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**Williamson County Interjurisdictional CWPP**

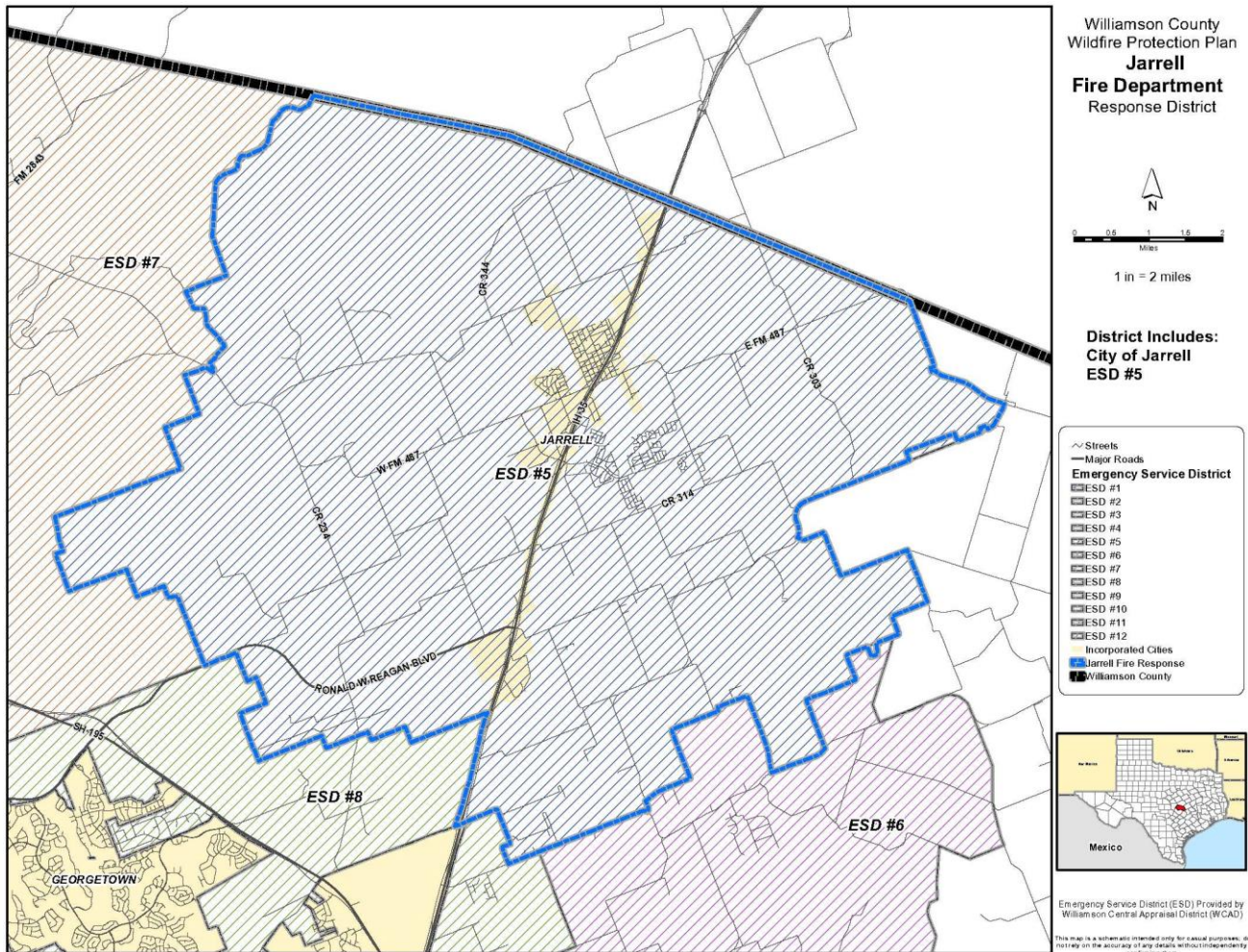
## **Annex 9: Jarrell Volunteer Fire Department**

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## ANNEX 9: JARRELL FIRE DEPARTMENT

### INTRODUCTION

#### Organization and Jurisdiction



Jarrell Fire Department and Williamson County ESD 5 provides fire, rescue and EMS to 75 square miles of north Williamson County which includes the City of Jarrell, Sonterra Community, Live Oak, Green Acres, and Corn Hill communities. They also cover a 13 mile stretch of the IH-35 corridor.

Name:	Jarrell Fire Department / Williamson County ESD 5
Address:	155 County Road 313, Jarrell, TX
Department Type (volunteer or paid):	
Number of Stations:	1
Municipalities covered:	75 square miles of north Williamson County, Texas which includes the City of Jarrell, the Sonterra Community, Live Oak, Green Acres and Corn Hill communities as well as thousands of acres of farmland, quarries, and industrial business; also covers a 13 mile stretch of the IH-35 corridor
Types of Services Provided (Firefighting, EMS, emergency response, HAZMAT, dispatch, training, etc.):	Structural and wildland fire fighting, medical first response, and limited rescue and hazmat capabilities.
Firefighting Personnel:	
Full-Time Paid Firefighters	2
Part-Time Paid Firefighters	
Volunteer Firefighters	
Non-Firefighting Support Personnel:	
Non-Firefighting Paid Staff	
Non-Firefighting Volunteers	
Firefighting Equipment List quantity, type, etc.):	
Other Firefighting Resources (Mutual aid, state resources, etc.):	The department is a participating agency with the County Resource Coordination that provides a coordinated mutual aid response.

