



Water Resources Technical Report

Farm-to-Market (FM) 2642 Widening Paris District

FM 35 to SH 66

CSJ: 2658-01-013

Hunt County

December 2018

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT

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1 Introduction

1.1 Project Description

In cooperation with Hunt County and Royce City, TxDOT proposes to widen Farm-to-Market (FM) 2642 from FM 35 to State Highway (SH) 66. The proposed project consists of widening the existing two-lane roadway to a four-lane divided roadway with a raised median which varies from 14 to 26 ft in width and includes median openings with left-turn deceleration lanes providing access to adjacent properties along the corridor. The proposed curb and gutter type roadway will feature underground storm sewers and six-foot wide sidewalks along both sides. The total project length is approximately 2.6 miles and includes an approximate 650-foot-long project exception with begin and end termini located on either side of the recently constructed Interstate Highway (IH) 30 interchange improvements. Refer to the Project Location Map, Aerial Map, and United States Geological Survey (USGS) Topographic Map (**Figures 1, 2, and 3**).

The intersection of FM 2642 and FM 35 will be reconfigured to provide a north-south thoroughfare per the City of Royce City's Comprehensive Plan. A modern roundabout at the intersection of FM 35 and FM 2642 is also under consideration for which no additional right of way would be required (**Figure 2**).

The proposed project is to be substantially constructed within the existing 100-foot to 120-foot right-of-way with an additional 10' to 15' of ROW required at two locations along the corridor to provide right-turn deceleration lanes at connections to the IH 30 westbound frontage road, and Verandah Blvd. Additionally, 60-foot to 80-foot-wide drainage easements will be required at seven cross drain locations to convey and maintain access to historic outfall locations along Bearpen Creek. Five-foot to fifteen-foot-wide temporary construction easements will also be required to construct tie-in slopes between the back of proposed sidewalk to existing ground.

1.2 Purpose and Need

This project is needed because the capacity of FM 2642 between the intersections with FM 35 and SH 66 is inadequate to meet current and future traffic volumes, resulting in congestion

and reduced mobility on this stretch of highway. The purpose of the project is to reduce congestion and improve mobility on FM 2642 between the intersections with SH 66 and FM 35.

2 Wetland/Stream Delineation

2.1 Delineation Methodology

Qualified biologists conducted site visits on December 12, 2017, April 19, 2018, and May 18, 2018 to identify the presence and extents of waters of the U.S. (including wetlands). Waters of the U.S. include rivers, streams (perennial, intermittent, and ephemeral), bogs, sloughs, lakes, on-channel ponds, and wetlands. Additionally, waters of the U.S. (water bodies) are further classified by the United States Army Corps of Engineers (USACE) as TNWs, RPWs, and non-navigable tributaries that are not relatively permanent (i.e. ephemeral stream - non-RPW).

The jurisdictional limit of lakes, ponds, rivers, and streams are identified by the ordinary high water mark (OHWM). The OHWM is defined as:

“...that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed in the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (33 CFR 328).”

Wetlands are those “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions [as defined by the USACE and U.S. Environmental Protection Agency].”

Potential wetland features identified within the proposed project were delineated in accordance with the Wetlands Research Program Technical Report Y-87-1 USACE Wetlands Delineation Manual (USACE1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains (Version 2.0) (USACE 2010).

The locations and limits of potential waters of the U.S. (including wetlands) were mapped using a Trimble Geo-7X Global Positioning System (GPS), capable of sub-meter accuracy. Field mapped OHWM's, as well as field OHWM width estimates were used to delineate the OHWM of streams intersected by the project. OHWM indicators observed in the field included shelving along the edge of the banks of the streams, sediment sorting, and changes in the amount of terrestrial vegetation present (i.e., destruction of terrestrial vegetation). The data collected in the field were interpreted using ArcMap, a Geographic Information System (GIS), from which the area and length of potential waters of the U.S. (including wetlands) were calculated.

2.2 Results

The proposed improvements include 2.6 miles of FM 2642. Land use surrounding the proposed project is primarily commercial, agricultural, and residential. Additionally, the proposed project lies within the Bearpen Creek Watershed. According to the Josephine and Royle City U.S. Geological Survey (USGS) topographic maps, 7.5-minute quadrangles, elevations within the Bearpen Creek Watershed on the proposed project ranged from a low of approximately 540 feet above mean sea level (msl) at the southern extent of the project area at FM 35 to a high of approximately 580 feet above msl at SH 66 at the northern extent of the project area (**Figure 3**).

According to Wunderground.com (Weather Underground), the preliminary climatological data shows 1.37 inches of rainfall was recorded in Royle City in the month-to-date during which the last field visit was conducted (May 18, 2018). According to the National Oceanic and Atmosphere Administration (NOAA), this total equates to 0.65 inches below normal rainfall for this period. In the three months prior to the May field visit (April 2018, March 2018, and February 2018), 15.57 inches of rainfall were recorded in Royle City, which was 5.59 inches above normal rainfall expected in this three month period. **Table 1** illustrates the recorded and normal rainfall amounts for twelve months preceding fieldwork.

