

# Burleson County Multi-Hazard Mitigation Plan

2021

"Under the Federal Disaster Mitigation Act of 2000 (DMA 2000 or "the Act"), Burleson County (County) is required to have a Federal Emergency Management Agency ("FEMA") - approved Local Hazard Mitigation Plan ("the Plan") in order to be eligible for certain pre- and post-disaster mitigation funds. Adoption of this Plan by the County and approval by FEMA will serve the dual objectives of providing direction and guidance on implementing hazard mitigation in the County, and qualify the County to obtain federal assistance for hazard mitigation. Solely to help achieve these objectives, the Plan attempts to systematically identify and address hazards that can affect the County. Nothing in this Plan is intended to be an admission, either expressed or implied, by or on behalf of the County, of any County obligation, responsibility, duty, fault or liability for any particular hazard or hazardous condition, and no such County obligation, responsibility, duty, fault or liability should be inferred or implied from the Plan, except where expressly stated."

## Table of Contents

1.	Introduction and Background .....	9
1)	Participating Jurisdictions .....	9
2)	Hazard Mitigation Plan History .....	9
2.	Planning Process .....	11
1)	Existing Plans, Reports, Ordinances, and Technical Information Sources .....	14
2)	Project Meetings .....	15
3)	Public Input .....	16
4)	Plan Maintenance .....	21
5)	Plan Monitoring .....	22
6)	Plan Evaluation .....	23
7)	Plan Update .....	23
3.	Determining Risk .....	25
1)	Risk Assessment .....	25
2)	Distribution of Property by Housing Units, Density, and Median Value .....	25
3)	Distribution of Vulnerable Populations .....	26
4.	Hurricane / Tropical Storm .....	34
1)	Hurricanes / Tropical Storms History .....	34
2)	Likelihood of Future Events .....	35
3)	Extent .....	35
4)	Location and Impact .....	36
5)	Vulnerability .....	37
5.	Drought .....	42
1)	Drought History .....	44
2)	Likelihood of Future Events .....	45
3)	Extent .....	45
4)	Location and Impact .....	47
5)	Vulnerability .....	47
6.	Hailstorm .....	52
1)	Hailstorm History .....	52

2)	Likelihood of Future Events.....	53
3)	Extent.....	54
4)	Location and Impact.....	55
5)	Vulnerability.....	55
7.	Riverine Flooding.....	59
1)	Flood History.....	62
2)	Likelihood of Future Events.....	65
3)	Extent.....	65
4)	Location and Impact.....	66
5)	Vulnerability.....	72
8.	Tornado.....	78
1)	Tornado History.....	78
2)	Likelihood of Future Events.....	78
3)	Extent.....	79
4)	Location and Impact.....	80
5)	Vulnerability.....	81
9.	Severe Winds.....	87
1)	Severe Winds History.....	87
2)	Likelihood of Future Events.....	88
3)	Extent.....	88
4)	Location and Impact.....	90
5)	Vulnerability.....	90
10.	Wildfire.....	97
1)	Wildfire History.....	97
2)	Likelihood of Future Events.....	98
3)	Extent.....	98
4)	Location and Impact.....	100
5)	Vulnerability.....	106
11.	Winter Weather.....	112

1)	Winter Weather History .....	112
2)	Likelihood of Future Events.....	113
3)	Extent.....	113
4)	Location and Impact .....	115
5)	Vulnerability.....	115
12.	Lightning.....	119
1)	Lightning History.....	119
2)	Likelihood of Future Events.....	120
3)	Extent.....	120
4)	Location and Impact .....	121
5)	Vulnerability.....	121
13.	Extreme Cold.....	125
1)	Extreme Cold History .....	125
2)	Likelihood of Future Occurrence.....	126
3)	Extent.....	126
4)	Location and Impact .....	127
5)	Vulnerability.....	127
14.	Extreme Heat .....	129
1)	Extreme Heat History .....	130
2)	Likelihood of Future Events.....	131
3)	Extent.....	131
4)	Location and Impact .....	133
5)	Vulnerability.....	133
15.	Dam / Levee Failure .....	134
1)	Dam / Levee Failure History .....	134
2)	Likelihood of Future Occurrence.....	135
3)	Extent.....	135
4)	Location and Impact .....	136
5)	Vulnerability.....	140

16. Mitigation Strategy .....	142
1) Capability Assessment .....	142
2) Goals and Objectives Overview .....	145
3) Long-Term Vision .....	145
4) Goals .....	145
5) Mitigation Action Plan .....	147

## List of Figures

Figure 1: Survey Responses for Question 1 .....	17
Figure 2: Survey Responses for Question 2 .....	18
Figure 3: Survey responses for Question 3.....	18
Figure 4: Survey Choices for Question 8.....	19
Figure 5: Response Breakdown for Question 8 .....	20
Figure 6: Burleson County Vulnerability Index .....	28
Figure 7: City of Caldwell Vulnerability Index .....	29
Figure 8: City of Snook Vulnerability Index.....	30
Figure 9: City of Somerville Vulnerability Index.....	31
Figure 10: Sequence of Drought Occurrence and Impacts for Commonly Accepted Drought Types .....	43
Figure 11: Burleson County Drought History.....	44
Figure 12: Graphic of Texas showing updated rainfall values in inches.....	61
Figure 13: Burleson County and ISD FEMA 100-Year and 500-Year Floodplain .....	67
Figure 14: City of Caldwell FEMA 100-Year and 500-Year Floodplain.....	68
Figure 15: City of Snook FEMA 100-Year and 500-Year Floodplain .....	69
Figure 16: City of Somerville FEMA 100-Year and 500-Year Floodplain .....	70
Figure 17: Burleson County MUD #1 FEMA 100-Year and 500-Year Floodplain .....	71
Figure 18: Burleson County and ISD Wildland Urban Interface .....	101
Figure 19: City of Caldwell Wildland Urban Interface .....	102
Figure 20: City of Snook Wildland Urban Interface .....	103
Figure 21: City of Somerville Wildland Urban Interface.....	104
Figure 22: Burleson County MUD #1 Wildland Urban Interface.....	105
Figure 23: Minimum Recorded Daily Temperature 2000-Present.....	125
Figure 24: NOAA's NWS Wind Chill Index.....	126
Figure 25: Maximum Recorded Daily Temperature 2000-2018 .....	130
Figure 26: NOAA's NWS Heat Index Chart.....	131
Figure 27: Burleson County Dam Locations.....	137
Figure 28: Lake Somerville Dam Potential Inundation Zone .....	139
Figure 29: Critical Facilities in the Potential Inundation Zone for Lake Somerville Dam.....	141

## List of Tables

Table 1: Hazards Addressed .....	9
Table 2: Local Planning Team Representatives .....	11
Table 3: Plan Schedule .....	13
Table 4: Plan Data Sources and Incorporation .....	14
Table 5: Local Stakeholders Contacted.....	15
Table 6: Maintenance Responsibility .....	21
Table 7: Estimated Values by Location .....	25
Table 8: Age, Disability, and Poverty Level Percentages by Jurisdiction.....	26
Table 9: Burleson County Hurricane History .....	34
Table 10: Saffir-Simpson Scale .....	35
Table 11: Average Hurricane Wind Speed by Jurisdiction.....	35
Table 12: Critical Facilities Vulnerable to Tropical Storms and Hurricanes and Potential Impacts	38
Table 13: Parcels Vulnerable to Hurricanes / Tropical Storms.....	41
Table 14: Drought Classifications.....	42
Table 15: Palmer Drought Index .....	45
Table 16: Palmer Drought Category Descriptions .....	46
Table 17: Critical Facilities Vulnerable to Drought and Potential Impacts.....	48
Table 18: Parcels Vulnerable to Drought.....	50
Table 19: Hailstorm Intensity' .....	54
Table 20: Critical Facilities Vulnerable to Hailstorms and Potential Impacts.....	56
Table 21: Parcels Vulnerable to Hailstorms.....	58
Table 22: Burleson County Flood History .....	62
Table 23: City of Caldwell Flood History .....	62
Table 24: NFIP Claims and Payments.....	64
Table 25: Critical Facilities Vulnerable to Flooding.....	73
Table 26: Vulnerable Parcels by Flood Zone in Burleson County.....	75
Table 27: Vulnerable Parcels by Flood Zone in the City of Caldwell .....	75
Table 28: Vulnerable Parcels by Flood Zone in the City of Snook.....	76
Table 29: Vulnerable Parcels by Flood Zone in the City of Somerville .....	76
Table 30: Vulnerable Parcels by Flood Zone in Caldwell ISD.....	76
Table 31: Vulnerable Parcels by Flood Zone in Snook ISD.....	77
Table 32: Vulnerable Parcels by Flood Zone in Somerville ISD .....	77
Table 33: Vulnerable Parcels by Flood Zone in Burleson County MUD #1 .....	77
Table 34: Burleson County Tornado History.....	78
Table 35: City of Snook Tornado History .....	78
Table 36: Fujita Scale.....	79

Table 37: Enhanced Fujita Scale.....	79
Table 38: Critical Facilities Vulnerable to Tornadoes and Potential Impacts.....	83
Table 39: Parcels Vulnerable to Tornadoes .....	86
Table 40: Beaufort Wind Scale.....	88
Table 41: Critical Facilities Vulnerable to Severe Winds and Potential Impacts.....	93
Table 42: Parcels Vulnerable to Severe Winds .....	96
Table 43: Burleson County Wildfire History .....	97
Table 44: City of Caldwell Wildfire History .....	97
Table 45: City of Snook Wildfire History .....	98
Table 46: City of Somerville Wildfire History .....	98
Table 47: Characteristic Fire Intensity Scale .....	99
Table 48: National Wildfire Coordinating Group Size Class of Fire .....	99
Table 49: Critical Facilities Vulnerable to Wildfire and Potential Impacts .....	107
Table 50: Burleson County Parcels Vulnerable to Wildfire .....	109
Table 51: City of Caldwell Parcels Vulnerable to Wildfire .....	109
Table 52: City of Snook Parcels Vulnerable to Wildfire .....	109
Table 53: City of Somerville Parcels Vulnerable to Wildfire .....	110
Table 54: Caldwell ISD Parcels Vulnerable to Wildfire .....	110
Table 55: Snook ISD Parcels Vulnerable to Wildfire .....	110
Table 56: Somerville ISD Parcels Vulnerable to Wildfire .....	110
Table 57: Burleson County MUD #1 Parcels Vulnerable to Wildfire.....	111
Table 58: Burleson County Severe Winter Weather Hazard History .....	113
Table 59: Winter Weather Extent Scale.....	113
Table 60: Critical Facilities Vulnerable to Winter Storms.....	117
Table 61: Burleson County Lightning History .....	119
Table 62: City of Caldwell Lightning History .....	119
Table 63: Lightning Activity Levels .....	120
Table 64: Critical Facilities Vulnerable to Lightning and Potential Impacts.....	122
Table 65: Parcels Vulnerable to Lightning .....	124
Table 66: Heat Intensity .....	132
Table 67: Dam Failure Extent Classification.....	135
Table 68: Capability Assessment by Jurisdiction .....	142
Table 69: Previous Mitigation Actions – All Jurisdictions .....	148
Table 70: Plan Integration .....	154
Table 71: Integration Process .....	155



# 1. Introduction and Background

## 1) Participating Jurisdictions

The Burleson County Multi-Hazard Mitigation plan includes seven participating jurisdictions: Burleson County, the City of Caldwell, the City of Snook, the City of Somerville, Snook ISD, Caldwell ISD, Somerville ISD, and MUD #1.

This plan is an update of the County’s previous plan that expired in 2018. That plan, the Burleson County Hazard Mitigation Plan, also included the cities of Caldwell, Snook, and Somerville.

## 2) Hazard Mitigation Plan History

The expired plan addressed the following natural hazards: floods, drought, hurricanes/tropical storms, wildfire, winter weathers, tornadoes, hail, thunderstorms, dam failure, and excessive heat.

The mitigation planning regulation of the Disaster Mitigation Act<sup>1</sup> requires that mitigation plans be reviewed and updated every five years to maintain eligibility for mitigation grant funding. As part of this plan, Burleson County will develop a schedule to ensure that its hazard mitigation plan is regularly updated.

Each participating jurisdiction will address the following natural hazards:

Table 1: Hazards Addressed

Hazard	Jurisdictions							
	Burleson County	City of Caldwell	City of Snook	City of Somerville	Caldwell ISD	Snook ISD	Somerville ISD	MUD #1
Hurricanes, Tropical Storms, and Depressions	X	X	X	X	X	X	X	X
Drought	X	X	X	X	X	X	X	X
Hailstorm	X	X	X	X	X	X	X	X
Riverine Flooding	X	X	X	X	X	X	X	X
Tornados	X	X	X	X	X	X	X	X
Severe Winds	X	X	X	X	X	X	X	X
Wildfire	X	X	X	X	X	X	X	X

<sup>1</sup> 44 CFR §201.6(d)(3)

Winter Weather	x	x	x	x	x	x	x	x
Lightning	x	x	x	x	x	x	x	x
Extreme Cold	x	x	x	x	x	x	x	x
Extreme Heat	x	x	x	x	x	x	x	x
Additional Hazards								
Coastal Erosion								
Inland Erosion								
Land Subsidence/Sinkhole								
Earthquakes								
Expansive Soils								
Dam/Levee Failure	x			x				

***Omission Statements***

Burleson County and the participating jurisdictions determined that the history of impacts associated with Coastal Erosion, Inland Erosion, Land Subsidence, Earthquakes, and Expansive Soils have been negligible (or non-existent), therefore it is expected that future impacts will be negligible as well.

The City of Caldwell, the City of Snook, Caldwell ISD, Snook ISD, Somerville ISD, and Burleson County MUD #1 are not at risk of inundation from dam failures; the jurisdictions have determined that the history of impacts associated with Dam/Levee Failure have been negligible (or non-existent), therefore it is expected that future impacts will be negligible as well.

## 2. Planning Process

The Burleson County Multi-Hazard Mitigation Plan is a multi-jurisdiction plan. Representatives to the local planning team were selected by each jurisdiction. Planning team members represented the following offices and departments:

Table 2: Local Planning Team Representatives

Title	Jurisdiction
County Judge	Burleson County
Emergency Management Coordinator	Burleson County
City Administrator	City of Caldwell
City Secretary	City of Caldwell
City Administrator	City of Somerville
Assistant City Administrator	City of Somerville
Mayor	City of Snook
City Secretary	City of Snook
Superintendent	Snook ISD
Superintendent	Caldwell ISD
Secretary	Caldwell ISD
Superintendent	Somerville ISD
Office Manager	Burleson County MUD #1

Once the planning team was established, members developed a schedule with specific goals and proposed meeting dates over the planning period.

Hazard mitigation planning team (HMPT) members contributed to the following activities throughout the planning process:

1. Providing technical assistance and necessary data to the HMPT.

2. Scheduling, coordinating, and facilitating community meetings.
3. Providing necessary materials for public planning meetings.
4. Collecting and analyzing data.
5. Developing mitigation goals and implementation strategies.
6. Preparing the first draft of the plan and providing technical writing assistance for review, editing, and formatting.

Each member of the HMPT participated in the following activities associated with development of the plan:

1. Identifying, contacting, coordinating, and implementing input from stakeholders.
2. Attending, conferencing in, or providing meeting support and information for regular HMPT meetings.
3. Identifying hazards and estimating potential losses from future hazard events.
4. Developing and prioritizing mitigation actions to address identified risks.
5. Coordinating public meetings to develop the plan.
6. Identifying community resources available to support planning effort.
7. Submitting proposed plan to all appropriate departments for review and comment, and working with the city to incorporate the resulting comments into the proposed plan.

Table 3: Plan Schedule

Timeline													
Planning Tasks	2021												Completed
	January	February	March	April	May	June	July	August	Sept	Oct	Nov	Dec	
Organize Resources and Identify Planning Team													
Create Outreach Strategy													
Review Community Capabilities													
Conduct Risk Assessment													
Identify Mitigation Goals and Actions													
Develop Action Plan for Implementation													
Identify Plan Maintenance Procedures													
Review Plan Draft													
Submit Plan to State and FEMA													12/30/2022
Adopt Plan													3/9/2022
Meetings													
Planning Team			3/25/21			6/21/21		8/4/21					
Public Outreach – Online Surveys													
Stakeholder Outreach													

### 1) Existing Plans, Reports, Ordinances, and Technical Information Sources

Each planning team member worked to collect and provide the input and information necessary to develop the hazard mitigation strategy. Research was coordinated and conducted by local planning team members. The local planning team reviewed the following documents during the planning process:

**Table 4: Plan Data Sources and Incorporation**

Data Source	Data Incorporation	Purpose
Federal Emergency Management Agency (FEMA) Flood Zones	Flood zone maps	GIS mapping of flood zones
National Centers for Environmental Information (NCEI)	Hazard occurrences	Previous event occurrences, damage dollars, and mapping for all hazards
National Inventory of Dams	Dam information	High-hazard dam list
National Oceanic and Atmospheric Administration (NOAA)	Historic Weather Data	Previous event occurrences, damage dollars, and mapping for all hazards
National Severe Storms Laboratory (NSSL)	Historic Weather Data	Previous event occurrences, damage dollars, and mapping for all severe storms
Region C 2016 Water Plan	Determining changing drought impacts	Review expected changes in type / volume of local water demands
Burleson County 2018 CHAMPS Report	Natural hazard data	Review previously compiled natural hazard histories.
Burleson County Appraisal District Data	Property values and parcel counts	Population counts, parcel data, and land use data
Burleson County Hazard Mitigation Plan, 2013-2018	Previous planning approach, hazards addressed, and mitigation actions	Previous planning team representatives, plan maintenance, hazard histories, and mitigation actions
State of Texas Hazard Mitigation Plan 2018 Update	Hazard Descriptions	Official descriptions of hazards and their potential impacts

Additional information sources included: USDA Census of Agriculture, United States Geological Survey, Vaisala, and specific details about previous natural hazard events from planning team participants. Sources are noted throughout the document. Report titles and links to the most recently accessed websites hosting the related information are also noted, where appropriate.

Area stakeholders contacted to participate in the planning process included the following offices and departments within the participating jurisdictions and neighboring jurisdictions. In many cases of non-participation, the title listed is reflective of the office the planning team tried to contact.

Table 5: Local Stakeholders Contacted

Organization	Participated
Koppers - Safety Health & Environmental Coordinator	Y
POSGCD	N
Entergy	N
BCAD	N
Citizens State Bank	N
SAAM	N
BNSF	N
USACE Lake Somerville	N
City of Somerville Police	N

Area stakeholders were contacted by email. In an effort to increase participation, each stakeholder was contacted at least twice. Area stakeholders who chose to participate provided important supplemental input and information that helped shape mitigation strategies for each hazard, in particular by making the planning team aware of hazard areas that had not been previously identified.

## 2) Project Meetings

The planning team met virtually on three separate occasions. Additional communication was regularly carried out via email and over the phone.

The first planning team meeting was held virtually on March 25th, 2021. During this meeting, the planning team decided which hazards needed to be addressed in the mitigation plan and which were not relevant. To make these decisions, a hazard handout was produced to show previous occurrences of each hazard, associated deaths and injuries, and total dollar damages.

The team agreed to use the collected hazard data, as the foundation for its hazard risk assessment and ongoing research into hazard extent, impact, and vulnerability.

The planning team also identified area stakeholders to be contacted in the time between the second and third meeting.

At the end of the meeting, Planning team members agreed to compile relevant data, including city ordinances, and begin identifying critical facilities.

The second planning team meeting was held virtually on June 21st, 2021. Prior to the meeting, planning team members were provided with information about the meeting's scope based on the information the team had gathered between meetings.

To stay on schedule, the planning team needed to meet four objectives: Review and tentatively approve the critical facilities list; review previous mitigation actions and determine whether or not they were implemented and successful; and start identifying future mitigation actions appropriate to the natural hazards identified in the first planning team meeting.

The planning team met its objectives.

The final planning team meeting was held virtually on August 4th, 2021. The planning team discussed and identified new mitigation actions, discussed final changes to the plan drafts, and agreed to work on completing all deliverables for the plan. Additional work was done over email in preparation for submitting the plan for official review on December XX, 2021.

### 3) Public Input

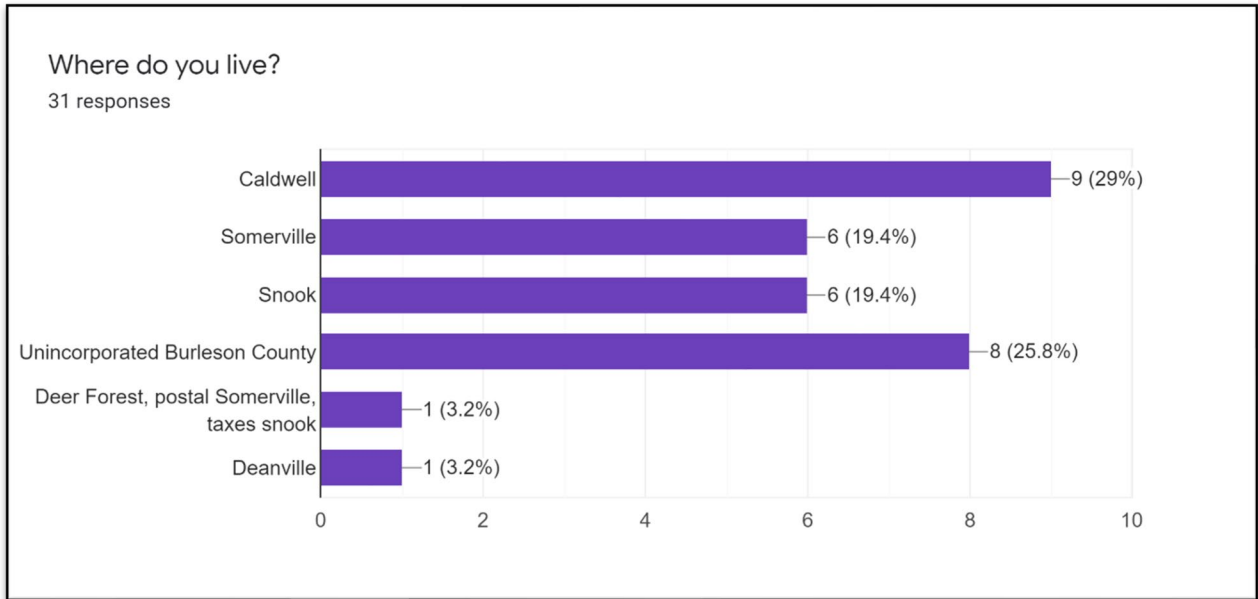
Members of the public were invited to participate in two public comment periods to provide input and feedback during the planning process. Due to the COVID-19 pandemic, the public comment periods were held virtually. The first public comment period took place in August and September 2021. A Google Form survey was posted to the County website for a period of two weeks for members of the public to fill out. The survey received 31 anonymous responses.

The survey asked nine questions:

1. Where do you live?
2. Do you own or rent?
3. Burleson County is looking at addressing the following hazards. Which hazards do you believe impact the County and/or participating cities the most? Please select all that apply (multiple choice answer).
4. Which of the above hazards have affected you directly within the past five years? Please select all that apply (multiple choice answer).
5. How have you been affected by the hazards selected above? (Open-ended question)
6. Have you taken any actions to reduce your risk to these hazards? If so, what actions have you taken? (Open-ended question)
7. What is the best means of communication for you? Please select all that apply (multiple choice answer).



8. Which of the following mitigation project types do you believe local government agencies should focus on to reduce disruptions of services and to strengthen the community?  
Please check all that apply (multiple choice answer).
9. Do you have any other thoughts or concerns relating to the Hazard Mitigation Plan?  
(Open-ended question).



*Figure 1: Survey Responses for Question 1*

As Figure 1 above shows, more than half of the respondents live in the City of Caldwell or in Unincorporated Burleson County. More than one-third of respondents live in the City of Somerville and the City of Snook.

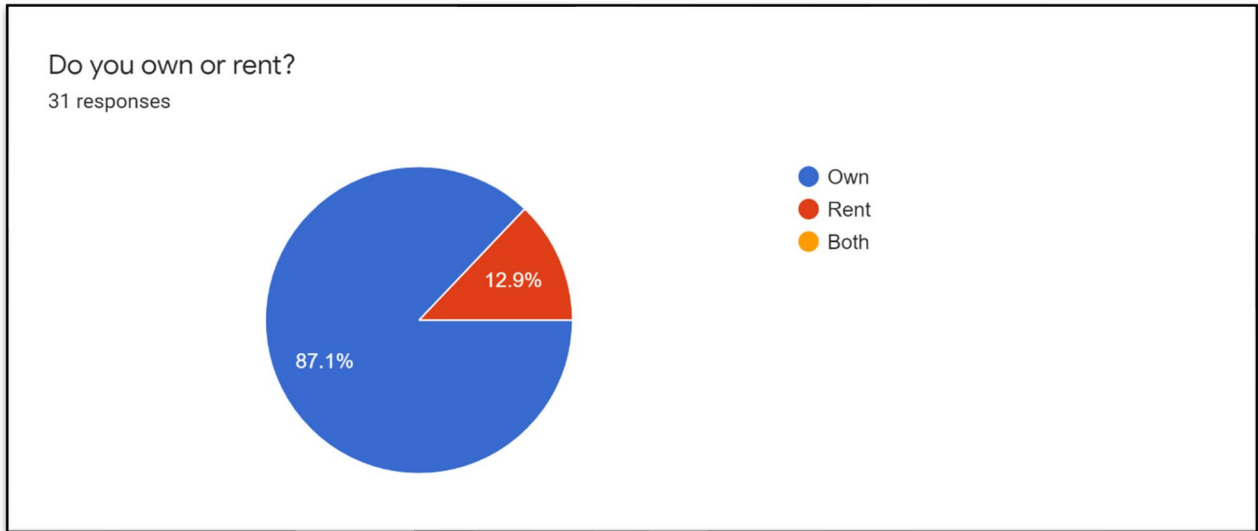


Figure 2: Survey Responses for Question 2

As shown in Figure 2 above, the majority of respondents (87.1%) own their home.



Figure 3: Survey responses for Question 3

The chart in Figure 3 above shows the breakdown of responses for survey question three. The answer choices were Hurricanes/Tropical Storms/Depressions, Drought, Hailstorm, Flooding, Tornados, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat, and

Dam/Levee Failure. Hurricanes, Tropical Storms, and Depressions; Drought; Flooding; Extreme Heat; Hailstorms; and Tornados ranked the highest out of all the hazards addressed in the plan, with each choice getting more than 40% of the votes.

Which of the following mitigation project types do you believe local government agencies should focus on to reduce disruptions of services and to strengthen the community? Please check all that apply.

- Provide better information about hazard risk and high-hazard areas
- Reinforce essential facilities such as police, fire, emergency medical services, hospitals, schools, etc
- Educate property owners on ways they can reduce risk and mitigate damage to their properties
- Replace or improve inadequate or vulnerable bridges and causeways
- Reinforce or improve infrastructure, such as elevating roadways and improving drainage systems
- Work on reducing risk to utilities (electricity, communications, water/wastewater facilities, etc)
- Install or improve protective structures, such as floodwalls or levees
- Buyout flood-prone properties and maintain as open space
- Strengthen codes, ordinances, and plans to require higher hazard risk management strategies
- Help at-risk property owners with getting funding to reduce impacts to their property(ies)
- Work with schools, churches, local community groups to educate on and reduce hazard risks
- Other...

*Figure 4: Survey Choices for Question 8*

Figure 4 shows the choices for Question 8: Which of the following mitigation project types do you believe local government agencies should focus on to reduce disruptions of services and to strengthen the community? Please check all that apply. Respondents could choose from 11 answers such as “Provide better information about hazard risk and high-hazard areas,” “Reinforce or improve infrastructure, such as elevating roadways and improving drainage

systems,” “Install or improve protective structures, such as floodwalls or levees,” or input their own answer.

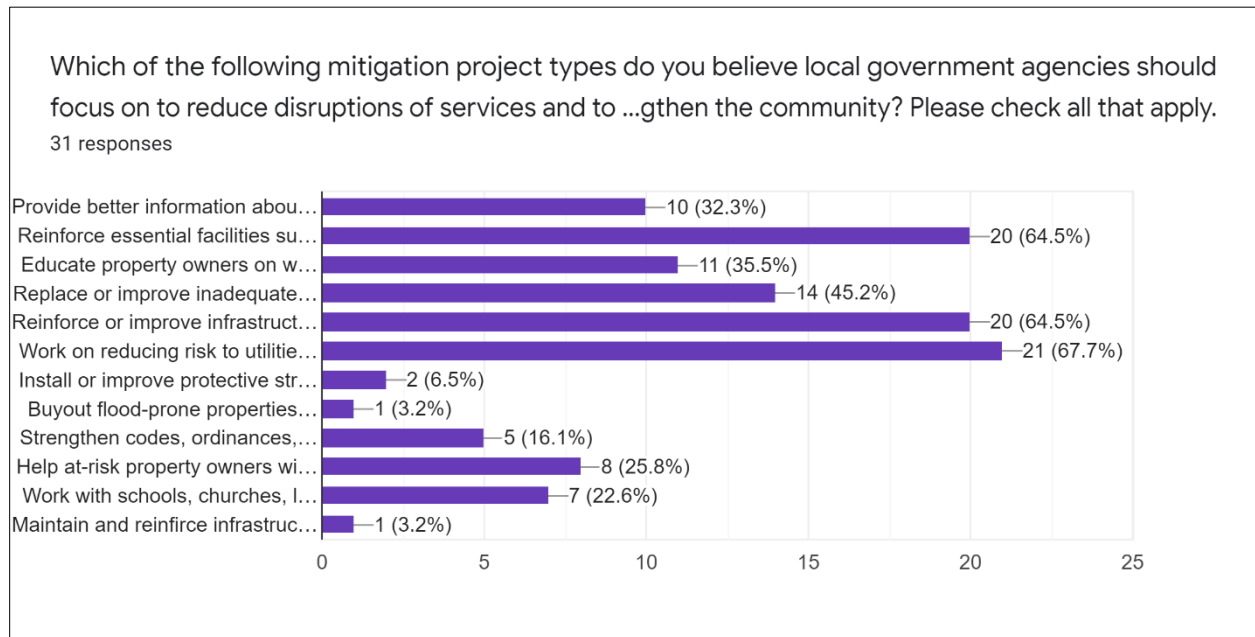


Figure 5: Response Breakdown for Question 8

Figure 5 shows the breakdown of responses to Question 8. The three most popular answers with more than 60% respondents voting for them were:

- Reinforce essential facilities such as police, fire, emergency medical services, hospitals, schools, etc
- Reinforce or improve infrastructure, such as elevating roadways and improving drainage systems
- Work on reducing risk to utilities (electricity, communications, water/wastewater facilities, etc)

The planning team appreciated receiving so many responses to the survey and the answers helped inform them in their selection of new mitigation actions for this plan update.

The second public comment period took place in December 2021. A copy of the in-progress plan draft was posted to the County website for two weeks for the public to review and comment on. This public comment period was advertised in the newspaper and shared on social media.

#### 4) Plan Maintenance

The hazard mitigation plan is not a static document. As conditions change and mitigation actions are implemented, the plan will need to be updated to reflect new and changing conditions in each jurisdiction.

The planning team has identified specific departments to oversee action implementation in each jurisdiction. The planning team has also identified potential funding sources and an implementation timeframe for each mitigation action. The expected timeframes will be an important component in determining whether or not actions are implemented efficiently. The departments or persons identified for each jurisdiction include but are not limited to:

Table 6: Maintenance Responsibility

Title	Jurisdiction
County Judge	Burleson County
Emergency Management Coordinator	Burleson County
City Administrator	City of Caldwell
City Secretary	City of Caldwell
City Administrator	City of Somerville
Assistant City Administrator	City of Somerville
Mayor	City of Snook
City Secretary	City of Snook
Superintendent	Snook ISD
Superintendent	Caldwell ISD
Secretary	Caldwell ISD
Superintendent	Somerville ISD
Office Manager	Burleson County MUD #1

Within one year of adoption of this plan, each department or agency will review and, as appropriate, integrate implementation of their respective mitigation actions with their existing internal plans and policies relating to capital improvements, land use, design and construction, and emergency management.

On a biannual basis, representatives from each jurisdiction serving as the planning team will evaluate progress on implementing the plan's mitigation actions. The planning team will review departmental / agency findings, public input, and future development plans to evaluate the effectiveness and appropriateness of the plan. Burlison County and the participating jurisdictions will solicit public input through announcements in the local paper, fliers, and /or jurisdictional websites and social media accounts.

In light of changing funding sources, hazard vulnerability, and local mitigation priorities, the planning team will identify changes to plan goals and priorities for their respective jurisdictions, and they will report their findings to the rest of the planning team. It will be the planning team's responsibility to identify relevant reasons for delay or obstacles to completing the plan's mitigation actions, along with recommended strategies to overcome any deficiencies.

Any significant change to the plan, including but not limited to changing mitigation actions, abandoning mitigation actions, or pursuing new mitigation actions, will require the County and participating jurisdictions to provide opportunities for the public to make its views and concerns known. Burlison County and the participating jurisdictions will provide notice to the public through announcements in the local paper, fliers posted at city hall, and on the city's website.

### 5) Plan Monitoring

The Emergency Management Coordinator (EMC) will be responsible for the overall continued coordination and monitoring of the mitigation plan in its entirety, including but not limited to the planning process, risk assessment, strategy, and the actions assigned for each hazard. The agency or department identified above in Table 6 shall serve as the responsible party for each respective jurisdiction. The plan monitoring worksheet outlined below will serve as the basis for revision of the plan.

At a minimum, the mitigation plan will be reviewed by the EMC and planning team representatives from each jurisdiction quarterly, during budget workshops, and as other plans are being developed or revised including: comprehensive plans, capital improvement project plans, and emergency plans.

To execute the monitoring requirement, the EMC will produce a plan monitoring worksheet to be completed by each jurisdiction's representative. The worksheet will identify and track the following for each mitigation action: the expected implementation schedule, setbacks or delays,

changes to the local risk assessment, changes in jurisdictional capabilities, and current and future opportunities for integration with other local plans.

Regularly monitoring the plan implementation process in each participating jurisdiction will ensure that every component of the plan gets reviewed for potential amendments.

After adoption of this plan, it will be posted to each participating jurisdiction's website or Facebook page, and a printed copy will be available for review in the Office of Emergency Management. The goal is to create the opportunity for constant and continued feedback from local officials, stakeholders, and the general public.

## 6) Plan Evaluation

Proper evaluation will measure the progress and effectiveness of the mitigation actions identified in the plan. On a bi-annual basis the Emergency Management Coordinator along with the planning team representatives from each jurisdiction will use the following criteria, along with additional metrics as necessary, to assess the effectiveness of the plan in its entirety, including but not limited to the planning process, risk assessment, strategy, and the actions:

- Do the specified goals and objectives still address current and expected conditions?
- Has the nature, magnitude, and/or risk of any hazard changed?
- Have there been changes in land development that the plan needs to address?
- Are available resources suitable for implementing the plan?
- Is funding budgeted or available to successfully implement prioritized mitigation actions?
- Are there opportunities in the local budgeting process or local, state, and national grant funding cycles to increase funding to implement mitigation actions?

Other steps will include site visits to completed mitigation projects in each jurisdiction to measure and ensure their success. In the event that a mitigation project fails to meet its goal, the planning team will evaluate the causes of the shortcoming. The planning team will use their assessment to amend the project and related projects in other jurisdictions, allocate additional resources to achieve the desired outcome for the project and related projects in other jurisdictions, or replace the project and similar projects in other jurisdictions with better projects.

The EMC and planning team members will also work to implement any additional revisions required to ensure that the plan and their respective jurisdiction is in full compliance with federal regulations and state statutes.

## 7) Plan Update

The plan is designed to address a five-year period. In accordance with 44CFR Section 201.6, it will be updated every five years to maintain compliance with State and Federal regulations.

However, at least every two years from the date of approval, and quarterly on the fifth and final year of the plan, the EMC and planning team representatives from each participating jurisdiction will thoroughly review any significant changes in their respective jurisdictions that might impact the plan update.

During the update process, planning team representatives will do the following for their respective jurisdictions: collect data on recent occurrences of each natural hazard identified in the plan, record how each natural hazard impacted their jurisdiction during the preceding years, determine whether or not implemented mitigation actions produced the desired outcomes in their jurisdiction, and determine whether or not to modify their jurisdiction's list of hazards to be addressed in the update.

Additional considerations to address on a jurisdictional level include but are not limited to: changes in local development, changes in exposure to natural hazards, the development of new mitigation capabilities or techniques, and revisions to state or federal legislation.

The update process will provide continued opportunity for the public and elected officials to determine which actions succeeded, failed, or are no longer relevant. It is also an opportunity for each jurisdiction to identify recent losses due to natural hazards and to consider whether or not any of those losses could have been avoided.



### 3. Determining Risk

#### 1) Risk Assessment

Throughout the plan, each hazard addressed will be considered in light of its history, likelihood of future events, extent, jurisdictional vulnerability, location and impact.

**Likelihood of Future Events** is measured based on a hazard’s expected frequency of occurrence in light of its previous frequency. Each hazard’s likelihood of future events will be considered using the following standardized parameters:

- **Highly likely** – event probable in the next year
- **Likely** – event probable in the next three years
- **Occasional** – event possible in the next five years
- **Unlikely** – event possible in the next 10 years

Given this plan’s five-year duration, hazards likely to occur during that period will be given priority when selecting and prioritizing mitigation actions.

#### 2) Distribution of Property by Housing Units, Density, and Median Value

Table 7: Estimated Values by Location

Category	Burleson County	City of Caldwell	City of Snook	City of Somerville
Total Housing Units <sup>2</sup>	9,203	1,726	225	752
Housing Unit Density (per sq. mile)	13 units per sq mi	442 units per sq mi	111 units per sq mi	251 units per sq mi
Median Housing Value <sup>3</sup>	\$121,900	\$112,000	\$133,000	\$77,400
Estimated Value of Housing Units <sup>4</sup>	\$1,121,845,700	\$193,312,000	\$29,925,000	\$58,204,800

<sup>2</sup> Table B25001 2015-2019 ACS Estimates

<sup>3</sup> Table B25077 2015-2019 ACS Estimates

<sup>4</sup> Total value of housing units derived from median value multiplied by number of units

### 3) Distribution of Vulnerable Populations

The planning team identified a set of indicators it could use to identify each jurisdiction’s vulnerable population. The indicators include demographic data like age and income, as well as geographic data including the location of low income or subsidized housing units, concentrations of manufactured and mobile homes, and concentrations of homes in substandard condition.

#### *Age, Disability and Income*

The populations of each jurisdiction were broken down into four categories: young residents, elderly residents, disabled residents, and low-income residents. Residents falling into these categories were deemed most likely to suffer disproportionate losses due to natural hazards because of their potentially limited means to prepare for and recover from a hazard event.