## CURRENT /HISTORICAL MITIGATION ACTIONS AND PROGRAMS

The unincorporated areas of the Jarrell Fire District are covered by the Williamson County Hazard Mitigation Plan.

## PUBLIC EDUCATION AND OUTREACH PROGRAMS

The Jarrell Fire Department maintains a Facebook page to use as an effective tool to communicate with residents. The Department uses their Facebook page to post updates on fires, accidents, and rescue incidents; share public service announcements; and inform people of upcoming events.

Program	Do you have this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Public Protection (ISO Fire Protection Classes 1 to 10)			
Storm Ready certification	Yes	Williamson County	
Firewise Communities classification	No		
Natural Disaster/Safety Programs in/for Schools			
Public Education Program/Outreach (through website, social media)	Yes	See above	

## CAPABILITIES ASSESSMENT

### Emergency Response Capabilities

No information received.

### Policies

No specific policies regarding wildfire.

### Regulations

No specific regulations regarding wildfires, other than the requirement to report controlled burns.

### Ordinances and Codes

No specific ordinances or codes regarding wildfire.

### Plans, Reports and Studies

The Jarrell Fire District is covered by both the City of Jarrell and Williamson County Emergency Management Plans and the unincorporated areas are covered by the Williamson County Hazard Mitigation Plan.

### Resources

No information received.

## IDENTIFY CRITICAL INFRASTRUCTURE AND COMMUNITY VALUES AT RISK

### Critical Infrastructure within the Jarrell 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

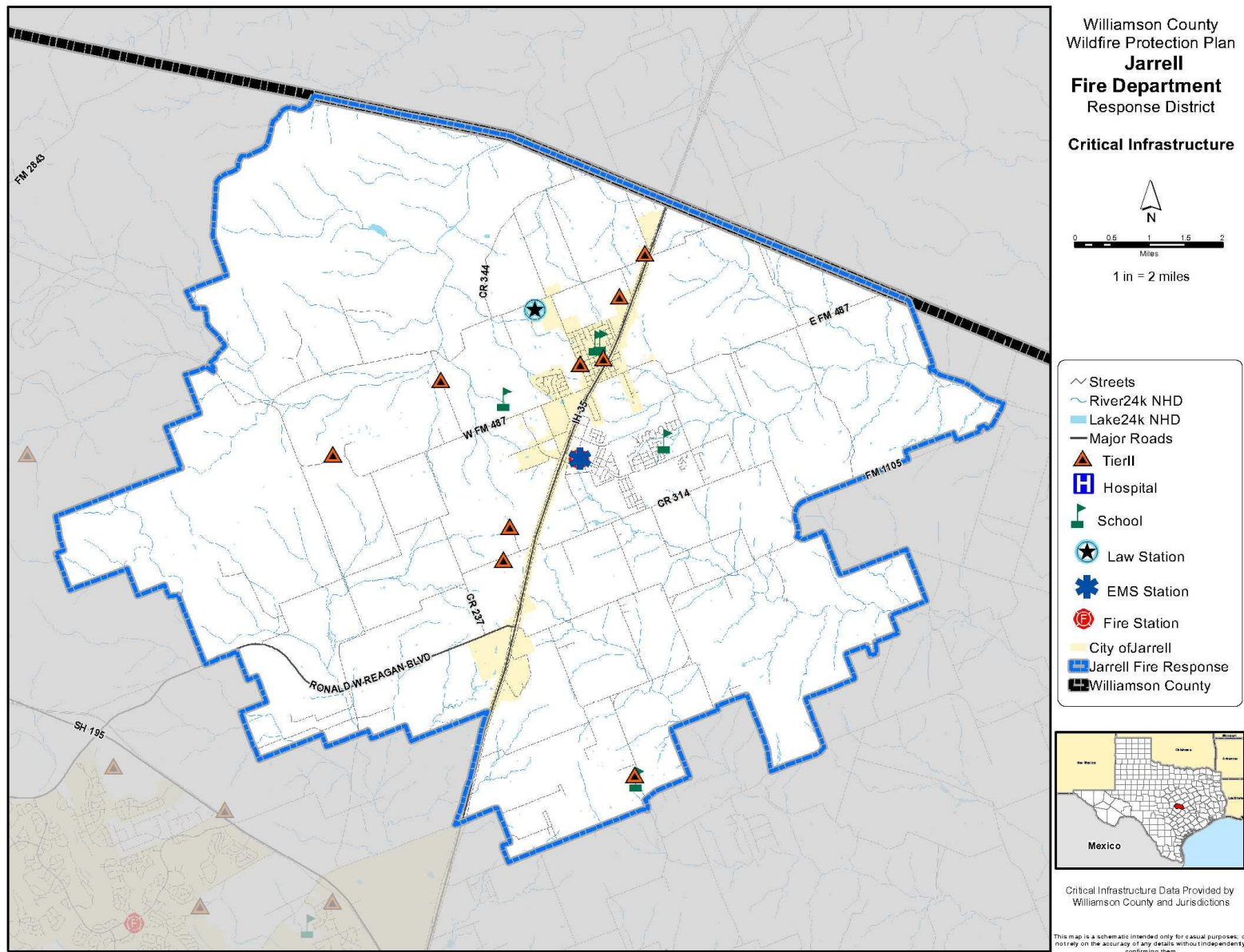
Jarrell Volunteer Fire Department there are 18 infrastructure facilities designated as critical. . The following summarizes the general types of critical facilities located within the District.

