Williamson County Interjurisdictional CWPP

Annex 12: Liberty Hill Volunteer Fire Department

Note: The Liberty Hill Fire Department maintains an independent Wildfire Protection Plan. This annex was included into this plan to provide a complete overview of all areas within Williamson County. For access to the Liberty Hill Wildfire Protection Plan please contact the Liberty Hill Fire Department.

ANNEX 12: LIBERTY HILL FIRE DEPARTMENT

INTRODUCTION

Organization and Jurisdiction



CURRENT /HISTORICAL MITIGATION ACTIONS AND PROGRAMS

No Information received.

PUBLIC EDUCATION AND OUTREACH PROGRAMS

No Information received.

CAPABILITIES ASSESSMENT

Emergency Response Capabilities

No Information received.

Policies

No Information received.

Regulations

No Information received.

Ordinances and Codes

No Information received.

IDENTIFY CRITICAL INFRASTRUCTURE AND COMMUNITY VALUES AT RISK

Critical Infrastructure within the Liberty Hill Volunteer Fire Department

One of the critical elements of the Community Wildfire Protection Plan is to analyze where the critical infrastructure within the district is located in comparison to the highest risk areas for wildfire. Critical facilities typically fall within the following categories: Hospitals, Schools, Law Enforcement, Fire, EMS and Tier II facilities. Within the Liberty Hill Volunteer Fire Department there are 36 facilities that are designated as critical. The following summarizes the general types of critical facilities located within the District.

Liberty Hill Volunteer Fire Department Critical Infrastructure Summary		
Facility Type Number of Facilitie		
Hospitals	0	
Schools	7	
Law Enforcement	1	
Fire	1	
Emergency Medical Services (EMS)	1	
Tier II Facilities	26	

As mentioned above, once the critical facilities are identified, the next step is to assess where and which facilities may be located in high risk areas and to then determine whether these facilities are candidates for special actions / measures like hardening, increased fire proofing, wildfire mitigation or relocation, etc. This plan analyzed impacts based in five wildfire factors: Wildland Urban Interface, Flame Length, Surface Fuels, Vegetation and Wildfire Threat as mapped and defined by the Texas State Forest Service and Texas A&M. More detail is provided later in this annex as to the level and possible impacts of these five characteristics.





Wildland Urban Interface Fire Hazard and Environment

As mentioned previously in the Williamson County Community Wildfire Protection Plan (CWPP) on the national level, following the establishment of the National Fire Plan via Executive Order due to the 2000 national wildfire season, work throughout the country was undertaken to identify areas at high risk from wildfire; this work would be used to identify the location of hazardous fuel reduction projects designed to reduce this risk. Communities across the nation that are considered to have a WUI have been identified; this list was subsequently published in the Federal Register.

Loss of structures due to wildland fires has been attributed to many factors, one of which is the proximity of hazardous fuels to homes and communities. During periods of hot, dry weather, the buildup of vegetation that has occurred on some Federal, State, and private lands in the vicinity of communities poses a potentially high risk of damage to homes and other structures, disruption to the local economy, or loss of life.

Other factors—including weather conditions and patterns, and the hazardous fuels conditions in the immediate vicinity of homes, businesses, and other structures—play important roles in the spread of wildland fire. Reducing hazardous fuel near communities may reduce, but not eliminate, wildlife risks to these communities. Some risk is inherent to communities that exist in fire-dependent ecosystems. Private landowners may help reduce this risk by creating defensible space around their homes and businesses, and by using fire-resistant materials in building those structures. Without such precautionary measures, fuel reduction on Federal land in the vicinity may be ineffective in significantly reducing community risk.

Per the Texas A&M Forest Service "The WUI is described as the area where structures and other human improvements meet and intermingle with undeveloped wildland or vegetative fuels. Population growth within the WUI substantially increases the risk from wildfire. In Texas nearly 85% of wildfires occur within two miles of a community." Texas is one of the fastest growing states in the Nation, with much of this growth occurring adjacent to metropolitan areas. This increase in population across the state will impact counties and communities that are located within the Wildland Urban Interface (WUI).