Table 8: Age, Disability, and Poverty Level Percentages by Jurisdiction

Demographic Category	Burleson County	City of Caldwell	City of Snook	City of Somerville	Texas	U.S.
Population Under Age 5 <sup>5</sup>	6.0%	6.1%	3.2%	8.8%	7.1%	6.1%
Population Over Age 65 <sup>6</sup>	20.4%	14.9%	15.2%	19.3%	12.3%	15.6%
Disability Status <sup>7</sup>	16.9%	13.5%	18.6%	18.9%	11.5%	12.6%
Individuals Below Poverty Level <sup>8</sup>	11.8%	12.8%	18.2%	25.0%	14.7%	13.4%

#### *Distribution of Vulnerable Populations*

The vulnerable populations map is based on a social vulnerability index created specifically for the planning area. The index considers six relevant Census Block Group-level factors: poverty rate, population of residents 65 years old and older, population of residents younger than 18,

<sup>5</sup> Table S0101, Age and Sex, 2015-2019 ACS 5-Year Estimates

<sup>6</sup> Table S0101, Age and Sex, 2015-2019 ACS 5-Year Estimates

<sup>7</sup> Table S1810, Disability Characteristics, 2015-2019 ACS 5-Year Estimates

The U.S. Census defines a person as having a work disability if one or more of the following conditions are met:

1. Persons with a health problem or disability which prevents them from working or which limits the kind or amount of work they can do
2. Persons who have retired or left a job for health reasons
3. Persons currently not in the labor force because of a disability.
4. Persons who did not work at all in the previous year because of illness or disability
5. Under 65 years old and covered by Medicare in previous year.
6. Under 65 years old and received Supplemental Security Income (SSI) in previous year.
7. Received VA disability income in previous year.

<sup>8</sup> Table S1701, Poverty Status in the Past 12 Months, 2015-2019 ACS 5-Year Estimates.

the population of residents without a high school diploma or GED, the population of residents with a low English proficiency, and the number of homes constructed before 1980.

To create the index, each factor is re-scaled by assigning the largest population in each category a score of 1. The remaining population counts for each category are then given a score based the ratio of the relevant population to the largest population. Once each factor has a re-scaled score, the scores for each factor are totaled to create an overall index number for each Census Block Group. The vulnerable populations map is representative of each Census Block Group's overall vulnerability, based on the six factors outlined above, relative to the other Census Block Groups in the planning area.

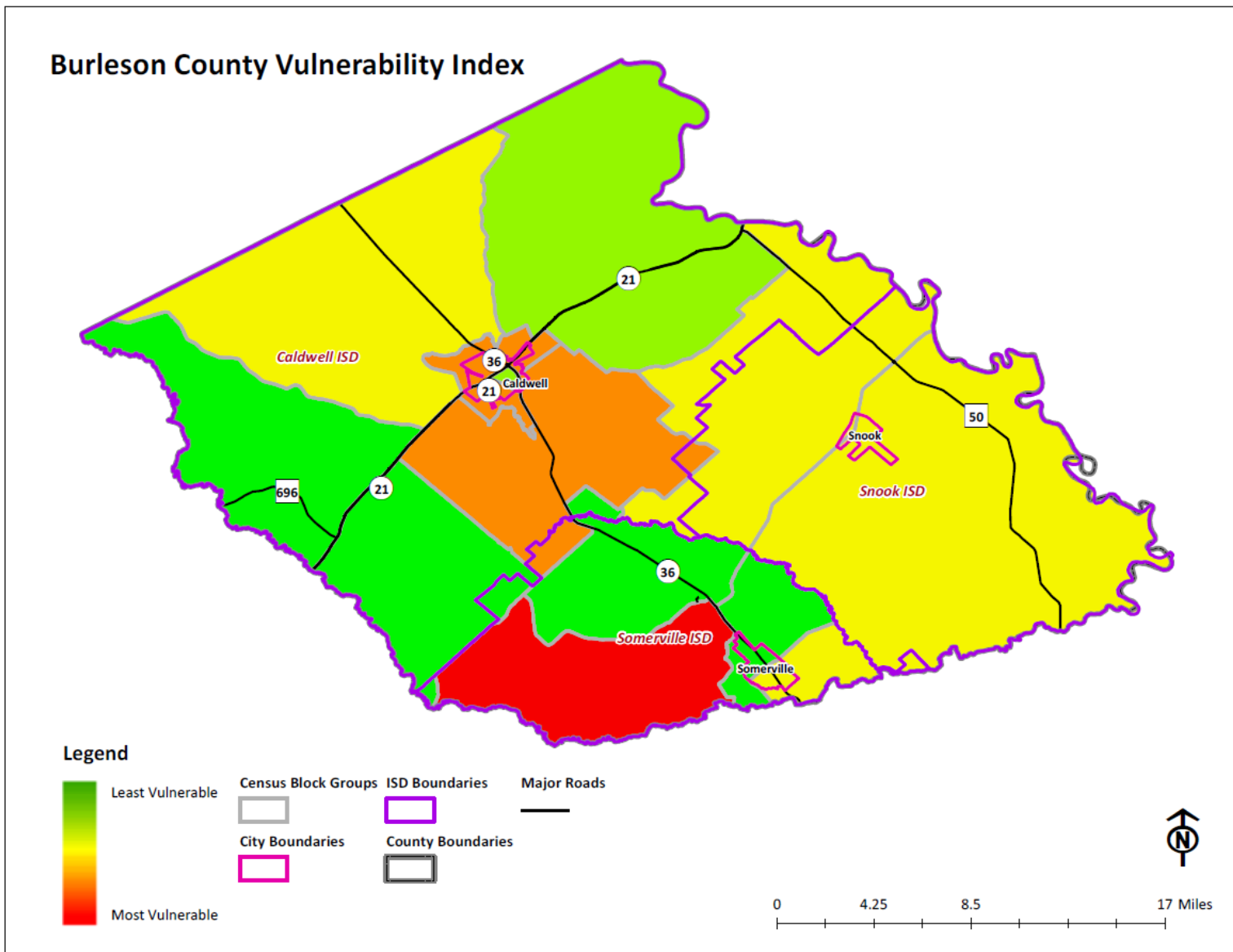
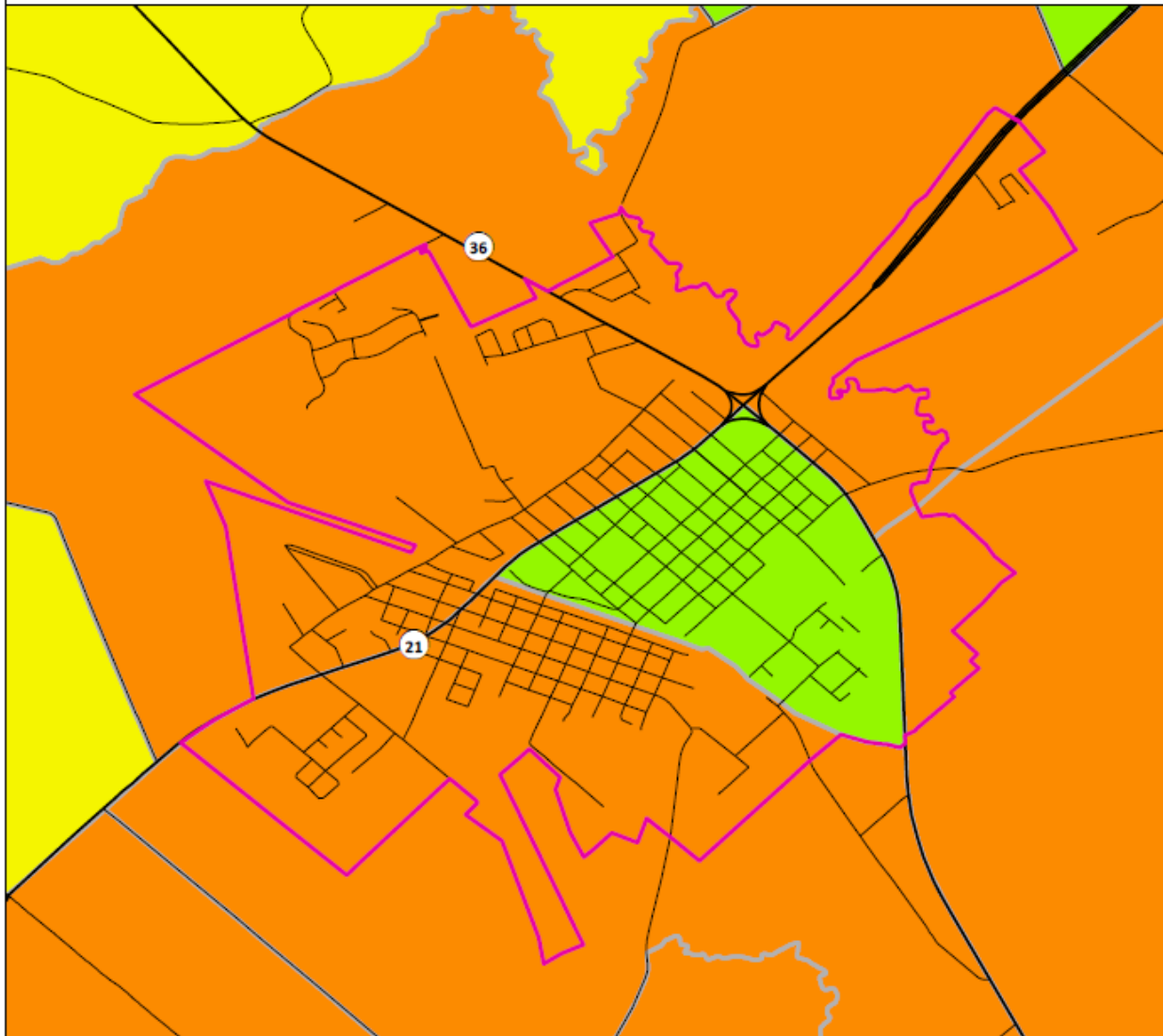


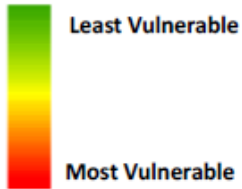
Figure 6: Burleson County Vulnerability Index

# City of Caldwell Vulnerability Index



## Legend

### Vulnerability Index



### City Boundaries



### County Boundaries



### Census Block Groups



### Major Roads



### Streets

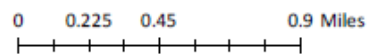
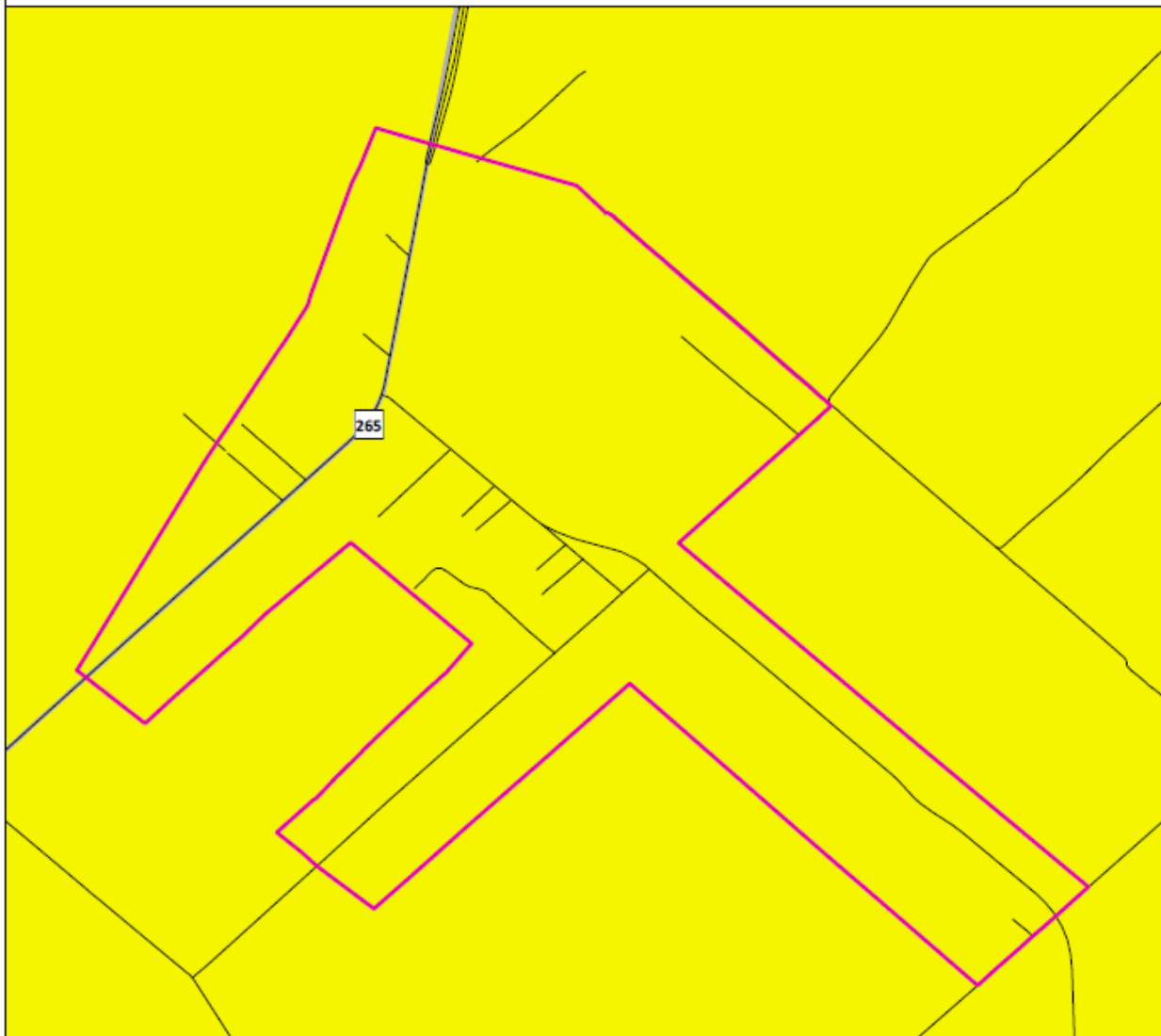


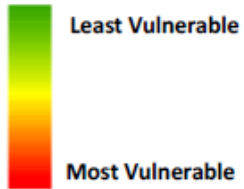
Figure 7: City of Caldwell Vulnerability Index

# City of Snook Vulnerability Index



## Legend

### Vulnerability Index



### City Boundaries



### County Boundaries



### Census Block Groups



### Streets

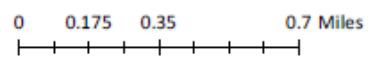


Figure 8: City of Snook Vulnerability Index

# City of Somerville Vulnerability Index

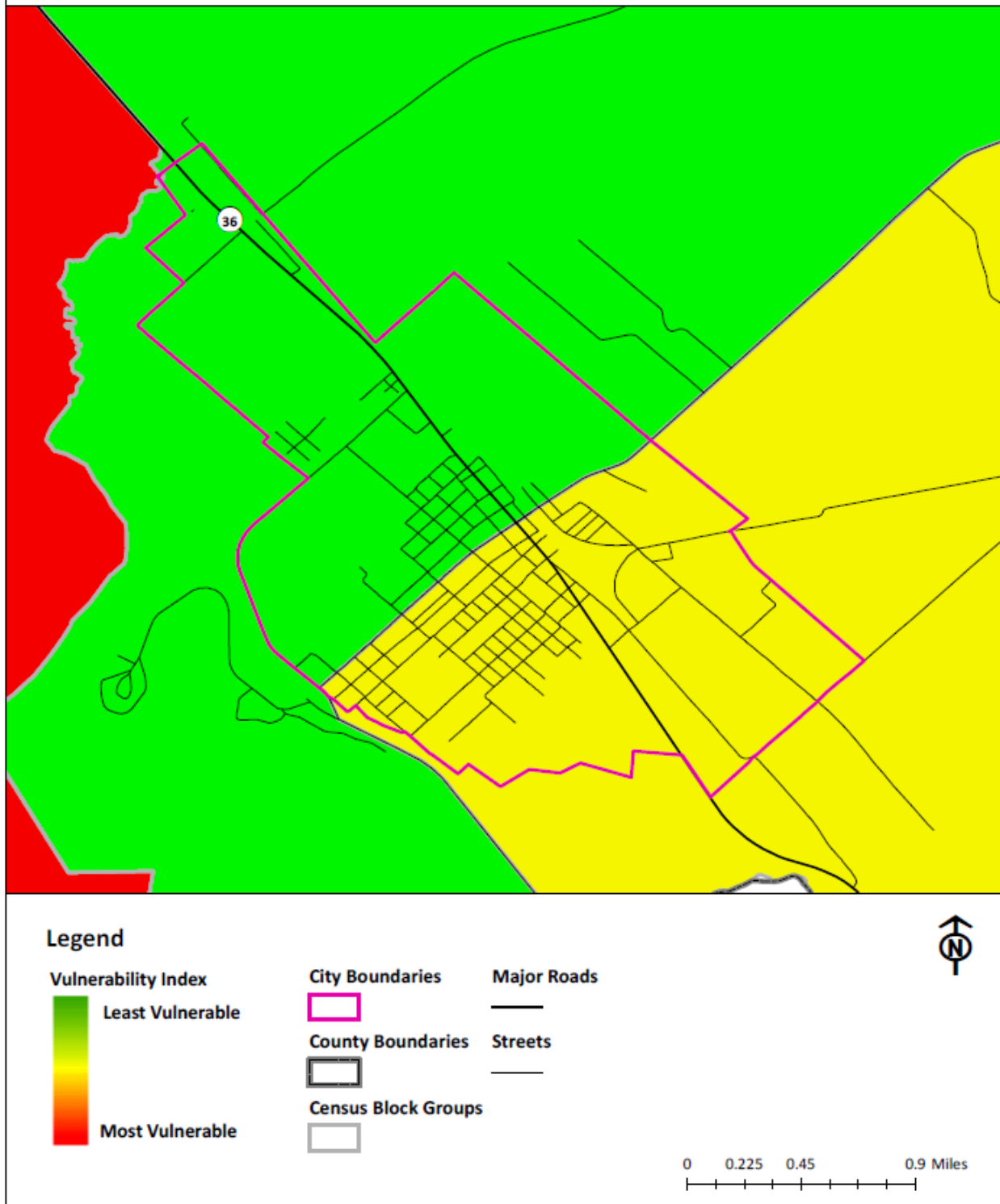


Figure 9: City of Somerville Vulnerability Index

### ***Low Income and Subsidized Housing***

There are six affordable apartment communities offering 168 units in Burleson County, the majority of which are located in the City of Caldwell. The Brazos Valley Council of Governments offers Section 8 Housing Choice Vouchers.<sup>9</sup>

Residents of low-income housing and/or subsidized housing facilities are expected to suffer disproportionate losses due to natural hazards because of their potentially limited means to prepare for and recover from a hazard event.

### ***Housing Type and Condition***

The participating jurisdictions have used housing type and housing conditions to identify additional vulnerable areas and concentrations of vulnerable residents.

#### **Manufactured / Mobile Homes**

The participating jurisdictions have identified areas with large numbers of mobile/manufactured housing as being disproportionately vulnerable to certain hazards including but not limited to: hurricanes and tropical storms, floods, tornados, droughts, and Severe Winds.

Mobile and manufactured homes can be found throughout Burleson County.

Burleson County has several RV parks: 908 RV Park, Brazos Valley RV Park, Rockin H RV Park, and Pecan Haven RV Campground.

#### **Homes in Substandard Condition**

The jurisdictions have determined that homes in sub-standard condition, regardless of structure type, may indicate that residents are low-income or otherwise means-limited and thus more vulnerable to certain hazards.

To be considered standard condition, a home must show few or no minor visible exterior defects such as:

- cracked, peeling, or missing paint
- cracked, sagging, rotting, or missing siding, steps, porch planks, or other wooden surfaces
- cracked or broken window panes
- cracked masonry, brick, or mortar surfaces
- missing or damaged roof shingles
- small rust spots on mobile homes

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<sup>9</sup> <https://affordablehousingonline.com/housing-search/Texas/Burleson-County>



The home must generally meet building codes, and there can't be any detriment to health and safety present.

Structures in sub-standard condition may provide less protection to residents during certain hazard events like tropical storms, tornados, or hurricanes. Furthermore, because they're already in a state of disrepair, additional damages due to hazard events may compound existing ones and potentially make these homes uninhabitable.

## 4. Hurricane / Tropical Storm

Once a tropical depression has intensified to the point where its maximum sustained winds are between 35-64 knots (39 – 73 mph), it becomes a tropical storm. At these wind speeds the storm becomes more organized and begins to become more circular in shape – resembling a hurricane. The rotation of a tropical storm is more recognizable than for a tropical depression. Tropical storms can cause many problems without becoming a hurricane. However, most of the problems a tropical storm causes stem from heavy rainfall and high winds.

According to National Oceanic and Atmospheric Administration (NOAA), a hurricane is an intense tropical weather system of strong thunderstorms with a well-defined surface circulation and maximum sustained winds of 74 mph or higher. Hurricanes are categorized according to the strength of their winds using the Saffir-Simpson Hurricane Scale. A Category 1 storm has the lowest wind speeds, while a Category 5 hurricane has the highest. These are relative terms, because lower category storms can sometimes inflict greater damage than higher category storms, depending on where they strike and the particular hazards they bring. In fact, tropical storms can also produce significant damage and loss of life, mainly due to flooding.

The ingredients for a hurricane include a pre-existing weather disturbance, warm tropical oceans, moisture, and relatively light winds aloft. If the right conditions persist long enough, they can combine to produce the violent winds, incredible waves, torrential rains, and floods associated with this phenomenon.

### 1) Hurricanes / Tropical Storms History

The planning team relied on data from the National Climatic Data Center (NCDC) and the Burleson County 2018 CHAMPS report to develop a hurricane history for the County and each participating jurisdiction.

According to Burleson County’s 2013 plan, Tropical Storm Frances had caused \$287,200,000 in property damage in 1998.

Table 9: Burleson County Hurricane History

Location	Date Range	Number of Hurricane & Tropical Storm Events	Hurricane & Tropical Storm Category Range	Maximum Wind Speed Range	Local Fatalities	Local Injuries	Local Property Damage \$2021	Local Crop Damage \$2021
Countywide	8/25/2017	1	Tropical Storm	37	0	0	\$21,343,178.85	\$0

No crop damages, injuries, or deaths due to hurricanes, tropical storms, or tropical depressions have been reported since the previous plan.

## 2) Likelihood of Future Events

Hurricanes occur in seasonal patterns between June 1 and November 30. Based on historical frequency of hurricanes and tropical storms in Burleson County and the participating jurisdictions outlined above, the likelihood of a hurricane or tropical storm affecting any or all of the participating jurisdictions is unlikely, meaning an event is possible in the next ten years.

## 3) Extent

Storms with winds less than 39 miles an hour are called Tropical depressions. Tropical storms have wind speeds between 39 – 74 miles an hour. Storms maintaining winds of 74 or more miles an hour are called hurricanes. The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential. Wind, pressure, and surge are combined to estimate potential damage. Categories 3, 4 and 5 are classified as “major” hurricanes. Major hurricanes comprise only 20 percent of total tropical cyclone landfalls but they account for over 70 percent of the damage in the United States. Damage from hurricanes can result from spawned tornados, coastal flooding from storm surge, and inland flooding from heavy rainfall.

Table 10: 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
3	111-130	964-945	9-12
4	131-155	944-920	13-18
5	155+	Less than 920	19+

Table 11 below profiles the potential wind speeds in miles per hour (mph) that Burleson County might expect during a hurricane event for various return periods. In the case of a 10-year, 20-year, and 50-year event, the wind speeds are projected to fall below the minimum sustained winds necessary to be classified as a Category 1 hurricane. Instead, these wind speeds fall between the lower end and middle of the tropical storm wind range, 39 – 73 mph.

Table 11: Average Hurricane Wind Speed by Jurisdiction<sup>10</sup>

Jurisdiction	Wind Speed (MPH) Per Return Period						
	10-year	20-year	50-year	100-year	200-year	500-year	1,000-year
Burleson County	40	55	72	84	95	107	114

<sup>10</sup> Section 8: Hurricane, p. 57 – Burleson County Hazard Mitigation Plan 2013-2018

Burleson County and the participating jurisdictions are located far enough from the coast that storm surge will not have an impact.

The worst hurricanes and tropical storms in Burleson County and the participating jurisdictions have measured as high as Category 1 on the Saffir-Simpson scale, dropped up to 25" in rainfall<sup>11</sup> and caused property damages in excess of \$280,000,000.

Future hurricanes and tropical storms may meet previous worst-case Tropical Storms in terms of strength, rainfall, flooding, damage dollars, injuries, and deaths.

#### **4) Location and Impact**

##### ***A) Location***

Location is often referred to in terms of Tier I and II counties, designated by the Texas Department of Insurance (TDI) for Severe Winds insurance purposes, to represent differing levels of loss exposure to coastal counties and adjacent counties. Tier I are those counties adjacent to the Gulf of Mexico and Tier II are those counties adjacent to Tier I counties.

Burleson County is not a Tier I or Tier II County. However, the County and all participating jurisdictions are located within 200 miles of the Gulf coast. Although tropical storm and hurricane effects begin to diminish as they move inland, the winds alone from Hurricane Harvey reached as far as 140 miles from the eye of the storm. The County and all participating jurisdictions are considered especially susceptible to indirect impacts from hurricanes and tropical storms including high winds and flooding.

Tropical storms and hurricanes vary tremendously in terms of size, location, intensity and duration. According to the Burleson County 2018 CHAMPS Report, Burleson County's proximity to the coast places it among the top 20% of all Texas counties in terms of recorded hurricane and tropical storm impacts including damage dollars, injuries, and deaths.

##### ***B) Impact***

The planning team determined that Burleson County is uniformly exposed to tropical storms and hurricanes.

Impacts from a hurricane or tropical Storm in Burleson County and the participating jurisdictions may include but are not limited to: loss of power due to downed lines caused by flying debris or fallen trees, flooding, flooding due to damaged or destroyed roofs, damaged or broken windows,

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<sup>11</sup> [https://theeagle.com/news/local/with-the-worst-of-harvey-likely-passed-brazos-valley-gets-a-chance-to-assess-the/article\\_caa9753f-fd55-5460-8d6b-c5ddf4891f20.html](https://theeagle.com/news/local/with-the-worst-of-harvey-likely-passed-brazos-valley-gets-a-chance-to-assess-the/article_caa9753f-fd55-5460-8d6b-c5ddf4891f20.html)

damage due to flying debris, wind damage, escaped livestock and pets, injured or killed livestock and pets, crop damage or destruction. In the worst storms, people may be injured or killed.

## 5) Vulnerability

### *A) Population*

As described in Section 3 of Chapter 3 above, Burluson County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The participating jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a hurricane or tropical storm. The participating jurisdictions also recognize that subdivisions or neighborhoods with only a single entrance may be cut off due to Hurricane/Tropical Storm impacts and therefore unable to obtain supplies or receive emergency services.

Residents of mobile / manufactured housing are of particular concern. These structures are never considered safe during a hurricane, and depending on tie-down methods, may also be unsafe during strong tropical storms.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a tropical storm or hurricane, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during a hurricane or tropical storm than structures in standard condition. Existing structural weaknesses may mean increased damages, injuries, or loss of life.

### *B) Critical Infrastructure*

There are no major TxDOT-designated major hurricane evacuation routes in Burluson County.

State Highway 21 and State Highway 36 run through the City of Caldwell. State Highway 36 goes through the City of Somerville. No major highways pass through the City of Snook.

Flooding along any of these routes during a hurricane evacuation could strand motorists trying to escape the storm. These drivers may need to be rescued, and could be injured or killed.

### *C) Critical Facilities*

The planning team identified 77 critical facilities spread across the County and participating jurisdictions. Because of Burluson County's proximity to the Gulf coast, the planning team determined that all critical facilities, no matter their jurisdictional location, are equally vulnerable to a hurricane or tropical storm.

Table 12: Critical Facilities Vulnerable to Tropical Storms and Hurricanes and Potential Impacts

Jurisdiction	Critical Facilities	Potential Hurricane / Tropical Storm Impacts										
		Loss of Power	Flying Debris	Uprooted Trees	Flooding	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death	
Burleson County	Burleson County Courthouse	x	x	x	x	x	x	x	x	x	x	x
	Burleson County Sheriff's Office	x	x	x	x	x	x	x	x	x	x	x
	St. Joseph's Health Burleson Hospital	x	x	x	x	x	x	x	x	x	x	x
	Deanville Fire Department	x	x	x	x	x	x	x	x	x	x	x
	Communications Towers	x	x	x	x				x	x	x	
	Deanville Water Supply	x	x	x	x	x	x	x	x	x	x	x
	FM 50 Yegua Creek Bridge		x	x	x	x			x	x	x	
	State HWY 36 South Yegua Creek Bridge		x	x	x	x			x	x	x	
	State Hwy 21 West Yegua Creek Bridge		x	x	x	x			x	x	x	
	State HWY 21 East Brazos River Bridge		x	x	x	x			x	x	x	
	Fm 1361 Davidson Creek Bridge		x	x	x	x			x	x	x	
	Park Road 57 Bridge		x	x	x	x			x	x	x	
	FM 60 E Davidson Creek Bridge		x	x	x	x			x	x	x	
	Old River Bridge Snook		x	x	x	x			x	x	x	
	FM 60 E Brazos River Bridge		x	x	x	x			x	x	x	
	Cade Lake Water Supply System	x	x	x	x	x	x	x	x	x	x	x
	Tunis Water Supply System #2	x	x	x	x	x	x	x	x	x	x	x
	Tunis Water Supply System #1	x	x	x	x	x	x	x	x	x	x	x
	Southwest Milam Water Supply System	x	x		x	x	x	x	x	x	x	x
	Cooks Point Water Supply System	x	x	x	x	x	x	x	x	x	x	x
	Lyons Water Supply System	x	x	x	x	x	x	x	x	x	x	x
	Birch Creek VFD	x	x	x	x	x	x	x	x	x	x	x
Black Jack VFD	x	x	x	x	x	x	x	x	x	x	x	
ATT/Firstnet Towers	x	x	x	x	x			x	x	x		
Beaver Creek VFD	x	x	x	x	x	x	x	x	x	x	x	

	Cade Lake Fire Department	x	x	x	x	x	x	x	x	x	x
	Cooks Point Volunteer Fire Department	x	x	x	x	x	x	x	x	x	x
City of Caldwell	Wells	x	x	x	x	x			x	x	x
	Lift Stations	x	x	x	x	x			x	x	x
	Caldwell Civic Center	x	x	x	x	x		x	x	x	x
	Administration Building	x	x	x	x	x	x	x	x	x	x
	Caldwell Library	x	x	x	x	x	x	x	x	x	x
	Caldwell Police Department	x	x		x	x		x	x	x	x
	Caldwell Fire Department	x	x		x	x		x	x	x	x
	Wastewater Treatment Plant	x	x	x	x	x	x	x	x	x	x
	City of Caldwell Electrical Substation	x	x	x	x	x	x		x	x	x
	City of Snook	Snook City Hall	x	x	x	x	x	x	x	x	x
City of Snook Waste Water Treatment Plant		x	x	x	x	x	x	x	x	x	x
City of Snook Water Plant - water well #2 and water tower		x	x	x	x	x	x	x	x	x	x
City of Snook Water well # 3		x	x	x	x	x	x	x	x	x	x
City of Snook Lift Stations		x	x	x	x	x			x	x	x
City of Somerville	Somerville City Hall	x	x		x	x	x	x	x	x	x
	Somerville Volunteer Fire Department	x	x		x	x	x	x	x	x	x
	Somerville St Josephs clinic/EMS	x	x	x	x	x		x	x	x	x
	Community chapel school	x	x	x	x	x	x	x	x	x	x
	Koppers (GIS for office on site)	x	x	x	x	x	x	x	x	x	x
	Somerville senior center	x	x	x	x	x	x	x	x	x	x
	COS Wastewater treatment plant	x	x	x	x	x	x	x	x	x	x
	COS Transfer station	x	x	x	x	x	x	x	x	x	x
	COS elevated water tank	x	x	x	x	x			x	x	x
	COS water plant (storage tanks, wells, treatment)	x	x	x	x	x	x	x	x	x	x
	COS public works yard	x	x	x	x	x	x	x	x	x	x
	Army Corps of Engineers office/site for lake Somerville	x	x	x	x	x		x	x	x	x
Bridge, drainage, culverts etc associated with the big ditch		x	x	x	x			x	x	x	

	COS PD	x	x	x	X	x	x	x	x	X	X
	Warning siren & digital sign	x	x	x	X	x			x	X	X
	Lift Stations	x	x	x	X	x			x	X	X
	Culvert		x	x	X	x			x	X	X
	Main Railroad crossing		x	x	X	x			x	X	X
Caldwell ISD	Caldwell Technology Building	x	x	x	X	x	x	x	x	X	X
	Caldwell Maintenance	x	x	x	X	x	x	x	x	X	X
	Caldwell Elementary	x	x	x	X	x	x	x	x	X	X
	Caldwell Intermediate	x	x	x	X	x	x	x	x	X	X
	Caldwell Junior High	x	x	x	X	x	x	x	x	X	X
Snook ISD	Snook Elementary School	x	x	x	X	x	x	x	x	X	X
	Snook Secondary School	x	x	x	X	x	x	x	x	X	X
	Snook ISD Transportation Center	x	x	x	X	x			x	X	X
Somerville ISD	Somerville Elem/Intermediate	x	x	x	X	x	x	x	x	X	X
	Somerville High School	x	x	x	X	x	x	x	x	X	X
	Yegua Center (evacuation /staging site)	x	x	x	X	x	x	x	x	X	X
Burleson County MUD #1	Wells	x	x	x	X	x			x	X	X
	85k gal Ground Water Tank	x	x	x	X	x			x	X	X
	100k gal Ground Water Tank	x	x	x	X	x			x	X	X
	Chlorine Bldg w/pumps/motors/misc. equip.	x	x	x	X	x	x	x	x	X	X
	Maintenance /Control room bldg/control panel	x	x	x	X	x	x	x	x	X	X
	Booster Pumps	x	x	x	X	x			x	X	X
	Office	x	x	x	X	x	x	x	x	X	X



#### *D) Vulnerable Parcels*

Central Appraisal District data was used to estimate potential damage values for each participating jurisdiction. Given the broad nature of vulnerability, damage values were calculated on the jurisdictional level.

Table 13: Parcels Vulnerable to Hurricanes / Tropical Storms

Jurisdiction	Estimated Parcel Count	Estimated Potential Damage Value
Burleson County	26,535	\$3,197,469,392
City of Caldwell	2,240	\$239,513,308
City of Somerville	1,388	\$97,774,495
City of Snook	706	\$24,470,594
Caldwell ISD	6	\$12,941,093
Snook ISD	5	\$474,781
Somerville ISD	45	\$2,686,852
Burleson County MUD #1	15	\$212,536

## 5. Drought

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

Table 14: Drought Classifications

<b>Meteorological Drought</b>	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
<b>Hydrologic Drought</b>	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
<b>Agricultural Drought</b>	Soil moisture deficiencies relative to water demands of plant life, usually crops.
<b>Socioeconomic Drought</b>	The effect of demands for water exceeding the supply as a result of a weather-related supply shortfall.