Jarrell Volunteer Fire Department Critical Infrastructure Summary	
Facility Type	Number of Facilities
Hospitals	0
Schools	5
Law Enforcement	1
Fire	1
Emergency Medical Services (EMS)	1
Tier II Facilities	10

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.



Figure 1. Jarrell Critical Infrastructure



## 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.

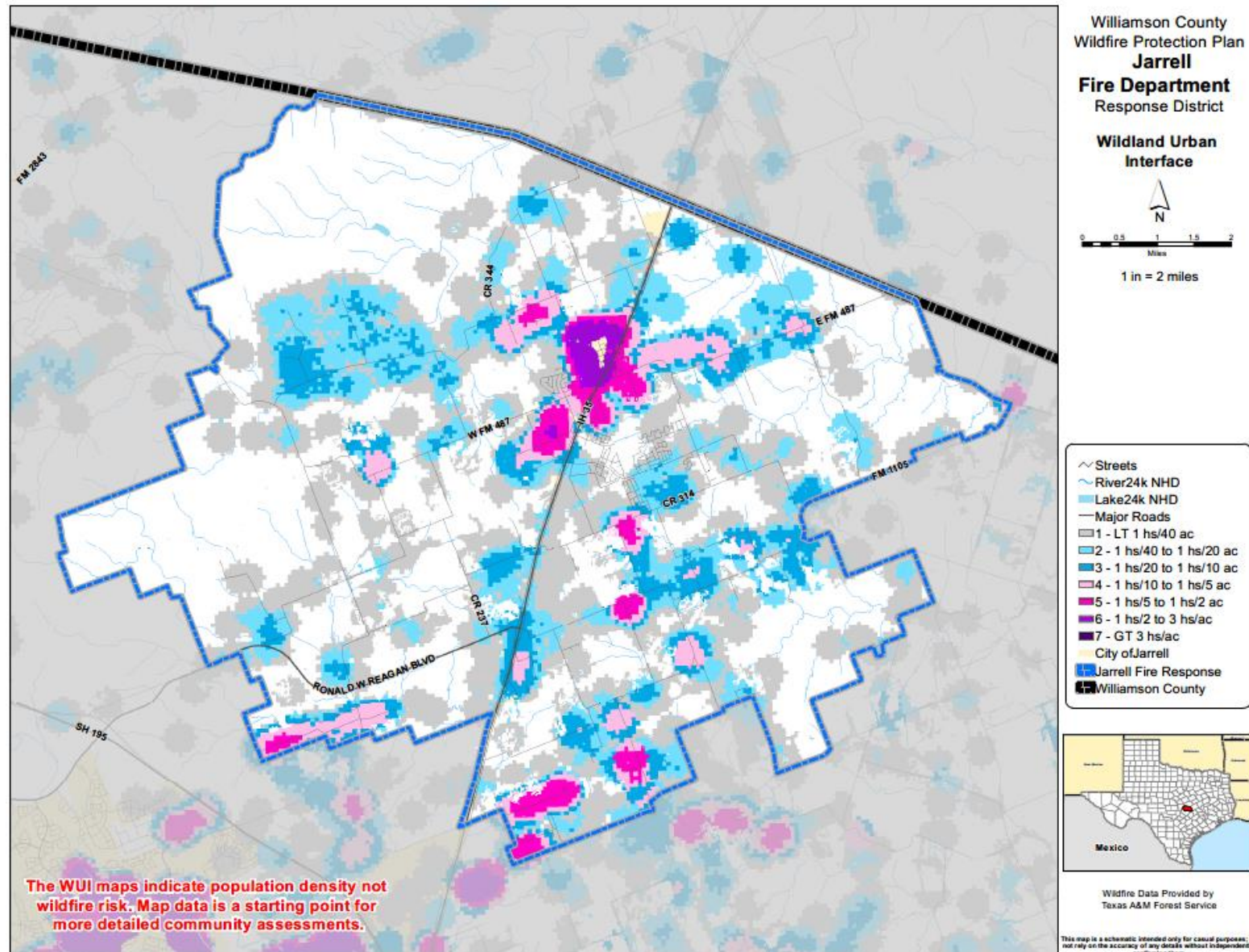
Loss of structures due to wildland fires has been attributed to many factors, one of which is the proximity of hazardous fuels to homes and communities. During periods of hot, dry weather, the buildup of vegetation that has occurred on some Federal, State, and private lands in the vicinity of communities 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, wildfire 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 Jarrell VFD project area, it is estimated that 3,981 people or 96% of the total project area population (4,141) 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.

Figure 2. Jarrell Wildland Urban Interface





	Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
	LT 1hs/40ac	419	10.5 %	11,947	47.8 %
	1hs/40ac to 1hs/20ac	572	14.4 %	6,143	24.6 %
	1hs/20ac to 1hs/10ac	593	14.9 %	3,715	14.9 %
	1hs/10ac to 1hs/5ac	671	16.9 %	1,821	7.3 %
	1hs/5ac to 1hs/2ac	978	24.6 %	1,053	4.2 %
	1hs/2ac to 3hs/1ac	748	18.8 %	316	1.3 %
	<b>Total:</b>	<b>3,981</b>	<b>100.0 %</b>	<b>24,996</b>	<b>100.0 %</b>

### 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 Williamson County 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