Table 1: Monthly Rainfall Recorded in Royse City, Texas

Month	Recorded Rainfall (inches)	Normal Rainfall (inches)	Difference (inches)
May 19-31, 2017	1.81	2.79	-0.98
June 2017	7.91	3.63	4.28
July 2017	3.86	2.22	1.64
August 2017	7.28	1.83	5.45
September 2017	0.27	2.76	-2.49
October 2017	2.72	4.52	-1.8
November 2017	1.04	3.43	-2.39
December 2017	6.23	3.21	3.02
January 2018	0.66	2.19	-1.53
February 2018	11.3	2.86	8.44
March 2018	2.86	3.88	-1.02
April 2018	1.41	3.24	-1.83
May 1-18, 2018	1.37	2.02	-0.65
Totals	48.72	38.58	10.14

Source: Weather Underground, 2018; NOAA, 2018

According to FEMA flood insurance rate map (FIRM) panels 48231C0350G and 48231C0475G (January, 2012) and the FEMA National Flood Hazard Layer (NFHL) GIS dataset, five of the proposed drainage easements would fall within the 100-year floodplain of Bearpen Creek (**Figure 4**).

The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), and the USGS National Hydrology Dataset (NHD) (**Figure 5**) indicate that the project area would intersect with two unnamed tributaries of Bearpen Creek. Upon field verification, an additional ephemeral stream (Stream 1) and an impoundment of Bearpen Creek (Pond 1) were identified within the project area. Field verification also identified one of the NHD mapped streams as a non-jurisdictional swale constructed in uplands to provide drainage from FM 2642 (Ditch 1), while the other was confirmed as a potentially jurisdictional ephemeral stream (Stream 2). Vegetation observed within the proposed project is identified in **Table 2**.

Table 2: Vegetation

Vegetation Observed within the Project Area	
Trees and Shrubs	
Sugarberry (<i>Celtis laevigata</i>)	Honey locust (<i>Gleditsia triacanthos</i>)
Black willow (<i>Salix nigra</i>)	Chinese tallow (<i>Triadica sebifera</i>)
American elm (<i>Ulmus americana</i>)	
Grasses, Rushes, and Sedges	
Hammock sedge (<i>Carex fissa</i>)	Bermudagrass (<i>Cynodon dactylon</i>)
Johnsongrass (<i>Sorghum halepense</i>)	Knotroot bristlegrass (<i>Setaria parviflora</i>)

Source: Project Team (December 2017, April 2018)

Three soil types were mapped within the proposed project area by the U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) (**Figure 6**). The descriptions provided in **Table 3** are derived from the USDA NRSC online Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov>). One hydric soil (Kaufman clay, frequently flooded) was identified within two of the proposed drainage easements.

Table 3: Hunt County Soils Located within the Proposed Project

Soil Type	Map Symbol	Soil Description
Burleson clay, 0 to 1 percent slopes	5	This clay soil is found on stream terraces and is moderately well drained with high runoff. Soil is not prone to flooding and is used for pasture and cultivated cropland.
Kaufman clay, frequently flooded	19	This clay soil is found within floodplains and is moderately well drained with high runoff. Soil is hydric and prone to frequent flooding. Used for pastures, but unsuitable for crop cultivation.
Leson clay, 1 to 3 percent slopes	21	This clay soil is found on the summit or shoulder of convex ridges and is moderately well drained. Soil is not prone to flooding and is used for pasture and cultivated cropland.

Source: USDA NRCS Web Soil Survey, October 21, 2017.

2.3 Conclusions

Potential Section 404 jurisdictional waters of the U.S. within the proposed project consisted of two ephemeral streams and an impoundment of Bearpen Creek (**Figures 7.1 to 7.6**). Area and linear footage within the existing and proposed ROW was calculated for all potentially jurisdictional water crossings. The potential Waters of the U.S. delineated within the existing and proposed project ROW are summarized in **Table 4**. Subsequent paragraphs provide a habitat description for the potential jurisdictional features.

Table 4: Potential Jurisdictional Waters of the U.S. Located Within the Existing and Proposed Project ROW

Potential Water/Wetland Feature	Classification	OHWM (feet)*	Length (feet)**	Area /Impact (Acres) **	Section 404 Permitting
Stream 1	Ephemeral	7	13		NWP 14 Without PCN
	Culverted Portion of Ephemeral Stream	-	-	0.002	
Stream 2	Ephemeral	4	50		NWP 14 Without PCN
	Culverted Portion of Ephemeral Stream	-	72	0.005	
Pond 1	-	-	230	0.087	NWP 14 Without PCN

* Represents an average width at the OHWM.