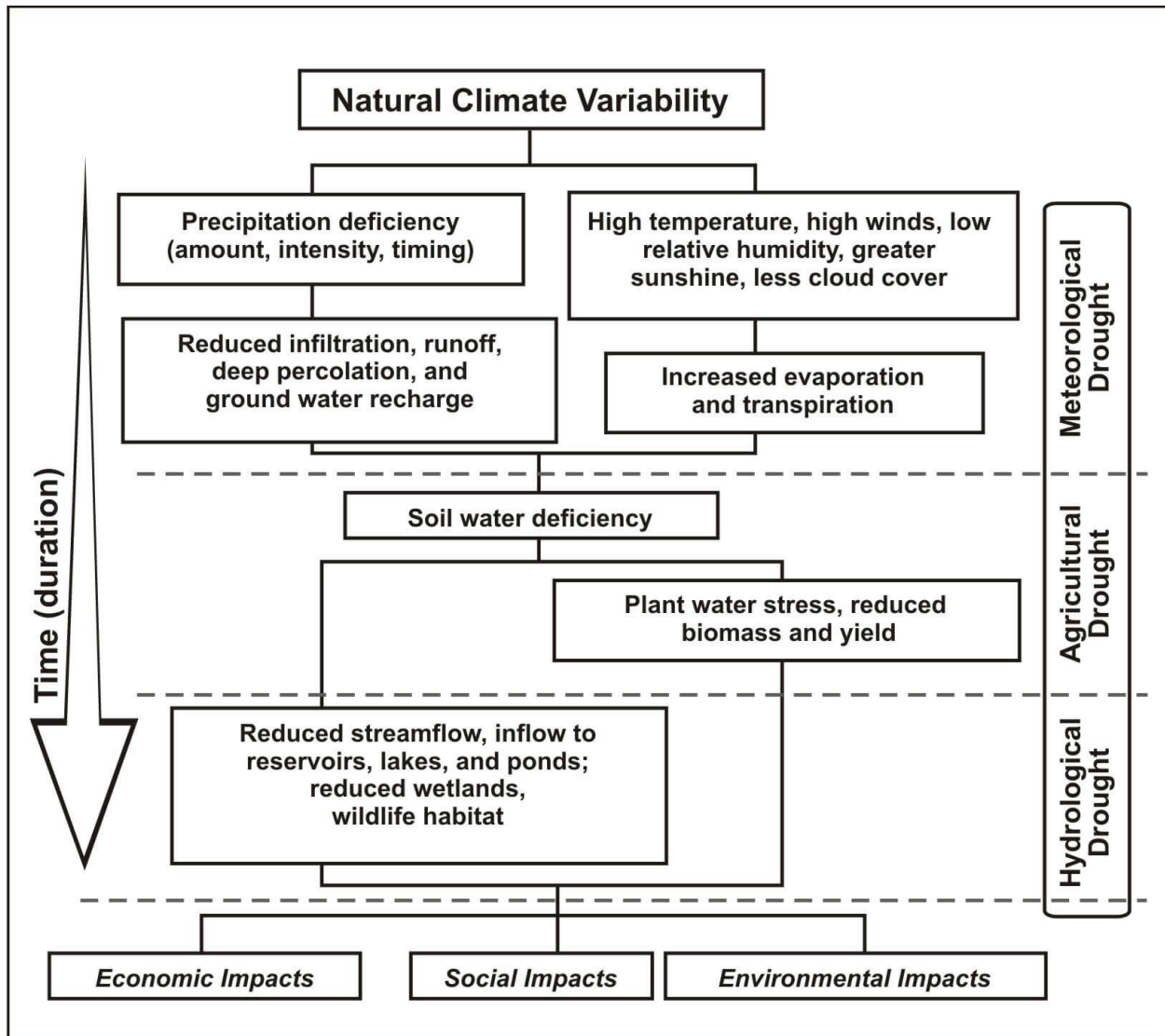


Figure 10: Sequence of Drought Occurrence and Impacts for Commonly Accepted Drought Types<sup>12</sup>

<sup>12</sup> Source: National Drought Mitigation Center, University of Nebraska-Lincoln, <http://drought.unl.edu/DroughtBasics/TypesofDrought.aspx>

## 1) Drought History

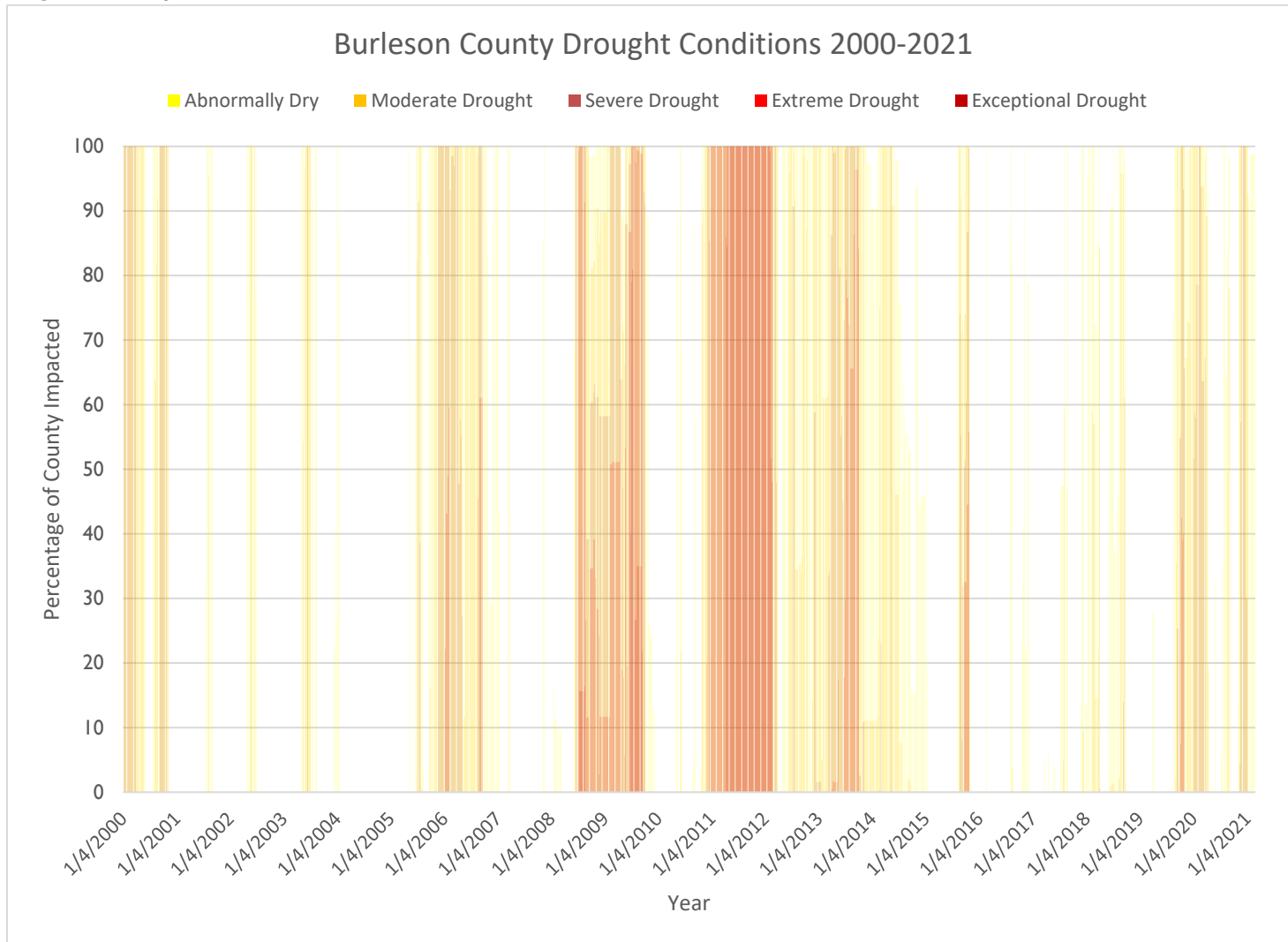


Figure 11: Burleson County Drought History

Drought history is recorded at the County level. However, the data is measured by the percentage of the County affected by drought. Although no specific data regarding drought’s occurrences in the individual cities is available, it’s possible to use the data in Figure 11 to infer when the participating jurisdictions previously experienced drought conditions due to the fact that the conditions impacted 100% of the county. According to the data, Burleson County and the participating jurisdictions have regularly experienced drought conditions since 2000, especially between 2005 – 2007, 2008 – 2010, 2011 – 2015, and 2020-2021.

In Burleson County’s 2013 plan, the participating jurisdictions reported 11 incidences of drought from 1996 to 2011. The worst drought conditions on caused \$1,613,582.82 in property damages and \$12,055,972.39 in crop damages adjusted to \$2021. There were no recorded injuries or deaths due to drought in Burleson County or the participating jurisdictions in the 2013 plan.

There have been no drought events reported since the previous plan.

## 2) Likelihood of Future Events

Based on historical drought in Texas and Burleson County, it is likely that a future drought will affect Burleson County and the participating jurisdictions, meaning an event affecting any or all of the participating jurisdictions is probable in the next three years, and a major drought every 20 years.

## 3) Extent

Since 2000, Burleson County has regularly experienced county-wide droughts classified as periods ranging from abnormal dryness to exceptional drought. At multiple times, the entire County, including all participating jurisdictions, has been in exceptional drought, the most severe drought category.

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

Table 15: Palmer Drought Index

Drought Index	Drought Conditions Classifications						
	Extreme	Severe	Moderate	Normal	Mostly 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

Table 16: Palmer Drought Category Descriptions<sup>13</sup>

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

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

Based on the historical occurrences of drought, Burlison County and all participating jurisdictions should anticipate experiencing droughts ranging from abnormally dry to exceptional drought or D0 to D4 based on the Palmer Drought Category. Given varying conditions, droughts may start on the low end of the Palmer Drought Category, but will intensify with duration and an ongoing lack of precipitation.

<sup>13</sup> [www.droughtmonitor.unl.edu](http://www.droughtmonitor.unl.edu)

Future drought events may meet previous worst-case D4 droughts in terms of intensity, duration, and total damage dollars inflicted.

#### **4) Location and Impact**

##### ***A) Location***

Drought has no distinct geographic boundary. Drought can occur across all participating jurisdictions.

##### ***B) Impact***

General impacts may include water shortage, risk to public safety due to wildfire risk increases, respiratory impacts to the public due to affected air quality, and degradation of fish and wildlife habitat.

Economic impacts may include: increased prices for food, unemployment for farm workers and ranch hands, livestock mortality from limited grazing availability, and reduced tax revenues because of reduced supplies of agriculture products and livestock that are dependent on rainfall.

The City of Somerville adopted its current Drought Contingency Plan in July 2007. The plan describes five stages of water restrictions ranging from voluntary conservation to a prohibition of activities. Each stage is triggered by changes in the level of water demand relative to the safe operating capacity of the City's water supply facilities or the occurrence of a water supply emergency.

Burleson County Municipal Utility District #1 adopted its current Drought Contingency Plan in January 2019. The plan describes three stages of water restrictions ranging from voluntary conservation to a prohibition of activities. Each stage is triggered by changes in the level of water demand relative to the safe operating capacity of the district's water supply facilities or the occurrence of a water supply emergency.

None of the other participating jurisdictions have a drought contingency plan.

#### **5) Vulnerability**

Because drought has the potential to impact every jurisdiction equally, all improved property and the entire population is exposed to this hazard. General impacts may include water shortage, risk to public safety due to wildfire risk increases, respiratory impacts to the public due to affected air quality, and degradation of fish and wildlife habitat.

Economic impacts may include: increased prices for food, unemployment for farm workers and ranch hands, livestock mortality from limited grazing availability, and reduced tax revenues because of reduced supplies of agriculture products and livestock that are dependent on rainfall.

Lower income populations who may not have the resources to buy large quantities of bottled water in the event of a shortage may be more vulnerable than other populations.

***A) Population***

As described in Section 3 of Chapter 3 above, Burlleson County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a drought. Lower income populations who may not have the resources to buy large quantities of bottled water in the event of a shortage may be more vulnerable than other populations.

***B) Critical Facilities***

In addition to triggering various components of participating jurisdictions’ Drought Contingency plans, drought conditions may affect local critical facilities. Area fire departments may see increased demand for controlling wildland fire due to dry conditions. Drought is likely to require increased output from the local power company, in order to keep up with electrical demand. Depending on factors like time of year, temperature, and duration, increased electrical demand may cause brownouts that would impact critical facilities.

**Table 17: Critical Facilities Vulnerable to Drought and Potential Impacts**

Jurisdiction	Critical Facilities	Potential Drought Impacts	
		Increased Demand for Services	Economic Damages
Burlleson County	Burlleson County Courthouse	x	
	Burlleson County Sheriff's Office	x	
	St. Joseph's Health Burlleson Hospital	x	
	Deanville Fire Department	x	
	Communications Towers	x	
	Deanville Water Supply	x	x
	FM 50 Yegua Creek Bridge	x	
	State HWY 36 South Yegua Creek Bridge	x	
	State Hwy 21 West Yegua Creek Bridge	x	
	State HWY 21 East Brazos River Bridge	x	
	Fm 1361 Davidson Creek Bridge	x	
	Park Road 57 Bridge	x	
	FM 60 E Davidson Creek Bridge	x	
	Old River Bridge Snook	x	
	FM 60 E Brazos River Bridge	x	
	Cade Lake Water Supply System	x	x
	Tunis Water Supply System #2	x	x



	Tunis Water Supply System #1	X	X
	Southwest Milam Water Supply System	X	X
	Cooks Point Water Supply System	X	X
	Lyons Water Supply System	X	X
	Birch Creek VFD	X	
	Black Jack VFD	X	
	ATT/Firstnet Towers	X	
	Beaver Creek VFD	X	
	Cade Lake Fire Department	X	
	Cooks Point Volunteer Fire Department	X	
City of Caldwell	Wells	X	X
	Lift Stations	X	X
	Caldwell Civic Center	X	
	Administration Building	X	
	Caldwell Library	X	
	Caldwell Police Department	X	
	Caldwell Fire Department	X	
	Wastewater Treatment Plant	X	X
City of Caldwell Electrical Substation	X		
City of Snook	Snook City Hall	X	
	City of Snook Waste Water Treatment Plant	X	X
	City of Snook Water Plant - water well #2 and water tower	X	X
	City of Snook Water well # 3	X	X
	City of Snook Lift Stations	X	X
City of Somerville	Somerville City Hall	X	
	Somerville Volunteer Fire Department	X	
	Somerville St Josephs clinic/EMS	X	
	Community chapel school	X	
	Koppers (GIS for office on site)	X	
	Somerville senior center	X	
	COS Wastewater treatment plant	X	X
	COS Transfer station	X	
	COS elevated water tank	X	X
	COS water plant (storage tanks, wells, treatment)	X	X
	COS public works yard	X	
	Army Corps of Engineers office/site for lake Somerville	X	
	Bridge, drainage, culverts etc associated with the big ditch	X	
	COS PD	X	
	Warning siren & digital sign	X	
	Lift Stations	X	X
	Culvert	X	
Main Railroad crossing	X		
Caldwell ISD	Caldwell Technology Building	X	

	Caldwell Maintenance	x	
	Caldwell Elementary	x	
	Caldwell Intermediate	x	
	Caldwell Junior High	x	
Snook ISD	Snook Elementary School	x	
	Snook Secondary School	x	
	Snook ISD Transportation Center	x	
Somerville ISD	Somerville Elem/Intermediate	x	
	Somerville High School	x	
	Yegua Center (evacuation /staging site)	x	
Burleson County MUD #1	Wells	x	x
	85k gal Ground Water Tank	x	x
	100k gal Ground Water Tank	x	x
	Chlorine Bldg w/pumps/motors/misc. equip.	x	x
	Maintenance /Control room bldg/control panel	x	x
	Booster Pumps	x	x
	Office	x	

***C) Vulnerable Parcels and Infrastructure***

Given drought’s geographic reach, all parcels within the participating jurisdictions are equally vulnerable to the hazard. However, given the limited damages inflicted by previous droughts, future damages are expected to be similarly limited.

**Table 18: Parcels Vulnerable to Drought**

Jurisdiction	Estimated Parcel Count	Estimated Potential Damage Value
Burleson County	26,535	\$3,197,469,392
City of Caldwell	2,240	\$239,513,308
City of Somerville	1,388	\$97,774,495
City of Snook	706	\$24,470,594
Caldwell ISD	6	\$12,941,093
Snook ISD	5	\$474,781
Somerville ISD	45	\$2,686,852
Burleson County MUD #1	15	\$212,536

## I. Agricultural Production

According to the USDA 2017 Census of Agriculture<sup>14</sup>, the total market value of agricultural products sold, including direct sales, in Burleson County was \$58,590,000. Between 1995 and 2018<sup>15</sup>, \$27,113,086 in indemnities was paid to farmers in Burleson County. That is roughly \$1,178,829 per year. Although the proportion of indemnities paid to cover losses due to drought isn't identifiable, given Burleson County's recent drought history, it is likely that at least some of the dollars paid were related to drought-caused damages.

Given agriculture's role in the County, drought-caused losses will have impacts beyond any individual and may lead to contraction in the wider economy. However, because the data is recorded at the county level, there is no specific information regarding agricultural losses to due drought for the individual participating jurisdictions.

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<sup>14</sup>[https://www.nass.usda.gov/Publications/AgCensus/2017/Full\\_Report/Volume\\_1,\\_Chapter\\_2\\_County\\_Level/Texas/st48\\_2\\_0002\\_0002.pdf](https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/Texas/st48_2_0002_0002.pdf)

<sup>15</sup> <https://farm.ewg.org/cropinsurance.php?fips=48051&summpage=SUMMARY>

## 6. Hailstorm

Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and subsequent cooling of the air mass. Frozen droplets gradually accumulate into ice crystals until they fall as precipitation that is round or irregularly shaped masses of ice. The size<sup>16</sup> of hailstones is a direct result of the size and severity of the storm.

High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a byproduct of heating on the Earth’s surface. Higher temperature gradients above Earth’s surface result in increased suspension time and hailstone size.

Texas officials estimate that up to 40 percent of all homeowners’ insurance claims in the state result from hail damage.

### 1) Hailstorm History

In the 2013 plan, Burleson County and the participating jurisdictions reported 13 hailstorm events between 2005 - 2011. The 2013 plan recorded \$52,000 in damages associated with hailstorms between March 2005 and April 2010. However, the damage total is considered to be slightly low. Even though most of the damages occurred between 2005 and 2010, the total wasn’t adjusted to account for inflation. The 2013 plan did not record any injuries or fatalities associated with hailstorms.

The following tables identify the most comprehensive list available of hailstorm events and associated damages in Burleson County and the participating jurisdictions. No participating jurisdiction has recorded a hailstorm more recently than 2020.

#### A) Burleson County

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Burleson County	3/19/2013 – 4/9/2020	16	0.75 – 2.5	0	0	\$12,192.70	\$0

#### B) City of Caldwell and Caldwell ISD

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Caldwell	7/4/2014 – 3/18/2018	6	0.75 – 4.25	0	0	\$104,741.80	\$0

<sup>16</sup> As of January 5, 2010, the national minimum size for severe hail increased from ¾” to 1”.

***C) City of Snook and Snook ISD***

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Snook	7/3/2013 – 5/27/2020	2	0.88 – 1	0	0	\$1,930.86	\$0

***D) City of Somerville and Somerville ISD***

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Somerville	5/25/2011 – 4/19/2015	2	1 – 1.75	0	0	\$3,329.05	\$0

**Caldwell ISD**

Hailstorm data is generally recorded at the county or city level, so there is no specific information regarding flood events in Caldwell ISD. However, given its boundaries are within Burleson County, its hailstorm history is known to be similar to Burleson County’s.

**Snook ISD**

Hailstorm data is generally recorded at the county or city level, so there is no specific information regarding flood events in Snook ISD. However, given its boundaries are within Burleson County, its hailstorm history is known to be similar to Burleson County’s.

**Somerville ISD**

Hailstorm data is generally recorded at the county or city level, so there is no specific information regarding flood events in Somerville ISD. However, given its boundaries are within Burleson County, its hailstorm history is known to be similar to Burleson County’s.

**Burleson County Municipal District #1**

Hailstorm data is generally recorded at the county or city level, so there is no specific information regarding flood events in Burleson County MUD #1. However, given its boundaries are within Burleson County, its hailstorm history is known to be similar to Burleson County’s.

**2) Likelihood of Future Events**

The hailstorm history in Burleson County and the participating jurisdictions suggests that a hailstorm in the County and participating jurisdictions is highly likely, meaning that an event is probable within the next year.

### 3) Extent

The severity of hail events ranges based on the size of the hail, wind speed, and the number and types of structures in the path of the hailstorm. Storms that produce high winds in addition to hail are most damaging and can result in numerous broken windows and damaged siding.

When hail breaks windows, water damage from accompanying rains can also be significant. A major hailstorm can easily cause damage running into the millions of dollars. Nationwide hail is responsible for over \$1 billion in property and crop damages per year. The scale showing intensity categories in Table 19 was developed by combining data from National Centers for Environmental Information (NCEI) – formerly the National Climatic Data Center – and the Tornado and Storm Research Organization (TORRO).

Table 19: Hailstorm Intensity<sup>17,18</sup>

Size Code	Intensity Category	Size (Diameter in inches)	Descriptive Term	Typical Damage
H0	Hard Hail	Up to 0.33	Pea	No damage
H1	Potentially Damaging	0.33-.060	Mothball	Slight damage to plants and crops
H2	Significant	.060-.080	Penny	Significant damage to fruit, crops, and vegetation
H3	Severe <sup>19</sup>	0.80-1.20	Nickel – Half dollar	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	1.2-1.6	Half dollar – Ping pong ball	Widespread glass damage and vehicle bodywork damage
H5	Destructive	1.6-2.0	Ping pong ball – hen egg	Wholesale destruction of glass, damage to tiled roofs, and significant risk of injuries
H6	Destructive	2.0-2.4	Hen egg – tennis ball	Bodywork of grounded aircraft dented and brick walls pitted
H7	Destructive	2.4-3.0	Tennis ball – Baseball	Severe roof damage and risk of serious injuries
H8	Destructive	3.0-3.5	Hockey puck	Severe damage to aircraft bodywork
H9	Super Hailstorms	3.5-4.0	Softball	Extensive structural damage could cause fatal injuries
H10	Super Hailstorms	4.0+	Greater than softball-sized	Extensive structural damage could cause fatal injuries

<sup>17</sup> <http://www1.ncdc.noaa.gov/pub/data/cmb/extremes/scec/reports/SCEC-Hail-Guide.pdf>

<sup>18</sup> <http://www.torro.org.uk/hscale.php>

<sup>19</sup> Hail must be 1" or larger to be classified as severe

According to NCEI data, the worst hailstorms in Burleson County and the jurisdictions addressing the hazard have produced hail up to 4.25” in diameter, H10 on the Hailstorm Intensity Scale, and have inflicted over \$120,000 in reported property damages. No participating jurisdiction has ever reported any deaths or injuries caused by hail.

Future hailstorms may meet previous worst-case H10 storms in terms of hailstone size, damage dollars inflicted, and possible injuries or death.

#### **4) Location and Impact**

##### ***A) Location***

Hailstorms vary in terms of size, location, intensity and duration but are considered frequent occurrences in the planning area. Each jurisdiction addressing the hazard is uniformly exposed to hail events just as each is uniformly exposed to the thunderstorms that typically produce the hail events.

##### ***B) Impact***

The severity of a hailstorm’s 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. All existing and future buildings, facilities, and populations in the participating jurisdictions are considered to be exposed to this hazard and could potentially be impacted.

#### **5) Vulnerability**

##### ***A) Population***

As described in Section 3 of Chapter 3 above, Burleson County and the jurisdictions addressing hailstorms are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

Since hailstorms arise with little to no warning, the participating jurisdictions recognize that vulnerable populations may primarily need additional help recovering from a hailstorm.

Residents of sub-standard structures are of particular concern. Structures in sub-standard condition ahead of a hailstorm, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may sustain more damages than structures in standard condition.

Existing weaknesses, especially those related to the condition of a structure’s roof, due to housing type or existing damages, may lead to compounded damages, injuries, or loss of life.

***B) Critical Facilities***

Due to the presence of structures with flat roofs and the increased vulnerability a flat roof creates, the presence of older structures that have not been hardened against hailstorms, and / or the presence of metal buildings that may be more susceptible to hail, the following critical facilities were determined to be especially vulnerable to hailstorms:

**Table 20: Critical Facilities Vulnerable to Hailstorms and Potential Impacts**

Jurisdiction	Critical Facilities	Potential Hailstorm Impacts		
		Damaged or Destroyed Roof	Damaged Windows	Water damage due to Physical Damages
Burleson County	Burleson County Courthouse	x	x	x
	Burleson County Sheriff's Office	x	x	x
	St. Joseph's Health Burleson Hospital	x	x	x
	Deanville Fire Department	x	x	x
	Communications Towers			
	Deanville Water Supply	x	x	x
	Cade Lake Water Supply System	x	x	x
	Tunis Water Supply System #2	x	x	x
	Tunis Water Supply System #1	x	x	x
	Southwest Milam Water Supply System	x	x	x
	Cooks Point Water Supply System	x	x	x
	Lyons Water Supply System	x	x	x
	Birch Creek VFD	x	x	x
	Black Jack VFD	x	x	x
	ATT/Firstnet Towers			x
	Beaver Creek VFD	x	x	x
	Cade Lake Fire Department	x	x	x
	Cooks Point Volunteer Fire Department	x	x	x
	Caldwell Civic Center		x	x
	Administration Building	x	x	x
	Caldwell Library	x	x	x
	Caldwell Police Department		x	x
	Caldwell Fire Department		x	x
Wastewater Treatment Plant	x	x	x	
City of Caldwell Electrical Substation	x		x	
City of Snook	Snook City Hall	x	x	x
	City of Snook Waste Water Treatment Plant	x	x	x
	City of Snook Water Plant - water well #2 and water tower	x	x	x



	City of Snook Water well # 3	x	x	x
	City of Snook Lift Stations			x
City of Somerville	Somerville City Hall	x	x	x
	Somerville Volunteer Fire Department	x	x	x
	Somerville St Josephs clinic/EMS		x	x
	Community chapel school	x	x	x
	Koppers (GIS for office on site)	x	x	x
	Somerville senior center	x	x	x
	COS Wastewater treatment plant	x	x	x
	COS Transfer station	x	x	x
	COS elevated water tank			x
	COS water plant (storage tanks, wells, treatment)	x	x	x
	COS public works yard	x	x	x
	Army Corps of Engineers office/site for lake Somerville		x	x
	COS PD	x	x	x
	Warning siren & digital sign			x
	Caldwell ISD	Caldwell Technology Building	x	x
Caldwell Maintenance		x	x	x
Caldwell Elementary		x	x	x
Caldwell Intermediate		x	x	x
Caldwell Junior High		x	x	x
Snook ISD	Snook Elementary School	x	x	x
	Snook Secondary School	x	x	x
	Snook ISD Transportation Center			x
Somerville ISD	Somerville Elem/Intermediate	x	x	x
	Somerville High School	x	x	x
	Yegua Center (evacuation /staging site)	x	x	x
	85k gal Ground Water Tank			x
	100k gal Ground Water Tank			x
	Chlorine Bldg w/pumps/motors/misc. equip.	x	x	x
	Maintenance /Control room bldg/control panel	x	x	x
	Booster Pumps			x
	Office	x	x	x

### *C) Vulnerable Parcels*

Although every structure is vulnerable to damage from hail, due to often having flat roofs and the increased exposure that flat roofs create, the County's commercial buildings are expected to sustain more damages than other infrastructure.

Table 21: Parcels Vulnerable to Hailstorms

Jurisdiction	Estimated Parcel Count	Estimated Potential Damage Value
Burleson County	26,535	\$3,197,469,392
City of Caldwell	2,240	\$239,513,308
City of Somerville	1,388	\$97,774,495
City of Snook	706	\$24,470,594
Caldwell ISD	6	\$12,941,093
Snook ISD	5	\$474,781
Somerville ISD	45	\$2,686,852
Burleson County MUD #1	15	\$212,536

## 7. Riverine Flooding

According to the Texas State Hazard Mitigation Plan, Floods are defined as:

[T]he accumulation of water within a water body and the overflow of excess water into adjacent floodplain lands.

In hydrologic analysis, runoff is that portion of rainfall which, in combination with other factors, contributes to the stream flow of any surface drainage way. When runoff exceeds the carrying capacity of the stream or drainage, flooding occurs. Runoff is a product of two major groups of factors, climate and physiographic. Climatic factors may include precipitation, evaporation, transpiration and interception. Physiographic factors would include the characteristics of the watershed such as size, shape and slope of the basin's drainage area, the general land use within the basin. Average annual runoff decreases unevenly moving east to west across Texas, the localized variations based on these factors listed above.

When surface water runoff enters into streams, rivers, or dry creek beds, riverine flooding conditions occur whenever the water carrying capacity of the water channel is compromised by excess runoff.

If the local basin drainage area is relatively flat, shallow, slow-moving floodwater can last for days. In drainage areas with substantial slope, or the channel is narrow and confined, rapidly moving and extreme high-water conditions, called a flash flood, can occur.

In 2018, the National Oceanic and Atmospheric Administration (NOAA) published Atlas 14, Volume 11, an updated Precipitation-Frequency Atlas of the United States. Atlas 14 replaces rainfall frequency values from the 1960s and 1970s, based on decades of additional rainfall data, an increase in the amount of available data, and improved methods used in the analysis. NOAA Atlas 14 rainfall values are used for infrastructure design and planning activities under federal, state and local regulations. They also help delineate flood risks, manage development in floodplains for FEMA's National Flood Insurance Program and are used to monitor precipitation observations and forecasts that can indicate flooding threats by NOAA's National Weather Service. Atlas 14 "found increased values in parts of Texas, including larger cities such as Austin and Houston, that will result in changes to the rainfall amounts that define 100-year events,

which are those that on average occur every 100 years or have a one percent chance of happening in any given year.”<sup>20</sup>

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<sup>20</sup> <https://www.noaa.gov/media-release/noaa-updates-texas-rainfall-frequency-values>

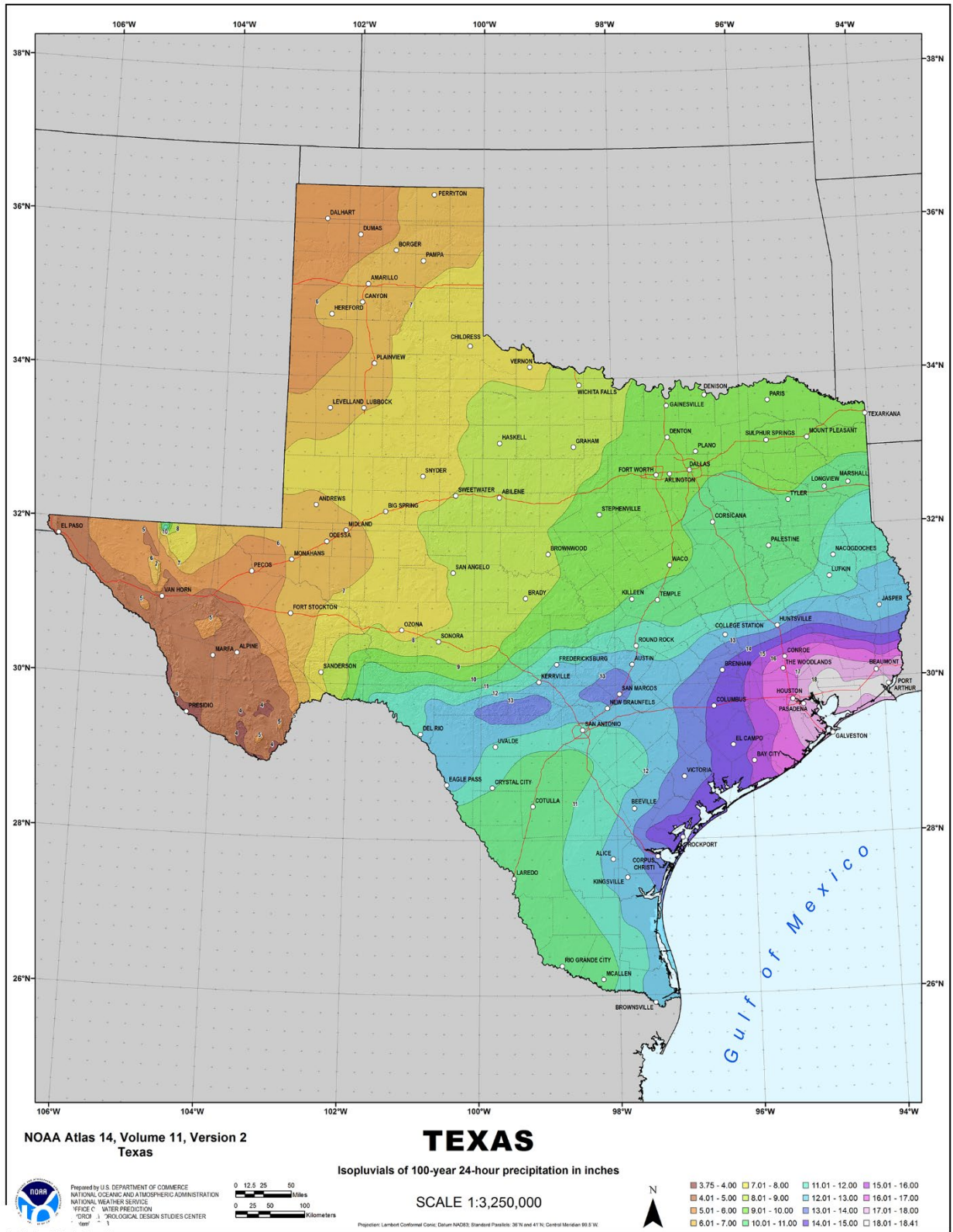


Figure 12: Graphic of Texas showing updated rainfall values in inches

As shown in Figure 12 above, the new rainfall frequency values show that 100-year event estimates range from 10-12 inches in Burleson County and the participating jurisdictions.<sup>21</sup> Increased rainfall averages will likely make flooding worse in Burleson County and the participating jurisdictions.

### 1) Flood History

The planning team relied on data from the National Centers for Environmental Information (NCEI) to develop a flood history for the County and each participating jurisdiction.

According to Burleson County’s 2013 plan, the County and jurisdictions addressing the hazard recorded 15 flood events between October 1994 and June 2010. The plan recorded \$5,263,000 in property damages during that time. However, the damage total is considered to be slightly low. The most damaging event occurred in 1994, and none of the damages were adjusted to account for inflation. None of the flooding events was reported to have caused any injuries, or fatalities.

The following tables identify the most comprehensive list available from the NCEI of flood events and associated damages in Burleson County and the participating jurisdictions. The participating jurisdictions reported several flood events that have occurred since the previous plan that was not recorded in the NCEI data.

#### Burleson County

Table 22: Burleson County Flood History

Location	Date Range	Number of Flood Events	Flood Types	Local Fatalities	Local Injuries	Local Property Damage \$2021	Local Crop Damage \$2021
Countywide	6/9/2010 – 5/6/2015	2	Flash Flood	0	0	\$11,096.84	\$0

#### City of Caldwell

Table 23: City of Caldwell Flood History

Location	Date Range	Number of Flood Events	Flood Types	Local Fatalities	Local Injuries	Local Property Damage \$2021	Local Crop Damage \$2021
Caldwell Municipal Airport	3/28/2012 – 10/24/2015	2	Flash Flood	0	0	\$22,911.23	\$0

<sup>21</sup> <https://www.noaa.gov/media-release/noaa-updates-texas-rainfall-frequency-values>

There have been no reported flood events in NCEI data for the Cities of Somerville and Snook since the previous plan.

### **Caldwell ISD**

Flood data is generally recorded at the county level, so there is no specific information regarding flood events on Caldwell ISD property. However, given its boundaries are about a third of the size of the County, its flood history is known to be similar to the County's.

### **Snook ISD**

Flood data is generally recorded at the county level, so there is no specific information regarding flood events at Snook ISD or its associated properties. However, given its boundaries are about a third of the size of the County, its flood history is known to be similar to the County's.

### **Somerville ISD**

Flood data is generally recorded at the county level, so there is no specific information regarding flood events on Somerville ISD property. However, given its boundaries are about a third of the size of the County, its flood history is known to be similar to the County's.

### **Burleson County Municipal District #1**

Flood data is generally recorded at the county level, so there is no specific information regarding flood events at Burleson County MUD #1 or its associated properties. However, given its boundaries are near the City of Somerville, its flood history is known to be similar to the City of Somerville.

#### ***A) National Flood Insurance Program***

The National Flood Insurance Program (NFIP) is administered by FEMA to provide flood insurance coverage to the nation. Burleson County, the City of Caldwell, the City of Somerville, and the City of Snook are all listed as participating in the National Flood Insurance Program.<sup>22</sup>

Burleson County, the City of Caldwell and the City of Somerville have adopted and enforce flood damage prevention ordinances in their respective jurisdictions. While the City of Snook is listed as participants in the Community Status Workbook, they currently do not have a flood damage prevention ordinance. In order to be in compliance with the NFIP, the City of Snook has proposed a mitigation action in Chapter 16 that will create and implement a flood damage prevention ordinance and identify a floodplain manager.

In Burleson County, the County Judge is the designated Floodplain Administrator and enforces its flood damage prevention ordinance. In the City of Caldwell, the City Administrator is the designated Floodplain Administrator and enforces its flood damage prevention ordinance. In the

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<sup>22</sup> <https://www.fema.gov/cis/TX.html>

City of Somerville, the City Administrator is also the designated Floodplain Administrator and enforces its flood damage prevention ordinance.

The City of Caldwell’s flood damage prevention ordinance requires the lowest level of new structures in the floodplain to meet the base flood elevation. The City of Somerville’s flood damage prevention ordinance requires the lowest level of new structures in the floodplain to meet the base flood elevation.

Their respective floodplain management ordinances and any future updates will guide each enforcing jurisdiction as it continues to comply with NFIP requirements through local permitting, inspection, and recordkeeping, especially for new and substantially redeveloped construction. Each enforcing jurisdiction will continue to encourage property owners to purchase flood insurance to reduce their flood risk.

The current FIRM maps covering Burleson County and the participating jurisdictions became effective on January 6, 2011.

There are no Letters of Map Changes (LOMC) in Burleson County or the participating jurisdictions.

As of March 30, 2021, there are 63 NFIP policies in force in unincorporated Burleson County, including direct and Write-Your-Own (WYO) policies. These policies cover property worth \$16,146,000.

There are 27 NFIP policies in force in the City of Caldwell covering property worth \$7,182,500, including direct and WYO policies.

There are 19 NFIP policies in force in the City of Somerville covering property worth \$3,956,200, including direct and WYO policies.

There are six WYO NFIP policies in force in the City of Snook covering property worth \$1,017,100.

**Table 24: NFIP Claims and Payments**

Jurisdiction Name	Direct Losses	WYO Losses	Total Losses	Direct Net Dollar Paid	WYO Net Dollar Paid	Total Net Dollar Paid
Burleson County	0	19	19	\$0.00	\$828,577.83	\$828,577.83
City of Caldwell	3	1	4	\$1,928.75	\$9,400.00	\$11,328.75
City of Somerville	11	14	25	\$385,815.58	\$120,493.22	\$506,308.80
City of Snook	0	2	2	\$0.00	\$56,045.85	\$56,045.85



### Repetitive Loss Properties

A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling ten-year period, since 1978. According to the data available, there are two RL properties in the City of Somerville, one residential and one commercial. There are no RL properties in any other participating jurisdictions. City of Somerville RL properties have claimed seven (7) losses.

Total payments on all RL properties in Burleson County come to \$984,229.19.

### Severe Repetitive Loss Properties

A severe repetitive loss property is: “a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding \$5,000 and with cumulative amount of such claims payments exceeding \$20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

According to the information available, there is one severe repetitive loss property in the City of Somerville, which is a commercial property. There are no SRL properties in any other participating jurisdictions. City of Somerville SRL properties have claimed three (3) losses.

Total payments on all SRL properties in Somerville reached \$954,100.00 as of 3/29/2021.

## 2) Likelihood of Future Events

In the case of the FEMA 100-year floodplain, there’s a 1% annual chance, and in the 500-year floodplain it’s a 0.02% annual chance. The likelihood of a 100-year flood event is therefore occasional. The likelihood of a 500-year flood event is therefore unlikely.

However, based on the frequency of previous flood events, every jurisdiction can expect to experience some type of flooding that may or may not meet the definition of a 100-year or 500-year event on a more regular basis.

In Burleson County, previous flood history indicates that a future flood event is likely, meaning that one is probable in the next three years, in every participating jurisdiction.

## 3) Extent

Throughout Burleson County and the participating jurisdictions, the worst flood events have been associated with flooding due to combinations of heavy rainfall, flash flooding, and riverine flooding.

The worst flooding events in Burleson County and the participating jurisdictions have inflicted as high as \$160,620.79<sup>23</sup> in property damages. No crop damages have been reported as a result of flooding in NCEI data for Burleson County. No injuries or deaths have been reported due to floods in Burleson County.

The worst flooding throughout the County and the participating jurisdictions has been estimated at 8" deep<sup>24</sup>. Hurricane Harvey in 2017 dumped as much as 22-25 inches of rain on the County, leading to widespread flooding.<sup>25</sup>

Future flood events in Burleson County and the participating jurisdictions may meet previous worst-case 8" flood depths, property damages, crop damages, injuries, or even deaths.

#### **4) Location and Impact**

##### ***A) Location***

Roughly 28% (122,631.33 acres out of 433,343.34) of Burleson County is in the FEMA 100-year floodplain. In contrast, 72% (310,712.00 acres out of 433,343.34) of Burleson County is in the FEMA 500-year floodplain. Nearly every type of land use found in Burleson County can be found in both the FEMA 100-year and FEMA 500-year floodplains.

