at risk during droughts or flooding.
<b>Cemeteries</b>	PARC manages 5 cemeteries within the city limits. Flooding of these cemeteries could cause a major health hazard to residents. Extreme drought will hamper PARC's ability to protect heritage trees in the cemeteries.
<b>Swimming Pools</b>	PARC operates 7 municipal pools, including Barton Springs, 27 neighborhood pools, six wading pools, and 10 splash pads. All could be impacted by droughts or flooding, resulting in lost revenue and damage to structures.
<b>Golf Courses</b>	PARC manages 6 golf courses that provide revenue to the City. Past flooding and fires have resulted in the loss of revenue.
<b>Recreation Centers</b>	PARC operates 22 recreation centers; some are located in major floodplains and all are possible emergency shelters for natural disasters.
<b>Museums/Cultural Centers</b>	PARC operates 11 museums/cultural centers; some of the items in these facilities are culturally significant or are on loan to the City, and would be irreplaceable if damaged by fire or flooding.
<b>Tennis Centers</b>	PARC operates 5 tennis centers; flooding or fire could result in revenue loss.
<b>Support Facilities</b>	PARC operates 19 administrative buildings and 7 maintenance facilities that house vehicles and heavy equipment. These facilities are at risk for flooding or wildfires.

**Resources Needed:** PARC estimates that this assessment would require the coordinated effort of their Climate Protection Coordinator and hired consultants. The estimated budget for the consultants' effort is **\$100,000**.

**Schedule:** PARC estimates that it would take 1 year to complete the vulnerability assessment and recommends starting in early 2015, if funding is approved.