**Length and area were calculated using ArcMap, a geographic information system (GIS).

Source: Project Team (December 2017, April 2018)

Stream 1 is a potential jurisdictional stream that is located on the east side of FM 35 approximately 765 feet south of the intersection with FM 2642. This ephemeral stream is an unnamed tributary with headwaters originating within the project area before flowing out of the ROW east for 0.4 mile into Bearpen Creek. Bearpen Creek flows into The South Fork Sabine River which ultimately flows into Lake Tawakoni, an impoundment of the Sabine River, 12 miles southeast of the project area. The observed vegetation associated with this stream included sugarberry, black willow, Chinese tallow, American elm, Johnsongrass, and bermudagrass. See **Table 4** for more information on this water feature (**Figures 7.1 and 8, Photographs 1-2**).

Stream 2 is a potential jurisdictional stream that is located approximately 600 feet south of the intersection of County Road (CR) 2515 and FM 2642. This emergent tributary originates from an on-channel pond approximately 50 feet west of FM 2642 before entering the ROW and flowing into a concrete channel north then east for 0.32 mile into Bearpen Creek. Bearpen Creek flows into The South Fork Sabine River which ultimately flows into Lake Tawakoni, an impoundment of the Sabine River, 12 miles southeast of the project area. The observed vegetation at this stream included black willow, bermudagrass, Johnsongrass, and knotroot bristlegrass. See **Table 4** for more information on this water feature (**Figures 7.2 and**

8; Photographs 3-4).

Pond 1 is an impoundment of Bearpen Creek impacted by two of the proposed drainage easements approximately 210 feet north of the intersection of FM 2642 and the unnamed road which connects FM 2642 with Verandah Boulevard (Blvd). Bearpen Creek flows into The South Fork Sabine River which ultimately flows into Lake Tawakoni, an impoundment of the Sabine River, 12 miles southeast of the project area. The observed vegetation at this stream included sugarberry, honey locust, black willow, bermudagrass, and Johnsongrass. See **Table 4** for more information on this water feature (**Figures 7.3 and 8; Photographs 5-6**).

Stream 1 and Stream 2 within the proposed project are classified as ephemeral based on a review of the corresponding USGS quadrangle map, the field investigation, and the definition contained in the USACE 2017 Nationwide Permits. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for ephemeral streams. Runoff from rainfall is the primary source of water for stream flow.

The ecological functions of the streams and wetlands include physical, chemical, and biological processes. Existing functions that the streams provide include short-term surface water storage and the ability to absorb hydraulic energy, serve to reduce the sediment load, and provide habitat for wildlife. All of these functions are largely dependent on the amount of water being conveyed from adjacent areas into the streams. This short-term surface water storage can help to reduce downstream flood conditions. Some areas adjacent to the streams also provide good diversity of vegetation and landscape for wildlife species.