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<sup>23</sup> Incident date: 11/3/2000, NOAA Data, Adjusted for inflation to \$2021

<sup>24</sup> [https://www.facebook.com/permalink.php?story\\_fbid=1892756090881435&id=234949443328783](https://www.facebook.com/permalink.php?story_fbid=1892756090881435&id=234949443328783)

<sup>25</sup> [https://theeagle.com/news/local/with-the-worst-of-harvey-likely-passed-brazos-valley-gets-a-chance-to-assess-the/article\\_caa9753f-fd55-5460-8d6b-c5ddf4891f20.html](https://theeagle.com/news/local/with-the-worst-of-harvey-likely-passed-brazos-valley-gets-a-chance-to-assess-the/article_caa9753f-fd55-5460-8d6b-c5ddf4891f20.html)

## Burleson County FEMA Special Flood Hazard Areas

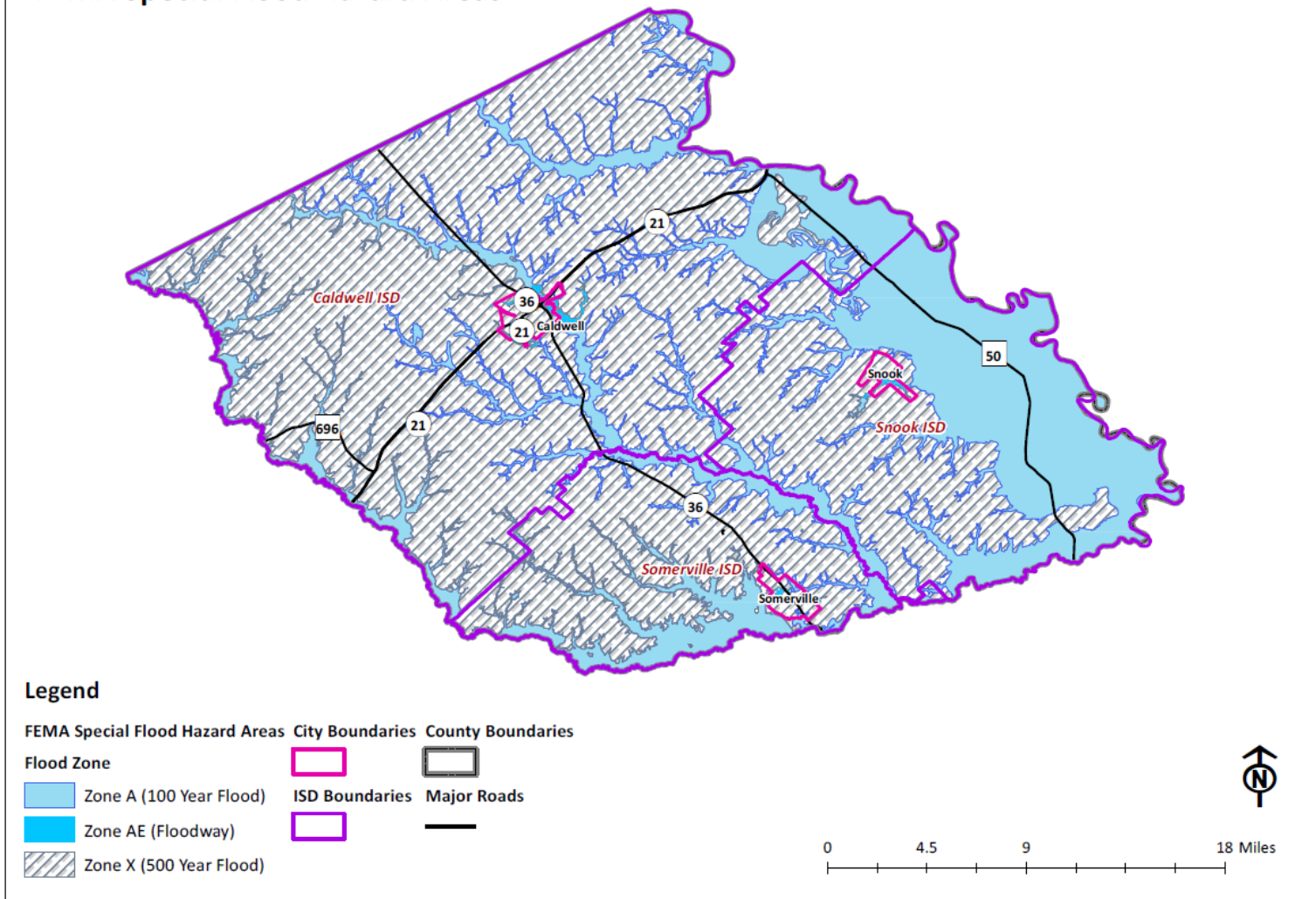
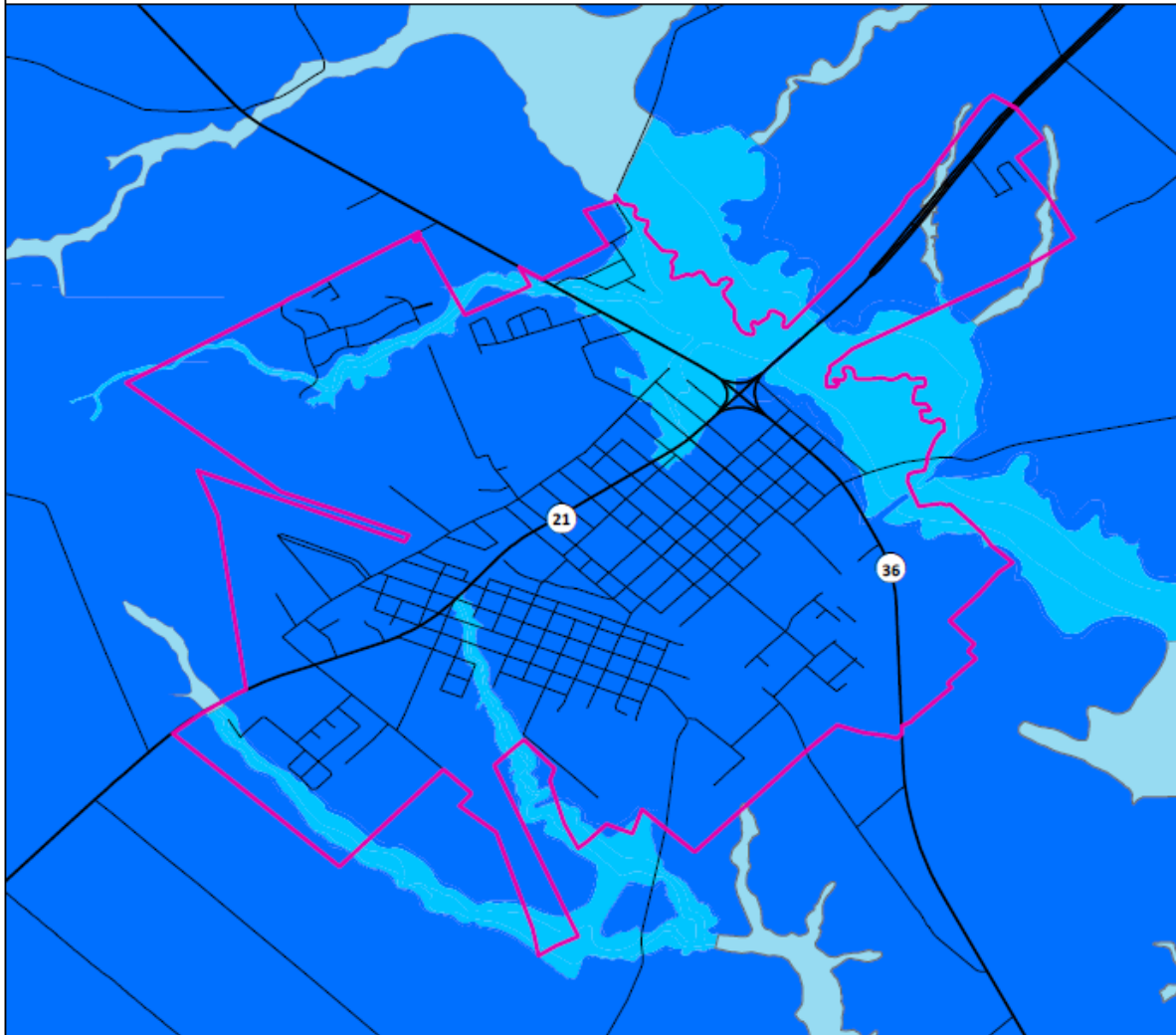


Figure 13: Burleson County and ISD FEMA 100-Year and 500-Year Floodplain

## City of Caldwell FEMA Special Flood Hazard Areas



### Legend

- |   |   |
|---|---|
| FEMA Special Flood Hazard Areas   | <span style="border: 1px solid pink; display: inline-block; width: 15px; height: 10px;"></span> City Boundaries |
| Flood Zone  | <span style="border-bottom: 2px solid black; width: 20px;"></span> Major Roads                                  |
| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Zone A (100 Year Flood) | <span style="border-bottom: 1px solid black; width: 20px;"></span> Streets                                      |
| <span style="background-color: #00bfff; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Zone AE (Floodway)      |   |
| <span style="background-color: #0000ff; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Zone X (500 Year Flood) |   |

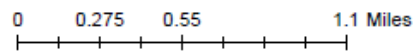
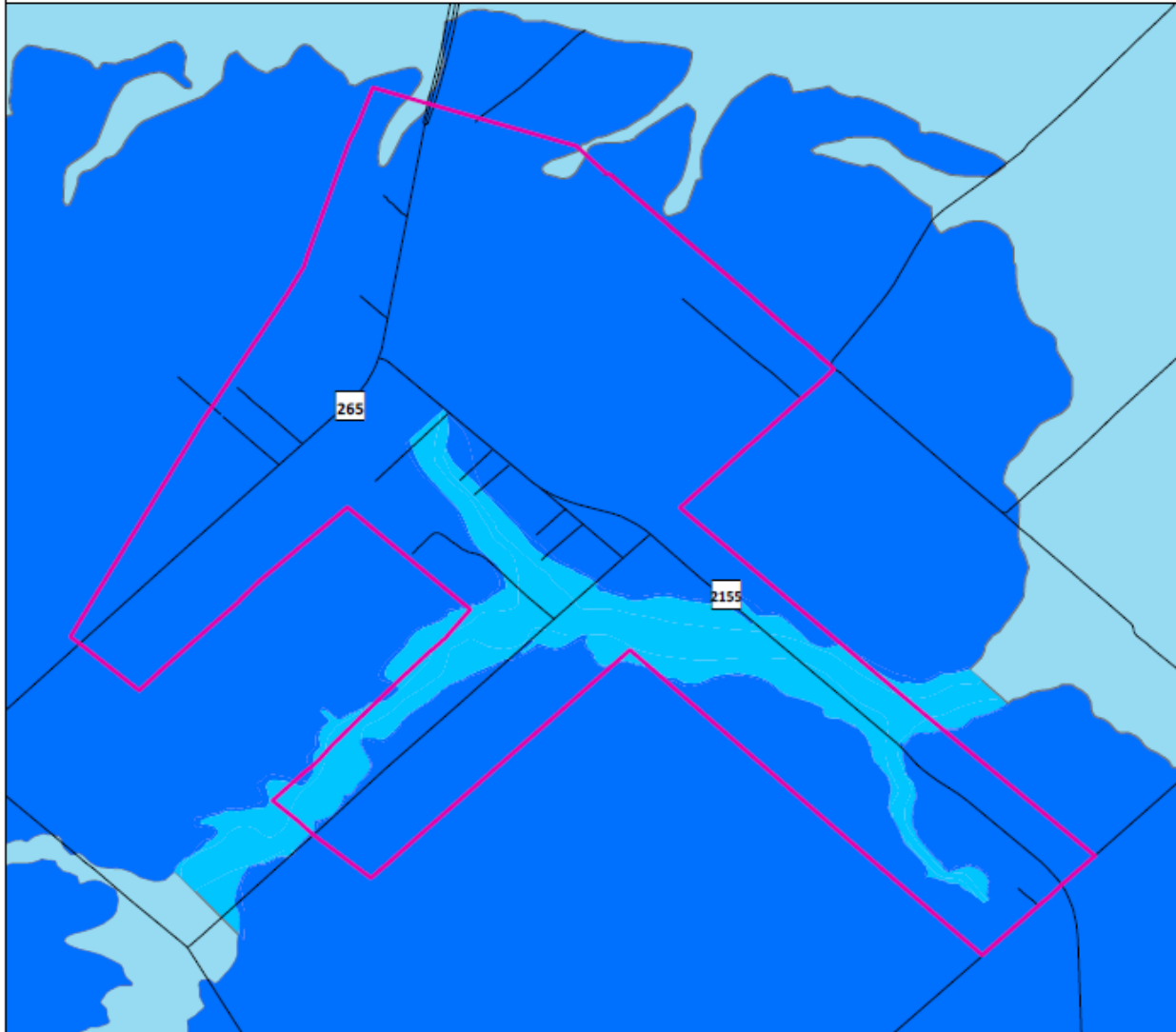


Figure 14: City of Caldwell FEMA 100-Year and 500-Year Floodplain


# City of Snook FEMA Special Flood Hazard Areas





### Legend

FEMA Special Flood Hazard Areas  City Boundaries

Flood Zone  Streets

 Zone A (100 Year Flood)

 Zone AE (Floodway)

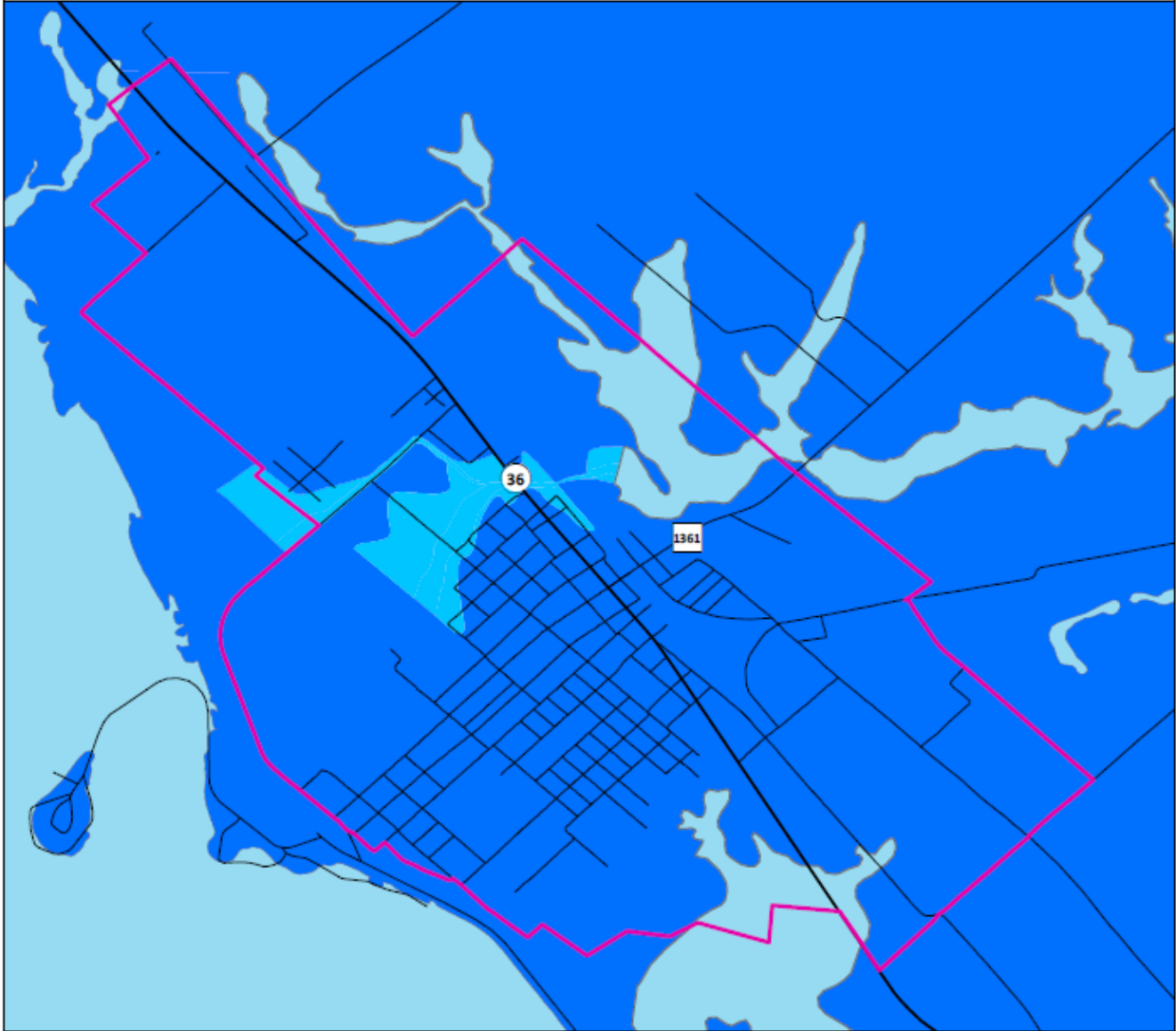
 Zone X (500 Year Flood)









0 0.2 0.4 0.8 Miles

Figure 15: City of Snook FEMA 100-Year and 500-Year Floodplain

# City of Somerville FEMA Special Flood Hazard Areas



## Legend

- |   |   |
|---|---|
| FEMA Special Flood Hazard Areas   |  City Boundaries |
| Flood Zone  |  Major Roads     |
|  Zone A (100 Year Flood) |  Streets         |
|  Zone AE (Floodway)      |   |
|  Zone X (500 Year Flood) |   |



0 0.225 0.45 0.9 Miles

Figure 16: City of Somerville FEMA 100-Year and 500-Year Floodplain

# Burleson County MUD #1 FEMA Special Flood Hazard Areas



### Legend

- FEMA Special Flood Hazard Areas
- County Boundaries
- Flood Zone
  - Zone A (100 Year Flood)
  - Zone AE (Floodway)
  - Zone X (500 Year Flood)

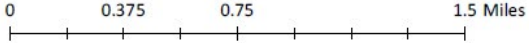


Figure 17: Burleson County MUD #1 FEMA 100-Year and 500-Year Floodplain

## I. Impact

Although the likelihood of a FEMA 100-year flood event remains occasional, 1% in any given year, the floodplain crosses all of Burleson County's major thoroughfares, potentially limiting travel across, within, and around the County.

The impact of a FEMA 100-year flood event will vary depending on the location, size of the affected area, and number of structures affected. Residents outside of the participating jurisdictions are evenly distributed throughout the county. Flooding in the County's Census Designated Places will impact more residents than flooding in less developed parts of the County. Residents in unincorporated Burleson County may temporarily lose power due to downed power lines. Motorists and residents throughout the County may be left stranded and needing rescue. Affected structures may be flooded, damaged by floodborne contaminants, damaged by debris flow, or even completely washed away. Crops may be damaged or destroyed. Estimated damage totals to vulnerable parcels affected during a 100-year flood event may meet the totals outlined in Table 26-Table 33 below.

Despite the unlikely probability of a so-called 500-year flood, 0.02% in any given year, the danger isn't negligible. Moreover, the relatively limited information on the 500-year flood zone should not be interpreted to mean that a 500-year flood will only occur in the areas depicted in the 500-year flood zone on the County's NFIP maps. Parts of the County may temporarily lose power due to downed power lines. Motorists and residents may be left stranded and needing rescue. Affected structures may be flooded, damaged by floodborne contaminants, damaged by debris flow, or even completely washed away. Crops may be damaged or destroyed. A 500-year flood event is expected to affect a larger area and more structures than a 100-year flood. Estimated damage totals to vulnerable parcels affected during a 500-year flood event may meet the totals outlined in Table 26-Table 33 below.

The cost of recovery from previous flood events have also been high

## 5) Vulnerability

### A) Population

As described in Section 3 of Chapter 3 above, Burleson County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The participating jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a flood. The participating jurisdictions also recognize that subdivisions or neighborhoods with only a single entrance may be cut off due to flooding and



therefore unable to obtain supplies or receive emergency services. Subdivisions such as Beaver Creek, Anita Heights, and Clay were cut off for several days in the 2015 and 2016 floods and had to receive supplies via boat.

Residents of mobile / manufactured housing are of particular concern. These structures are never considered safe during a flood, and depending on tie-down methods, may threaten surrounding structures.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a flood, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during a flood than structures in standard condition. Existing structural weaknesses may mean increased damages, injuries, or loss of life.

***B) Critical Facilities***

The planning team identified 77 critical facilities spread across the County and participating jurisdictions. All are located in a known FEMA Special Flood Hazard Area (SFHA).

**Table 25: Critical Facilities Vulnerable to Flooding**

Jurisdiction	Critical Facilities
<b>Burleson County</b>	Burleson County Courthouse
	Burleson County Sheriff's Office
	St. Joseph's Health Burleson Hospital
	Deanville Fire Department
	Communications Towers
	Deanville Water Supply
	FM 50 Yegua Creek Bridge
	State HWY 36 South Yegua Creek Bridge
	State Hwy 21 West Yegua Creek Bridge
	State HWY 21 East Brazos River Bridge
	Fm 1361 Davidson Creek Bridge
	Park Road 57 Bridge
	FM 60 E Davidson Creek Bridge
	Old River Bridge Snook
	FM 60 E Brazos River Bridge
	Cade Lake Water Supply System
	Tunis Water Supply System #2
	Tunis Water Supply System #1
	Southwest Milam Water Supply System
	Cooks Point Water Supply System
Lyons Water Supply System	
Birch Creek VFD	

	Black Jack VFD
	ATT/Firstnet Towers
	Beaver Creek VFD
	Cade Lake Fire Department
	Cooks Point Volunteer Fire Department
<b>City of Caldwell</b>	Wells
	Lift Stations
	Caldwell Civic Center
	Administration Building
	Caldwell Library
	Caldwell Police Department
	Caldwell Fire Department
	Wastewater Treatment Plant
	City of Caldwell Electrical Substation
<b>City of Snook</b>	Snook City Hall
	Waste Water Treatment Plant
	Water Plant - water well #2 and water tower
	Water well # 3
	Lift Stations
<b>City of Somerville</b>	Somerville City Hall
	Somerville Volunteer Fire Department
	Somerville St Joshephs clinic/EMS
	Community chapel school
	Koppers (GIS for office on site)
	Somerville senior center
	COS Wastewater treatment plant
	COS Transfer station
	COS elevated water tank
	COS water plant (storage tanks, wells, treatment)
	COS public works yard
	Army Corps of Engineers office/site for lake somerville
	Bridge , drainage, culverts etc associated with the big ditch
	COS PD
	Warning siren & digital sign
	Lift Stations
	Culvert
	Main Railroad crossing
<b>Caldwell ISD</b>	Caldwell Technology Building
	Caldwell Maintenance
	Caldwell Elementary
	Caldwell Intermediate

	Caldwell Junior High
Snook ISD	Snook Elementary School
	Snook Secondary School
	Snook ISD Transportation Center
Somerville ISD	Somerville Elem/Intermediate
	Somerville High School
	Yegua Center (evacuation /staging site)
Burleson County MUD #1	Wells
	85k gal Ground Water Tank
	100k gal Ground Water Tank
	Chlorine Bldg w/pumps/motors/misc. equip.
	Maintenance /Control room bldg/control panel
	Booster Pumps
	Office

***C) Vulnerable Parcels***

The planning team developed a parcel inventory to identify estimated damage values during a flood event. Parcels vulnerable to flooding have been identified by their complete or partial location within the FEMA 100-year floodplain and the FEMA 500-year floodplain.

Actual damages will vary based on the location and extent of flooding.

Table 26: Vulnerable Parcels by Flood Zone in Burleson County

Jurisdiction	Total Parcels	Estimated Potential Damage Value
<u>FEMA 100-Year Flood Zone A</u>		
Burleson County	4,148	\$1,329,769,460
<u>FEMA 500-Year Flood Zone</u>		
Burleson County	22,387	\$1,867,699,932

Table 27: Vulnerable Parcels by Flood Zone in the City of Caldwell

Jurisdiction	Total Parcels	Estimated Potential Damage Value
<u>FEMA 100-Year Flood Zone A</u>		

City of Caldwell	134	\$7,882,297
<u>FEMA 500-Year Flood Zone</u>		
City of Caldwell	2,106	\$231,631,011

Table 28: Vulnerable Parcels by Flood Zone in the City of Snook

Jurisdiction	Total Parcels	Estimated Potential Damage Value
<u>FEMA 100-Year Flood Zone A</u>		
City of Snook	43	\$294,808
<u>FEMA 500-Year Flood Zone</u>		
City of Snook	656	\$20,054,229

Table 29: Vulnerable Parcels by Flood Zone in the City of Somerville

Jurisdiction	Total Parcels	Estimated Potential Damage Value
<u>FEMA 100-Year Flood Zone A</u>		
City of Somerville	24	\$1,939,070
<u>FEMA 500-Year Flood Zone</u>		
City of Somerville	1,294	\$85,766,377

Table 30: Vulnerable Parcels by Flood Zone in Caldwell ISD

Jurisdiction	Total Parcels	Estimated Potential Damage Value
<u>FEMA 100-Year Flood Zone A</u>		
Caldwell ISD	2	\$12,151,380
<u>FEMA 500-Year Flood Zone</u>		

Caldwell ISD	6	\$12,941,093
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Table 31: Vulnerable Parcels by Flood Zone in Snook ISD

Jurisdiction	Total Parcels	Estimated Potential Damage Value
<u>FEMA 100-Year Flood Zone A</u>		
Snook ISD	0	N/A
<u>FEMA 500-Year Flood Zone</u>		
Snook ISD	4	\$426,740

Table 32: Vulnerable Parcels by Flood Zone in Somerville ISD

Jurisdiction	Total Parcels	Estimated Potential Damage Value
<u>FEMA 100-Year Flood Zone A</u>		
Somerville ISD	2	\$144,350
<u>FEMA 500-Year Flood Zone</u>		
Somerville ISD	45	\$2,686,852

Table 33: Vulnerable Parcels by Flood Zone in Burleson County MUD #1

Jurisdiction	Total Parcels	Estimated Potential Damage Value
<u>FEMA 100-Year Flood Zone A</u>		
Burleson County MUD #1	0	N/A
<u>FEMA 500-Year Flood Zone</u>		
Burleson County MUD #1	15	\$212,536

## 8. Tornado

A tornado is defined as a rapidly rotating vortex or funnel of air extending ground-ward from a cumulonimbus cloud. Most of the time, vortices remain suspended in the atmosphere and are visible as a funnel cloud. However, when the lower tip of a vortex touches the ground, the tornado becomes a force of destruction. Tornado strength is currently measured using the Enhanced Fujita (EF) Scale. Like the previously used Fujita scale, the EF Scale uses damage to estimate tornado wind speeds and assign a number between 0 and 5. A rating of EF0 represents minor to no damage whereas a rating of EF5 represents total destruction of buildings.

### 1) Tornado History

Burleson County previously reported 18 tornados between July 2003 and April 2007. The 2013 plan recorded \$10,356,000 in property damages during that time. However, the damage total is considered to be low since the totals weren't adjusted for inflation. There were 19 injuries and 2 deaths reported as a result of these tornado events.

#### Burleson County

Table 34: Burleson County Tornado History

Location	Date Range	Number of Tornados	F / EF Magnitude Range	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Burleson County	1/25/2012 – 1/10/2020	2	EF1	0	0	\$259,599.45	\$0

#### City of Snook

Table 35: City of Snook Tornado History

Location	Date Range	Number of Tornados	F / EF Magnitude Range	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Snook	2/3/2012	2	EF 1 – EF 2	0	0	\$744,614.84	\$0

Although the City of Caldwell, Caldwell ISD, the City of Somerville, Snook ISD and Somerville ISD have not recorded any previous tornados, their locations and tornados' unpredictable nature means they're as vulnerable to tornados as every other participant.

### 2) Likelihood of Future Events

Based on the frequency of previous tornados in Burleson County and the participating jurisdictions, a future event that may impact any or all of them is occasional, meaning one is possible in the next five years.

### 3) Extent

Before 2007, the Fujita Scale was used for rating tornado strength. The Fujita Scale is based on damage intensity instead of wind speed, with estimated wind speed ranges based on the extent of observed damage.

Table 36: Fujita Scale

Fujita Scale			
Enhanced Fujita Category	Wind Speed (MPH)	Character	Potential Damage
Zero (F0)	40-72	Weak	Light Damage. Some damage to chimneys; branches broken off trees, shallow-rooted trees uprooted, sign boards damaged.
One (F1)	73-112	Weak	Moderate damage. Roof surfaces peeled off; mobile homes pushed foundations or overturned; moving autos pushed off road.
Two (F2)	113-157	Strong	Considerable damage. Roofs torn from frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light objects become projectiles.
Three (F3)	158-206	Strong	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
Four (F4)	207-260	Violent	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
Five (F5)	260-318	Violent	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yds.); high-rise buildings have significant structural deformation; incredible phenomena will occur.

Adopted after 2007, The Enhanced Fujita Scale, or EF Scale, is the scale for rating the strength of tornados via the damage they cause. Six categories from zero to five represent increasing degrees of damage. The scale considers how most structures are designed, and is thought to be an accurate representation of the surface wind speeds in the most violent tornados.

Table 37: Enhanced Fujita Scale<sup>26</sup>

<sup>26</sup> Texas State Hazard Mitigation Plan, 2013 Update.

Enhanced Fujita (EF) Scale		
Enhanced Fujita Category	Wind Speed (MPH)	Potential Damage
EF0	65-85	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	86-110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	200+	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yds.); high-rise buildings have significant structural deformation; incredible phenomena will occur.

Previous tornados ranged in strength from F0 to F3 on the Fujita Scale. Since the switch to the updated scale, EF1 and EF2 tornadoes have been recorded. In terms of property damages inflicted, the worst reported tornado in Burleson County and the participating jurisdictions was an EF2. That tornado caused the \$2021 equivalent of \$572,780.65<sup>27</sup> in property damages after adjusting for inflation.

Future tornados may meet previous worst-case tornado events in terms of total damage dollars inflicted and the number of residents injured or killed.

**4) Location and Impact**

*A) Location – All Jurisdictions*

Tornados are not constrained by any distinct geographic boundary. Tornados can occur across all participating jurisdictions and may freely cross from one jurisdiction into another.

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<sup>27</sup> Incident date: 2/3/2012



### ***B) Impact – All Jurisdictions***

Impacts from a tornado may include but are not limited to damaged or destroyed personal property including vehicles, damaged or destroyed agricultural, residential, commercial, and industrial buildings. Crops may be damaged or destroyed. Pets and livestock may be injured or killed by tornados or flying debris. Pets and livestock may escape due to damaged or destroyed structures and fences.

In the worst cases, tornados may cause injuries and/or be deadly.

## **5) Vulnerability**

Tornadoes have the potential to impact the entire planning area. All existing and future buildings, critical facilities, critical infrastructure, improved property, and the population of the participating jurisdictions are considered vulnerable to this hazard.

### ***A) Population***

As described in Section 3 of Chapter 3 above, Burleson County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The participating jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a tornado. The participating jurisdictions also recognize that subdivisions or neighborhoods with only a single entrance may be cut off due to tornado impacts and therefore unable to obtain supplies or receive emergency services.

Residents of mobile / manufactured homes are of particular concern. These structures are never considered safe during a tornado.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a tornado, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during a tornado than structures in standard condition.

Existing structural weaknesses, due to housing type or existing damages, may lead to compounded damages, injuries, or loss of life.

### ***B) Critical Facilities and Infrastructure***

Certain critical facilities and infrastructure in each jurisdiction may be particularly vulnerable to tornados. These facilities have been identified for reasons including: the number of people who use the facility or infrastructure, the facility's role in providing basic services to begin the cleanup process and get the jurisdictions running again, and the facility's ability to offer goods and materials residents will need to resume normalcy as quickly as possible. The selected critical

facilities are built from a variety of materials with varying levels of resistance to tornadic damages. Additionally, their varying ages mean they weren't constructed to uniform building standards. Given tornados' violent nature, these facilities may experience increased levels of vulnerability to the hazards. Damage to any of these facilities may have a disproportionately negative impact on each jurisdiction's recovery from a tornado if that damage affects the facility's ability to reopen and resume normal business right away.

Table 38: Critical Facilities Vulnerable to Tornadoes and Potential Impacts

Jurisdiction	Critical Facilities	Potential Tornado Impacts										
		Loss of Power	Flying Debris	Uprooted Trees	Flooding	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death	
Burleson County	Burleson County Courthouse	x	x	x	x	x	x	x	x	x	x	x
	Burleson County Sheriff's Office	x	x	x	x	x	x	x	x	x	x	x
	St. Joseph's Health Burleson Hospital	x	x	x	x	x	x	x	x	x	x	x
	Deanville Fire Department	x	x	x	x	x	x	x	x	x	x	x
	Communications Towers	x	x	x					x	x	x	x
	Deanville Water Supply	x	x	x	x	x	x	x	x	x	x	x
	FM 50 Yegua Creek Bridge		x	x					x	x	x	x
	State HWY 36 South Yegua Creek Bridge		x	x					x	x	x	x
	State Hwy 21 West Yegua Creek Bridge		x	x					x	x	x	x
	State HWY 21 East Brazos River Bridge		x	x					x	x	x	x
	Fm 1361 Davidson Creek Bridge		x	x					x	x	x	x
	Park Road 57 Bridge		x	x					x	x	x	x
	FM 60 E Davidson Creek Bridge		x	x					x	x	x	x
	Old River Bridge Snook		x	x					x	x	x	x
	FM 60 E Brazos River Bridge		x	x					x	x	x	x
	Cade Lake Water Supply System	x	x	x	x	x	x	x	x	x	x	x
	Tunis Water Supply System #2	x	x	x	x	x	x	x	x	x	x	x
	Tunis Water Supply System #1	x	x	x	x	x	x	x	x	x	x	x
	Southwest Milam Water Supply System	x	x		x	x	x	x	x	x	x	x
	Cooks Point Water Supply System	x	x	x	x	x	x	x	x	x	x	x
	Lyons Water Supply System	x	x	x	x	x	x	x	x	x	x	x
	Birch Creek VFD	x	x	x	x	x	x	x	x	x	x	x
	Black Jack VFD	x	x	x	x	x	x	x	x	x	x	x
ATT/Firstnet Towers	x	x	x		x			x	x	x	x	
Beaver Creek VFD	x	x	x	x	x	x	x	x	x	x	x	

	Cade Lake Fire Department	x	x	x	x	x	x	x	x	x	x
	Cooks Point Volunteer Fire Department	x	x	x	x	x	x	x	x	x	x
City of Caldwell	Wells	x	x	x	x	x			x	x	x
	Lift Stations	x	x	x	x	x			x	x	x
	Caldwell Civic Center	x	x	x	x	x		x	x	x	x
	Administration Building	x	x	x	x	x	x	x	x	x	x
	Caldwell Library	x	x	x	x	x	x	x	x	x	x
	Caldwell Police Department	x	x		x	x		x	x	x	x
	Caldwell Fire Department	x	x		x	x		x	x	x	x
	Wastewater Treatment Plant	x	x	x	x	x	x	x	x	x	x
	City of Caldwell Electrical Substation	x	x	x	x	x	x		x	x	x
	City of Snook	Snook City Hall	x	x	x	x	x	x	x	x	x
City of Snook Waste Water Treatment Plant		x	x	x	x	x	x	x	x	x	x
City of Snook Water Plant - water well #2 and water tower		x	x	x	x	x	x	x	x	x	x
City of Snook Water well # 3		x	x	x	x	x	x	x	x	x	x
City of Snook Lift Stations		x	x	x	x	x			x	x	x
City of Somerville	Somerville City Hall	x	x		x	x	x	x	x	x	x
	Somerville Volunteer Fire Department	x	x		x	x	x	x	x	x	x
	Somerville St Josephs clinic/EMS	x	x	x	x	x		x	x	x	x
	Community chapel school	x	x	x	x	x	x	x	x	x	x
	Koppers (GIS for office on site)	x	x	x	x	x	x	x	x	x	x
	Somerville senior center	x	x	x	x	x	x	x	x	x	x
	COS Wastewater treatment plant	x	x	x	x	x	x	x	x	x	x
	COS Transfer station	x	x	x	x	x	x	x	x	x	x
	COS elevated water tank	x	x	x	x	x			x	x	x
	COS water plant (storage tanks, wells, treatment)	x	x	x	x	x	x	x	x	x	x
	COS public works yard	x	x	x	x	x	x	x	x	x	x
	Army Corps of Engineers office/site for lake Somerville	x	x	x	x	x		x	x	x	x
Bridge, drainage, culverts etc associated with the big ditch		x	x		x			x	x	x	

	COS PD	x	x	x	X	x	x	x	x	X	X
	Warning siren & digital sign	x	x	x	X	x			x	X	X
	Lift Stations	x	x	x	X	x			x	X	X
	Culvert		x	x		x			x	X	X
	Main Railroad crossing		x	x		x			x	X	X
Caldwell ISD	Caldwell Technology Building	x	x	x	X	x	x	x	x	X	X
	Caldwell Maintenance	x	x	x	X	x	x	x	x	X	X
	Caldwell Elementary	x	x	x	X	x	x	x	x	X	X
	Caldwell Intermediate	x	x	x	X	x	x	x	x	X	X
	Caldwell Junior High	x	x	x	X	x	x	x	x	X	X
Snook ISD	Snook Elementary School	x	x	x	X	x	x	x	x	X	X
	Snook Secondary School	x	x	x	X	x	x	x	x	X	X
	Snook ISD Transportation Center	x	x	x	X	x			x	X	X
Somerville ISD	Somerville Elem/Intermediate	x	x	x	X	x	x	x	x	X	X
	Somerville High School	x	x	x	X	x	x	x	x	X	X
	Yegua Center (evacuation /staging site)	x	x	x	X	x	x	x	x	X	X
Burleson County MUD #1	Wells	x	x	x	X	x			x	X	X
	85k gal Ground Water Tank	x	x	x	X	x			x	X	X
	100k gal Ground Water Tank	x	x	x	X	x			x	X	X
	Chlorine Bldg w/pumps/motors/misc. equip.	x	x	x	X	x	x	x	x	X	X
	Maintenance /Control room bldg/control panel	x	x	x	X	x	x	x	x	X	X
	Booster Pumps	x	x	x	X	x			x	X	X
	Office	x	x	x	X	x	x	x	x	X	X

***C) Vulnerable Parcels***

Table 39: Parcels Vulnerable to Tornadoes

Jurisdiction	Estimated Parcel Count	Estimated Potential Damage Value
Burleson County	26,535	\$3,197,469,392
City of Caldwell	2,240	\$239,513,308
City of Somerville	1,388	\$97,774,495
City of Snook	706	\$24,470,594
Caldwell ISD	6	\$12,941,093
Snook ISD	5	\$474,781
Somerville ISD	45	\$2,686,852
Burleson County MUD #1	15	\$212,536

## 9. Severe Winds

Severe Winds<sup>28</sup> are classified as any wind that is strong enough to cause at least light damage to trees and buildings, and may or may not be accompanied by precipitation. Wind speeds during a windstorm typically exceed 41 knots. Damage can be attributed to gusts or longer periods of sustained winds.

Severe winds may last for just a few minutes when caused by downbursts from thunderstorms, or they may last for hours (and even several days) when they result from large-scale weather systems. Severe winds that travel in a straight line and is caused by the gust front (the boundary between descending cold air and warm air at the surface) of an approaching thunderstorm is called a derecho. Derechos are capable of causing widespread damage and landscape devastation.

### 1) Severe Winds History

Severe Winds is a new hazard for Burlison County. Severe Winds was a part of the Thunderstorm hazard in the 2013 plan. In the 2013 plan, Burlison County and the participating jurisdictions recorded 57 instances of thunderstorm winds between October 2006 and April 2010 that caused \$545,000 in damages. However, the damage total is considered to be low. The damaging events occurred between 2006 and 2010, and the damage total wasn't adjusted to account for inflation.