For the Liberty Hill Volunteer FD project area, it is estimated that 13,859 people or 100% of the total project area population (13.923) live within the WUI. The Texas A&M Forest Service WUI dataset is derived using advanced modeling techniques based on the Where People Live dataset and LandScan USA population count data available from the Department of Homeland Security, HSIP Freedom Data Set. WUI is simply a subset of the Where People Live dataset. The primary difference is populated areas surrounded by sufficient non-burnable areas (i.e. interior urban areas) are removed from the Where People Live data set, as these areas are not expected to be directly impacted by a wildfire.

Williamson County Wildfire Protection Plan Liberty Hill Fire Department Response District Wildland Urban Interface CR 241 1 in = 2 miles WREAGAN BLVD WILLIAMS ~Streets ~River24k NHD Lake24k NHD -Major Roads 1 - LT 1 hs/40 ac 2 - 1 hs/40 to 1 hs/20 ac 3 - 1 hs/20 to 1 hs/10 ac 4 - 1 hs/10 to 1 hs/5 ac 5 - 1 hs/5 to 1 hs/2 ac 6 - 1 hs/2 to 3 hs/ac 7 - GT 3 hs/ac City of Liberty Hill Liberty Hill Fire Response Mexico The WUI maps indicate population density not Wildfire Data Provided by wildfire risk. Map data is a starting point for more detailed community assessments. Texas A&M Forest Service ded only for casual purposes; do

Figure 2. Liberty Hill Wildland Urban Interface

Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
LT 1hs/40ac	574	4.1 %	17,836	36.4 %
1hs/40ac to 1hs/20ac	595	4.3 %	8,144	16.6 %
1hs/20ac to 1hs/10ac	1,337	9.6 %	8,339	17.0 %
1hs/10ac to 1hs/5ac	2,518	18.2 %	7,520	15.3 %
1hs/5ac to 1hs/2ac	4,206	30.3 %	5,217	10.6 %
1hs/2ac to 3hs/1ac	4,629	33.4 %	1,955	4.0 %
Total:	13,859	100.0 %	49,011	100.0 %

Liberty Hill Wildland Urban Interface

Surface Fuels

Surface fuels are important to categorize for they account for the surface fire potential. Canopy fire potential is computed through a separate but linked process. The Texas Wildfire Risk Assessment (TWRA) Summary Report for Liberty Hill accounts for both surface and canopy fire potential in the fire behavior outputs.

Surface fuels are typically categorized into one of four primary fuel types based on the primary carrier of the surface fire:

Grass Shrub/brush Timber litter Slash

There are two standard fire behavior fuel model sets published for use. The Fire Behavior Prediction System 1982 Fuel Model Set (Anderson 1982) contains 13 fuel models and the Fire Behavior Prediction System 2005 Fuel Model Set (Scott and Burgan 2005) contains 40 fuel models. The TWRA uses fuel models from both sets, as well as two additional custom fuel models devised by Texas A&M Forest Service.

Figure 3 and its associated table show that the county primarily consists of Moderate Load (42.5%), followed by Low Load, Dry Climate Grass at 23.6%, Short, Timber Litter with 22.4% and Sparse Dry Climate Grass at 2.8%,. Only 5.5% of the area is designated as Urban/Developed. Figure 65 is a Liberty Hill map showing all the surface fuel types.

DEFINITIONS

Surface fuels—Surface fuels, or fire behavior fuel models as they are technically referred to, contain the parameters needed by the Rothermel (1972) surface fire spread model to compute surface fire behavior characteristics, such as rate of spread, flame length, fireline intensity, and other fire behavior metrics.