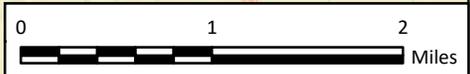
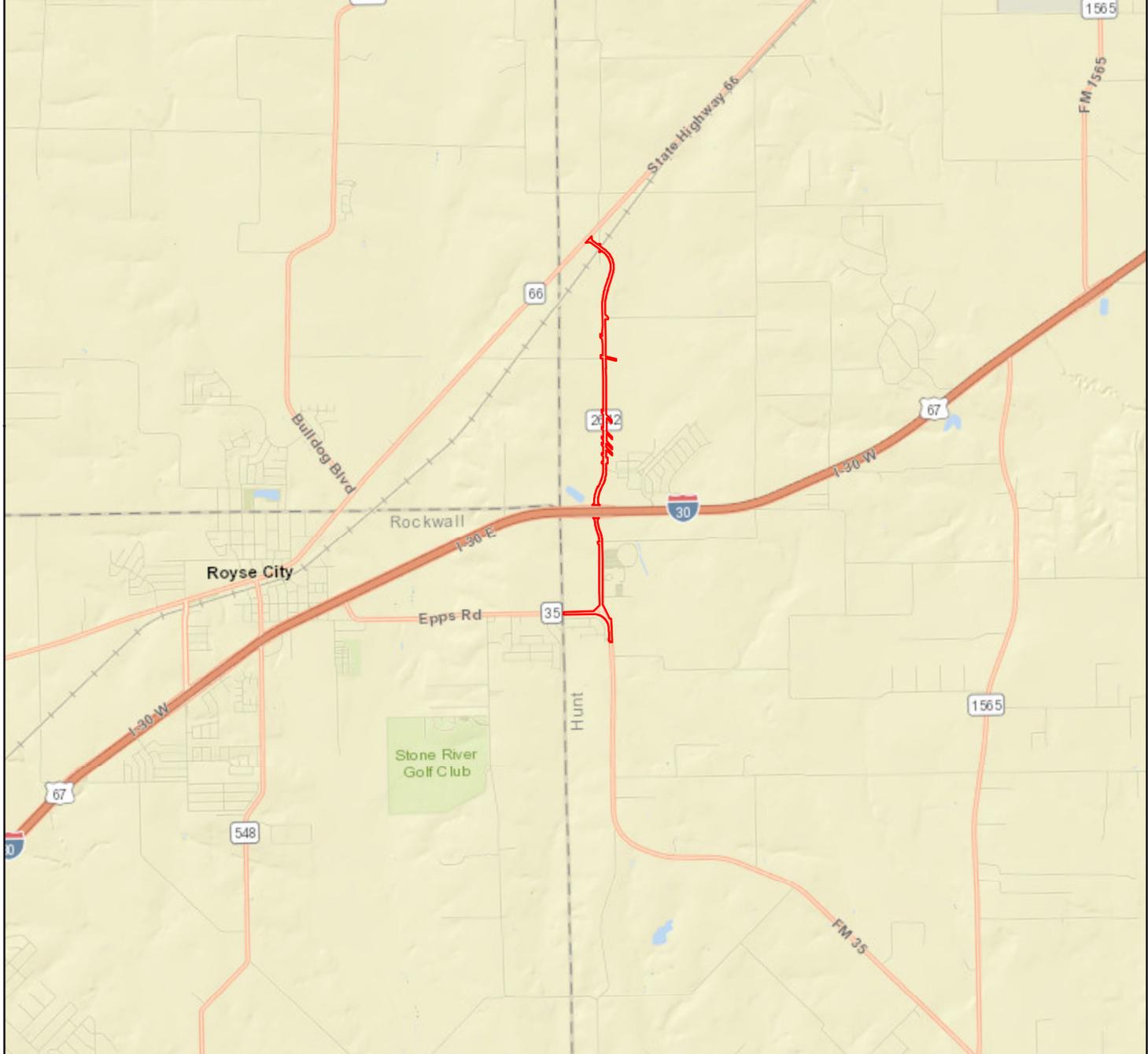
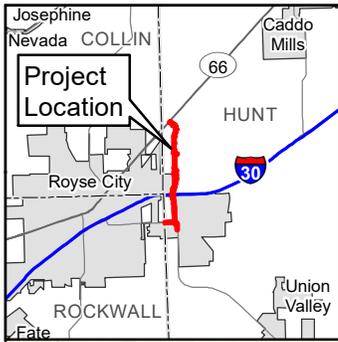
Nationwide Permit 14 authorizes impacts to waters of the U.S. associated with the construction, expansion, modification or improvements of linear transportation projects. For single and complete transportation projects, the maximum limit of loss to jurisdictional waters of the U.S. that would be authorized under Nationwide Permit 14 is 0.5 acre. A Preconstruction Notification (PCN) would be required if the loss of waters of the U.S. exceeds 0.10-acre or there is any proposed discharge (temporary and/or permanent) within a special aquatic site, including wetlands, at any crossing of a single and complete project. Compensatory mitigation is required in a PCN for NWP 14 when more than 0.10-acre of wetlands is permanently impacted. This is to ensure that those losses result only in minimal adverse effects to the

aquatic environment. Impacts to waters of the U.S. do not exceed 0.10-acre at Stream 1, Stream 2, or Pond 1, and there are no impacts to wetlands or other special aquatic sites; therefore, impacts to these waters of the U.S. are authorized under NWP 14 with no PCN or mitigation required.

3 References

- 33 CFR 328. "Definition of Waters of the United States," Title 33 Code of Federal Regulations, Part 328. Electronic Code of Federal Regulations.
<http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=%2Findex.tpl>.
January 3, 2011.
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- U.S. Army Corps of Engineers. 1987. Corps of Engineers Wetland Delineation Manual. Wetland Research Program Technical Report, Y-87-1. U.S. Army Corps of Engineers Environmental Laboratory, Vicksburg, Mississippi.
- _____. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- _____. 2017 Definitions of 2017 Nationwide Permits. 2017. U.S. Army Corps of Engineers Fort Worth District.
- United States Department of Agriculture (USDA). 2018. Web Soil Survey of Hunt County. <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>. Data obtained December 2018.