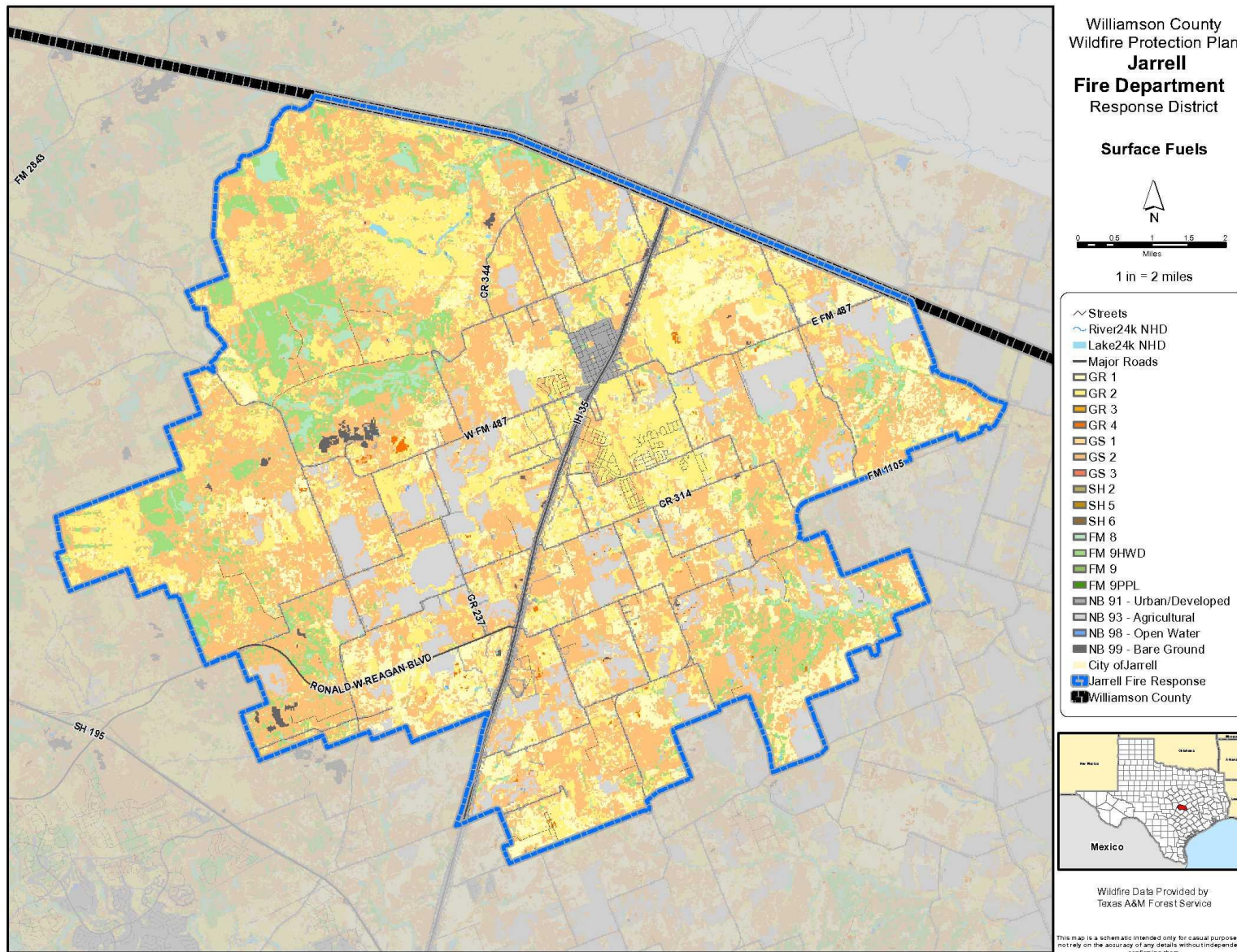
#### DEFINITIONS

**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.

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 49 and the associated table show that the county primarily consists of Moderate Load (38.6%), followed by Low Load, Dry Climate Grass at 21.2%, Short, Sparse Dry Climate Grass at 15.5%, and Agricultural with 9.2%. Figure 3 is a Jarrell map showing all the surface fuel types.