Figure 3. Liberty Hill- Surface Fuels by type



Surface Fuels	Description	FBPS Fuel Model Set	Acres	Percent
GR 1	Short, Sparse Dry Climate Grass (Dynamic)	2005	2,264	2.8 %
GR 2	Low Load, Dry Climate Grass (Dynamic)	2005	19,229	23.6 %
GR 4	Moderate Load, Dry Climate Grass (Dynamic)	2005	1,792	2.2 %
GS 2	Moderate Load, Dry Climate Grass-Shrub (Dynamic)	2005	34,610	42.5 %
SH 5	High Load, Dry Climate Shrub	2005	132	0.2 %
FM 8	Closed timber litter (compact)	1982	7,657	9.4 %
FM 9 HWD	Hardwood litter (fluffy) - Low Load for Texas	Custom	10,587	13.0 %
NB 91	Urban/Developed	2005	4,496	5.5 %
NB 93	Agricultural	2005	305	0.4 %
NB 98	Open Water	2005	213	0.3 %
NB 99	Bare Ground	2005	62	0.1 %
-		Total:	81,347	100.0%

Vegetation

The Vegetation map describes the land cover and vegetation types across the Liberty Hill area. In the Texas Wildfire Risk Assessment (TWRA), the Vegetation dataset is used to support the development of the Surface Fuels, Canopy Cover, Canopy Stand Height, Canopy Base Height, and Canopy Bulk Density datasets. The vegetation classes with descriptions are shown in the following table. It should be noted that the area is dominated by Grassland/Herbaceous vegetation that can be grazed (34.1%), Shrub/Scrub (15.1%), and Juniper or Juniper/Live Oak Forest (10.3%). Only 5.0 % of the Liberty Hill area is considered to be developed.

Figure 4. Liberty Hill Vegetation



Class	Description	Acres	Percent
Open Water	All areas of open water, generally with < 25% cover of vegetation or soil	90	0.1 %
Developed Open Space	Impervious surfaces account for < 20% of total cover (i.e. golf courses, parks, etc)	2,087	2.6 %
Developed Low Intensity	Impervious surfaces account for 20-49% of total cover	2,258	2.8 %
Developed Medium Intensity	Impervious surfaces account for 50-79% of total cover	108	0.1 %
Developed High Intensity	Impervious surfaces account for 80-100% of total cover	40	0.0 %
Barren Land (Rock/Sand/Clay)	Vegetation generally accounts for <15% of total cover	17	0.0 %
Cultivated Crops	Areas used for the production of annual crops, includes land being actively tilled	305	0.4 %
Pasture/Hay	Areas of grasses and/or legumes planted for livestock grazing or hay production	32	0.0 %
Grassland/Herbaceous	Areas dominated (> 80%) by grammanoid or herbaceous vegetation, can be grazed	27,699	34.1 %
Shrub/Scrub	Areas dominated by shrubs/trees < 5 meters tall, shrub canopy > than 20% of total vegetation	12,253	15.1 %
Floodplain Forest	> 20% tree cover, the soil is periodically covered or saturated with water	239	0.3 %
Deciduous Forest	$\geq 20\%$ tree cover, ${>}75\%$ of tree species shed leaves in response to seasonal change	5,049	6.2 %
Live Oak Forest	> 20% tree cover, live oak species represent >75% of the total tree cover	6,279	7.7 %
Juniper or Juniper/Live Oak Forest	> 20% tree cover, juniper or juniper/live oak species represent > 75% of the total tree cover	8,383	10.3 %
Juniper/Deciduous Forest	> 20% tree cover, neither juniper or deciduous species represent > 75% of the total tree cover	16,506	20.3 %
	Total:	81,347	100.0 %

Liberty Hill Vegetation

Flame Length

Characteristic Flame Length is the typical or representative flame length of a potential fire based on a weighted average of four percentile weather categories. Flame Length is defined as the distance between the flame tip and the midpoint of the flame depth at the base of the flame, which is generally the ground surface. It is an indicator of fire intensity and is often used to estimate how much heat the fire is generating. Flame length is typically measured in feet Flame length is the measure of fire intensity used to generate the response index outputs for the TWRA. Flame length characteristics are varied in the Liberty Hill area but is dominated by 46.9% of the area having a projected flame length of 4-8 feet, followed by 0-2 feet at 13.1%, and 2-4 feet flame lengths are estimated at only 2.7% of the total area. Only 6.2% of the area is projected as non-burnable area.