The following tables identify the most comprehensive list available of severe wind events and associated damages in Burlison County and the participating jurisdictions. No participating jurisdiction has recorded a severe wind event more recently than 2020. Although no specific data regarding Severe Winds damages for Caldwell ISD, Snook ISD, Somerville ISD, or Burlison County Municipal Utility District #1 are available, all are vulnerable to physical damages during severe winds.

#### A) Burlison County

Location	Date Range	Severe Winds Events	Windspeed Range Knots	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Burlison County	1/25/2012 – 4/9/2020	10	50 – 61	0	0	\$72,902.36	\$10,749.80

<sup>28</sup> [https://www.britannica.com/science/Severe Winds](https://www.britannica.com/science/Severe_Winds)

### B) City of Caldwell

Location	Date Range	Severe Winds Events	Windspeed Range Knots	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Caldwell	1/25/2012 – 4/9/2020	8	50 – 70	0	0	\$181,107.97	\$13,405.03

### C) City of Snook

Location	Date Range	Severe Winds Events	Windspeed Range Knots	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Snook	8/24/2011 – 3/18/2018	5	50 – 70	0	0	\$300,624.91	\$0

### D) City of Somerville

Location	Date Range	Severe Winds Events	Windspeed Range Knots	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Somerville	4/27/2015 – 4/9/2020	3	50 – 61	0	0	\$6,240.73	\$8,320.98

## 2) Likelihood of Future Events

Burleson County and the participating jurisdictions have experienced a damaging severe wind event roughly once every three to five years. Given the frequency of past events in all jurisdictions, a damaging severe wind event in the future is likely, meaning that an event is probable in the next three years.

Caldwell ISD, Snook ISD, Somerville ISD, and’s Burleson County MUD #1’s vulnerability to severe winds is expected to be similar to those of the County and participating cities. Therefore, a severe wind event affecting all of the jurisdictions is likely, meaning that an event is probable within the next three years.

## 3) Extent

The generally accepted extent scale for wind events is the Beaufort Wind Scale. The following table lists categories, measurement, classification, and appearance descriptions.

Table 40: Beaufort Wind Scale<sup>29</sup>

Beaufort Wind Scale			
Force			Appearance of Wind Effects

<sup>29</sup> Source: [www.spc.noaa.gov/faq/tornado/beaufort.html](http://www.spc.noaa.gov/faq/tornado/beaufort.html)



	Wind (Knots)	WMO Classification	On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 feet becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 feet taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 feet, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 feet, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 feet) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 feet), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 feet) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (30-45 feet) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 feet, sea completely	

			white with driving spray, visibility greatly reduced	
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The worst severe winds in Burleson County and the jurisdictions addressing the hazard have ranged up to a 12 on the Beaufort Wind Scale.

Adjusted for inflation to \$2021, the most devastating severe wind events have inflicted up to \$293,120.68<sup>30</sup> in property damages and \$9,361.10<sup>31</sup> in agricultural damages.

No recent severe wind events in any of the participating jurisdictions have caused any injuries or deaths.

Future severe winds may meet previous worst-case Force 12 events in terms of wind speed, damage dollars inflicted, and residents injured or killed.

#### 4) Location and Impact

##### *A) Location – All Jurisdictions*

Severe winds are not constrained by any distinct geographic boundary. Severe winds can occur across all jurisdictions addressing the hazard.

##### *B) Impact – All Jurisdictions*

Impacts from a severe wind event may include but are not limited to damaged or destroyed personal property including vehicles, damaged or destroyed agricultural, residential, commercial, and industrial buildings. Crops may be damaged or destroyed. Pets and livestock may be injured or killed by flying debris. Pets and livestock may escape due to damaged or destroyed structures and fences.

The participating jurisdictions have reported severe wind events causing power loss and arcing power lines, leading to disrupted communications. Previous severe wind events have also led to blocked roads as a result of fallen trees or other debris.

In the worst cases, severe winds may cause injuries and/or be deadly.

#### 5) Vulnerability

Severe winds have the potential to impact all jurisdictions addressing the hazard. Therefore, each jurisdiction is equally exposed to the hazard. Improved property, critical facilities, critical

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<sup>30</sup> Incident date: 2/3/2012 in the City of Snook, NCEI Data

<sup>31</sup> Incident date: 4/9/2020 at Caldwell Municipal Airport, NCEI Data

infrastructure, and the entire population of each jurisdiction addressing the hazard are considered vulnerable to severe winds.

Based on severe wind data collected for the participating jurisdictions, severe winds primarily damage physical structures. However, there is no uniformity with respect to the type of structures that have been damaged by severe winds in any of the participating jurisdictions. Severe wind damages can be directly caused by the wind itself, flying debris, and falling trees, or indirectly by damages like power outages.

### ***A) Population***

As described in Section 3 of Chapter 3 above, Burleson County and the jurisdictions addressing severe winds are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The participating jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a severe wind event. The participating jurisdictions also recognize that subdivisions or neighborhoods with only a single entrance may be cut off due to severe wind impacts and therefore unable to obtain supplies or receive emergency services.

Residents of mobile / manufactured homes are of particular concern. These structures may not be safe during a severe wind event.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a severe wind event, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during severe winds than structures in standard condition.

Existing structural weaknesses, due to housing type or existing damages, may lead to compounded damages, injuries, or loss of life.

### ***B) Critical Facilities***

Similar to hurricanes and tornados, certain critical facilities and infrastructure in each jurisdiction may be particularly vulnerable to severe winds. These facilities have been identified for reasons including: the number of people who use the facility or infrastructure, the facility's role in providing basic services to begin the cleanup process and get the jurisdictions running again, and the facility's ability to offer goods and materials residents will need to resume normalcy as quickly as possible. The selected critical facilities are built from a variety of materials with varying levels of resistance to wind damages. Additionally, their varying ages mean they weren't constructed to uniform building standards. Given wind's potentially violent nature, these facilities may experience increased levels of vulnerability to the hazards. Damage to any of these

facilities may have a disproportionately negative impact on each jurisdiction's recovery from a Severe Winds if that damage affects the facility's ability to reopen and resume normal business right away.

Table 41: Critical Facilities Vulnerable to Severe Winds and Potential Impacts

Jurisdiction	Critical Facilities	Potential Severe Wind Impacts										
		Loss of Power	Flying Debris	Uprooted Trees	Flooding	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death	
Burleson County	Burleson County Courthouse	x	x	x	x	x	x	x	x	x	x	x
	Burleson County Sheriff's Office	x	x	x	x	x	x	x	x	x	x	x
	St. Joseph's Health Burleson Hospital	x	x	x	x	x	x	x	x	x	x	x
	Deanville Fire Department	x	x	x	x	x	x	x	x	x	x	x
	Communications Towers	x	x	x	x				x	x	x	
	Deanville Water Supply	x	x	x	x	x	x	x	x	x	x	x
	FM 50 Yegua Creek Bridge		x	x		x			x	x	x	
	State HWY 36 South Yegua Creek Bridge		x	x		x			x	x	x	
	State Hwy 21 West Yegua Creek Bridge		x	x		x			x	x	x	
	State HWY 21 East Brazos River Bridge		x	x		x			x	x	x	
	Fm 1361 Davidson Creek Bridge		x	x		x			x	x	x	
	Park Road 57 Bridge		x	x		x			x	x	x	
	FM 60 E Davidson Creek Bridge		x	x		x			x	x	x	
	Old River Bridge Snook		x	x		x			x	x	x	
	FM 60 E Brazos River Bridge		x	x		x			x	x	x	
	Cade Lake Water Supply System	x	x	x	x	x	x	x	x	x	x	x
	Tunis Water Supply System #2	x	x	x	x	x	x	x	x	x	x	x
	Tunis Water Supply System #1	x	x	x	x	x	x	x	x	x	x	x
	Southwest Milam Water Supply System	x	x		x	x	x	x	x	x	x	x
	Cooks Point Water Supply System	x	x	x	x	x	x	x	x	x	x	x
	Lyons Water Supply System	x	x	x	x	x	x	x	x	x	x	x
	Birch Creek VFD	x	x	x	x	x	x	x	x	x	x	x
	Black Jack VFD	x	x	x	x	x	x	x	x	x	x	x
ATT/Firstnet Towers	x	x	x	x	x			x	x	x		
Beaver Creek VFD	x	x	x	x	x	x	x	x	x	x	x	

	Cade Lake Fire Department	x	x	x	x	x	x	x	x	x	x
	Cooks Point Volunteer Fire Department	x	x	x	x	x	x	x	x	x	x
City of Caldwell	Wells	x	x	x	x	x			x	x	x
	Lift Stations	x	x	x	x	x			x	x	x
	Caldwell Civic Center	x	x	x	x	x		x	x	x	x
	Administration Building	x	x	x	x	x	x	x	x	x	x
	Caldwell Library	x	x	x	x	x	x	x	x	x	x
	Caldwell Police Department	x	x		x	x		x	x	x	x
	Caldwell Fire Department	x	x		x	x		x	x	x	x
	Wastewater Treatment Plant	x	x	x	x	x	x	x	x	x	x
	City of Caldwell Electrical Substation	x	x	x	x	x	x		x	x	x
	City of Snook	Snook City Hall	x	x	x	x	x	x	x	x	x
City of Snook Waste Water Treatment Plant		x	x	x	x	x	x	x	x	x	x
City of Snook Water Plant - water well #2 and water tower		x	x	x	x	x	x	x	x	x	x
City of Snook Water well # 3		x	x	x	x	x	x	x	x	x	x
City of Snook Lift Stations		x	x	x	x	x			x	x	x
City of Somerville	Somerville City Hall	x	x		x	x	x	x	x	x	x
	Somerville Volunteer Fire Department	x	x		x	x	x	x	x	x	x
	Somerville St Josephs clinic/EMS	x	x	x	x	x		x	x	x	x
	Community chapel school	x	x	x	x	x	x	x	x	x	x
	Koppers (GIS for office on site)	x	x	x	x	x	x	x	x	x	x
	Somerville senior center	x	x	x	x	x	x	x	x	x	x
	COS Wastewater treatment plant	x	x	x	x	x	x	x	x	x	x
	COS Transfer station	x	x	x	x	x	x	x	x	x	x
	COS elevated water tank	x	x	x	x	x			x	x	x
	COS water plant (storage tanks, wells, treatment)	x	x	x	x	x	x	x	x	x	x
	COS public works yard	x	x	x	x	x	x	x	x	x	x
	Army Corps of Engineers office/site for lake Somerville	x	x	x	x	x		x	x	x	x
Bridge, drainage, culverts etc associated with the big ditch		x	x		x			x	x	x	

	COS PD	x	x	x	X	x	x	x	x	X	X
	Warning siren & digital sign	x	x	x	X	x			x	X	X
	Lift Stations	x	x	x	X	x			x	X	X
	Culvert		x	x		x			x	X	X
	Main Railroad crossing		x	x		x			x	X	X
Caldwell ISD	Caldwell Technology Building	x	x	x	X	x	x	x	x	X	X
	Caldwell Maintenance	x	x	x	X	x	x	x	x	X	X
	Caldwell Elementary	x	x	x	X	x	x	x	x	X	X
	Caldwell Intermediate	x	x	x	X	x	x	x	x	X	X
	Caldwell Junior High	x	x	x	X	x	x	x	x	X	X
Snook ISD	Snook Elementary School	x	x	x	X	x	x	x	x	X	X
	Snook Secondary School	x	x	x	X	x	x	x	x	X	X
	Snook ISD Transportation Center	x	x	x	X	x			x	X	X
Somerville ISD	Somerville Elem/Intermediate	x	x	x	X	x	x	x	x	X	X
	Somerville High School	x	x	x	X	x	x	x	x	X	X
	Yegua Center (evacuation /staging site)	x	x	x	X	x	x	x	x	X	X
Burleson County MUD #1	Wells	x	x	x	X	x			x	X	X
	85k gal Ground Water Tank	x	x	x	X	x			x	X	X
	100k gal Ground Water Tank	x	x	x	X	x			x	X	X
	Chlorine Bldg w/pumps/motors/misc. equip.	x	x	x	X	x	x	x	x	X	X
	Maintenance /Control room bldg/control panel	x	x	x	X	x	x	x	x	X	X
	Booster Pumps	x	x	x	X	x			x	X	X
	Office	x	x	x	X	x	x	x	x	X	X

***C) Vulnerable Parcels***

Table 42: Parcels Vulnerable to Severe Winds

Jurisdiction	Estimated Parcel Count	Estimated Potential Damage Value
Burleson County	26,535	\$3,197,469,392
City of Caldwell	2,240	\$239,513,308
City of Somerville	1,388	\$97,774,495
City of Snook	706	\$24,470,594
Caldwell ISD	6	\$12,941,093
Snook ISD	5	\$474,781
Somerville ISD	45	\$2,686,852
Burleson County MUD #1	15	\$212,536



## 10. Wildfire

Wildfire is defined as a sweeping and destructive conflagration and can be further categorized as wildland, interface, or intermix fires.

Wildland fires are fueled almost exclusively by natural vegetation wildland/urban interface (WUI) fires include both vegetation and the built environment. The wildfire disaster cycle begins when homes are built adjacent to wildland areas. When what would have been rural wildfires occur, they advance through all available fuels, which can include homes and structures.

### 1) Wildfire History

The Texas A&M Forest Service Wildfire Risk Assessment Portal provides wildfire data on fires that occurred as recently as 2015. Additional data came from local planning team members.

In the 2013 plan, the County and participating jurisdictions looked at Texas A&M Forest Service Wildfire Risk Assessment Portal data from 2006 - 2011.

None of the participating jurisdictions have data available on fires past 2015.

The following tables show the wildfire history of each participant as recorded by the Texas A&M Forest Service. None of these events includes any information about damages, injuries, or fatalities.

#### A) *Burleson County*

Table 43: Burleson County Wildfire History

Location	Date Range	Number of Wildfire Events	Range of Acres Burned	Total Acres Burned	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Countywide	3/13/2010 – 12/11/2015	253	0.01 - 150	1,600	-	-	-	-

#### B) *City of Caldwell*

Table 44: City of Caldwell Wildfire History

Location	Date Range	Number of Wildfire Events	Range of Acres Burned	Total Acres Burned	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Caldwell	3/20/2010 – 10/13/2015	200	0.01 - 120	470.39	-	-	-	-

### C) City of Snook

Table 45: City of Snook Wildfire History

Location	Date Range	Number of Wildfire Events	Range of Acres Burned	Total Acres Burned	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Snook	3/18/2010 – 11/19/2015	143	0.01 - 60	279.06	-	-	-	-

### D) City of Somerville

Table 46: City of Somerville Wildfire History

Location	Date Range	Number of Wildfire Events	Range of Acres Burned	Total Acres Burned	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Somerville	3/10/2010 – 10/29/2015	92	0.1 - 170	364.38	-	-	-	-

While Caldwell ISD, Snook ISD, Somerville ISD, and Burleson County MUD #1 do not have specific information about wildfire history, their histories are assumed to be the same as Burleson County and the participating cities.

Wildfire history isn't broken down beyond the city level. However, given the participating jurisdictions' locations within the planning area, and specifically the number of their facilities located in the wildfire hazard area, participating jurisdictions determined they're vulnerable to hazard despite lacking a specific history of previous wildfire events.

### 2) Likelihood of Future Events

Although the County and participating jurisdictions haven't recorded a wildfire since 2015, given the prior frequency of wildfire events, a wildfire event in any of the jurisdictions addressing the hazard is highly likely, meaning an event is probable within the next year.

### 3) Extent

The Texas A&M Forest Service's Characteristic Fire Intensity Scale (FIS) specifically identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist. The FIS is a fire behavior output, which is influenced by three environmental factors - fuels, weather, and topography. According to Texas A&M Forest Service data, Burleson County and the participating jurisdictions are rated between Class 1 and Class 4.

Table 47: Characteristic Fire Intensity Scale<sup>32</sup>

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

The National Wildfire Coordinating Group (NWCG) provides an additional way to measure extent by accounting for fire size. Based on NWCG numbers, the largest fires in Burleson County and the participating jurisdictions have been Class D events. Based on Texas A&M Forest Service data, the average fire in Burleson County and the participating jurisdictions is a Class B event.

Table 48: National Wildfire Coordinating Group Size Class of Fire<sup>33</sup>

Class A	¼ acre or less
Class B	More than ¼ acre, but less than 10 acres
Class C	10 acres or more, but less than 100 acres
Class D	100 acres or more, but less than 300 acres
Class E	300 acres or more, but less than 1,000 acres
Class F	1,000 acres or more, but less than 5,000 acres
Class G	5,000 acres or more

Previous wildfires in Burleson County and the jurisdictions addressing the hazard have ranged between Class 1 and Class 4 on the Characteristic Fire Intensity Scale, with flames up to 30' in

<sup>32</sup> <https://www.texaswildfirerisk.com>

<sup>33</sup> <http://www.nwcg.gov/term/glossary/size-class-of-fire>

length, and between Class A and Class D on the National Wildfire Coordinating Group Size Class of Fire scale (NWCGSCF). Most fires have been small and were contained quickly. However, the worst reported fire in Burleson County burned 170 acres.

Future fire events in Burleson County and the participating jurisdictions may meet previous worst-case Class D (NWCGSCF) and Class 4 (FIS) wildfires in terms of intensity, acreage burned, and inflicted damage.

#### **4) Location and Impact**

##### ***A) Location***

Due to wildfire's ability to inflict damages to both structures and landscapes, wildfire risk and vulnerability, both full and partial, for the participating jurisdictions have been assessed based on TxWRAP's Wildland Urban Interface boundaries<sup>34</sup>. The Wildland Urban Interface is the area where people and their homes meet or mix with wildland vegetation. Many different types of land uses can be found within the WUI.

Because wildfires are dynamically unpredictable, the following maps and tables may not be representative of every jurisdiction at risk of wildfire. For the maps below, "No Data" means populated areas surrounded by sufficient non-burnable areas (i.e. interior urban areas) have been removed from the dataset, as these areas are not expected to be directly impacted by a wildfire, according to TxWRAP.

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<sup>34</sup> <https://texaswildfirerisk.com/the-wildland-urban-interface>

I. Burleson County and ISD Location

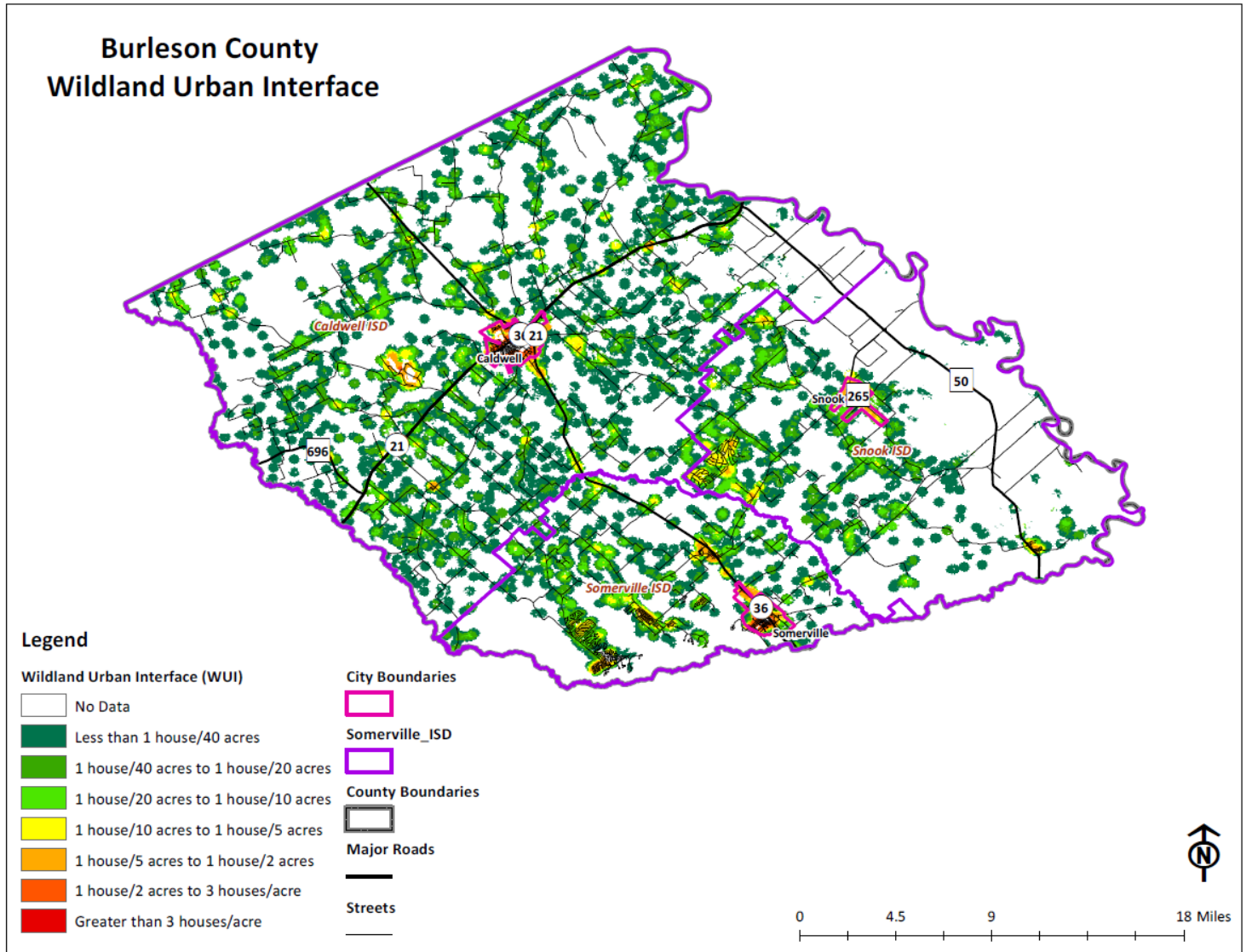


Figure 18: Burleson County and ISD Wildland Urban Interface

## II. City of Caldwell Location

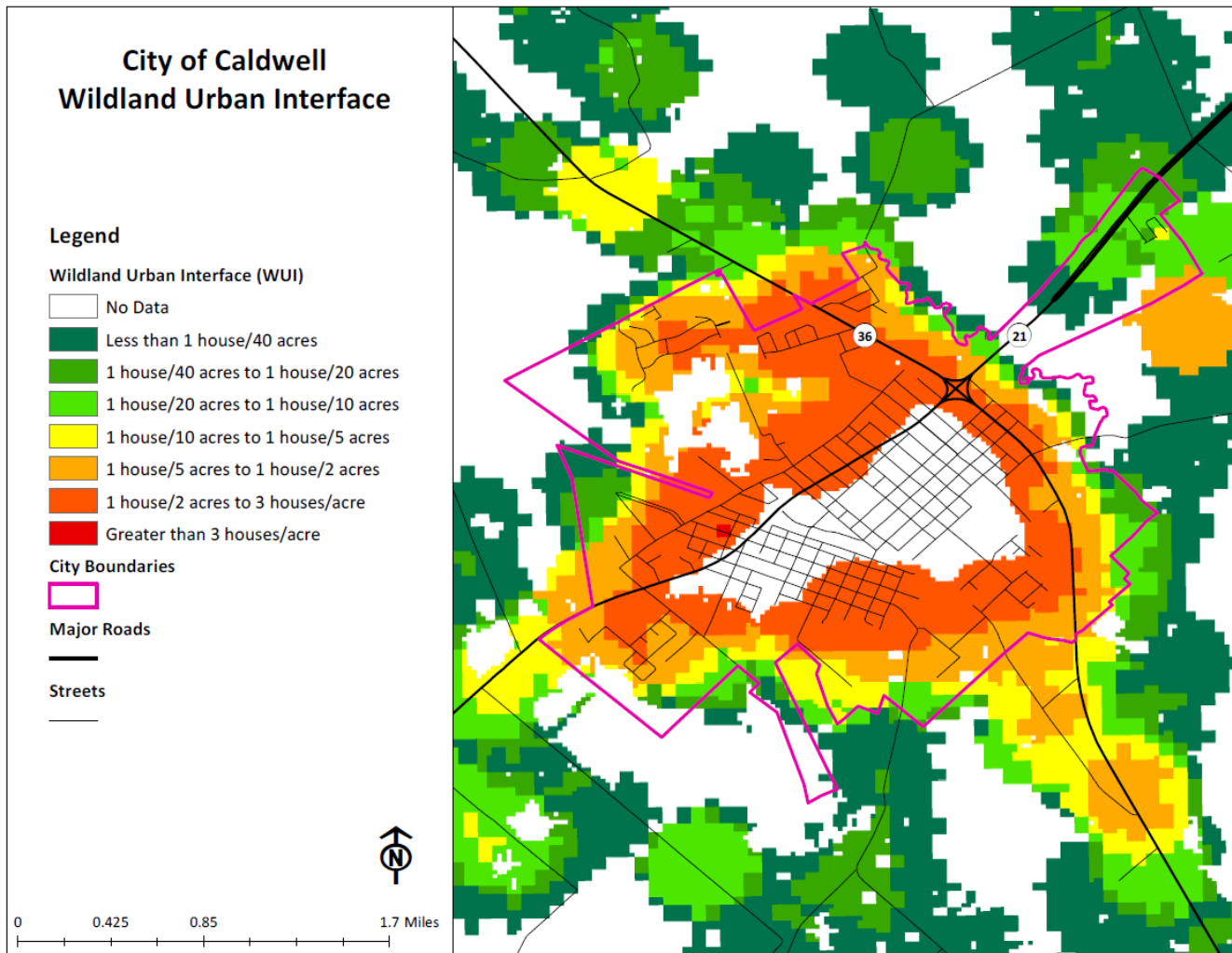


Figure 19: City of Caldwell Wildland Urban Interface

III. City of Snook Location

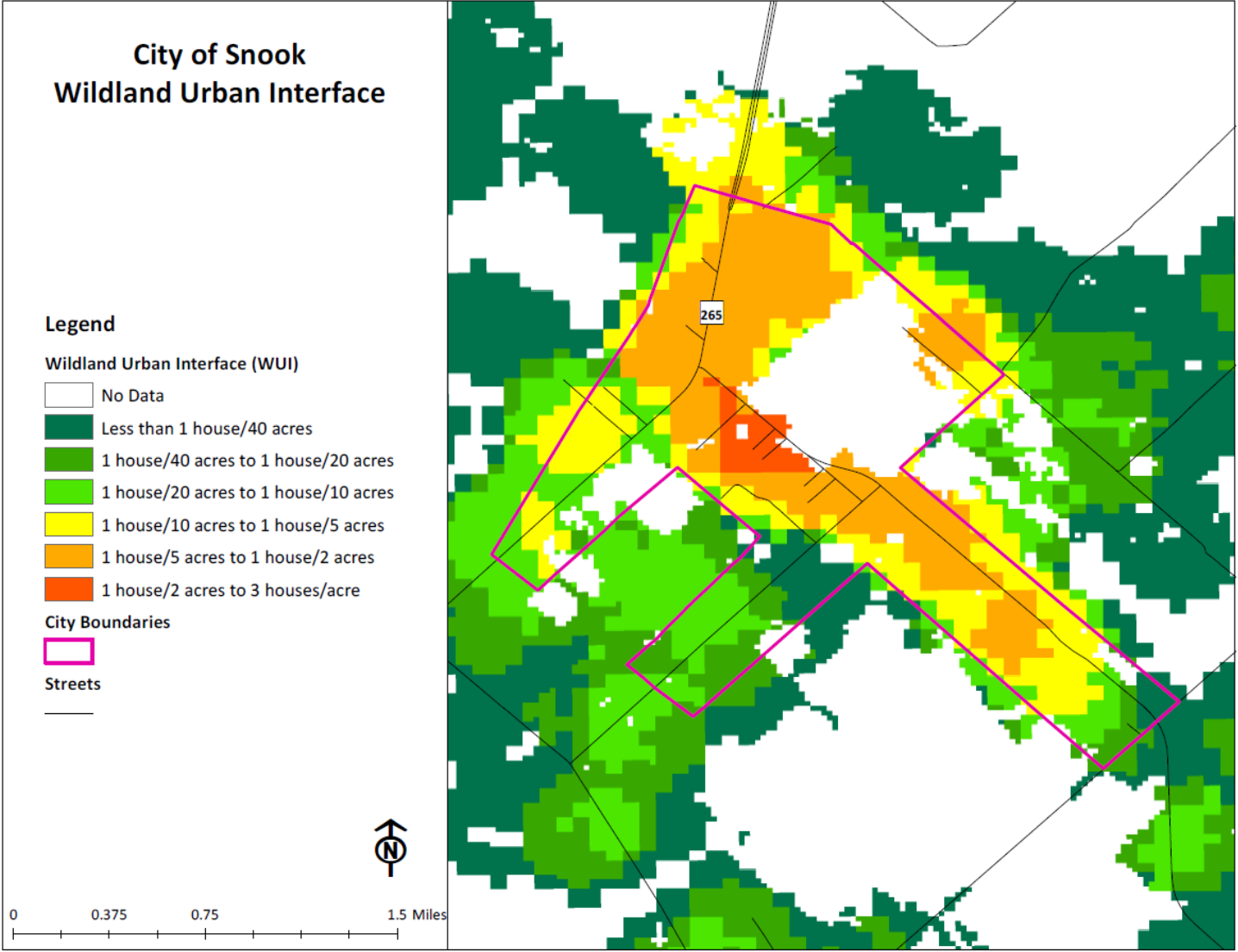


Figure 20: City of Snook Wildland Urban Interface

IV. City of Somerville Location

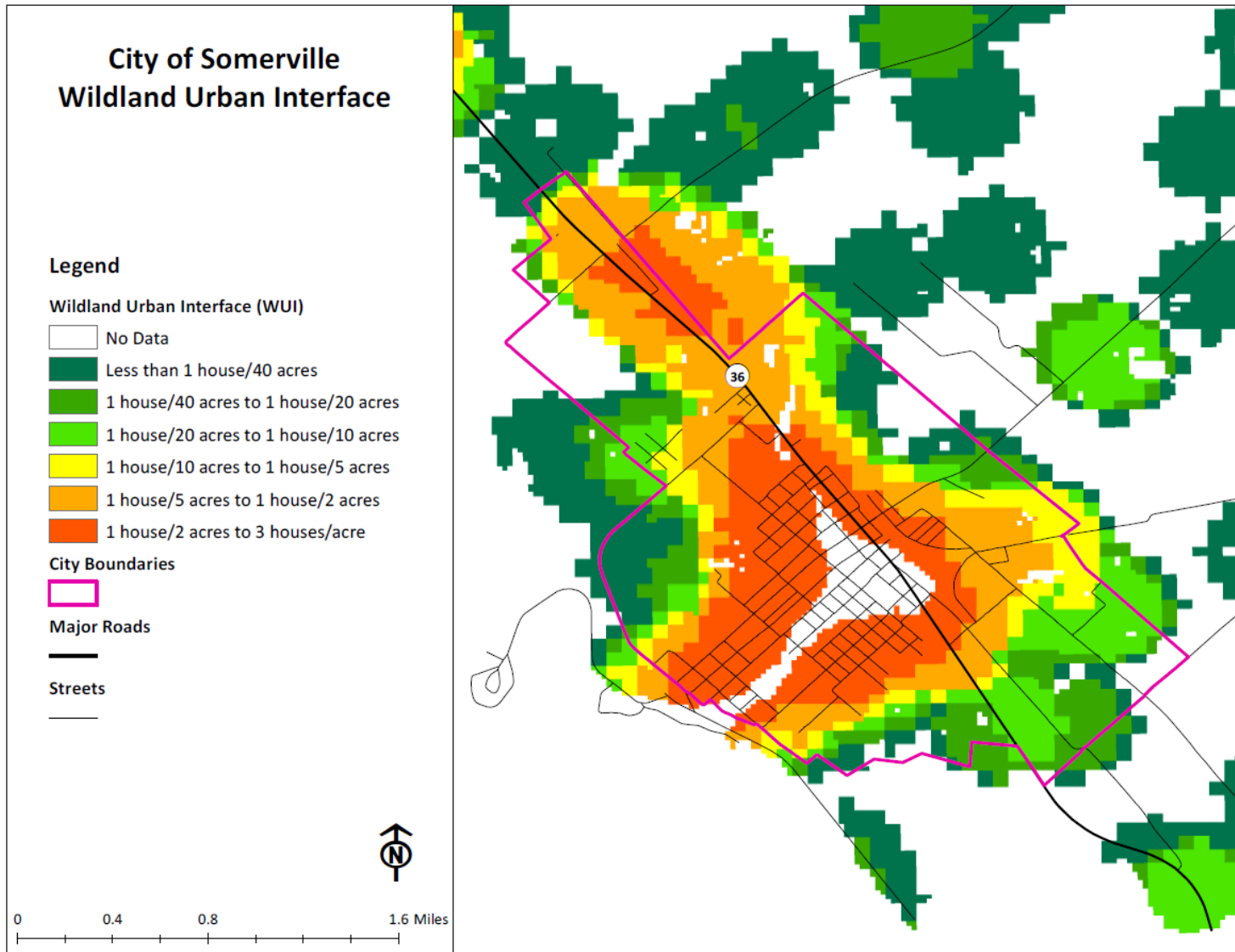


Figure 21: City of Somerville Wildland Urban Interface



V. Burleson County MUD #1 Location

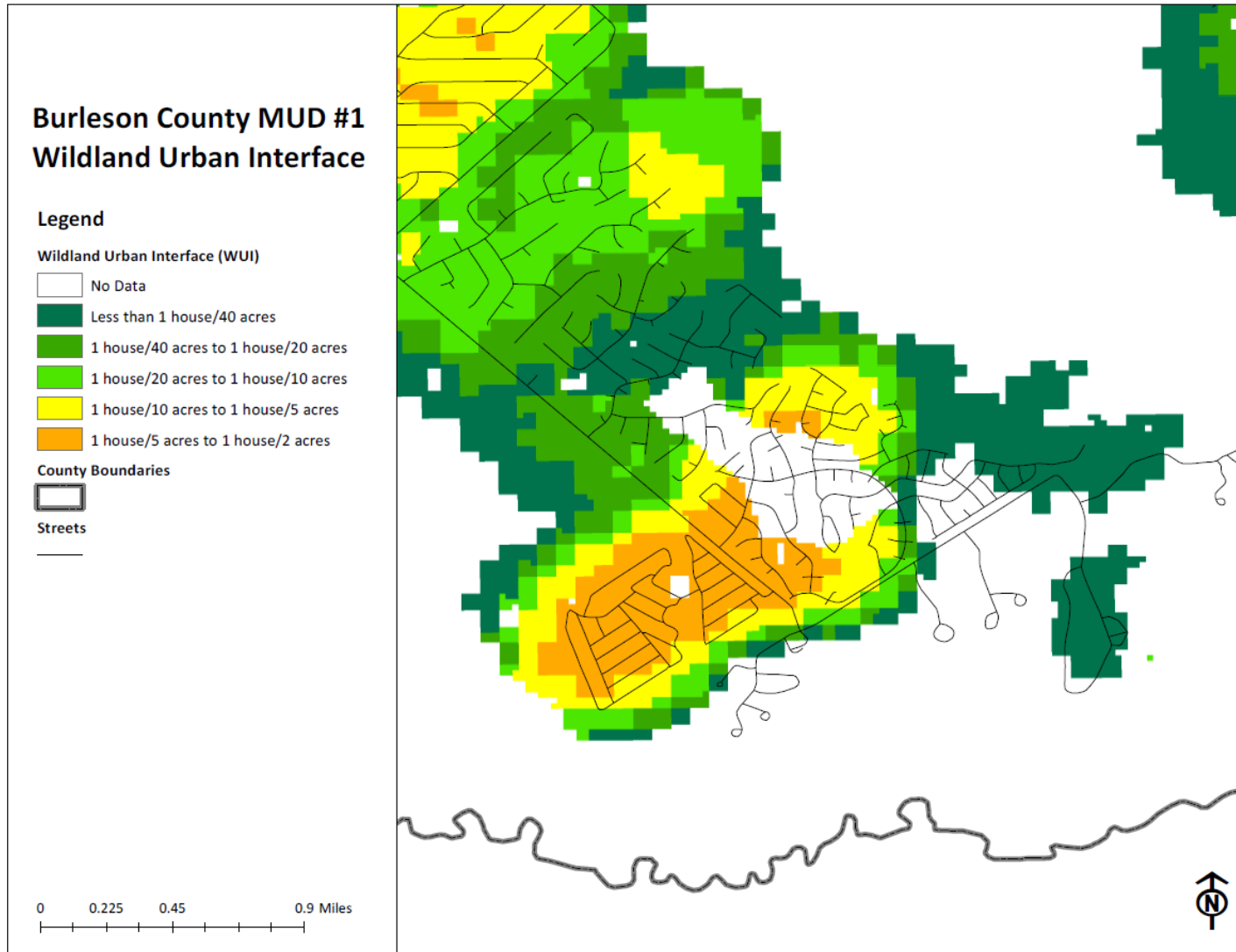


Figure 22: Burleson County MUD #1 Wildland Urban Interface

## ***B) Impact***

Impacts from a wildfire in Burleson County and the participating jurisdictions may include but are not limited to: crop damage or destruction; damaged or destroyed agricultural, residential, commercial, and industrial buildings; escaped, lost, injured or killed livestock and pets. Personal property, recreational facilities, wildlife also have the potential to suffer from wildfire events. In the worst cases, residents may be injured or killed.

## **5) Vulnerability**

### ***A) Population***

As described in Section 3 of Chapter 3 above, Burleson County and the jurisdictions addressing wildfire are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a wildfire. The participating jurisdictions also recognize that subdivisions or neighborhoods with only a single entrance may be cut off due to wildfire impacts and therefore unable to evacuate, unable to obtain supplies, or unable to receive emergency services.

Residents of mobile homes, specifically those built before HUD's Manufactured Housing and Standards requirements were introduced in 1976, are of particular concern<sup>35</sup>. These structures are more prone to fire and have a higher incidence of occupant death than modern manufactured homes.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a wildfire, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during a wildfire than structures in standard condition. Exterior damages may make the homes more prone to fire by more readily exposing flammable materials to flame. Missing windows and other exterior gaps may leave residents and structures prone to smoke inhalation and smoke damage.

All of these issues may increase damages and lead to injuries or loss of life.

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<sup>35</sup> <https://www.usfa.fema.gov/downloads/pdf/statistics/rural.pdf>

### *B) Critical Facilities*

There are 77 critical facilities located throughout the County and jurisdictions addressing wildfire. 54 of their critical facilities are located in the wildland urban interface (WUI), as defined by the Texas A&M Forest Service. Because of their location in the WUI, the density of development, and proximity to wildland areas, these facilities are believed to be particularly susceptible to future wildfire threats.