Figure 3. Jarrell- Surface Fuels by type



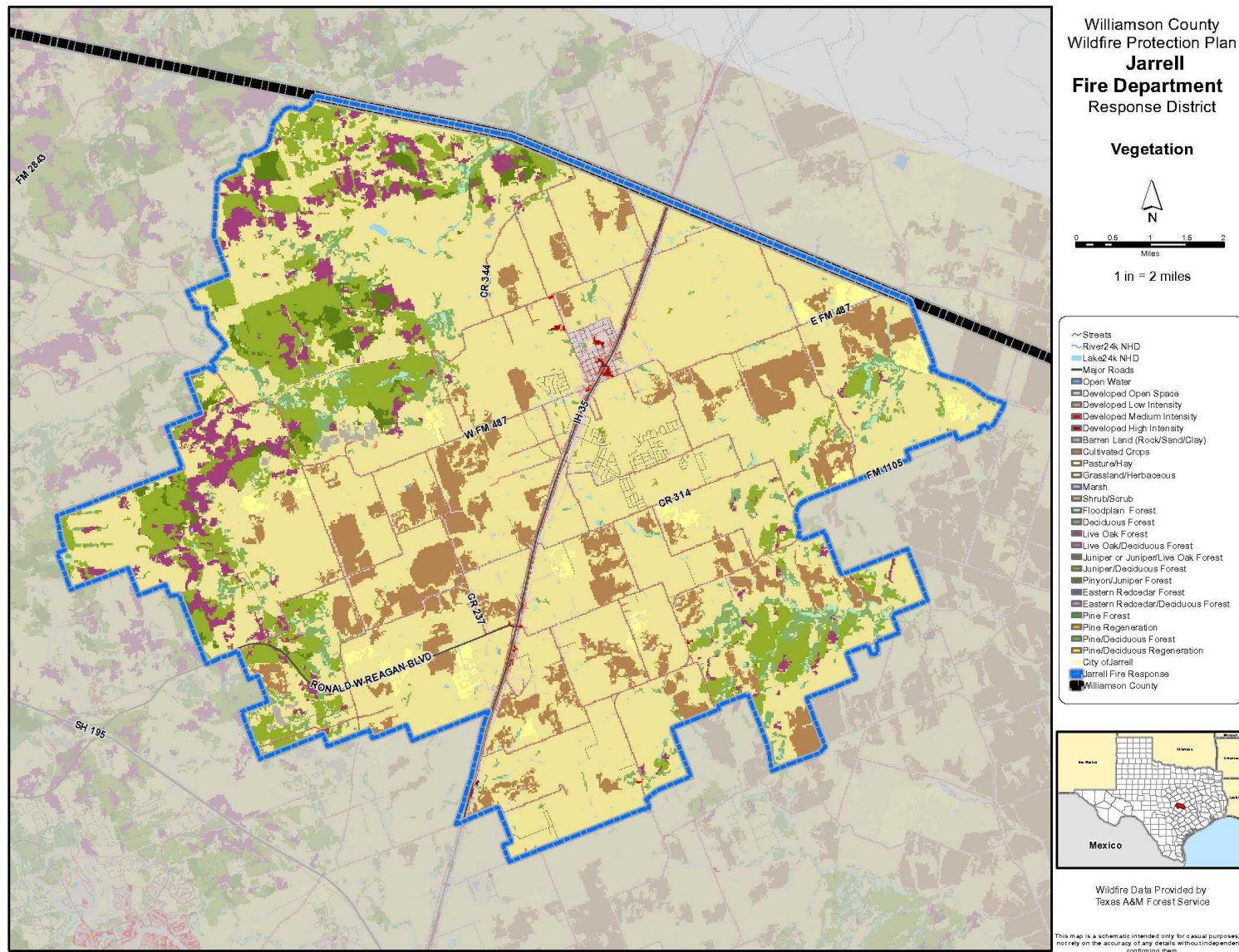
	Surface Fuels	Description	FBPS Fuel Model Set	Acres	Percent
	GR 1	Short, Sparse Dry Climate Grass (Dynamic)	2005	7,500	15.5 %
	GR 2	Low Load, Dry Climate Grass (Dynamic)	2005	10,308	21.2 %
	GR 4	Moderate Load, Dry Climate Grass (Dynamic)	2005	87	0.2 %
	GS 2	Moderate Load, Dry Climate Grass-Shrub (Dynamic)	2005	18,742	38.6 %
	FM 8	Closed timber litter (compact)	1982	1,399	2.9 %
	FM 9 HWD	Hardwood litter (fluffy) - Low Load for Texas	Custom	3,365	6.9 %
	NB 91	Urban/Developed	2005	2,467	5.1 %
	NB 93	Agricultural	2005	4,446	9.2 %
	NB 98	Open Water	2005	46	0.1 %
	NB 99	Bare Ground	2005	168	0.3 %
Total:				48,527	100.0%

## Vegetation

The Vegetation map describes the land cover and vegetation types across the Bartlett 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 (63.9%), Juniper/Deciduous Forest (10.2%), Cultivated Crops (9.2%) and Deciduous Forest (4.0%). Only 5.1% of the overall land area in Jarrell falls in the developed categories.



Figure 4. Jarrell Vegetation





	Class	Description	Acres	Percent
	Open Water	All areas of open water, generally with < 25% cover of vegetation or soil	13	0.0 %
	Developed Open Space	Impervious surfaces account for < 20% of total cover (i.e. golf courses,	810	1.7 %
	Developed Low Intensity	Impervious surfaces account for 20-49% of total cover	1,603	3.3 %
	Developed Medium	Impervious surfaces account for 50-79% of total cover	31	0.1 %
	Developed High	Impervious surfaces account for 80-100% of total cover	22	0.0 %
	Barren Land (Rock/Sand/Clay)	Vegetation generally accounts for <15% of total cover	153	0.3 %
	Cultivated Crops	Areas used for the production of annual crops, includes land being actively	4,474	9.2 %
	Pasture/Hay	Areas of grasses and/or legumes planted for livestock grazing or hay	682	1.4 %
	Grassland/Herbaceous	Areas dominated (> 80%) by grammanoid or herbaceous vegetation, can	30,998	63.9 %
	Floodplain Forest	> 20% tree cover, the soil is periodically covered or saturated with water	280	0.6 %
	Deciduous Forest	> 20% tree cover, >75% of tree species shed leaves in response to	1,955	4.0 %
	Live Oak Forest	> 20% tree cover, live oak species represent >75% of the total tree cover	1,878	3.9 %
	Live Oak/Deciduous Forest	> 20% tree cover, neither live oak or deciduous species represent >75% of the total tree cover	0	0.0 %
	Juniper or Juniper/Live Oak Forest	> 20% tree cover, juniper or juniper/live oak species represent > 75% of the total tree cover	658	1.4 %
	Juniper/Deciduous Forest	> 20% tree cover, neither juniper or deciduous species represent > 75% of the total tree cover	4,969	10.2 %
<b>Total:</b>			<b>48,527</b>	<b>100.0 %</b>