Flame length is a fire behavior output, which is influenced by three environmental factors - fuels, weather, and topography. Weather is by far the most dynamic variable as it changes frequently. To account for this variability, four percentile weather categories were created from historical weather observations to represent low, moderate, high, and extreme weather days for each weather influence zone in Texas. A weather influence zone is an area

where, for analysis purposes, the weather on any given day is considered uniform. There are 22 weather influence zones in the State of Texas.



Figure 5. Liberty Hill Flame Length

Flame Length	Acres	Percent
Non-Burnable	5,075	6.2 %
0 - 2 ft.	10,675	13.1 %
2 - 4 ft.	2,196	2.7 %
4 - 8 ft.	38,184	46.9 %
8 - 12 ft.	1,621	2.0 %
20 - 30 ft.	8,964	11.0 %
30 + ft.	14,610	18.0 %
Total:	81,347	100.0 %

Liberty Hill Flame Length

Wildfire Threat

Per the Texas A&M Forest Service Wildfire Threat is the likelihood of a wildfire occurring or burning into an area. Threat is derived by combining a number of landscape characteristics including surface fuels and canopy fuels, resultant fire behavior, historical fire occurrence, percentile weather derived from historical weather observations, and terrain conditions. These inputs are combined using analysis techniques based on established fire science.

The measure of wildfire threat used in the Texas Wildfire Risk Assessment (TWRA) is called Wildland Fire Susceptibility Index, or WFSI. WFSI combines the probability of an acre igniting (Wildfire Ignition Density) and the expected final fire size based on rate of spread in four weather percentile categories. WFSI is defined as the likelihood of an acre burning. Since all areas in Texas have WFSI calculated consistently, it allows for comparison and ordination of areas across the entire state. For example, a high threat area in East Texas is equivalent to a high threat area in West Texas.

To aid in the use of Wildfire Threat for planning activities, the output values are categorized into seven (7) classes. These are given general descriptions from Low to Very High threat. Only 0.7% of the area within the Liberty Hill Volunteer Fire Department area is designated as non-burnable. The balance of the area or 92.1% is categorized as moderate (categories 3 and 4) and 7.2% as High (category 5). The Wildfire Threat in the Liberty Hill Volunteer Fire District area is significantly higher than other areas of the County as well as the average for Williamson County.





Class	Acres	Percent
Non-Burnable	579	0.7 %
3 (Moderate)	25,703	31.6 %
4	49,219	60.5 %
5 (High)	5,845	7.2 %
Total:	81,347	100.0 %

WILDFIRE MITIGATION ACTIONS



Name of Jurisdiction:	Williamson County Emergency Service District No. 4 -Liberty Hill Fire Protection District	Mitigation Action #:	1
Mitigation Action Title:	Practice Firewise, RSG practices and fuel treatments		