**Table 49: Critical Facilities Vulnerable to Wildfire and Potential Impacts**

Critical Facilities	Potential Wildfire Impacts				
	Destruction	Partial Destruction	Heat Damage	Smoke Damage	Water Damage
Burleson County - Beaver Creek VFD	X	X	X	X	X
Burleson County - Black Jack VFD	X	X	X	X	X
Burleson County - Burleson County Sheriff's Office	X	X	X	X	X
Burleson County - Cade Lake Fire Department	X	X	X	X	X
Burleson County - Cade Lake Water Supply System	X	X	X	X	X
Burleson County - Cooks Point Volunteer Fire Department	X	X	X	X	X
Burleson County - Cooks Point Water Supply System	X	X	X	X	X
Burleson County - Deanville Fire Department	X	X	X	X	X
Burleson County - Deanville Water Supply	X	X	X	X	X
Burleson County - Fm 1361 Davidson Creek Bridge	X	X	X		X
Burleson County - FM 50 Yegua Creek Bridge	X	X	X		X
Burleson County - FM 60 E Davidson Creek Bridge	X	X	X		X
Burleson County - Lift station 11	X	X	X		X
Burleson County - Lyons Water Supply System	X	X	X	X	X
Burleson County - Old River Bridge Snook	X	X	X		X
Burleson County - Park Road 57 Bridge	X	X	X		X
Burleson County - Southwest Milam Water Supply System	X	X	X	X	X
Burleson County - St. Joseph's Health Burleson Hospital and Heliport	X	X	X	X	X
Burleson County - State HWY 21 East Brazos River Bridge	X	X	X		X
Burleson County - State HWY 36 South Yegua Creek Bridge	X	X	X		X

Burleson County - Tunis Water Supply System	X	X	X	X	X
Burleson County - Tunis Water Supply System #2	X	X	X	X	X
Burleson County MUD #1 - Office	X	X	X	X	X
Burleson County MUD #1 - Well #2	X	X	X		X
Burleson County MUD #1 - Well #3	X	X	X		X
Burleson County MUD #1 - Well #4	X	X	X		X
Burleson County MUD #1 - Well #5	X	X	X		X
Caldwell - Caldwell Library	X	X	X	X	X
Caldwell - Caldwell Police Department	X	X	X	X	X
Caldwell - City of Caldwell Electrical Substation	X	X	X	X	X
Caldwell - COC Well #3	X	X	X		X
Caldwell - COC Well#6	X	X	X		X
Caldwell - Wastewater Treatment Plant	X	X	X	X	X
Caldwell ISD - Caldwell Elementary	X	X	X	X	X
Snook – Lift Stations A-D	X	X	X		X
Snook - Snook City Hall	X	X	X	X	X
Snook - Water Plant - water well #2 and water tower	X	X	X		X
Snook ISD - Snook Elementary School	X	X	X	X	X
Snook ISD - Snook Secondary School	X	X	X	X	X
Somerville - Army Corps of Engineers office/site for lake Somerville	X	X	X	X	X
Somerville - Bridge, drainage, culverts etc associated with the big ditch	X	X	X		X
Somerville - COS elevated water tank	X	X	X	X	X
Somerville - COS Police Department	X	X	X	X	X
Somerville - Culvert	X	X	X	X	X
Somerville - Koppers	X	X	X	X	X
Somerville – Lift Stations 1-10, 12	X	X	X		X
Somerville - Main Railroad crossing	X	X	X		X
Somerville - Transfer Station	X	X	X		X
Somerville - Wastewater treatment plant	X	X	X	X	X
Somerville City Hall	X	X	X	X	X

Somerville ISD - Somerville Elem/Intermediate	X	X	X	X	X
Somerville ISD - Somerville High School	X	X	X	X	X
Somerville ISD - Yegua Center (evacuation /staging site)	X	X	X	X	X
Somerville - St Joseph's clinic/EMS	X	X	X	X	X

***C) Vulnerable Parcels***

Table 50: Burleson County Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
Burleson County	11,130	\$485,640,530

Table 51: City of Caldwell Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
City of Caldwell	1,202	\$114,248,171

Table 52: City of Snook Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
City of Snook	498	\$10,801,063

Table 53: City of Somerville Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
City of Somerville	888	\$58,074,227

Table 54: Caldwell ISD Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
Caldwell ISD	2	\$12,070,220

Table 55: Snook ISD Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
Snook ISD	2	\$197,818

Table 56: Somerville ISD Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
Somerville ISD	41	\$2,276,937

Table 57: Burleson County MUD #1 Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
Burleson County MUD #1	15	\$212,536

## 11. Winter Weather

Winter weather is defined by extreme cold and heavy concentrations of snowfall or ice. Texas is disrupted more severely by winter weathers than are regions that experience winter weather more frequently.

The types of winter weather which Texans are most familiar with are snowstorms, blizzards, cold waves and ice storms.

Snowfall with an accumulation of four or more inches in a 12-hour period is considered a heavy snowfall. Snowfall of any amount is rare south of a line from Del Rio to Port Arthur, and it is this rarity of event, coupled with a lack of preparedness for such an event, that creates a severe weather condition.

Blizzards are the most perilous of all winter storms, characterized by low temperatures and strong winds in excess of 35 mph, bearing large amounts of blowing or drifting snow. Blizzards take a terrible toll on livestock and people caught in the open. In Texas, blizzards are most likely to occur in the Panhandle and South Plains Regions.

The passage of a winter cold front with a drastic drop in temperature heralds the arrival of a cold wave, usually referred to as a “blue north’er.”

An ice storm occurs when rain falls out of the warm and moist upper layers of the atmosphere into a cold and dry layer near the ground. The rain freezes on contact with the cold ground and accumulates on exposed surfaces. If a half inch of rain freezes on trees and utility wires, damage can occur, especially if accompanied by high winds, thus half an inch is used as the criteria before an icing event is categorized as an “ice storm.”

### 1) Winter Weather History

In the 2013 plan, Burleson County and the participating jurisdictions reported 10 winter storms between 1993 and 2011. These events caused \$1,131,000 in damages in Burleson County and the participating jurisdictions. However, the damage total is considered to be slightly low because the damage total wasn’t adjusted to account for inflation.

The following table shows the winter weather events that have occurred within Burleson County and the participating jurisdictions since the previous plan, along with damage amounts adjusted for inflation to 2021.



Table 58: Burleson County Severe Winter Weather Hazard History

Location	Date Range	Number of Winter weathers	Winter Storm Types	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Countywide	12/7/2013 - 2/17/2021	8	Winter Weather, Winter Storm, Ice Storm	0	0	\$5,555.01	\$0

Severe winter weather data is recorded at the county level. However, given the nature of severe winter weather and the proximity of all jurisdictions to each other, every jurisdiction experienced the same severe winter weather events. According to NCEI data, the last severe winter weather event reported was Winter Storm Uri in February 2021; it was a winter storm and ice storm event that did not cause any recorded crop damage, property damage, injuries, or deaths within Burleson County and the participating jurisdictions. Planning team members spoke of the jurisdictions experiencing pipes and walls buckling; water and power outages; and water systems being severely affected with pumps and pipes freezing.

## 2) Likelihood of Future Events

Because it is likely that more winter storms have occurred than have been officially reported, the likelihood of winter storms occurring in Burleson County and the participating jurisdictions is occasional, meaning an event affecting any or all of the participating jurisdictions is possible in the next five years.

## 3) Extent

Table 59 below displays the magnitude of winter weathers.

Table 59: Winter Weather Extent Scale<sup>36</sup>

<b>Frost Advisory*</b>	Issued when nighttime minimum temperatures are expected to range from 33°F to 36°F in the growing season.
<b>Freeze Warning*</b>	Issued when nighttime minimum temperatures are expected to reach 32°F or lower in the growing season. They are usually issued to highlight the first few freezes of the fall or unusually late freezes in the spring. <i>A Freeze Watch is issued when these conditions may be met 12 to 48 hours in the future.</i>
<b>Snow Advisory</b>	Issued when accumulating snow of 2 to 4 inches is expected. An advisory may still be warranted if lesser accumulations will produce travel difficulties, especially early in the winter season.

<sup>36</sup> Source: National Weather Service Weather Forecast Office; Norman, Oklahoma. <http://www.srh.noaa.gov/oun/?n=spotter-wwa-definitions>

<b>Blowing Snow Advisory</b>	Issued when blowing snow is expected to occasionally reduce visibilities to 1/4 mile or less with winds generally 25 to 34 mph. The event should last at least 3 hours.
<b>Snow and Blowing Snow Advisory</b>	Issued when winds of 25 to 34 mph are expected to be accompanied by falling snow and blowing snow, occasionally reducing the visibility to 1/4 mile or less. The event should last at least 3 hours
<b>Freezing Rain / Drizzle Advisory</b>	Issued for freezing rain when ice accumulations are expected to cause travel problems, but not exceed 1/4".
<b>Sleet Advisory</b>	Issued for accumulating sleet of 1/4" to 1". Because sleet usually occurs with other precipitation types, a winter weather advisory will almost always be used in such cases.
<b>Winter Weather Advisory</b>	Issued for a winter weather event in which there is more than one hazard present, but all precipitation is expected to remain below warning criteria. For example, it would be issued if 2 inches of snow were expected with a small amount of sleet mixing in at times.
<b>Wind Chill Advisory<sup>37</sup></b>	Issued when wind chill temperatures are expected to be a significant inconvenience to life with prolonged exposure, and, if caution is not exercised, could lead to hazardous exposure.
<b>Wind Chill Warning<sup>38</sup></b>	Issued when wind chill temperatures are expected to be hazardous to life within several minutes of exposure.
<b>Ice Storm Warning</b>	Issued when a period of freezing rain is expected to produce ice accumulations of 1/4" or greater, or cause significant disruptions to travel or utilities.
<b>Heavy Sleet Warning</b>	Issued when a period of sleet is expected to produce ice accumulations of 1" or greater, or cause significant disruptions to travel or utilities.
<b>Heavy Snow Warning</b>	Issued when snow is expected to accumulate 4 inches or more in 12 hours, or 6 inches or more in 24 hours.
<b>Winter Storm Warning</b>	Issued for a winter weather event in which there is more than one hazard present, and one of the warning criteria listed above is expected to be met. For example, it would be issued if 5 inches of snow were expected in 12 hours, with some sleet mixing in at times. It is commonly issued for heavy snow with strong winds of 25-34 mph that will cause blowing and drifting of the snow. <i>A Winter Storm Watch is issued when these conditions may be met 12 to 48 hours in the future.</i>
<b>Blizzard Warning</b>	Issued for sustained wind or frequent gusts greater than or equal to 35 mph accompanied by falling and/or blowing snow, frequently reducing visibility to less than 1/4 mile for three hours or more. <i>A Blizzard Watch is issued when these conditions may be met 12 to 48 hours in the future.</i>

<sup>37</sup> [https://www.osha.gov/dts/weather/winter\\_weather/windchill.html](https://www.osha.gov/dts/weather/winter_weather/windchill.html)

<sup>38</sup> [https://www.osha.gov/dts/weather/winter\\_weather/windchill.html](https://www.osha.gov/dts/weather/winter_weather/windchill.html)

\* - Non-precipitation watch / warning / advisory

Based on previous winter storm events, future storms in Burleson County and the participating jurisdictions may see snow accumulation of up to 6" and see ice accumulation of up to 1/4".

#### 4) Location and Impact

##### *A) Location – All Jurisdictions*

Severe winter weather has no distinct geographic boundary. Severe winter weather can occur across the entire planning area and uniformly affect all participating jurisdictions.

##### *B) Impact – All Jurisdictions*

The potential impact of a winter weather is normally minor, resulting in few, if any, injuries. Because of the rarity of winter storm events in Burleson County and the participating jurisdictions, drivers, especially those unfamiliar with or unable to drive in icy conditions, may be at the highest risk of crashing their vehicle and sustaining injuries.

Beyond accidents caused by icy conditions, severe winter weather has the potential to cause widespread power outages. Trees and other vegetation that grow along or near power lines and utility lines can become overburdened by ice and snow accumulation. Falling limbs or trees can easily take down power and utility lines. Neglected vegetation is especially at risk of failure due to increased weight loads. Power outages can create a cascading effect depending on residents' ability to heat their homes without electricity, especially for those young, elderly, and low-income residents as identified in Section 3 of Chapter 3 above. Although no deaths related to winter weathers have been reported in the participating jurisdictions, in the worst cases, the hazard has the potential to be deadly.

Winter weathers will likely cause only minor property damage and minimal disruption to the quality of life in the participating jurisdictions.

Depending on when the event happens, a winter weather may damage or destroy crops.

#### 5) Vulnerability

##### *A) Infrastructure*

While all of the participating jurisdictions are exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities are not considered vulnerable to significant damage caused by winter weather events. This determination was made based on the expectation that most roofs can support 20 lbs. / square foot of snow<sup>39</sup>. The worst snow storm in

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<sup>39</sup> <https://disastersafety.org/freezing-weather/prevent-roof-collapse-homes/>

any participating jurisdiction dropped 6". Although it's not impossible<sup>40</sup> for that much snow to cause structural damage, given that the snow weight is well below the threshold where damage is likely, structural damages are not expected. Additionally, 1" of ice is roughly equivalent in weight per square foot to 10" of snow. Considering the worst ice storms in the participating jurisdictions cause ice accumulations of 1/4", it's unlikely, but not impossible, that an ice storm causing structural ice accumulations of less than 4" will cause significant structural damages.

However, significant damages may be incurred indirectly. Examples include, but are not limited to, trees and limbs that fall after being overburdened with snow or ice, building strikes due to vehicles losing traction on snow or ice-covered roads, and power outages that affect building temperature regulation and allow pipes to freeze and burst.

### ***B) Population***

As described in Section 3 of Chapter 3 above, Burluson County and the participating jurisdictions are home to many vulnerable residents. Areas with concentrations of young, elderly, and low-income residents may feel greater impacts from severe winter weather due to those populations' limited ability to properly address the hazard. Deficiencies may include but aren't limited to: lack of heating in their homes or vehicles, lack of access to heated public spaces during the coldest part of the day or night, and frozen pipes that may jeopardize access to drinking water, and in the worst cases, lead to severe structural damage that can render a home unlivable.

The participating jurisdictions also recognize that subdivisions or neighborhoods with only a single entrance may be cut off due to accumulation of snow and ice and therefore unable to obtain supplies or receive emergency services.

The consequences for these populations' exposure to severe winter weather can include but are not limited to: complications for those suffering from hypertension, hypothyroidism, and diabetes, as well as exhaustion, hypothermia, trench foot, or death.

### ***C) Critical Facilities***

Any shutdown of critical facilities due to severe winter weather is expected to be temporary. However, based on the proximity of trees and powerlines on their properties, the following critical facilities may be at a higher risk of losing power due to falling limbs.

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<sup>40</sup> [https://www.fema.gov/media-library-data/7d8c55d1c4f815edf3d7e7d1c120383f/FEMA957\\_Snowload\\_508.pdf](https://www.fema.gov/media-library-data/7d8c55d1c4f815edf3d7e7d1c120383f/FEMA957_Snowload_508.pdf) - The weight of a foot a snow can vary widely based on how wet the snow is, between 3 and 21 lbs. per square foot. However, wet snow primarily affects the East Coast, Pacific Northwest, and southwestern Alaska.

Table 60: Critical Facilities Vulnerable to Winter Storms

Jurisdictions	Critical Facilities	Potential Winter weather Impacts
		Falling Tree Limbs
Burleson County	Burleson County Courthouse	x
	Burleson County Sheriff's Office	x
	St. Joseph's Health Burleson Hospital	x
	Deanville Fire Department	x
	Communications Towers	x
	Deanville Water Supply	x
	FM 50 Yegua Creek Bridge	x
	State HWY 36 South Yegua Creek Bridge	x
	State Hwy 21 West Yegua Creek Bridge	x
	State HWY 21 East Brazos River Bridge	x
	Fm 1361 Davidson Creek Bridge	x
	Park Road 57 Bridge	x
	FM 60 E Davidson Creek Bridge	x
	Old River Bridge Snook	x
	FM 60 E Brazos River Bridge	x
	Cade Lake Water Supply System	x
	Tunis Water Supply System #2	x
	Tunis Water Supply System #1	x
	Southwest Milam Water Supply System	
	Cooks Point Water Supply System	x
	Lyons Water Supply System	x
	Birch Creek VFD	x
	Black Jack VFD	x
	ATT/Firstnet Towers	x
Beaver Creek VFD	x	
Cade Lake Fire Department	x	
Cooks Point Volunteer Fire Department	x	
City of Caldwell	Wells	x
	Lift Stations	x
	Caldwell Civic Center	x
	Administration Building	x
	Caldwell Library	x
	Caldwell Police Department	
	Caldwell Fire Department	
	Wastewater Treatment Plant	x
	City of Caldwell Electrical Substation	x

<b>City of Snook</b>	Snook City Hall	x
	City of Snook Waste Water Treatment Plant	x
	City of Snook Water Plant - water well #2 and water tower	x
	City of Snook Water well # 3	x
	City of Snook Lift Stations	x
<b>City of Somerville</b>	Somerville City Hall	
	Somerville Volunteer Fire Department	
	Somerville St Josephs clinic/EMS	x
	Community chapel school	x
	Koppers (GIS for office on site)	x
	Somerville senior center	x
	COS Wastewater treatment plant	x
	COS Transfer station	x
	COS elevated water tank	x
	COS water plant (storage tanks, wells, treatment)	x
	COS public works yard	x
	Army Corps of Engineers office/site for lake Somerville	x
	Bridge, drainage, culverts etc associated with the big ditch	x
	COS PD	x
	Warning siren & digital sign	x
	Lift Stations	x
	Culvert	x
Main Railroad crossing	x	
<b>Caldwell ISD</b>	Caldwell Technology Building	x
	Caldwell Maintenance	x
	Caldwell Elementary	x
	Caldwell Intermediate	x
	Caldwell Junior High	x
<b>Snook ISD</b>	Snook Elementary School	x
	Snook Secondary School	x
	Snook ISD Transportation Center	x
<b>Somerville ISD</b>	Somerville Elem/Intermediate	x
	Somerville High School	x
	Yegua Center (evacuation /staging site)	x
<b>Burleson County MUD #1</b>	Wells	x
	85k gal Ground Water Tank	x
	100k gal Ground Water Tank	x
	Chlorine Bldg w/pumps/motors/misc. equip.	x
	Maintenance /Control room bldg/control panel	x
	Booster Pumps	x
	Office	x

## 12. Lightning

Lightning is a massive electrostatic discharge between electrically charged regions within clouds, or between a cloud and the Earth's surface.

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 50 people <sup>41</sup>each year in the United States.

### 1) Lightning History

Burleson County and the participating jurisdictions did not address lightning as a separate hazard in their previous plan; it was previously a part of the Thunderstorm hazard.

According to NCEI data, Burleson County and the participating jurisdictions have experienced four lightning events, which caused property and crop damage. There is no data documenting a lightning event more recent than 2015. However, the planning team determined that lightning events occur multiple times annually.

Table 61: Burleson County Lightning History

Location	Date Range	Number of Lightning Events	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Countywide	7/3/2013 – 5/6/2015	3	0	0	\$16,741.96	\$1,129.02

Table 62: City of Caldwell Lightning History

Location	Date Range	Number of Lightning Events	Fatalities	Injuries	Property Damage \$2021	Crop Damage \$2021
Caldwell	11/22/2007	1	0	0	\$6,342.52	\$0

No lightning-inflicted property or crop damage dollars have been recorded in the other participating jurisdictions addressing this hazard.

<sup>41</sup> <http://www.lightningsafety.noaa.gov/victims.shtml>

## 2) Likelihood of Future Events

Lightning is especially associated with thunderstorms. Despite the lack of officially reported instances of lightning-caused damages, a lightning event is highly likely, meaning an event affecting any or all of the participating jurisdictions is probable in the next year.

According to information from VAISALA<sup>42</sup>, Burleson County and the participating jurisdictions can expect to see between 6 and 20 lightning flashes per square mile per year.

## 3) Extent

The extent for lightning can be expressed in terms of the number of strikes within an interval. Given the lack of lightning history data, it is expected that Burleson County and all participating jurisdictions may experience lightning events between LAL 1 and LAL 5. Dry thunderstorms, LAL 6, are not expected.

Table 63: Lightning Activity Levels<sup>43</sup>

Lightning Activity Level (LAL)		
Activity levels are valuable guidance tools to aid in the preparation for possible fire initiation from cloud-to-ground lightning.		
LAL	Cloud and Storm Development	Lightning Strikes per 15 Minutes
1	No thunderstorms.	-
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense.	25+
6	Similar to LAL 3 except thunderstorms are dry.	

<sup>42</sup> [http://www.vaisala.com/VaisalaImages/Lightning/avg\\_fd\\_2005-2014\\_CONUS\\_2mi\\_grid.png](http://www.vaisala.com/VaisalaImages/Lightning/avg_fd_2005-2014_CONUS_2mi_grid.png)

<sup>43</sup> Source: <http://www.prh.noaa.gov/hnl/pages/LAL.php>



The worst lightning events to affect Burleson County and the participating jurisdictions have inflicted up to \$23,084.48 in property damages. No jurisdiction has recorded any injuries or deaths caused by lightning.

Future events may meet previous intensity levels, damage dollars inflicted, and the number of residents injured or worse.

#### **4) Location and Impact**

##### ***A) Location***

Lightning strikes have no distinct geographic boundary. Lightning can affect each jurisdiction addressing the hazard.

##### ***B) Impact***

Impacts from lightning in the participating jurisdictions may include but are not limited to loss of power due to electrical surges, damaged or destroyed personal property including computers and other electronics, damaged or destroyed agricultural, residential, commercial, and industrial buildings. Crops may be damaged or destroyed. Livestock may be injured or killed by lightning. In the worst cases, lightning may cause injuries or even loss of life.

#### **5) Vulnerability**

According to the Lightning Protection Institute, it is a myth<sup>44</sup> that lightning always strikes the tallest objects. Given lightning's indiscriminate nature, it is impossible to identify buildings that are at an increased risk of being struck by lightning. All existing and future buildings, critical facilities, critical infrastructure, improved property, and the population in the jurisdictions addressing the hazard are exposed to lightning. However, structures without adequate lightning protection and those with large concentrations of electronic equipment like computers, servers, and printers, are most vulnerable, as are locations that may have outside crowds during a lightning event.

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<sup>44</sup> [http://lightning.org/wp-content/uploads/2015/06/LPI\\_lightning\\_infographic\\_2015.jpg](http://lightning.org/wp-content/uploads/2015/06/LPI_lightning_infographic_2015.jpg)

**A) Critical Facilities**

Table 64: Critical Facilities Vulnerable to Lightning and Potential Impacts

Jurisdiction	Critical Facilities	Potential Lightning Impacts			
		Physical Damage	Electrical Damage	Data Damage or Loss	Fire
Burleson County	Burleson County Courthouse	X	X	X	X
	Burleson County Sheriff's Office	X	X	X	X
	St. Joseph's Health Burleson Hospital	X	X	X	X
	Deanville Fire Department	X	X	X	X
	Communications Towers	X	X	X	X
	Deanville Water Supply	X	X	X	X
	FM 50 Yegua Creek Bridge	X			X
	State HWY 36 South Yegua Creek Bridge	X			X
	State Hwy 21 West Yegua Creek Bridge	X			X
	State HWY 21 East Brazos River Bridge	X			X
	Fm 1361 Davidson Creek Bridge	X			X
	Park Road 57 Bridge	X			X
	FM 60 E Davidson Creek Bridge	X			X
	Old River Bridge Snook	X			X
	FM 60 E Brazos River Bridge	X			X
	Cade Lake Water Supply System	X	X	X	X
	Tunis Water Supply System #2	X	X	X	X
	Tunis Water Supply System #1	X	X	X	X
	Southwest Milam Water Supply System	X	X	X	X
	Cooks Point Water Supply System	X	X	X	X
	Lyons Water Supply System	X	X	X	X
	Birch Creek VFD	X	X	X	X
	Black Jack VFD	X	X	X	X
	ATT/Firstnet Towers	X	X	X	X
Beaver Creek VFD	X	X	X	X	
Cade Lake Fire Department	X	X	X	X	
Cooks Point Volunteer Fire Department	X	X	X	X	
City of Caldwell	Wells	X	X	X	X
	Lift Stations	X	X	X	X
	Caldwell Civic Center	X	X	X	X
	Administration Building	X	X	X	X
	Caldwell Library	X	X	X	X
	Caldwell Police Department	X	X	X	X
	Caldwell Fire Department	X	X	X	X
	Wastewater Treatment Plant	X	X	X	X
City of Snook	City of Caldwell Electrical Substation	X	X	X	X
	Snook City Hall	X	X	X	X
	City of Snook Waste Water Treatment Plant	X	X	X	X

	City of Snook Water Plant - water well #2 and water tower	X	X	X	X
	City of Snook Water well # 3	X	X	X	X
	City of Snook Lift Stations	X	X	X	X
City of Somerville	Somerville City Hall	X	X	X	X
	Somerville Volunteer Fire Department	X	X	X	X
	Somerville St Josephs clinic/EMS	X	X	X	X
	Community chapel school	X	X	X	X
	Koppers (GIS for office on site)	X	X	X	X
	Somerville senior center	X	X	X	X
	COS Wastewater treatment plant	X	X	X	X
	COS Transfer station	X	X	X	X
	COS elevated water tank	X	X	X	X
	COS water plant (storage tanks, wells, treatment)	X	X	X	X
	COS public works yard	X	X	X	X
	Army Corps of Engineers office/site for lake Somerville	X	X	X	X
	Bridge, drainage, culverts etc associated with the big ditch	X			X
	COS PD	X	X	X	X
	Warning siren & digital sign	X	X	X	X
	Lift Stations	X	X	X	X
Culvert	X			X	
Main Railroad crossing	X			X	
Caldwell ISD	Caldwell Technology Building	X	X	X	X
	Caldwell Maintenance	X	X	X	X
	Caldwell Elementary	X	X	X	X
	Caldwell Intermediate	X	X	X	X
	Caldwell Junior High	X	X	X	X
Snook ISD	Snook Elementary School	X	X	X	X
	Snook Secondary School	X	X	X	X
	Snook ISD Transportation Center	X	X	X	X
Somerville ISD	Somerville Elem/Intermediate	X	X	X	X
	Somerville High School	X	X	X	X
	Yegua Center (evacuation /staging site)	X	X	X	X
Burleson County MUD #1	Wells	X	X	X	X
	85k gal Ground Water Tank	X	X	X	X
	100k gal Ground Water Tank	X	X	X	X
	Chlorine Bldg w/pumps/motors/misc. equip.	X	X	X	X
	Maintenance /Control room bldg/control panel	X	X	X	X
	Booster Pumps	X	X	X	X
	Office	X	X	X	X

***B) Vulnerable Parcels***

Table 65: Parcels Vulnerable to Lightning

Jurisdiction	Estimated Parcel Count	Estimated Potential Damage Value
Burleson County	26,535	\$3,197,469,392
City of Caldwell	2,240	\$239,513,308
City of Somerville	1,388	\$97,774,495
City of Snook	706	\$24,470,594
Caldwell ISD	6	\$12,941,093
Snook ISD	5	\$474,781
Somerville ISD	45	\$2,686,852
Burleson County MUD #1	11	\$128,344

### 13. Extreme Cold

Extreme cold can happen anywhere in the state, although its levels can range extensively. In the panhandle extreme cold means days below zero Fahrenheit while in the Rio Grande Valley it means reaching temperatures below freezing. Extreme cold is an issue any time winter temperatures drop significantly below normal and make staying warm and safe a challenge.

Extreme cold can accompany winter weathers, but it can also be independent of those storms. For that reason, the impacts of extreme cold are presented here separately from the impacts of the severe winter.

#### 1) Extreme Cold History <sup>45</sup>

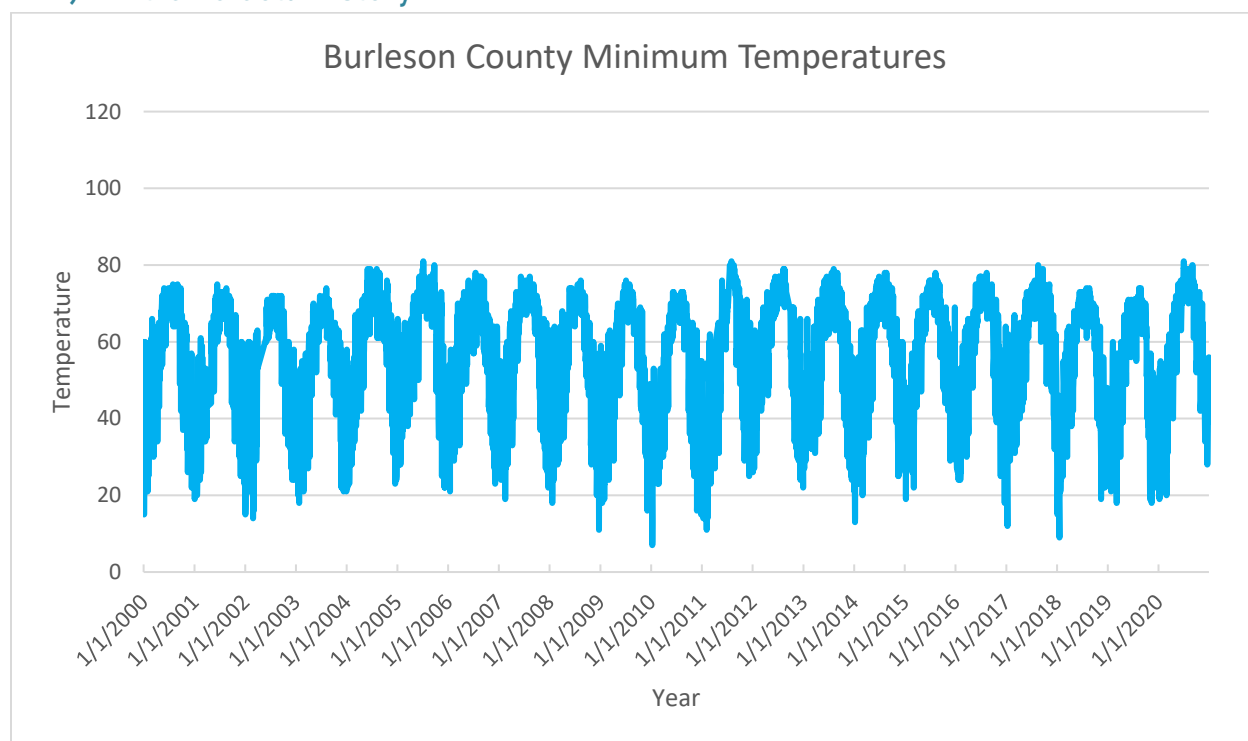


Figure 23: Minimum Recorded Daily Temperature 2000-Present<sup>46</sup>

Burleson County and the jurisdictions addressing the hazard have not previously included extreme cold in their mitigation plan as a standalone hazard. Prior to the 2018 update to the State of Texas mitigation plan, extreme cold was considered part of the winter weather hazard.

<sup>45</sup> Comprehensive temperature data for Burleson County isn't available. Instead, the planning team used data from neighboring Anderson County to estimate Burleson County's extreme cold history.

<sup>46</sup> Source: National Centers for Environmental Information, <https://www.ncdc.noaa.gov/cdo-web/datasets>

Between 2000 and 2020, Burleson County experienced 769 days with a minimum temperature of 32°F or colder. At least six of those days had a maximum temperature of 32°F or below.

During the same timeframe, the coldest temperature recorded was 7°F on January 9, 2010.

Temperature data is recorded at the county level. However, given the nature of extreme cold and the proximity of all jurisdictions to each other, the jurisdictions addressing the hazard experienced the same extreme cold events.

Winter Storm Uri in February 2021 caused \$108,000 in property damages due to extreme cold – extreme cold led to increased demand on energy and power outages; extreme cold also caused many pipes to burst.

### 2) Likelihood of Future Occurrence

Based on historic weather data, extreme cold in Burleson County and the participating jurisdictions is highly likely, meaning an event affecting any or all of the participating jurisdictions is probable in the next year.

### 3) Extent

The magnitude or intensity of an extreme cold event is measured according to temperature in relation to wind speed. The relationship is referred to as the “Wind Chill,” and is depicted in Figure 24.

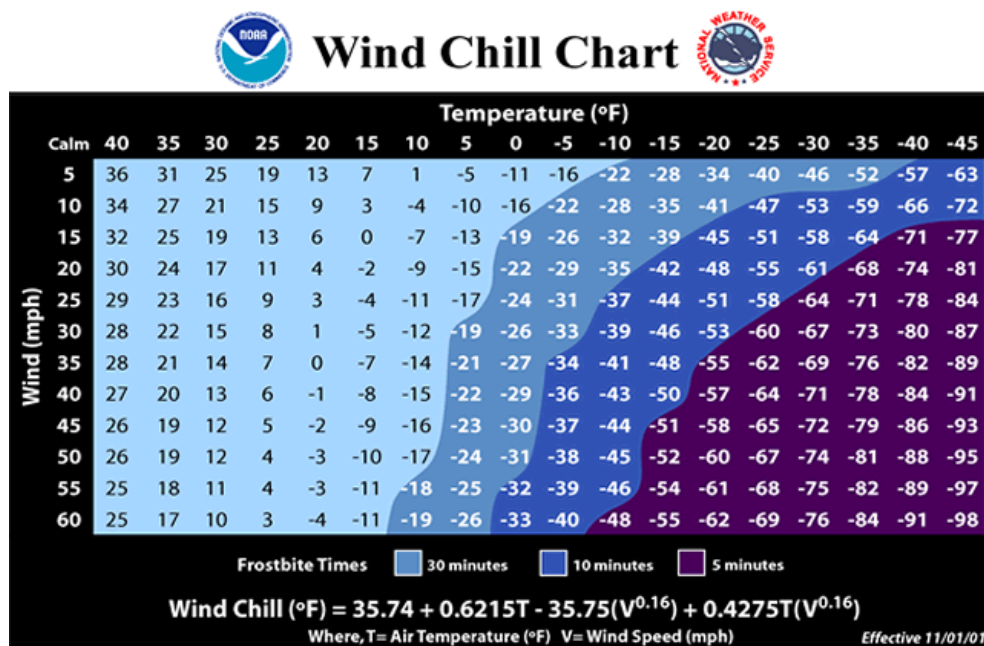


Figure 24: NOAA's NWS Wind Chill Index<sup>47</sup>

<sup>47</sup> <https://www.weather.gov/safety/cold-wind-chill-chart>

As displayed in Figure 24, the wind chill temperature is a measurement of how cold the wind makes the air feel to the human body. Since wind can dramatically accelerate heat loss from the body, a 20° day could feel just as cold as a calm day with 0° temperatures. The Wind Chill Chart factors the wind chill; it is not applicable in calm winds or when the temperature is over 50°.

The coldest temperatures in Burleson County and the participating jurisdictions may meet the current record temperature of 7°F. Future extreme cold events may be as intense, long-lasting, and dangerous as previous ones.

#### **4) Location and Impact**

##### ***A) Location – All Jurisdictions***

Extreme cold has no distinct geographic boundary. Extreme cold can occur across the entire planning area and uniformly affect all participating jurisdictions.

##### ***B) Impact – All Jurisdictions***

The potential impact of extreme cold is normally minor, resulting in few, if any, injuries. Only one case of extreme cold caused property damages – Winter Storm Uri in February 2021. No deaths related to extreme cold have ever been reported in the participating jurisdictions. However, based on the hazard’s potential, in the worst cases, especially if combined with winter weather, the hazard may inflict property or crop damages, and it can even be deadly. Any shutdown of facilities due to extreme cold is expected to be temporary.

#### **5) Vulnerability**

##### ***A) Population***

As described in Section 3 of Chapter 3 above, Burleson County and the participating jurisdictions are home to many vulnerable residents. Areas with concentrations of young, elderly, and low-income residents may feel greater impacts from extreme cold due to those populations’ limited ability to properly address the hazard. Deficiencies may include but aren’t limited to: lack of heating in their homes or vehicles, lack of access to heated public spaces during the coldest part of the day or night, and frozen pipes that may jeopardize access to drinking water, and in the worst cases, lead to severe structural damage that can render a home unlivable. The consequences for these populations’ exposure to extreme cold may include but are not limited to: complications for those suffering from hypertension, hypothyroidism, and diabetes, as well as exhaustion, hypothermia, trench foot, or death.

##### ***B) Critical Facilities***

While all of the jurisdictions are exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities are not considered vulnerable to damages significant enough

to interrupt or stop normal operations. Therefore, any estimated property losses associated with the hazard are anticipated to be minimal across the area.



## 14. Extreme Heat

Extreme heat is defined as summertime temperatures that are substantially hotter and/or more humid than average for a given location at that time of year. Humid conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground.

Although heat can damage buildings and facilities, it presents a more significant threat to the safety and welfare of citizens. The major human risks associated with severe summer heat include: heat cramps; sunburn; dehydration; fatigue; heat exhaustion; and 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 look out for their wellbeing.

Severe summer heat is an invisible killer. Although a heat wave does not happen with the spectacle of other hazards such as tornados and floods, the National Center for Environmental Health reports that extreme heat caused 7,415 heat-related deaths in the United States from 1999 to 2010<sup>48</sup>. Extreme heat kills more people than hurricanes, floods, tornados and lightning combined, according to the National Weather Service. In 2001, 300 deaths were caused by excessive heat exposure.

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<sup>48</sup> [http://www.bt.cdc.gov/disasters/extremeheat/heat\\_guide.asp](http://www.bt.cdc.gov/disasters/extremeheat/heat_guide.asp)

## 1) Extreme Heat History

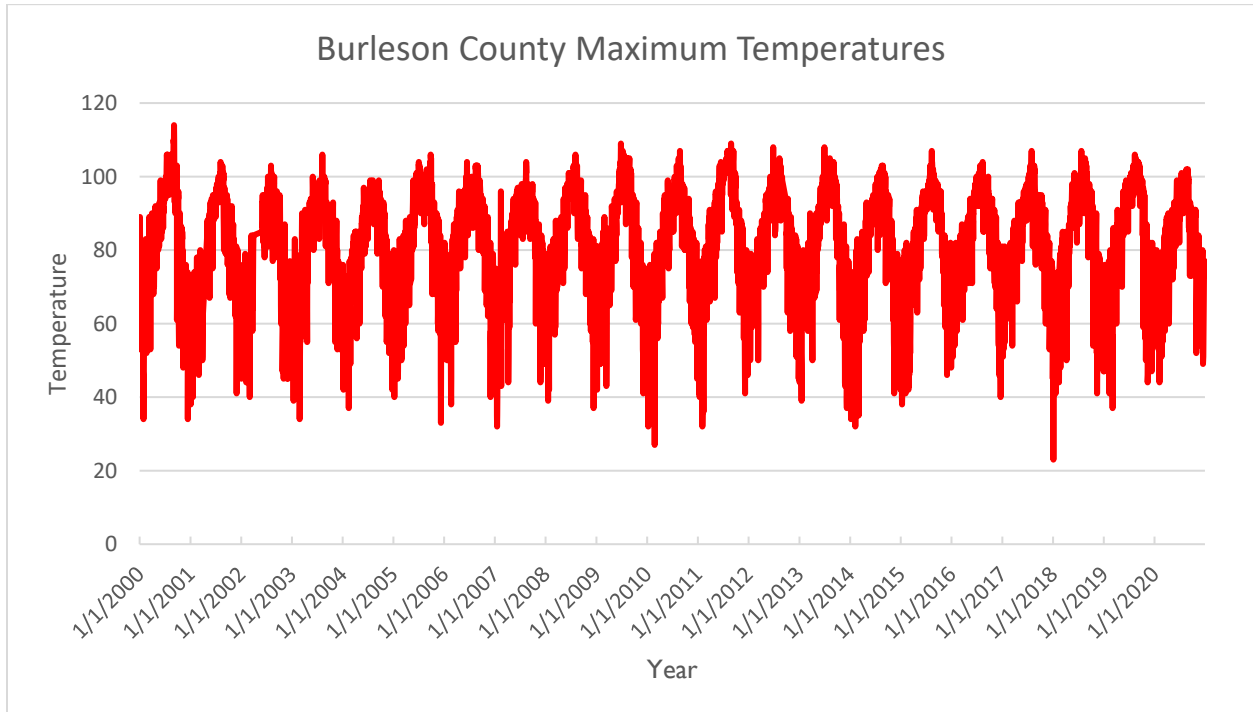


Figure 25: Maximum Recorded Daily Temperature 2000-2018<sup>49</sup>

In the 2013 plan, Burleson County and the participating jurisdictions reported eight extreme heat events from 1995 to 2011. No property or crop damages, injuries, or deaths were reported as a result of those events.