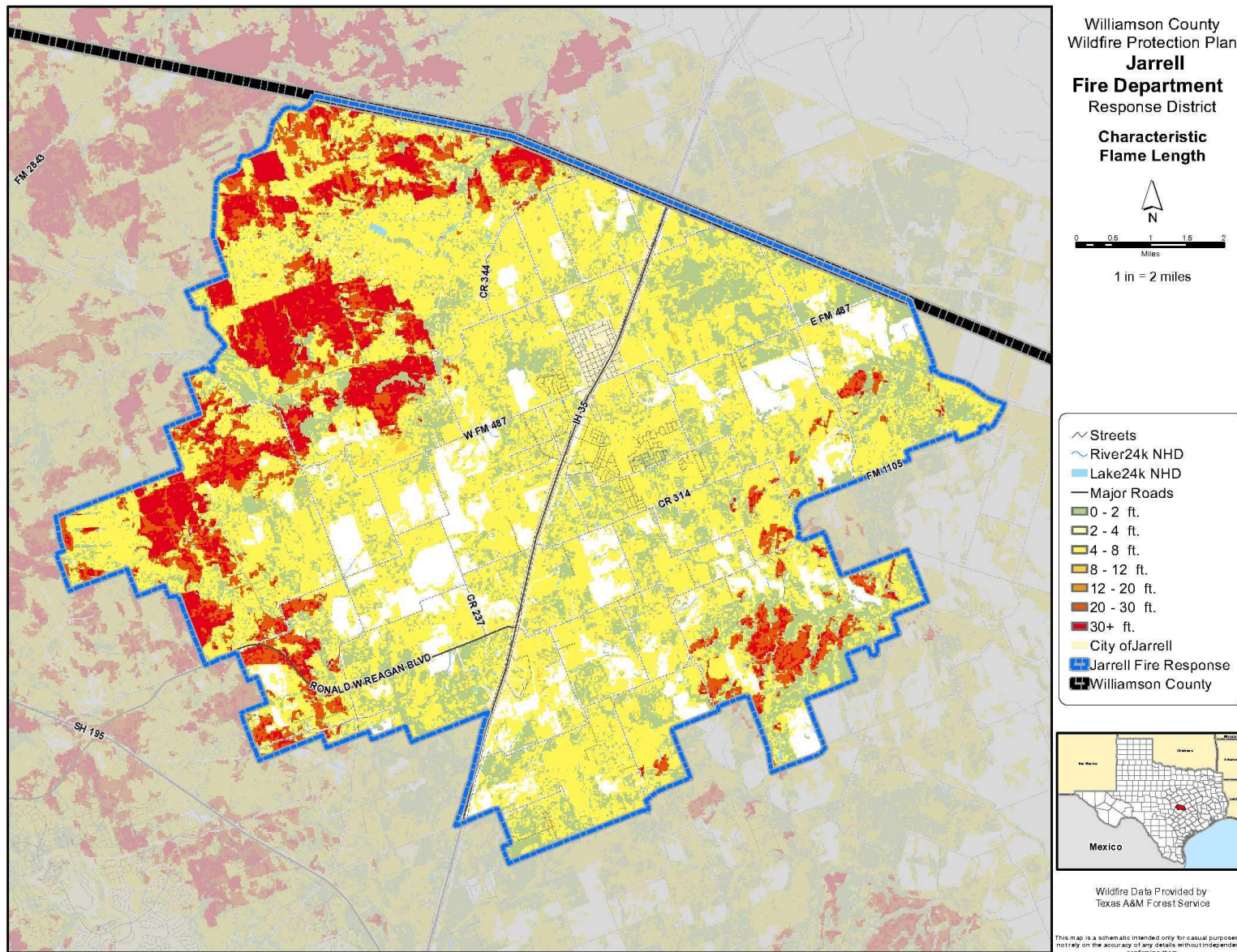
## Flame Length

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 Jarrell area but is dominated by 48.9% of the area having a projected flame length of 4-8 feet, followed by 0-2 feet at 20.1%, non-burnable area is projected at 14.7%, 20 -30 feet flame lengths are estimated at 7.6%, flame lengths greater than 30 feet are estimated at 7.0%, and 2-4 feet flame lengths are estimated at only 1.6% of the total area. It should be noted that 14.6% of the area within Jarrell has projected flame lengths in excess of 20 feet while 48.9% of the area has projected flame lengths in the 4 – 8 foot category for a total of more than 63%. Since flame length an indicator fire intensity as well heat generated by the fire, 63% of the area is at risk for higher than average county wildfire risk.

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. Jarrell Flame Length



	Flame Length	Acres	Percent
	Non-Burnable	7,126	14.7 %
	0 - 2 ft	9,760	20.1 %
	2 - 4 ft	753	1.6 %
	4 - 8 ft	23,722	48.9 %
	8 - 12 ft	87	0.2 %
	12 - 20 ft	8	0.0 %
	20 - 30 ft	3,672	7.6 %
	30 + ft	3,399	7.0 %
Total:		48,527	100.0 %