Appendix A: Figures



 Project Area

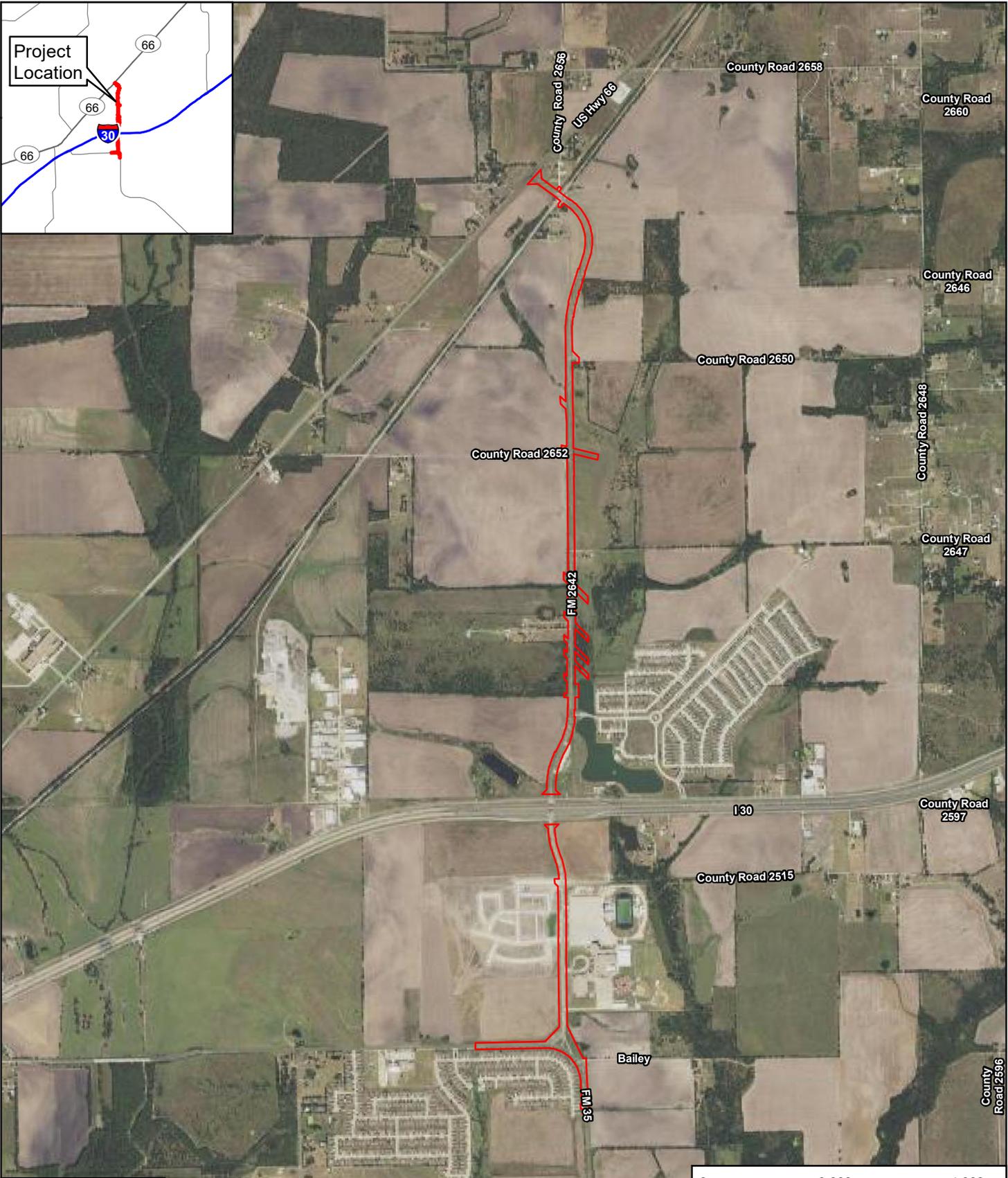
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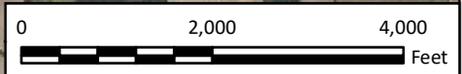
HUNT COUNTY
FM 2642 (FM 35 to SH 66)
Project Location Map