Between 2000 and 2020, Burleson County and the jurisdictions addressing the hazard experienced 627 days with a maximum temperature of 100°F or hotter and 433 days where the combination of humidity and moderate-to-high temperatures likely warranted a heat advisory, if not an extreme heat warning.

Extreme heat data is recorded at the county level. However, given the nature of extreme heat and the proximity of the jurisdictions addressing the hazard to each other, they all experienced the same extreme heat events.

No extreme heat events have been reported by the NCEI since the previous plan.

No extreme heat events are reported to have caused any injuries, fatalities, or damages.

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<sup>49</sup> Source: National Climatic Data Center, <https://www.ncdc.noaa.gov/cdo-web/datasets>

## 2) Likelihood of Future Events

Based on historic weather data, extreme heat in Burleson County and the participating jurisdictions is highly likely, meaning an event affecting any or all of the participating jurisdictions is probable in the next year.

## 3) 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 26. This index measures how hot it feels outside when humidity is combined with high temperatures.

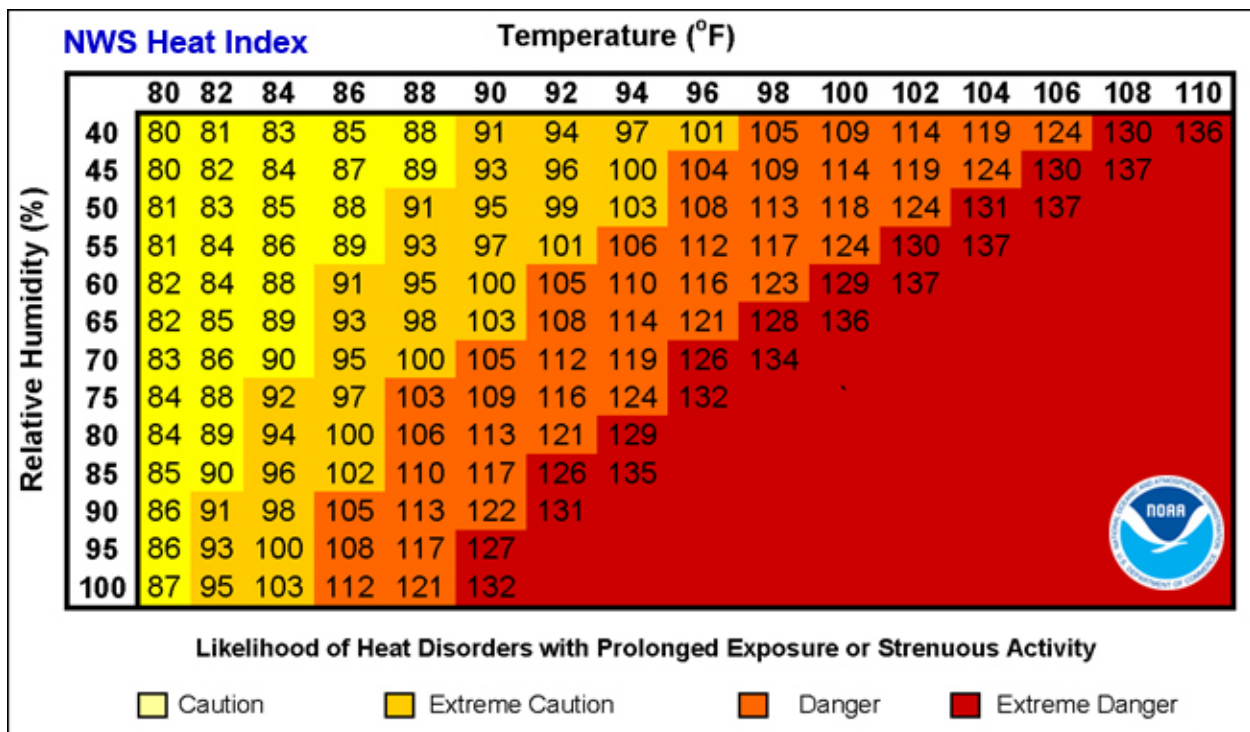


Figure 26: NOAA's NWS Heat Index Chart<sup>50</sup>

The extent scale in Figure 26 displays varying degrees of caution depending on the relative humidity combined with the temperature. For example, when the temperature is below 90°F, 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

<sup>50</sup> <https://www.weather.gov/images/safety/heatindexchart-650.jpg>

where fatigue due to heat exposure is possible. “Extreme Caution” indicates that sunstroke, muscle cramps or heat exhaustion are possible, whereas a “Danger” level means that these symptoms are likely. “Extreme Danger” indicates that heat stroke is likely.

The National Weather Service (NWS) initiates alerts based on the Heat Index as shown in Table 66.

Table 66: Heat Intensity

Intensity	Description
Heat Advisory	Extreme heat index making it feel hot, typically between 105°F to 110°F for 3 hours or more during the day and at or above 75°F at night.
Excessive Heat Warning	Extreme heat index making it feel very hot, typically above 105°F for 3 hours or more during the day and at or above 80°F at night.

Given an estimated daily average relative humidity level of 76%<sup>51</sup>, highs as low as 89°F can produce a heat index temperature of 106°F. The combination of high humidity and moderate temperatures creates an environment that reaches the Danger Zone on NOAA’s Heat Index Chart, and may trigger an NWS Heat Advisory.

Between 2000 and 2020, Burluson County and the jurisdictions addressing the hazard experienced 433 days with highs of 89°F or hotter and overnight lows of 75°F or hotter. Based on the NWS descriptions in Table 66 above, and the average daily humidity level, these days likely warranted a heat advisory.

The hottest temperature recorded in Burluson County in the recent past, 114°F, was reached on September 5<sup>th</sup>, 2000. Based on the NWS descriptions in Table 66 above, at least 15 of the 433 heat advisory days warranted an excessive heat warning based on daytime highs, the average daily humidity level, and overnight lows not falling below 80°F.

Future extreme heat events may meet the heat index requirements for issuing an Excessive Heat Warning as described in the Heat Intensity scale in Table 66 above. The hottest temperatures in Burluson County and the participating jurisdictions may meet the current record temperature of 114°F. Future extreme heat events may meet previous worst-case extreme heat events in terms of injuries, crop damages, property damages, or even death.

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<sup>51</sup> Used Corpus Christi Average, closest to County - <https://www.currentresults.com/Weather/Texas/humidity-annual.php>

#### 4) Location and Impact

##### *A) Location – All Jurisdictions*

Extreme heat has no distinct geographic boundary. Extreme heat can occur across the entire planning area and uniformly affect the jurisdictions addressing the hazard.

##### *B) Impact – All Jurisdictions*

The potential impact of excessive summer heat is normally minor, resulting in few, if any, injuries. No property or crop damage specifically tied to extreme heat events has been recorded in any of the participating jurisdictions. No deaths related to extreme heat have ever been reported in the participating jurisdictions. However, based on the hazard's potential, in the worst cases, especially if combined with drought conditions, the hazard may inflict property or crop damages, and it can even be deadly. Any shutdown of facilities due to extreme heat is expected to be temporary.

#### 5) Vulnerability

##### *A) Population*

As described in Section 3 of Chapter 3 above, Burleson County and the jurisdictions addressing the hazard are home to many vulnerable residents. Vulnerable populations may feel greater impacts from extreme heat due to these populations' limited ability to properly address the hazard due to deficiencies including but not limited to: lack of air conditioning in their homes or vehicles, lack of access to air-conditioned public spaces during the hottest part of the day, insufficient numbers of box or ceiling fans, or lack of access to other means of cooling. The consequences for these populations' exposure to extreme heat can include but are not limited to: heat cramps, sunburn, dehydration, fatigue, heat exhaustion, heat stroke, or death.

##### *B) Critical Facilities*

While all of the jurisdictions addressing the hazard are exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities are not considered vulnerable to damages significant enough to interrupt or stop normal operations. Therefore, any estimated property losses associated with the hazard are anticipated to be minimal across the area.

## 15. Dam / Levee Failure

Dam failure is defined as a systematic failure of the dam structure resulting in the uncontrolled release of water, often resulting in floods that could exceed the 100-year flood plain boundaries. Dam failure can cause mass fatalities, mass structural damage and/or a cascading potential if a populated area is located below the dam structure.

### 1) Dam / Levee Failure History

According to the best information available, there is no history of dam failure in Burleson County or any of the jurisdictions. Burleson County and City of Somerville elected to address this hazard because of the possibility that dam and / or levee failure may become a local issue within the current planning period.

The City of Caldwell determined that the jurisdiction has no risk of inundation from any high-hazard dams and the history of impacts of Dam/Levee Failure have been negligible (or non-existent), therefore it is expected that future impacts will be negligible as well, and isn't addressing the hazard.

The City of Snook determined that the jurisdiction has no risk of inundation from any high-hazard dams and the history of impacts of Dam/Levee Failure have been negligible (or non-existent), therefore it is expected that future impacts will be negligible as well, and isn't addressing the hazard.

Caldwell ISD determined that the jurisdiction has no risk of inundation from any high-hazard dams and the history of impacts of Dam/Levee Failure have been negligible (or non-existent), therefore it is expected that future impacts will be negligible as well, and isn't addressing the hazard.

Snook ISD determined that the jurisdiction has no risk of inundation from any high-hazard dams and the history of impacts of Dam/Levee Failure have been negligible (or non-existent), therefore it is expected that future impacts will be negligible as well, and isn't addressing the hazard.

Somerville ISD determined that the jurisdiction has no risk of inundation from any high-hazard dams and the history of impacts of Dam/Levee Failure have been negligible (or non-existent), therefore it is expected that future impacts will be negligible as well, and isn't addressing the hazard.

Burleson County MUD #1 determined that the jurisdiction has no risk of inundation from any high-hazard dams and the history of impacts of Dam/Levee Failure have been negligible (or non-

existent), therefore it is expected that future impacts will be negligible as well, and isn't addressing the hazard.

### 2) Likelihood of Future Occurrence

Given the lack of a prior dam or levee failure in the participating jurisdictions, dam / levee failure is considered unlikely, meaning that one is possible in the next 10 years.

### 3) Extent

A way to consider the hazard extent is to use the storage capacity behind the dam to estimate the ground surface that would be covered with a foot of water.

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

Hazard potential is also measured by the likelihood of dam / levee failure or negligent management to cause loss of human life. There are three levels of classification: High Hazard, Significant Hazard, and Low Hazard.

Table 67: Dam Failure Extent Classification

Hazard Potential Classification	Loss of Human Life	Dam Storage Capacity
Low	None Expected	Less than 10,000 acre-feet
Significant	Probable (1-6)	Between 10,000 – 100,000 acre-feet
High	Loss of Life Expected (7 or more)	100,000 acre-feet or more

There are 33 Dams and five levee systems along the Brazos River in Burleson County.

29 of the dams are privately owned. Of the privately-owned dams, none are primarily for flood control. All of the privately-owned dams have a storage capacity below 10,000 acre/ft.

It is each dam owner's responsibility to ensure that their dam is in compliance with the Texas Commission on Environmental Quality's <sup>52</sup>(TCEQ) regulations regarding emergency action plans.

<sup>52</sup> <https://www.tceq.texas.gov/compliance/investigation/damsafetyprog.html>

Additionally, each dam owner required to have an emergency action plan must know and be prepared to take the actions outlined in their emergency action plan, should their dam begin to fail.

There are four government-owned dams. Somerville Lake Dam, on Lake Somerville, the largest lake in Burleson County, is owned by the U.S. Army Corps of Engineers and is 1,042,000 acre-feet, making it a High Hazard dam. Somerville Lake Dam is used for flood control, water supply, recreation, and fish and wildlife purposes. The other three government-owned dams are East West Lake Dam, Cade Lake Number 3 Dam, and Mallard Lake Dam, all owned by Burleson County. All three dams are under 10,000 acre-feet and are primarily used for recreation. They are low hazard dams.

The overall levee system is the Brazos River Levee System, with several unconnected sections. According to the National Levee Database, the main San Brazos River Levee System section is 6.85 miles long, including the embankment and floodwall length. The leveed area is 25.27 sq mi. The Brazos River Levee 3 section is 1.49 miles long and covers a leveed area of 1.46 sq mi. The Brazos River Levee 4 section is 1.64 miles long and covers a leveed area of 1.13 sq mi. The Brazos River Levee 6 section is 2.46 miles long and covers a leveed area of 3.56 sq mi. The Brazos River Levee 7 section is 3.02 miles long and covers a leveed area of 3.94 sq mi.

The majority of dams and levees in Burleson County are considered low hazard. They hold less than 10,000 acre-feet of water, and no loss of life is expected should any fail. However, there is one dam that is considered a high hazard, the Somerville Lake Dam. If the Somerville Lake Dam was to fail, Burleson County could experience significant crop or property damage, injuries, or even death. Inundation could cover approximately 41,680 acres of land with an average depth of 25 feet.

#### 4) Location and Impact

##### *A) Location*

Figure 27 below shows the location of all dams within Burleson County.



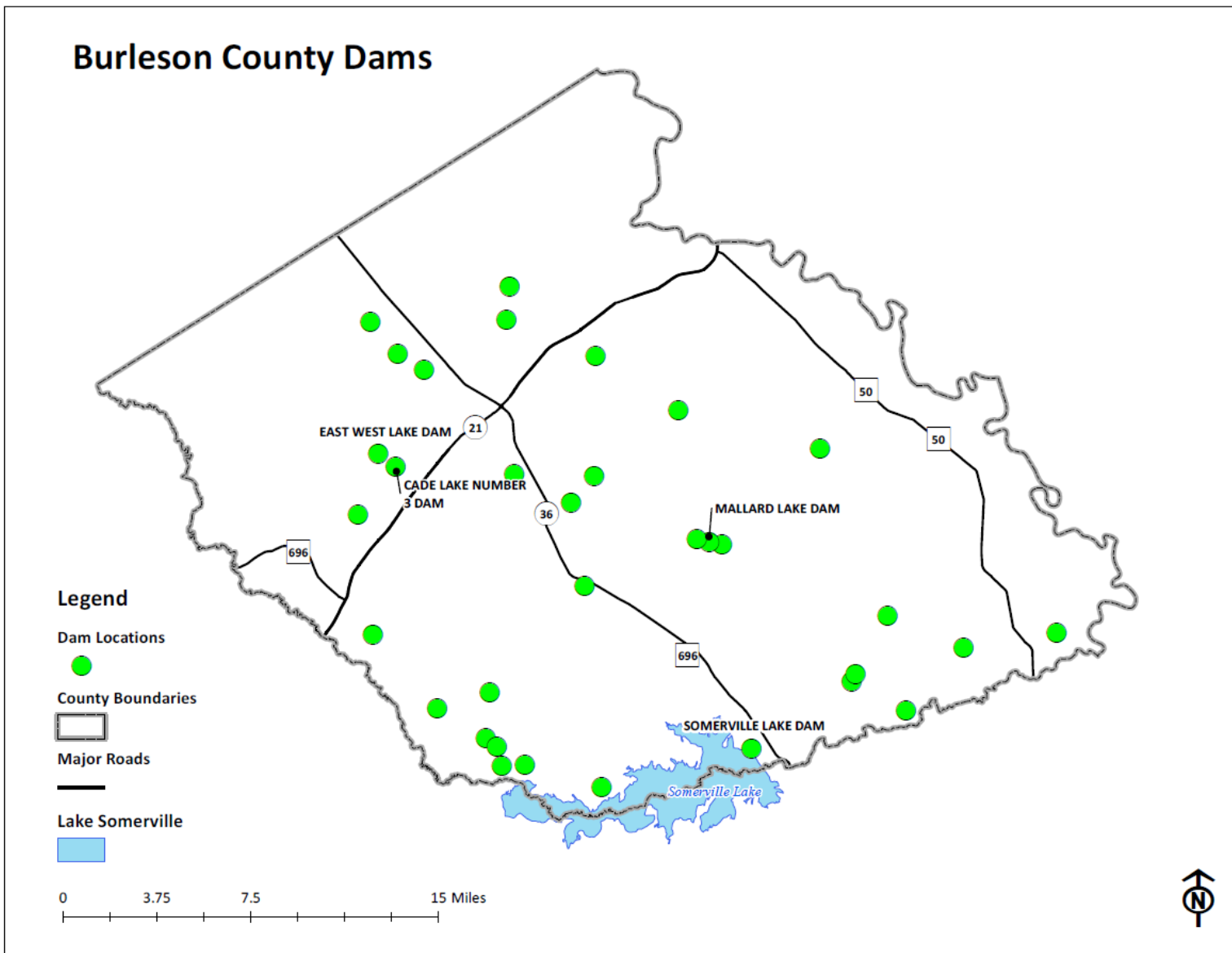


Figure 27: Burleson County Dam Locations

Location is defined by the area expected to be inundated during a dam failure for each dam. The expected inundation zone for the Lake Somerville Dam, shown below in Figure 28, is based on information from the previous Burlison County Hazard Mitigation Plan, and they represent the best information available for identifying locations vulnerable to dam failure.

## Lake Somerville Dam - Potential Inundation Zone

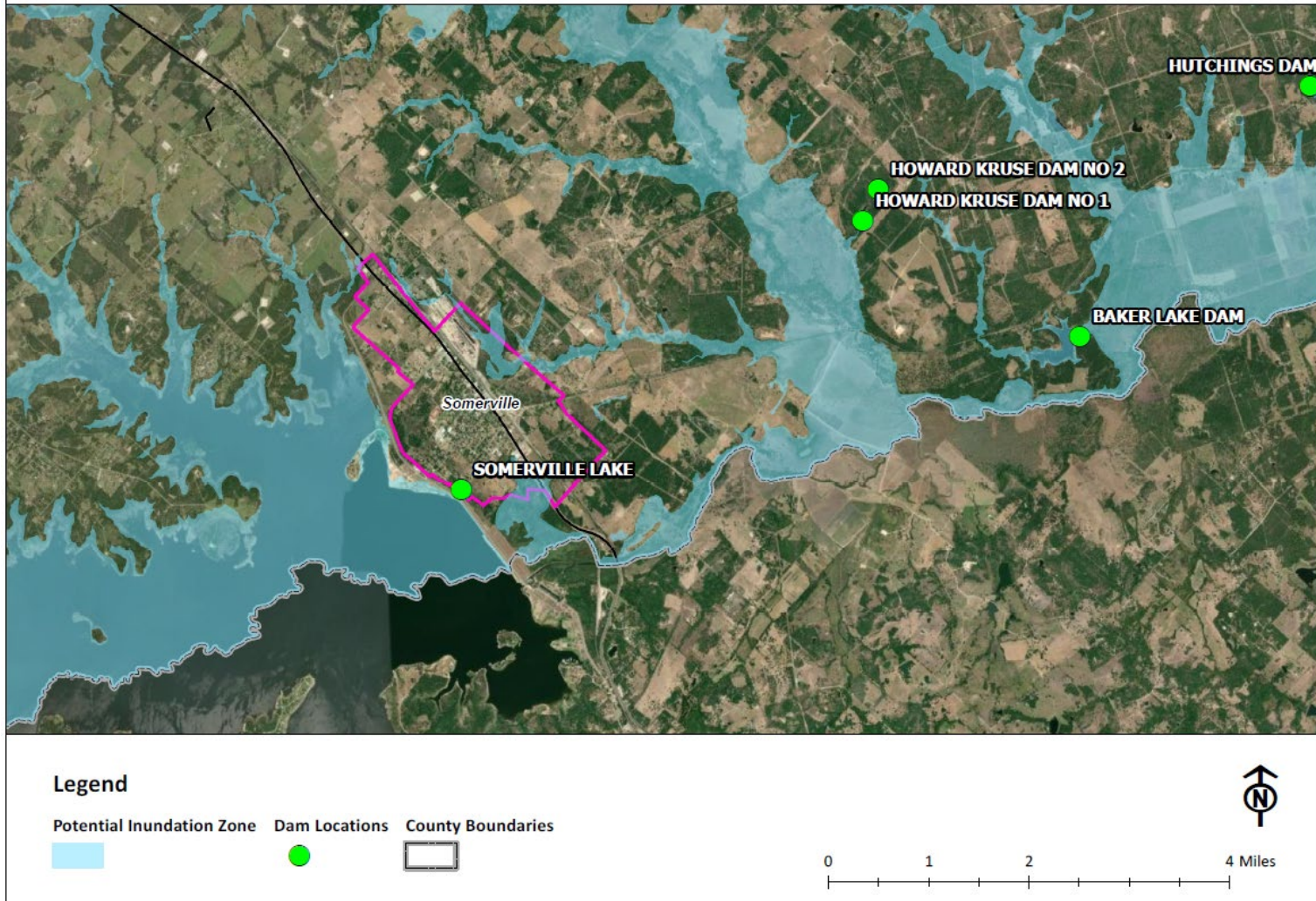


Figure 28: Lake Somerville Dam Potential Inundation Zone

### ***B) Impact***

Structures at risk of dam failure may be flooded, damaged by floodborne contaminants, damaged by debris flow, or even completely washed away. Although no loss of life to dam failure is expected in Burleson County, under the right conditions injury or loss of life are possible.

## **5) Vulnerability**

### ***A) Population***

While the Lake Somerville Dam is considered a High Hazard dam by TCEQ, meaning that property damage and loss of life could occur if the dam were to fail, the expected inundation zone is located in a primarily rural and sparsely populated area of Burleson County. Therefore, negative impacts on the population is unlikely. In the worst-case scenario, the City of Somerville and unincorporated areas of Burleson County downstream from the dam could see property and crop damages, injuries, or even deaths if there was a catastrophic dam failure.

### ***B) Critical Facilities***

As shown in Figure 29 below, there are two critical facilities located in the potential inundation zone – the State Highway 36 South Yegua Creek Bridge and the FM 50 Yegua Creek Bridge. If the Lake Somerville Dam were to have a catastrophic failure, these two bridges could be washed away, cutting off critical roadways for emergency services, evacuation, and people living within the region. There are also multiple critical facilities located within the City of Somerville that could potentially be affected by a catastrophic dam failure.

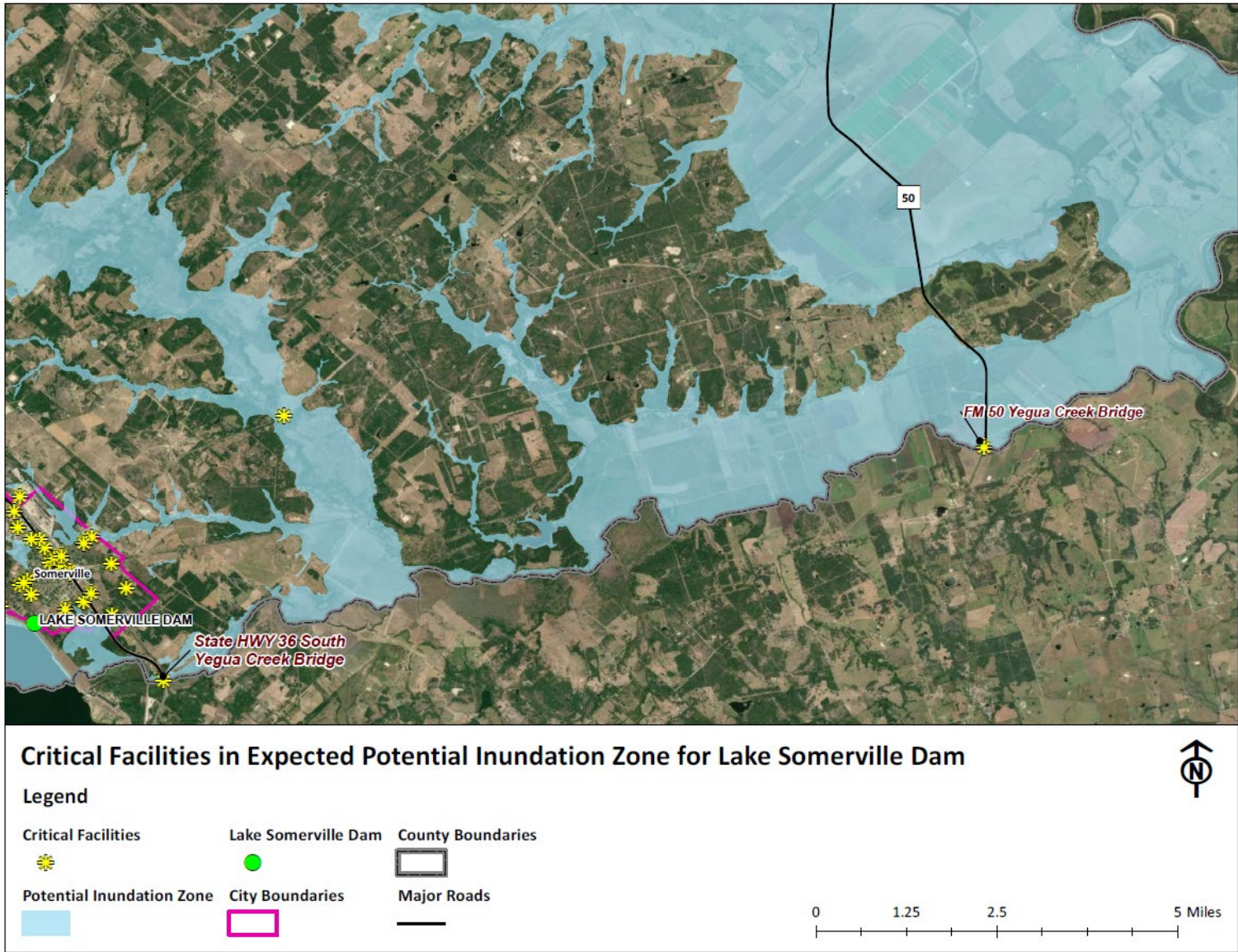


Figure 29: Critical Facilities in the Potential Inundation Zone for Lake Somerville Dam

## 16. Mitigation Strategy

### 1) Capability Assessment

Burleson County and the participating jurisdictions have shown themselves to be highly capable, especially in terms of implementing hazard mitigation actions. All four jurisdictions participated in the 2013 plan. Each of these jurisdictions completed, or is in the process of completing, many of the actions recommended in the 2013 plan.

In addition to reviewing previous actions and the steps taken to implement them, the planning team reviewed existing regulatory capabilities and opportunities for establishing new capabilities and enhancing existing ones. At this time, all jurisdictions could improve their hazard mitigation capabilities through the following efforts: budgeting for mitigation actions and support, passing policies and procedures to implement mitigation actions, adopting and implementing stricter mitigation regulations, approving the hiring and training of staff for mitigation activities, and approving mitigation updates and additions to existing plans as new needs are recognized. The participating cities could further improve their capabilities by creating and adopting regularly updated comprehensive plans.

Table 68: Capability Assessment by Jurisdiction

<b>Burleson County</b> <b>Administrative, Financial, Regulatory, and Technical Abilities</b>
Floodplain Management
Emergency Management
Economic Development
Road and Bridge Management
Tax Collection
Grant Writing
General Budgeting
CIP Funding
CDBG Funding
State and Federal Grant Funding
Environmental Enforcement Officer
<b>City of Caldwell</b> <b>Administrative, Financial, Regulatory, and Technical Abilities</b>
Floodplain management

Emergency Management
Subdivision
Zoning
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement
Water Conservation Planning
Drought Contingency Planning
Comprehensive Planning
Economic Development
Grant Writing
General Budgeting
CIP Funding
CDBG Funding
State and Federal Grant Funding

<b>City of Snook</b> <b>Administrative, Financial, Regulatory, and Technical Abilities</b>
Emergency Management
Drought Contingency Planning
Grant Writing
General Budgeting
CIP Funding
State and Federal Grant Funding

<b>City of Somerville</b> <b>Administrative, Financial, Regulatory, and Technical Abilities</b>
Floodplain management
Emergency Management
Subdivision
Zoning
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement
Water Conservation Planning
Drought Contingency Planning

Comprehensive Planning
Economic Development
Grant Writing
General Budgeting
CIP Funding
CDBG Funding
State and Federal Grant Funding

<b>Caldwell ISD</b> <b>Administrative, Financial, Regulatory, and Technical Abilities</b>
Emergency Management
Drought Contingency Planning
Grant Writing
General Budgeting
CIP Funding
State and Federal Grant Funding

<b>Snook ISD</b>
Emergency Management
Drought Contingency Planning
Grant Writing
General Budgeting
CIP Funding
State and Federal Grant Funding

<b>Somerville ISD</b> <b>Administrative, Financial, Regulatory, and Technical Abilities</b>
Emergency Management
Drought Contingency Planning
Grant Writing
General Budgeting
CIP Funding
State and Federal Grant Funding



<b>Burleson County MUD #1 Administrative, Financial, Regulatory, and Technical Abilities</b>
Emergency Management
Drought Contingency Planning
Grant Writing
General Budgeting
CIP Funding
State and Federal Grant Funding

**2) Goals and Objectives Overview**

The hazard analysis has shown that Burleson County and the participating jurisdictions are at risk of multiple natural hazards. The following goals and objectives take a broad approach to improving outcomes before, during, and after these anticipated natural hazard events.

The mitigation actions the County and participating jurisdictions have selected are designed to address specific hazard-related issues in support of achieving the desired goals and objectives. They are seen as a direct continuation of the goals and objectives outlined in the 2013 plan.

**3) Long-Term Vision**

The hazard mitigation plan must strike a balance between identifying long-term goals and objectives and prioritized mitigation actions that may be addressed sooner, depending on funding availability and local priorities. The result is that certain goals and objectives don't have a corresponding mitigation action. Instead, by taking the long view, the local planning team has created a framework that can be developed as the plan is updated over time.

**4) Goals**

***A) Goal 1: To reduce loss of life and injury to persons***

*Objective 1.1*

Improve the delivery and effectiveness of warning messages

*Objective 1.2*

Preserve public and private emergency response capability (9-1-1, law enforcement, fire services, emergency medical services, hospitals).

*Objective 1.3*

Utilize available mitigation measures to prevent or reduce life-threatening impacts of natural hazards.

*Objective 1.4*

Reduce obstacles to timely and safe evacuation of flood hazard areas.

*Objective 1.5*

Reduce vulnerability of individuals living in mobile homes / manufactured housing.

*Objective 1.6*

Reduce life or health threatening impacts on individuals with special physical care requirements.

*Objective 1.7*

Reduce secondary impacts to health and safety from cascading effects.

*Objective 1.8*

Reduce long-term vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public.

***B) Goal 2: To reduce disruptions to essential public services and infrastructure***

*Objective 2.1*

Minimize disruption to and enhance rapid restoration of utilities.

*Objective 2.2*

Minimize disruption to and enhance rapid restoration of essential transportation infrastructure.

*Objective 2.3*

Minimize disruption to governmental, educational, and other institutions providing services to the public.

***C) Goal 3: To reduce economic impacts to individuals, businesses, and area institutions***

*Objective 3.1*

Increase home and business owner investment in available mitigation measures for private property.

*Objective 3.2*

Increase home and business owner participation in appropriate insurance programs.

*Objective 3.3*

Increase public and private sector development and use of operations continuity strategies.

*Objective 3.4*

Utilize available mitigation measures to prevent or reduce economic losses from natural hazards.

*Objective 3.5*

Reduce vulnerability of existing development by encouraging property owners to participate in buy-out or flood-proofing opportunities.

*Objective 3.6*

Reduce vulnerability of future development by utilizing available planning and structural standards.

***D) Goal 4: To reduce losses to civic, cultural, and environmental resources***

*Objective 4.1*

Protect public investment in community-owned facilities and infrastructure through appropriate structural, non-structural, and financial methods.

*Objective 4.2*

Reduce future losses to the non-profit sector through participation in available mitigation opportunities.

*Objective 4.3*

Reduce vulnerability of historically or culturally significant structures.

*Objective 4.4*

Minimize environmental impacts from cascading effects.

**5) Mitigation Action Plan**

***A) Mitigation Action Prioritization***

The planning team members have identified at least two mitigation actions per natural hazard. The previous plan had four prioritization criteria: 1) benefits in terms of effect on overall risk and to life and property, including the effects on both new and existing buildings and infrastructure; 2) ease of implementation; 3) political and community support; and 4) cost and funding. The priorities for this plan were expanded based due to community changes in priorities. For this update, action items were identified and prioritized in consideration of the following criteria:

- 1) Life safety and property protection improvements
- 2) Cost effectiveness – do the action’s future benefits exceed its implementation costs
- 3) Technical feasibility – is the action reasonable given its technical requirements
- 4) Political acceptability
- 5) Administrative capabilities and legal authorities for implementation
- 6) Funding availability
- 7) The action’s environmental impacts
- 8) The action’s social acceptability

- 9) The action’s ability to reduce risk to more than one hazard
- 10) The ease of implementation
- 11) The availability of a local champion
- 12) The action’s relationship to other community objectives

In addition to considering an action’s cost effectiveness as described above, the planning team considered TDEM’s Cost-Effectiveness, Environmental Soundness and Technical Feasibility requirements as they relate to construction projects. Mitigation actions relating to physical infrastructure will meet the State’s standards as outlined below:

- A. Any state government construction project, regardless of potential funding source, has to be cost effective, technically feasible and meet all of the appropriate federal, state, and local environmental laws and regulations before it is started.
- B. State government projects funded by Federal Mitigation Grant Programs administered by TDEM have to meet specific criteria related to cost effectiveness, environmental soundness and technical feasibility. These are outlined in the applicable FEMA grant program guidance for that particular funding program.

***B) Incorporation and Integration of Existing Capabilities and Hazard Mitigation***

As previously outlined, the planning team reviewed a range of codes, ordinances, and planning studies that have been adopted by the participating jurisdictions. The planning team’s goal was to understand how these existing capabilities might affect mitigation actions in terms of implementation and enforcement.

**Mitigation Action Status – 2013 Plan**

In addition to reviewing existing codes, ordinances, and planning studies, the planning team also examined the status of each mitigation action identified in the 2013 plan.

A slight increase in local development is not known to have affected local vulnerability to the natural hazards this plan addresses or to those addressed in the 2013 plan.

Mitigation actions marked as incomplete or abandoned are no longer considered relevant as written to the participating jurisdictions.