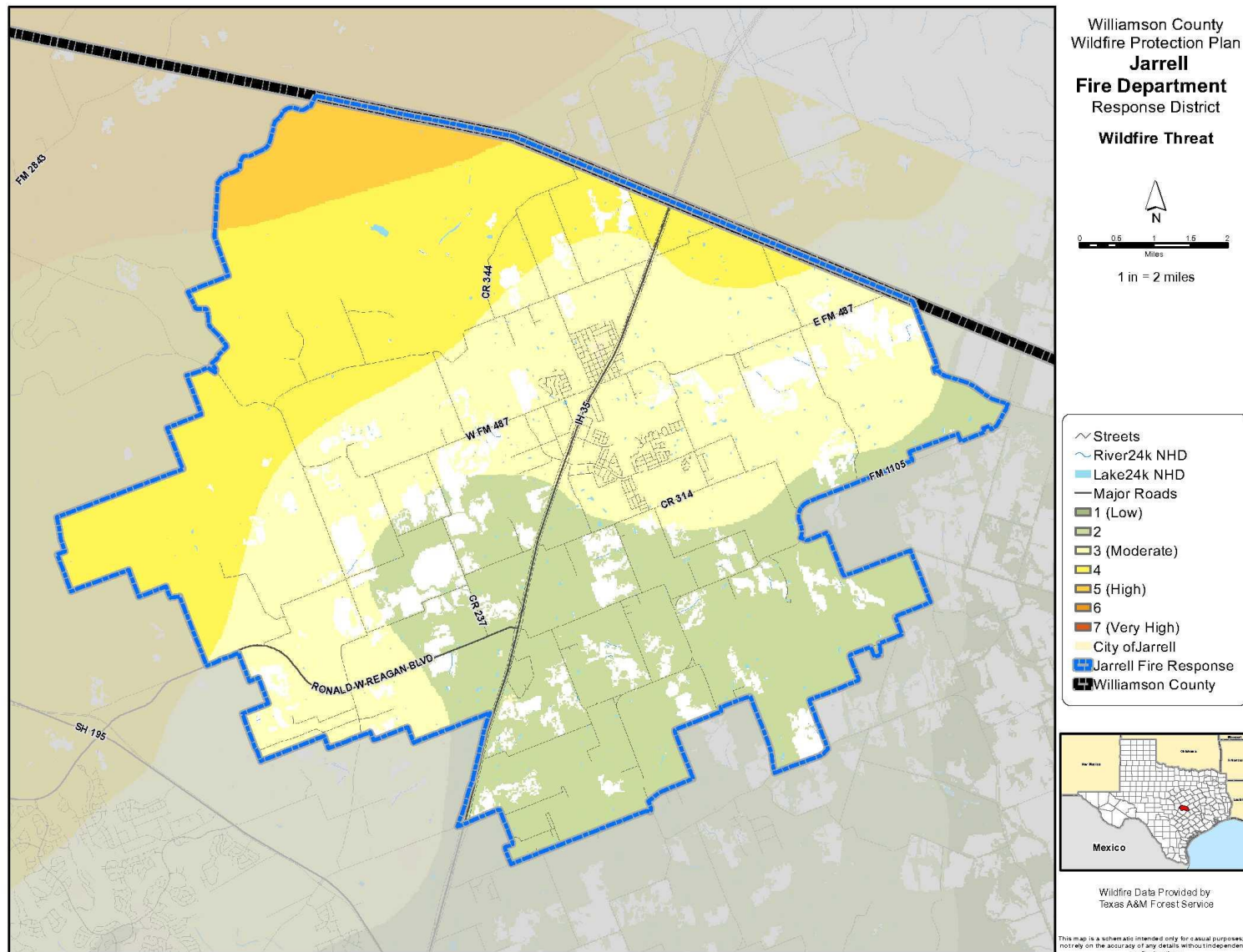
### Wildfire Threat

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.



Figure 6. Jarrell Wildfire Threat





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 9.7% of the area within the Jarrell Volunteer Fire Department area is designated as non-burnable. The balance of the area or 26.5 % is designated as low (categories 1), and 59.1% as moderate (categories 3 and 4) and 4.7% is rated as high. The percentages for medium and high risk area greater than the average for Williamson County.

**Wildfire Threat**

	Class	Acres	Percent
	Non-Burnable	4,690	9.7 %
	2	12,866	26.5 %
	3 (Moderate)	16,406	33.8 %
	4	12,275	25.3 %
	5 (High)	2,290	4.7 %
Total:		48,527	100.0 %

## WILDFIRE ASSESSMENTS

Community Wildfire Risk Hazard Analysis (CWRHA) were conducted on select communities or subdivisions within this fire district. The CWRHA's are essential in identifying areas that are at risk for catastrophic wildfires leading to the destruction of private and commercial property along with environmentally sensitive areas. Assessments were performed overall of the community and not on individual home sites, which may not indicate increased totals for small or site-specific hazards.

Assessments were performed locally developed assessment criteria that addresses specific criteria and assigned a numerical value indicating the potential risk to the identified assessment area. Assessment areas include:

- Community Access / Egress
  - Access / Egress Points
  - Primary Road Width
  - Secondary Road Terminus
  - Accessibility (surface grade)
  - Subdivision Bridges
  - Roadway Fuels
  - Street Signs
- Home Site Hazards
  - Driveway Characteristics
  - Dominant Trees
  - Ladder Fuels
  - Vegetation
  - Slope of Property
  - Defensible Space
  - Lot Size
- Building Construction Hazards
  - Roofing Materials
  - Siding
  - Soffits
  - Foundation Type
  - Fencing
- Additional Factor Hazards
  - Fire Control Water Supply
  - Utilities
  - Surrounding Environment
  - Undeveloped Lots / Areas

*Note: Assessments did not include local firefighting capabilities as Williamson County maintains strong auto-aid and mutual-aid agreements amongst the local fire departments which greatly enhances the capabilities of each fire district.*

The CWRHA's were conducted utilizing the Crisistrack software and mobile application, which provides a comprehensive report for each selected assessment area. (available upon request)