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1
FIGURE



 Project Area



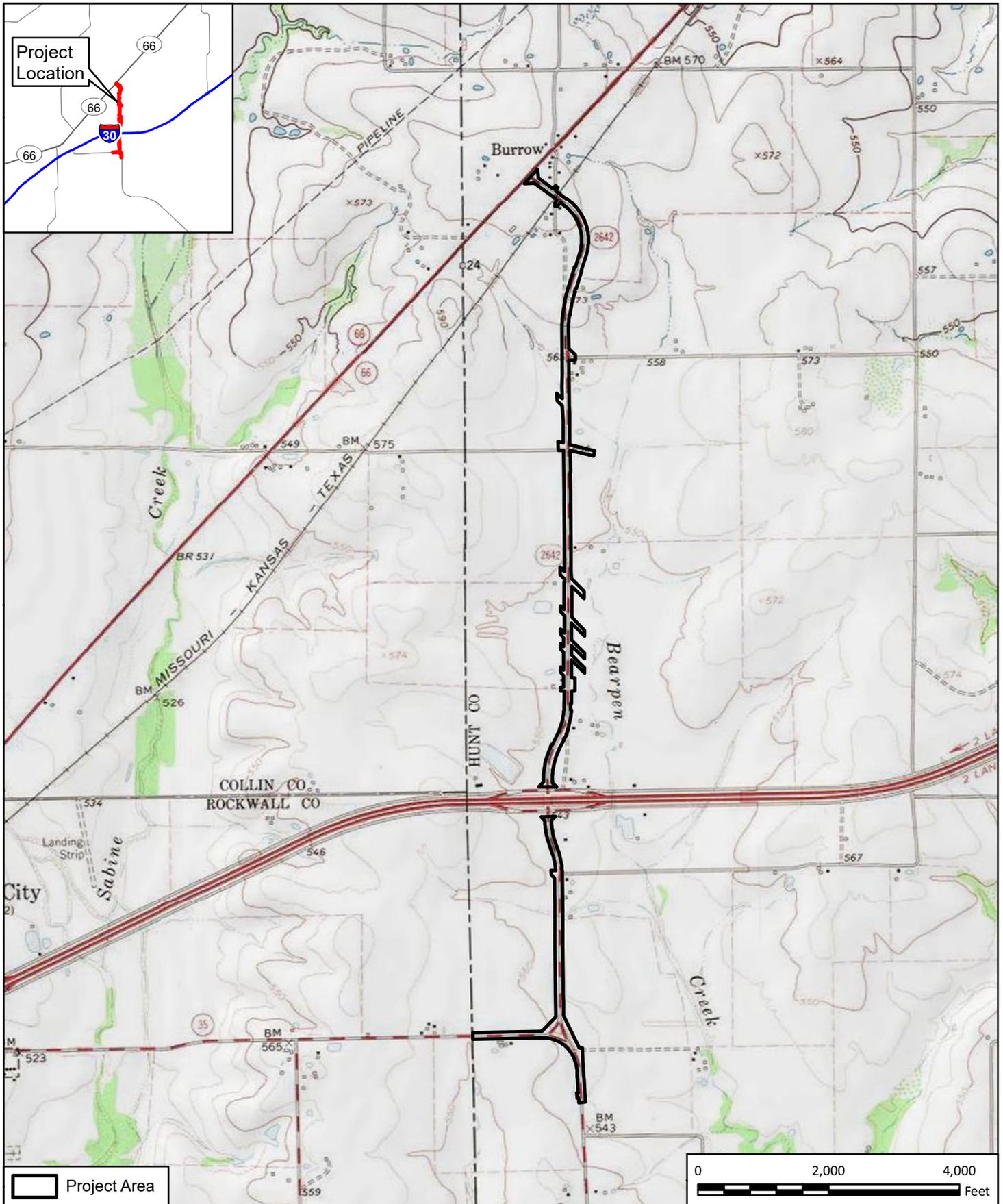
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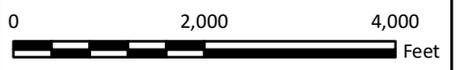
HUNT COUNTY
FM 2642 (FM 35 to SH 66)
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2
FIGURE



 Project Area



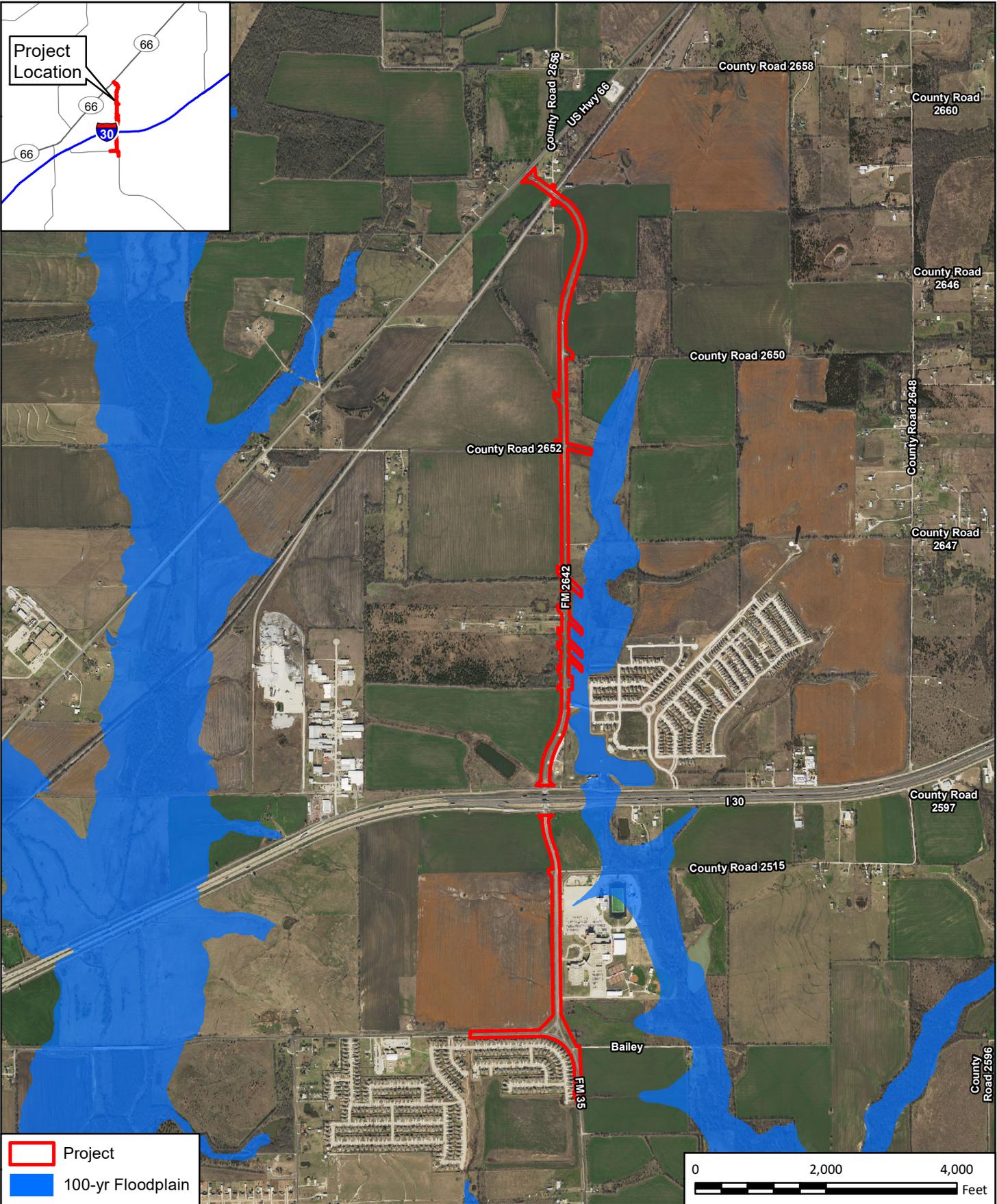
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HUNT COUNTY
FM 2642 (FM 35 to SH 66)
USGS Topographic Map
Quads: Josephine & Royse City