**Table 69: Previous Mitigation Actions – All Jurisdictions**

Jurisdiction	Hazards Addressed	Mitigation Action	Status
Burleson County	Flood, Thunderstorm, Dam Failure	Per NFIP participation, acquire structures located in the 100-year floodplain.	<i>Abandoned: no longer deemed relevant.</i>
Burleson County	Flood, Tornadoes, Hurricanes, Thunderstorms,	Build a new Emergency Operations Center for the county.	<i>In Progress.</i>

	Hailstorms and Winter Storms.		
Burleson County	Flood, Tornadoes, Hurricanes, Thunderstorms, Hailstorms and Winter Storms.	Construct a new building to house radio equipment at radio tower.	<i>Completed and in Progress.</i>
Burleson County	Flood, Tornadoes, Hurricanes, Thunderstorms, Hailstorms and Winter Storms.	Obtain a temporary shelter and supplies (blankets, cots, generators, food, etc.) for evacuees from the Houston-Galveston area and a storage area to keep the supplies (new or existing).	<i>Abandoned: no longer deemed relevant.</i>
Burleson County	Flood, Dam Failure	Complete and implement a study to examine the dams on local lakes to determine if they are in good condition and salvageable.	<i>In Progress</i>
Burleson County	Flood	Per NFIP participation, correct minor drainage problems in various areas with larger culverts to protect existing structures from floods.	<i>Deferred to Plan Update</i>
Burleson County	Flood, Tornadoes, Hurricanes, Thunderstorms, Hailstorms and Winter Storms	Obtain an emergency supply of road-base material and supplies and recovery equipment.	<i>Completed</i>
Burleson County	Dam Failure	Create dam failure inundation maps.	<i>Deferred to Plan Update</i>
Burleson County	Excessive Heat, Drought, Hail	Public Outreach and Education	<i>In Progress</i>
Burleson County	Excessive Heat, Drought, Fire	Burn Bans	<i>Completed</i>
Burleson County	Excessive Heat, Fire, Tornado, Hail, Hurricane, Winter Storm, Thunderstorm	Dual-use community safe room	<i>Deferred to Plan Update</i>
Burleson County	Hurricane, Winter Storm, Hail, Thunderstorm, Tornado	Tree Limb Removal Program	<i>Abandoned: no longer deemed relevant.</i>
Burleson County	Hail	Public Outreach and Education	<i>In Progress</i>
Burleson County	Drought	Identifying new available water supplies.	<i>Abandoned: no longer deemed relevant.</i>
Burleson County	Fire	Public Outreach and Education	<i>In Progress:</i>
Burleson County	Hurricane/Tropical Storms	Public Outreach and Education	<i>Completed</i>

Burleson County	Fire	Enforce Burn Bans	<i>Completed</i>
Burleson County	Winter Storm	Public Outreach and Education	<i>Completed</i>
Burleson County	Winter Storm	Establishing a tree limb removal program for areas around utility power lines	<i>Abandoned: no longer deemed relevant.</i>
Burleson County	Tornado, Hurricane	Developing a local grant program to assist homeowners who wish to construct a new safe room	<i>Completed</i>
Burleson County	Drought	Develop and Implement a Drought Contingency Plan and Enforce response stages.	<i>Deferred to Plan Update</i>
Burleson County	Hail	Improving roof sheathing to prevent hail penetration.	<i>Completed</i>
Burleson County	Excessive Heat	Organizing outreach to vulnerable populations, including establishing and promoting accessible cooling centers in the community	<i>Deferred to Plan Update</i>

Jurisdiction	Hazards Addressed	Mitigation Action	Status
City of Caldwell	Flood	Per NFIP participation, correct minor drainage problems in various areas with larger culverts to protect existing structures from floods.	<i>Deferred to Plan Update</i>
City of Caldwell	Flood, Tornadoes, Hurricanes, Thunderstorms, Hailstorms and Winter Storms	Upgrade communications for all city services and develop an emergency warning system	<i>Deferred to Plan Update</i>
City of Caldwell	Flood, Tornadoes, Hurricanes, Thunderstorms, Hailstorms and Winter Storms.	Purchase a backup generator for existing city critical facilities, such as the police and fire departments.	<i>Deferred to Plan Update</i>
City of Caldwell	Flood, Thunderstorms, Hurricanes	Per NFIP participation, work with local officials and implement an ordinance that will not allow new construction within high risk floodplains.	<i>In Progress</i>
City of Caldwell	Flood, Thunderstorms, Hurricanes	Per NFIP participation, work with local officials and implement an ordinance that will not allow new construction within high risk floodplains.	<i>Deferred to Plan Update</i>
City of Caldwell	Excessive Heat, Drought, Hail, Fire	Public Outreach and Education.	<i>Deferred to Plan Update</i>
City of Caldwell	Excessive Heat, Drought, Fire	Burn Bans	<i>Deferred to Plan Update</i>
City of Caldwell	Hurricane, Winter Storm, Hail, Thunderstorm, Tornado	Tree Limb Removal Program	<i>Deferred to Plan Update</i>

City of Caldwell	Excessive Heat, Fire, Tornado, Hail, Hurricane, Winter Storm, Thunderstorm	Dual-use community safe room	<i>Deferred to Plan Update</i>
City of Caldwell	Drought	Develop and Implement a Drought Contingency Plan and Enforce response stages.	<i>Deferred to Plan Update</i>
City of Caldwell	Drought	Identifying new available water supplies.	<i>Completed</i>
City of Caldwell	Hurricane, Tornado	Requiring structures on temporary foundations to be securely anchored to permanent foundations.	<i>Deferred to Plan Update</i>
City of Caldwell	Wildfire	Develop and maintain a database to track community vulnerability to wildfire and then remove the dry brush from those areas.	<i>Deferred to Plan Update</i>
City of Caldwell	Wildfire	Public Outreach and Education	<i>Deferred to Plan Update</i>
City of Caldwell	Tornadoes, Hurricanes, Thunderstorms, Hailstorms and Winter Storms.	Purchase a backup generator for existing city critical facilities, such as the police and fire department headquarters	<i>Deferred to Plan Update</i>
City of Caldwell	Winter Storm	Establishing a tree limb removal program for areas around utility power lines	<i>Deferred to Plan Update</i>
City of Caldwell	Hail	Improving roof sheathing to prevent hail penetration	<i>Deferred to Plan Update</i>
City of Caldwell	Excessive Heat	Organizing outreach to vulnerable populations, including establishing and promoting accessible cooling centers in the community	<i>Deferred to Plan Update</i>
City of Caldwell	Excessive Heat	Provide free fans to vulnerable populations, including the elderly and those without adequate air conditioning in their homes	<i>Abandoned: no longer deemed relevant.</i>

Jurisdiction	Hazards Addressed	Mitigation Action	Status
City of Snook	Flood	Per NFIP participation, correct minor drainage problems in various areas with larger culverts to protect existing structures from floods.	<i>Abandoned: no longer deemed relevant.</i>
City of Snook	Flood, Tornadoes, Hurricanes, Thunderstorms, Hailstorms and Winter Storms	Establish a new police station with two officers.	<i>Deferred to Plan Update</i>
City of Snook	Flood, Tornadoes, Hurricanes, Thunderstorms, Hailstorms and Winter Storms.	Install an emergency warning system	<i>Abandoned: no longer deemed relevant.</i>

City of Snook	Fire, Flood, Tornadoes, Hurricanes, Thunderstorms, Hailstorms and Winter Storms	Purchase back-up generators for critical facilities in the event of power outage.	Completed
City of Snook	Flood, Thunderstorms, Hurricanes	Per NFIP participation, create detention ponds in special flood areas where there are critical facilities, schools, or hospitals.	Abandoned: no longer deemed relevant.
City of Snook	Excessive Heat, Drought, Hail, Fire	Public Outreach and Education.	Abandoned: no longer deemed relevant.
City of Snook	Excessive Heat, Drought, Fire	Burn Bans	Completed
City of Snook	Drought	Develop and Implement a Drought Contingency Plan and Enforce response stages.	Abandoned: no longer deemed relevant.
City of Snook	Drought	Identifying new available water supplies.	Abandoned: no longer deemed relevant.
City of Snook	Fire	Enforce Burn Bans	Abandoned: no longer deemed relevant.
City of Snook	Excessive Heat	Provide free fans to vulnerable populations, including the elderly and those without adequate air conditioning in their homes	Abandoned: no longer deemed relevant.

Jurisdiction	Hazards Addressed	Mitigation Action	Status
City of Somerville	Flood	Per NFIP participation, correct minor drainage problems in various areas with larger culverts to protect existing structures from floods.	In Progress
City of Somerville	Dam failure	Acquire homes located downstream of Lake Somerville Dam	Abandoned: All or most of these parcels are large, undeveloped parcels with no structures or occupants. This mitigation activity then, is not applicable.
City of Somerville	Dam failure	Elevate homes located downstream of Lake Somerville Dam	Abandoned: All or most of these parcels are large, undeveloped parcels with no structures or occupants. This mitigation activity then, is not applicable.
City of Somerville	Fires, droughts, excessive heat	Identify obsolete fire hydrants and deteriorating infrastructure throughout the city as well as areas of inadequate water supply to some fire hydrants. Replace as funding becomes available.	Deferred to Plan Update and In Progress
City of Somerville	Flood, Tornadoes, Hurricanes, Thunderstorms,	Purchase communications equipment for all first	In Progress



	<b>Hailstorms and Winter Storms</b>	responder agencies to work with other cities and the county.	
<b>City of Somerville</b>	<b>Flood, Tornadoes, Hurricanes, Thunderstorms, Hailstorms and Winter Storms.</b>	Purchase generators to run existing city critical facilities, shelters and wastewater plant during a power outage.	<i>In Progress</i>
<b>City of Somerville</b>	<b>Drought, fire, excessive heat</b>	Add an additional water storage tank to the well site in Lyons. Well #5 and Well #6.	<i>Completed</i>
<b>City of Somerville</b>	<b>Flood</b>	Retrofit storm drainage to offset flooding of certain areas behind the High School and NW part of residential areas	<i>Deferred to Plan Update</i>
<b>City of Somerville</b>	<b>Fire, Flood, Tornadoes, Hurricanes, Thunderstorms, Hailstorms and Winter Storms</b>	Assess the need, cost, and availability of a location to provide a second entry to the Anita Heights Subdivision.	<i>Deferred to Plan Update</i>
<b>City of Somerville</b>	<b>Flood, Tornadoes, Hurricanes, Thunderstorms, Hailstorms and Winter Storms.</b>	Retrofit the City's storm warning sirens to meet all of FEMA's present standards. Install battery backup and capability to activate by phone, radio or manually.	<i>In Progress</i>
<b>City of Somerville</b>	<b>Flood, Thunderstorms, Hurricanes</b>	Per NFIP participation, acquire the existing Severe Repetitive Loss (SRL) structure located in the city.	<i>Abandoned: Current data is unable to identify the specific SRL property, action may be reconsidered in the future.</i>
<b>City of Somerville</b>	<b>Excessive Heat, Drought, Hail, Fire</b>	Public Outreach and Education.	<i>Deferred to Plan Update</i>
<b>City of Somerville</b>	<b>Excessive Heat, Drought, Fire</b>	Burn Bans	<i>Completed</i>
<b>City of Somerville</b>	<b>Drought</b>	Develop and Implement a Drought Contingency Plan and Enforce response stages	<i>Completed</i>
<b>City of Somerville</b>	<b>Wildfire</b>	Develop and maintain a database to track community vulnerability to wildfire and then remove the dry brush from those areas	<i>In Progress</i>
<b>City of Somerville</b>	<b>Wildfire</b>	Enact Burn Bans	<i>Completed</i>
<b>City of Somerville</b>	<b>Winter Storm, Tornado, Hurricane</b>	Burying overhead power lines for critical facilities, such as the police and fire department headquarter buildings	<i>Deferred to Plan Update</i>

<b>City of Somerville</b>	<b>Excessive Heat</b>	Organizing outreach to vulnerable populations, including establishing and promoting accessible cooling centers in the community	<i>Deferred to Plan Update</i>
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Each jurisdiction has its own established process for integrating new actions, codes, ordinances, plans, and studies into its existing capabilities. Due to staff changes since the last plan, it is unknown if the 2013 plan was integrated into other planning mechanisms. New tracking measures may be implemented to ensure future staff are aware of plan integration moving forward. The planning team will ensure that each jurisdiction’s various departments continue to integrate hazard mitigation actions into their day-to-day processes.

**Table 70: Plan Integration**

<b>Department</b>	All Departments	Commissioners' Court, Road and Bridge, Mayor's Office, Council, Public Works, Economic Development, Zoning, Schoolboard	Planning, Zoning, Economic Development, Public Works, Mayor's Office, Floodplain Manager	Office of Emergency Management, Mayor's Office, Chief of Fire Department, Superintendent's Office	Office of Emergency Management, Mayor's Office, Chief of Fire Department, Superintendent's Office	Office of Emergency Management, Mayor's Office, Superintendent's Office, Administrative Office	Floodplain Manager, Mayor's Office
<b>Activity</b>	Annual Budget	Capital Improvement Projects	Comprehensive Master Plan	Public Involvement	Emergency Operations	Grant Application	Floodplain Management
<b>Time Frame</b>	Quarterly/ Annual workshops	Bi-annually	Every 10 Years	As Needed	Annually	Annual Funding Cycles	Annually
<b>Integration Process</b>	Discuss integration of medium and high priority actions with Commissioners' Court, Council, or Board of Directors (as appropriate) concerning feasibility, potential funding sources, and a preliminary cost benefit review.	Discuss inclusion of mitigation actions with CIPs. Ensure CIPs are consistent with mitigation actions, NFIP compliance, and any new land use development.	Review existing floodplain and land use controls to ensure that long term goals are consistent with actions in the HMAP.	Utilize jurisdictional web sites, social media, and other forms of advertising to make announcements of any periodic review activities concerning potential amendments or updating of the HMAP	Review prevention and protection projects for continued relevance. Ensure appropriate actions and information are included in the Emergency Operation Plan.	Review and update mitigation actions as necessary based on funding opportunities available through FEMA FMA, FEMA BRIC, FEMA HMGP, and other grant funding sources.	Update and maintain floodplain information including but not limited to: maps, construction practices, permitting, and NFIP compliance.
<b>Jurisdiction</b>							
Burleson County	x	x	x	x	x	x	x
City of Caldwell	x	x	x	x	x	x	x
City of Somerville	x	x	x	x	x	x	x
City of Snook	x	x	x	x	x	x	x
Caldwell ISD	x	x		x	x	x	
Somerville ISD	x	x		x	x	x	
Snook ISD	x	x		x	x	x	
Burleson County MUD #1	x	x				x	

Each new mitigation action below outlines the following requirements: the identified responsible department head or delegate will research all relevant information to confirm the action’s feasibility and prioritization, will formulate a plan of action, and will confirm funding sources and identify any fiscal liabilities associated with the mitigation action.

As part of each jurisdiction’s commitment to transparency, all relevant information, including but not limited to that described above and in each action’s description, will be presented to the public before the action is formally adopted for implementation. After public notification, the integration process will resemble the one outlined in Table 71 below.

**Table 71: Integration Process**

Jurisdiction	Integration Process
Burleson County	<p>After considering integrating mitigation actions with the activities outlined in Table 70 above, mitigation actions will be presented, considered, and formally adopted by the County Commissioners’ Court and County Judge.</p> <p>Burleson County will also use the Burleson County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.</p>
City of Caldwell	<p>After considering integrating mitigation actions with the activities outlined in Table 70 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor.</p> <p>The City of Caldwell will also use the Burleson County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.</p>
City of Snook	<p>After considering integrating mitigation actions with the activities outlined Table 70 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor.</p> <p>The City of Snook will also use the Burleson County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.</p>
City of Somerville	<p>After considering integrating mitigation actions with the activities outlined in Table 70 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor.</p> <p>The City of Somerville will also use the Burleson County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.</p>
Caldwell ISD	<p>After considering integrating mitigation actions with the activities outlined in Table 70 above, mitigation actions will be presented, considered, and formally adopted by the school board.</p> <p>Caldwell ISD will also use the Burleson County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.</p>
Snook ISD	<p>After considering integrating mitigation actions with the activities outlined in Table 70 above, mitigation actions will be presented, considered, and formally adopted by the school board.</p> <p>Snook ISD will also use the Burleson County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.</p>
Somerville ISD	<p>After considering integrating mitigation actions with the activities outlined in Table 70 above, mitigation actions will be presented, considered, and formally adopted by the school board.</p> <p>Somerville ISD will also use the Burleson County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.</p>
Burleson County MUD #1	<p>After considering integrating mitigation actions with the activities outlined in Table 70 above, mitigation actions will be presented, considered, and formally adopted by the board.</p> <p>Burleson County MUD #1 will also use the Burleson County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.</p>

***C) Mitigation Actions by Jurisdiction and by Hazard***

Each jurisdiction has selected actions that were identified as high or medium priority and that are in line with TDEM’s recommended mitigation actions. However, many of the mitigation actions below are dependent upon outside grant funding for implementation. For all actions likely to require grant funding, potential sources have been identified. However, grant funding is awarded on a competitive basis, so applying for funding doesn’t guarantee that funds will be received. Burleson County and the participating jurisdictions have a successful history of applying for and receiving grant funding to implement physical infrastructure actions. Budget constraints will remain the determining factor for how and when each action is implemented.

***Burleson County***

**Multi-Hazard Actions**

Mitigation Action	Educational Outreach
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in NFIP, Wildfire Fuels Reduction, Structural Hardening, etc...
Hazard	Hurricanes/Tropical Storms/Depression, Drought, Hailstorm, Riverine Flooding, Tornados, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat, Dam Failure
Priority	Medium
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	County, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department(s)	County Commissioners’ Court
Implementation Schedule	Long Term 5-10 years+
Target	Existing and future population

Mitigation Action	Purchase Back Up Power Generators
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Hurricanes/Tropical Storms/Depression, Hailstorm, Riverine Flooding, Tornados, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat, Dam Failure
Priority	High

Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	County Commissioners' Court
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing infrastructure

Mitigation Action	Create Drainage Master Plan
Objective	This action proposes creating a drainage master plan for the County, in conjunction with other jurisdictions, that will provide the County with a comprehensive planning document that provides basic information and necessary guidance for the county-wide drainage system, including but not limited to an H&H study.
Hazard	Riverine Flooding, Hurricanes/Tropical Storms
Priority	Medium
Estimated Cost	Less than \$100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	County Commissioners' Court
Implementation Schedule	5 Years
Target	Existing and future infrastructure

Mitigation Action	Install Impact and Wind-resistant Windows and Doors at Public Facilities
Objective	This action proposes hardening facilities. Hardening will include adding impact and wind-resistant doors and windows at public and critical facilities in the City.
Hazard	Hurricane / Tropical Storm, Hailstorm, Severe Winds, Tornado
Priority	High
Estimated Cost	\$10,000 to \$100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	County Commissioners' Court
Implementation Schedule	Short Term: 0 – 2 Years

Target	Existing infrastructure
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Mitigation Action	Harden Facilities
Objective	This action proposes hardening facilities. Hardening will include but is not limited to increasing thermal insulation, upgrading and/or adding shatter-resistant films to all glazing, installing impact and wind-resistant windows and doors, installing shutters, building protective walls around exposed gas tanks and cylinders, designing water delivery systems to accommodate drought events; developing new or upgrading existing water delivery systems to eliminate breaks and leaks; shielding roof-mounted equipment.
Hazard	Hurricane/Tropical Storm, Tornado, Hailstorm, Windstorm, Drought
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	County Commissioners' Court
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing infrastructure

### Single Hazard Actions

Mitigation Action	Wildfire Fuels Reduction
Objective	The action's goal is to reduce wildfire fuels on County-maintained land. Unchecked wildfire fuels increase the potential for a wildfire's ability to spread quickly, potentially resulting in higher damage dollar totals.
Hazard	Wildfire
Priority	Medium
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	County, FEMA BRIC
Responsible Department	County Commissioners' Court
Implementation Schedule	Medium Term: 3-5 Years
Target	Existing and future infrastructure

Mitigation Action	Construct Storm Drainage Infrastructure
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Objective	This action proposes constructing new storm drainage infrastructure to reduce the potential impacts of future flood events.
Hazard	Riverine Flooding
Priority	High
Estimated Cost	More than \$1,000,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	County Commissioners' Court
Implementation Schedule	Short Term: 0-2 Years
Target	Existing infrastructure

<b>Mitigation Action</b>	<b>Install Protective Window Shutters on Public Facilities</b>
Objective	This action proposes adding protective shutters to public facilities. Doing so will help limit exposure to hailstorm damages.
Hazard	Hailstorm
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	County Commissioners' Court
Implementation Schedule	Long Term - Greater than 5 Years
Target	Existing infrastructure

<b>Mitigation Action</b>	<b>Install Surge Protection and Grounding Systems to Protect Electronic Assets</b>
Objective	This action will install surge protection at all City facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	\$1,000 - \$50,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	County Commissioners' Court

Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing infrastructure

### *City of Caldwell*

#### Multi-Hazard Actions

Mitigation Action	Educational Outreach
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Flood, Hurricane/Tropical Storm, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Severe Winter Storm, Windstorm, Lightning
Priority	Low
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	City Council, City Administration
Implementation Schedule	1 - 5 Years
Target	Existing and future population

Mitigation Action	Purchase or Upgrade Back Up Power Generators
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Hurricane/Tropical Storm, Extreme Heat, Extreme Cold, Hailstorm, Lightning
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	5 Years
Target	Existing infrastructure



Mitigation Action	Create Drainage Master Plan
Objective	This action proposes creating a drainage master plan for Jurisdiction that will provide the Jurisdiction with a comprehensive planning document that provides basic information and necessary guidance for the county-wide drainage system, including but not limited to an H&H study.
Hazard	Flood, Hurricanes/Tropical Storms
Priority	Medium
Estimated Cost	Less than \$100,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	City Council, City Administration
Implementation Schedule	5 Years
Target	Existing and future infrastructure

Mitigation Action	Harden Facilities
Objective	This action proposes hardening facilities. Hardening will include but is not limited to increasing thermal insulation, upgrading and/or adding shatter-resistant films to all glazing, installing impact and wind-resistant windows and doors, installing shutters, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment.
Hazard	Hurricane/Tropical Storm, Tornado, Hailstorm, Windstorm, Drought
Priority	Low
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Construct Community Safe Rooms
Objective	The action's goal is to minimize local population vulnerability to Hurricanes/Tropical Storms and Tornadoes by providing public safe rooms.
Hazard	Hurricane/Tropical Storm, Tornado

Priority	Medium
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Purchase Portable Digital Warning Signs
Objective	Warning signs will help limit local vulnerability to multiple hazards by providing residents with information they need where they're likely to see it.
Hazard	Flood, Hurricane/Tropical Storm, Wildfire, Tornado, Extreme Heat, Severe Winter Storm
Priority	Medium
Estimated Cost	\$35,000 per device
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	Short Term – 1 - 5 Years
Target	Existing and future population

COMBINE

Mitigation Action	Install and Expand Warning Systems/Weather Radio
Objective	Warning systems will help limit local vulnerability to tornados by giving residents an opportunity to take shelter before one occurs.
Hazard	Tornado, Wildfire
Priority	Medium
Estimated Cost	\$1,000 - \$100,000 per device
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	Short Term – 1 - 5 Years
Target	Existing and future population

Mitigation Action	Implement a Tree Trimming Program
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Objective	This action will develop and implement a tree trimming program to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events. Projects may include but are not limited to trees along power lines within the jurisdiction that are connected to critical facilities and creating firebreaks.
Hazard	Hurricane/Tropical Storm, Wildfire, Tornado, Hailstorm, Severe Winter Storm, Windstorm
Priority	Medium
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

<b>Mitigation Action</b>	<b>Develop and Implement a New Tie-Down Ordinance for Manufactured / Mobile Homes, Temporary Buildings, and Unrestrained Advertisement Signs</b>
Objective	Re-evaluate all existing tie-down measures to identify strengths and weaknesses in order to develop and enforce a new tie-down ordinance.
Hazard	Severe Wind, Tornado, Hurricanes/Tropical Storm
Priority	Low
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future population and infrastructure

<b>Mitigation Action</b>	<b>Install Impact and Wind-resistant Windows and Doors at Public Facilities</b>
Objective	This action proposes hardening facilities. Hardening will include adding impact and wind-resistant doors and windows at public buildings in the Jurisdiction.
Hazard	Hurricane / Tropical Storm, Hailstorm, Windstorm
Priority	Low
Estimated Cost	\$100,000

Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	5 Years
Target	Existing infrastructure

### Single Hazard Actions

Mitigation Action	Construct New or Upgrade Storm Drainage Infrastructure
Objective	This action proposes constructing new storm drainage infrastructure or upgrading current storm drainage infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	High
Estimated Cost	More than \$1,000,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	City Council, City Administration
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Purchase Portable Pumps
Objective	This action proposes purchasing portable pumps that can be deployed as needed to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	Low
Estimated Cost	\$250,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	City Council, City Administration
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Wildfire Fuels Reduction in WUI
Objective	This action will develop and implement a program to identify and prioritize lands in the Wildland Urban Interface in need of fuels

	reduction and then reduce or remove wildfire fuels through various methods as appropriate.
Hazard	Wildfire
Priority	Low
Estimated Cost	\$10,000 - \$100,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	Short Term – 1 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Develop and Implement a New Drought Contingency Plan
Objective	Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.
Hazard	Drought
Priority	High
Estimated Cost	\$10,000 to \$100,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP
Responsible Department(s)	City Council, City Administration
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	Develop and Implement a New Water Conservation Ordinance
Objective	Jurisdiction will re-evaluate all existing water conservation and reduction measures to identify strengths and weaknesses in order to develop and enforce a new water conservation ordinance.
Hazard	Drought
Priority	Medium
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	Short Term – 1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Replace Water Fixtures with Low Flow Units
Objective	This action's goal is to limit water consumption at jurisdiction-owned and maintained facilities by replacing traditional water fixtures with low flow units on an as-needed basis.
Hazard	Drought
Priority	Low
Estimated Cost	\$10,000 - \$100,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	1-5 Years
Target	Existing and Future infrastructure

Mitigation Action	Install Surge Protection to Protect Electronic Assets
Objective	This action will install surge protection at all Jurisdiction facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	Low
Estimated Cost	\$1,000 - \$50,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	1 - 5 Years
Target	Existing infrastructure

Mitigation Action	Install Grounding Systems to Protect Electronic Assets
Objective	This action will install grounding systems including but not limited to: lightning arresters, grounding rods, and grounding electrodes at all Jurisdiction facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High

Estimated Cost	Greater than \$10,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administration
Implementation Schedule	1 - 5 Years
Target	Existing infrastructure

Mitigation Action	Set up Cooling Centers in Existing Facilities
Objective	The action's goal is to increase extreme heat resilience by limiting vulnerable populations' exposure to extreme heat by creating new, or opening up existing facilities as cooling centers or warming centers.
Hazard	Extreme Heat
Priority	Medium
Estimated Cost	\$200,000 - \$1,000,000 or greater
Potential Funding Source(s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department(s)	City Council, City Administration
Implementation Schedule	1 - 5 Years
Target	Existing and future population

Mitigation Action	Set up Warming Centers in Existing Facilities
Objective	The action's goal is to increase severe winter storm resilience by limiting vulnerable populations' exposure to extreme cold.
Hazard	Severe Winter Storm
Priority	High
Estimated Cost	\$10,000 - \$100,000
Potential Funding Source(s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department(s)	City Council, City Administration
Implementation Schedule	1 - 5 Years
Target	Existing and future population

*City of Snook*

Multi-Hazard Actions

Mitigation Action	Educational Outreach
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Flood, Hurricane/Tropical Storm, Wildfire, Tornado, Drought, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning
Priority	Low
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	City Council
Implementation Schedule	1 - 5 Years
Target	Existing and future population

Mitigation Action	Purchase or Upgrade Back Up Power Generators
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Hurricanes/Tropical Storms/Depression, Hailstorm, Riverine Flooding, Tornados, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Harden Facilities
Objective	This action proposes hardening facilities. Hardening will include but is not limited to increasing thermal insulation, upgrading and/or adding shatter-resistant films to all glazing, installing impact and wind-



	resistant windows and doors, installing shutters, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment.
Hazard	Hurricane/Tropical Storm, Hailstorm, Tornado, Severe Winds, Winter Weather, Extreme Cold
Priority	Low
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Implement a Tree Trimming Program
Objective	This action will develop and implement a tree trimming program to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events. Projects may include but are not limited to trees along power lines within the jurisdiction that are connected to critical facilities and creating firebreaks.
Hazard	Hurricane/Tropical Storm, Hailstorm, Tornadoes, Severe Winds, Wildfire, Winter Weather
Priority	Medium
Estimated Cost	\$10,000 - \$500,000
Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP
Responsible Department	City Council
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

### Single Hazard Actions

Mitigation Action	Construct New or Upgrade Storm Drainage Infrastructure
Objective	This action proposes constructing new storm drainage infrastructure or upgrading current storm drainage infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	Medium
Estimated Cost	More than \$1,000,000

Potential Funding Source (s)	Jurisdiction, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	City Council
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Develop and Implement a New Drought Contingency Plan
Objective	Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.
Hazard	Drought
Priority	High
Estimated Cost	\$10,000 to \$100,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP
Responsible Department(s)	City Council
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	Develop and Implement a Flood Damage Prevention Ordinance
Objective	The jurisdiction will re-evaluate all existing flood damage prevention measures to identify strengths and weaknesses in order to develop and enforce a new flood damage prevention ordinance and identify a floodplain manager, in compliance with the NFIP.
Hazard	Flood
Priority	Low
Estimated Cost	Less than \$50,000
Potential Funding Source (s)	City
Responsible Department	City Council
Implementation Schedule	1-5 Years
Target	Existing and planned infrastructure

*City of Somerville*

Multi-Hazard Actions

Mitigation Action	Educational Outreach
Objective	This action will create a program to inform the public and local stakeholders of local hazards, general and individual mitigation activities to prevent or decrease damages or losses during such events, and to provide information on resources including but not limited to participation in NFIP, Wildfire Fuels Reduction, Structural Hardening, etc.
Hazard	Hurricanes/Tropical Storms/Depression, Drought, Hailstorm, Riverine Flooding, Tornados, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat, Dam Failure
Priority	High
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department(s)	City Staff
Implementation Schedule	Long Term 5-10 years+
Target	Existing and future population

Mitigation Action	Purchase Back Up Power Generators
Objective	To provide backup generators to maintain continuity of services to the residents and public prior to and during disasters that may impact the electric grid and the delivery of power to city offices, gathering or shelters, or as needed for dissemination of information. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Hurricanes/Tropical Storms/Depression, Hailstorm, Riverine Flooding, Tornados, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat, Dam Failure
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor and Council, Public Works, City Administrator, City Engineer
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing infrastructure

Mitigation Action	Construct Community Safe Rooms
Objective	The action's goal is to provide a place of temporary refuge and or supply distribution location for the vulnerable public before, after, and during Hurricane/Tropical Storm and Tornado events.
Hazard	Hurricane/Tropical Storm, Tornado
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor and Council, Building Code, City Administrator, Grant Writer, City Staff
Implementation Schedule	Short Term: 1 - 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	Document Hazard Occurrences
Objective	This action will document occurrences of hazards within the next five years to study and document historic and current losses and events to help with planning for necessary and appropriate mitigation actions for the local community; in addition to informing the risk assessment for future mitigation plan updates.
Hazard	Hurricanes/Tropical Storms/Depression, Drought, Hailstorm, Riverine Flooding, Tornados, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat, Dam Failure
Priority	High
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, TCEQ
Responsible Department(s)	Office of Emergency Management
Implementation Schedule	Long Term: 5 – 10+ Years
Target	Existing and future population and infrastructure

### Single Hazard Actions

Mitigation Action	Construct Storm Drainage Infrastructure
Objective	To improve drainage throughout the city through: 1. A thorough engineering analysis of the drainage issues/problems /potential solutions 2. Rank the needed actions in order of effectiveness versus cost, 3. Design & construct needed detention, improved drainage channels, culverts, etc. for the flood levels seen in the last ten years.
Hazard	Riverine Flooding
Priority	High
Estimated Cost	More than \$1,000,000

Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor and Council, Public Works, City Administrator, City Engineer, City Staff, Grant Writer
Implementation Schedule	Short Term: 0-2 Years
Target	Existing infrastructure

Mitigation Action	Install Automated Flood Warning System
Objective	An automated flood warning system will help limit local vulnerability to floods by giving residents an opportunity to take shelter before an event occurs.
Hazard	Riverine Flooding
Priority	High
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	DCCRD President, Board of Directors
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future population

Mitigation Action	Replace Water Fixtures with Low Flow Units
Objective	This action's goal is to limit water consumption at City-owned and maintained facilities by replacing traditional water fixtures with low flow units.
Hazard	Drought
Priority	Low
Estimated Cost	\$10,000 - \$100,000
Potential Funding Source (s)	ISD, FEMA BRIC, FEMA HMGP
Responsible Department	Superintendent, School Board
Implementation Schedule	Medium Term: 3-5 Years
Target	Existing and Future infrastructure

### *Caldwell ISD*

#### Multi-Hazard Actions

Mitigation Action	Educational Outreach
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Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in NFIP, Wildfire Fuels Reduction, Structural Hardening, etc...
Hazard	Hurricanes/Tropical Storms/Depression, Drought, Hailstorm, Riverine Flooding, Tornados, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat
Priority	Medium
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	ISD, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department(s)	Superintendent of Schools, School Board
Implementation Schedule	Long Term 5-10 years+
Target	Existing and future population

Mitigation Action	Purchase Back Up Power Generators
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Hurricanes/Tropical Storms/Depression, Hailstorm, Riverine Flooding, Tornados, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	ISD, FEMA BRIC, FEMA HMGP
Responsible Department	Superintendent of Schools, School Board
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing infrastructure

Mitigation Action	Construct Community Safe Rooms
Objective	The action's goal is to minimize local population vulnerability to Hurricanes/Tropical Storms and Tornados by providing public safe rooms.
Hazard	Hurricane/Tropical Storm, Tornado
Priority	High

Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	ISD, FEMA BRIC, FEMA HMGP
Responsible Department	Superintendent of Schools, School Board
Implementation Schedule	Short Term: 1 - 2 Years
Target	Existing and future population and infrastructure

<b>Mitigation Action</b>	<b>Install Impact and Wind-resistant Windows and Doors at Public Facilities</b>
Objective	This action proposes hardening facilities. Hardening will include adding impact and wind-resistant doors and windows at public and critical facilities in the City.
Hazard	Hurricane / Tropical Storm, Hailstorm, Severe Winds, Tornado
Priority	High
Estimated Cost	\$10,000 to \$100,000
Potential Funding Source (s)	ISD, FEMA BRIC, FEMA HMGP
Responsible Department	Superintendent of Schools, School Board
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing infrastructure

### Single Hazard Actions

<b>Mitigation Action</b>	<b>Set up Cooling Centers in Existing Facilities</b>
Objective	The action's goal is to increase extreme heat and cold resilience by limiting vulnerable populations' exposure to extreme heat or extreme cold by creating new or using existing facilities as cooling centers or warming centers.
Hazard	Extreme Heat
Priority	High
Estimated Cost	\$10,000 to \$100,000
Potential Funding Source(s)	City FEMA BRIC, FEMA HMGP
Responsible Department(s)	Mayor and Council, Fire Department
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing and future population

Mitigation Action	Replace Water Fixtures with Low Flow Units
Objective	This action's goal is to limit water consumption at City-owned and maintained facilities by replacing traditional water fixtures with low flow units.
Hazard	Drought
Priority	Low
Estimated Cost	\$10,000 - \$100,000
Potential Funding Source (s)	ISD, FEMA BRIC, FEMA HMGP
Responsible Department	Superintendent, School Board
Implementation Schedule	Medium Term: 3-5 Years
Target	Existing and Future infrastructure

### *Snook ISD*

#### Multi-Hazard Actions

Mitigation Action	Educational Outreach
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in NFIP, Wildfire Fuels Reduction, Structural Hardening, etc...
Hazard	Hurricanes/Tropical Storms/Depression, Drought, Hailstorm, Riverine Flooding, Tornados, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat
Priority	Medium
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	ISD, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department(s)	Superintendent of Schools, School Board
Implementation Schedule	Long Term 5-10 years+
Target	Existing and future population

Mitigation Action	Purchase Back Up Power Generators
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional



	systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Hurricanes/Tropical Storms/Depression, Hailstorm, Riverine Flooding, Tornadoes, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	ISD, FEMA BRIC, FEMA HMGP
Responsible Department	Superintendent of Schools, School Board
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing infrastructure

Mitigation Action	Implement a Tree Trimming Program
Objective	This action will develop and implement a tree trimming program, including purchasing necessary equipment, to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events. Projects may include but are not limited to trees along power lines within the jurisdiction that are connected to critical facilities and creating firebreaks.
Hazard	Hurricane/Tropical Storm, Wildfire, Tornado, Hailstorm, Severe Winter Storm, Severe Winds
Priority	Medium
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	County Commissioners' Court, Office of Emergency Management
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

### Single Hazard Actions

Mitigation Action	Purchase Portable or Permanent Pumps
Objective	This action proposes purchasing portable or permanent pumps that can be deployed as needed to reduce the potential impacts of future flood events.
Hazard	Riverine Flooding
Priority	High

Estimated Cost	\$10,000 to \$100,000
Potential Funding Source (s)	ISD, FEMA FMA, FEMA BRIC, FEMA HMGP
Responsible Department	Superintendent of Schools, School Board
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing infrastructure

Mitigation Action	Replace Water Fixtures with Low Flow Units
Objective	This action’s goal is to limit water consumption at City-owned and maintained facilities by replacing traditional water fixtures with low flow units.
Hazard	Drought
Priority	Low
Estimated Cost	\$10,000 - \$100,000
Potential Funding Source (s)	ISD, FEMA BRIC, FEMA HMGP
Responsible Department	Superintendent, School Board
Implementation Schedule	Medium Term: 3-5 Years
Target	Existing and Future infrastructure

Mitigation Action	Install Surge Protection to Protect Electronic Assets
Objective	This action will install surge protection at all ISD facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	\$1,000 - \$50,000
Potential Funding Source (s)	ISD, FEMA BRIC, FEMA HMGP
Responsible Department	Superintendent, School Board
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing infrastructure

Mitigation Action	Install Grounding Systems to Protect Electronic Assets
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Objective	This action will install grounding systems at all ISD facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	\$1,000 - \$50,000
Potential Funding Source (s)	ISD, FEMA BRIC, FEMA HMGP
Responsible Department	Superintendent, School Board
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing infrastructure

*Somerville ISD*

Multi-Hazard Actions

Mitigation Action	Educational Outreach
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in NFIP, Wildfire Fuels Reduction, Structural Hardening, etc...
Hazard	Hurricanes/Tropical Storms/Depression, Drought, Hailstorm, Riverine Flooding, Tornadoes, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat
Priority	Medium
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	ISD, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department(s)	Superintendent of Schools, School Board
Implementation Schedule	Long Term 5-10 years+
Target	Existing and future population

Mitigation Action	Purchase Back Up Power Generators
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.

Hazard	Hurricanes/Tropical Storms/Depression, Hailstorm, Riverine Flooding, Tornados, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	ISD, FEMA BRIC, FEMA HMGP
Responsible Department	Superintendent of Schools, School Board
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing infrastructure

Mitigation Action	Implement a Tree Trimming Program
Objective	This action will develop and implement a tree trimming program, including purchasing necessary equipment, to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events. Projects may include but are not limited to trees along power lines within the jurisdiction that are connected to critical facilities and creating firebreaks.
Hazard	Hurricane/Tropical Storm, Wildfire, Tornado, Hailstorm, Severe Winter Storm, Severe Winds
Priority	Medium
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	County Commissioners’ Court, Office of Emergency Management
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

**Single Hazard Actions**

Mitigation Action	Replace Current Landscaping with Drought Resistant Plant Varieties Or Plant New Drought Resistant Plant Varieties
Objective	This action's goal is to limit water consumption at ISD-owned and maintained facilities by replacing existing landscaping with more drought resistant types.
Hazard	Drought
Priority	High
Estimated Cost	Less than \$10,000

Potential Funding Source (s)	ISD, FEMA BRIC, FEMA HMGP
Responsible Department	ISD School Board and Superintendent
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing and future infrastructure

Mitigation Action	Install Surge Protection Systems to Protect Electronic Assets
Objective	This action will install surge protection at all City facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	\$1,000 - \$50,000
Potential Funding Source (s)	ISD, FEMA BRIC, FEMA HMGP
Responsible Department	ISD School Board and Superintendent
Implementation Schedule	Short Term: 0 – 2 Years
Target	Existing infrastructure

### *Burleson County MUD #1*

#### Multi-Hazard Actions

Mitigation Action	Educational Outreach
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in NFIP, Wildfire Fuels Reduction, Structural Hardening, etc...
Hazard	Hurricanes/Tropical Storms/Depression, Drought, Hailstorm, Riverine Flooding, Tornados, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat
Priority	Low
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	BCMUD #1, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department(s)	BCMUD #1 Office Manager
Implementation Schedule	Long Term 5-10 years+
Target	Existing and future population

Mitigation Action	Purchase Back Up Power Generators
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Hurricane/Tropical Storm, Wildfire, Tornados, Riverine Flooding, Hailstorm, Severe Winter Storms, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	BCMUD #1, FEMA BRIC, FEMA HMGP
Responsible Department	BCMUD #1 Office Manager
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Implement a Tree Trimming Program
Objective	This action will develop and implement a tree trimming program, including purchasing necessary equipment, to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events. Projects may include but are not limited to trees along power lines within the jurisdiction that are connected to critical facilities and creating firebreaks.
Hazard	Hurricane/Tropical Storm, Hailstorm, Tornados, Severe Winds, Wildfire, Winter Weather
Priority	Medium
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	BCMUD #1, FEMA BRIC, FEMA HMGP
Responsible Department	BCMUD #1 Office Manager
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

Single Hazard Actions

Mitigation Action	Develop and Implement a New Drought Contingency Plan
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Objective	Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.
Hazard	Drought
Priority	High
Estimated Cost	Less than \$10,000
Potential Funding Source(s)	BCMUD #1, FEMA BRIC, FEMA HMGP
Responsible Department(s)	BCMUD #1
Implementation Schedule	1-5 Years
Target	Existing and future population and infrastructure