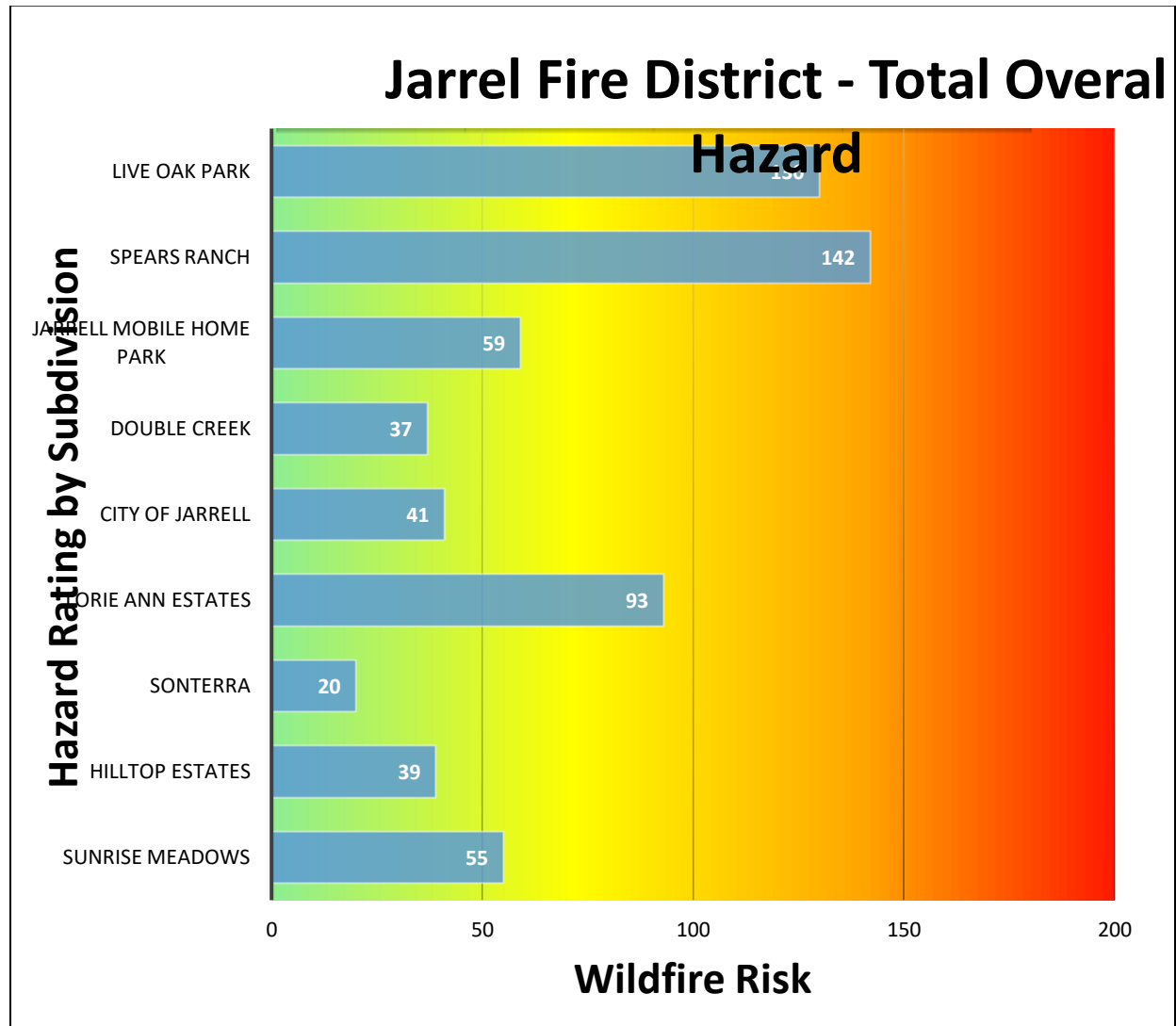
## Assessment Scoring

Section	Min	Mid	Max
Community Access/Egress Rating	0	19	38
Site Hazard Rating	5	62	119
Building Construction Hazard Rating	10	35	60
Additional Hazard Factors	0	25	50
<b>Total Hazard Factors</b>	<b>15</b>	<b>141</b>	<b>267</b>

## Community Hazards by Category

NAME	TOTAL COMMUNITY	TOTAL SITE HAZARD	TOTAL CONSTRUCTION HAZARD	TOTAL ADDITIONAL HAZARD	TOTAL OVERALL HAZARD
Sunrise Meadows	2	16	10	27	55
Hilltop Estates	2	10	10	17	39
Sonterra	0	5	15	0	20
Lorie Ann Estates	13	23	45	12	93
City of Jarrell	2	21	15	3	41
Double Creek	9	11	10	7	37
Jarrell Mobile Home Park	7	5	35	12	59
Spears Ranch	0	90	10	42	142
Live Oak Park	17	71	10	32	130

## Community Hazard Ratings





## MITIGATION AND FUELS REDUCTION

### A. MITIGATION

Mitigation efforts for communities and subdivisions within the Coupland Fire District should focus on wildfire public education and the benefits of Firewise Programs. Education consisting of Ready-Set-Go and private property fuels reduction should be the primary focus of education.

### B. FUELS REDUCTION PROJECTS

No publicly owned properties requiring fuels reduction have been identified in the Coupland Fire District.

Land in this fire district primarily consist of rural areas of which a majority is either cultivated farm lands, pasture land for grazing and limestone quarreis. No fuels reduction projects have been identified for fuels reduction projects. Areas will be reassessed as necessary to identify future areas that may require mitigation efforts to reduce the likelihood of wildfire.