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3
FIGURE



Project
 100-yr Floodplain



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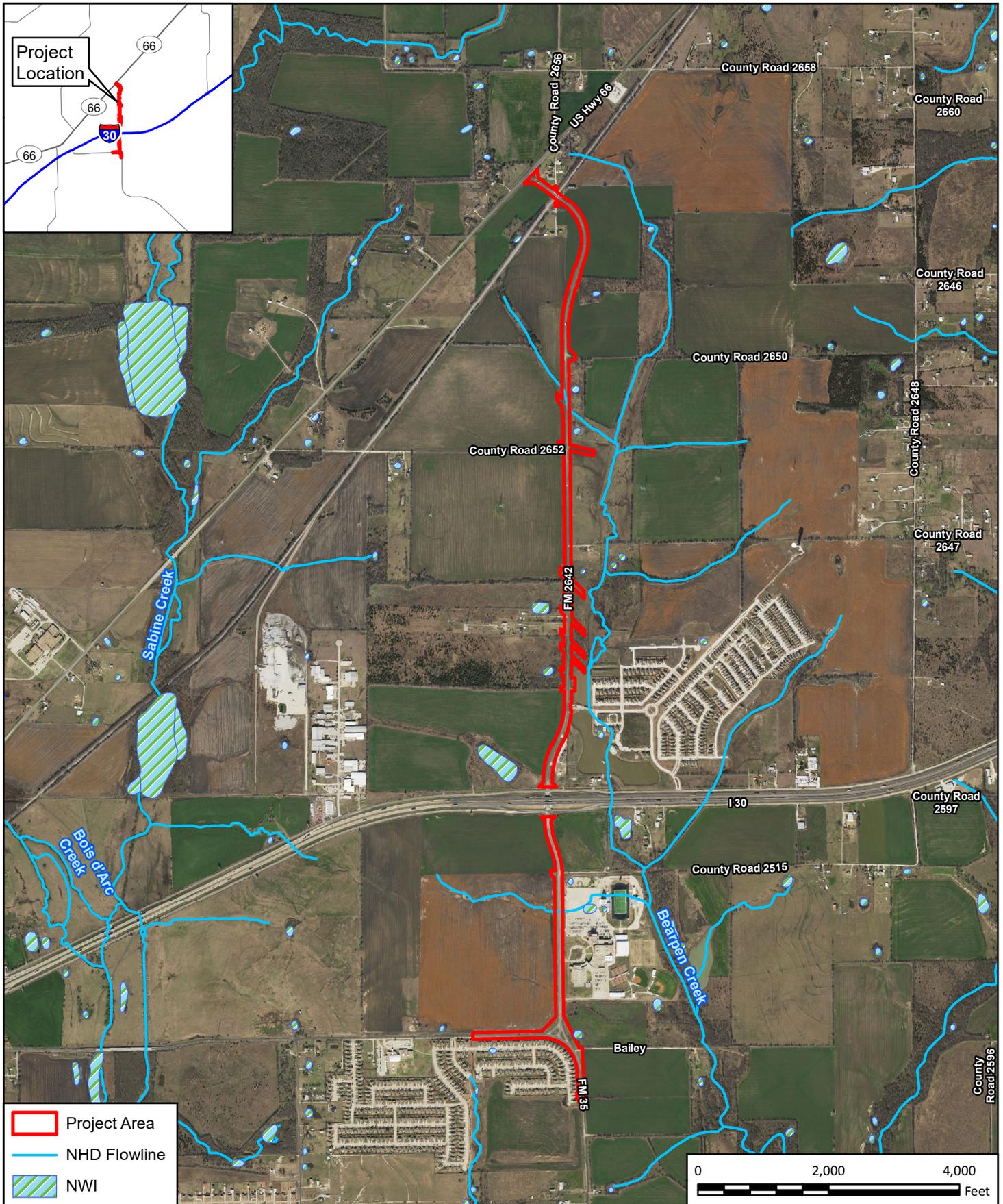