Assessing the Risk Hazard(s) addressed: \boxtimes Wildfire \boxtimes All Hazards ⊠ Drought ⊠Extreme Heat ⊠Flood ⊠Lightning (check all that apply) ⊠Thunderstorm ⊠Tornado ⊠Wind ⊠Winter Weather Heavy WUI, dense vegetation, distance from fire department and lack of defensible space. Specific problem being Unreliable water supply. Mitigated (describe why action is needed) **Evaluation of Potential Alternatives** 1. Encourage residents to practice Firewise, RSG practices and fuel treatments Alternatives Considered (name of project and reason for not 2. Work with City and County officials selecting) 3. No Action. Action/Project Intended for Implementation Encourage residents to practice Firewise and RSG practices. Educate residents to the benefits of Describe how action will be hazardous fuels reduction and encourage residents to work together toward landscape-level implemented hazardous fuels mitigation projects that benefit the entire community. Reduce ladder fuels and fuel (main steps involved) loading to modify fire behavior and provide for defensible space. Use mulching or hand clearing in environmentally sensitive zones to protect natural resources ⊠Local Plans and Regulations ⊠Structure and Infrastructure Project **Action/Project Type** ⊠Natural Systems Protection ⊠Education and Awareness Programs **Applicable Goals/Objectives** ⊠Goal #1 ⊠Goal #2 ⊠Goal #3 ⊠Goal #4 (refer to list of goals/objectives) Objective: 1,2,3,4,5 Applies to existing or future □ Existing Development □Future Development development Both Existing and Future Development DNot Applicable **Describe benefits** ⊠Life Safety ⊠Damage Reduction □Other (losses avoided) Describe: Comprehensive education will result in enhanced life safety and property protection. ⊠ < \$10,000; □\$10,000 to \$100,000; □>\$100,000 Estimated Cost Other Amount: \$ **Plan for Implementation Responsible Department** Local Planning Mechanism □CWPP □ Capital Improvement Plan □Comprehensive Plan □Building Code □Ordinance (check all that apply) □Other: **Potential Funding Sources Timeline for Completion** \Box Short Term (1-5 yrs.) \Box Long Term (>5 yrs.) \Box Ongoing **Reporting on Progress** □Not Started □In-progress □Delayed □Completed □No Longer Required Status/Comment Comment: Completed by: (name, title, phone #) Assessing the Risk

Hazard(s) addressed: (check all that apply)	⊠ Wildfire ⊠ All Hazards ⊠ Drought ⊠Extreme Heat ⊠Flood ⊠Lightning ⊠Thunderstorm ⊠Tornado ⊠Wind ⊠Winter Weather		
Specific problem being Mitigated (describe why action is needed)	Heavy WUI, dense vegetation, distance from fire department and lack of defensible space. Unreliable water supply.		
	Evaluation of Potential Alternatives		
Alternatives Considered	1. Develop Structure Protection Plan		
(name of project and reason	2. Work with City and County officials		
for not selecting)	3. No Action.		
	Action/Project Intended for Implementation		
Describe how action will be implemented (main steps involved)	Develop a plan to access and evacuate residents in the event of wildfire. Pre-plan engine staging to ensure safety of firefighters and equipment. Identify safe areas for evacuees to stage to and from. Identify the type and number of engines to protect or prepare homes in the event of wildfire. Develop defensible space to protect homes and give firefighters room to maneuver. Identify safe zones for firefighters engaged in fire suppression activities. Identify available water sources in the area of the neighborhood		
Action/Project Type	 ☑Local Plans and Regulations ☑Structure and Infrastructure Project ☑Natural Systems Protection ☑Education and Awareness Programs 		
Applicable Goals/Objectives(refer to list ofgoals/objectives)	⊠Goal #1 ⊠Goal #2 ⊠Goal #3 ⊠Goal #4 Objective: 1,2,3,4,5		
Applies to existing or future development	 □ Existing Development □ Future Development □ Not Applicable 		
Describe benefits (losses avoided)	⊠Life Safety ⊠Damage Reduction □Other Describe: Comprehensive education will result in enhanced life safety and property protection.		
Estimated Cost	$\Box < 10,000; \ \Xi 10,000 \text{ to } 100,000; \ \Box > 100,000$ Other Amount: \$		
	Plan for Implementation		
Responsible Department			
Local Planning Mechanism (check all that apply)	□CWPP □ Capital Improvement Plan □Comprehensive Plan □Building Code □Ordinance □Other:		
Potential Funding Sources			
Timeline for Completion	\Box Short Term (1-5 yrs.) \Box Long Term (>5 yrs.) \Box Ongoing		
	Reporting on Progress		
Status/Comment	□Not Started □In-progress □Delayed □Completed □No Longer Required Comment:		
Completed by: (name, title, phone #)			