HUNT COUNTY
FM 2642 (FM 35 to SH 66)
100-yr Floodplain Map

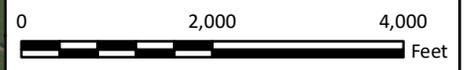
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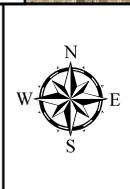
FIGURE



Project Area
 NHD Flowline
 NWI



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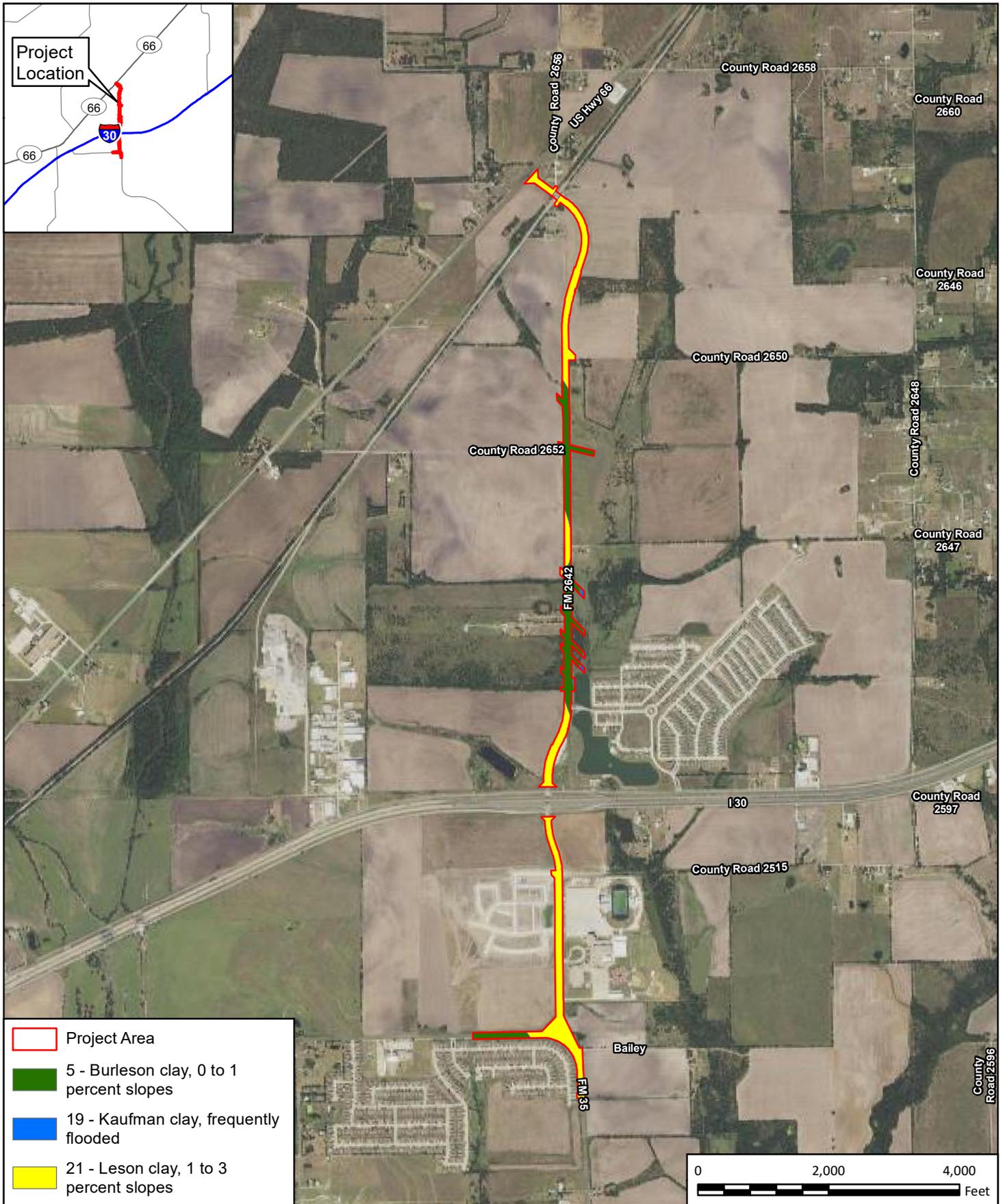


HUNT COUNTY
FM 2642 (FM 35 to SH 66)
NWI/NHD Map

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5

FIGURE



- Project Area
- 5 - Burleson clay, 0 to 1 percent slopes
- 19 - Kaufman clay, frequently flooded
- 21 - Leson clay, 1 to 3 percent slopes



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 NRCS Soils

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6

FIGURE



- Project Area
- Ditch
- Stream OHWM
- Ponds



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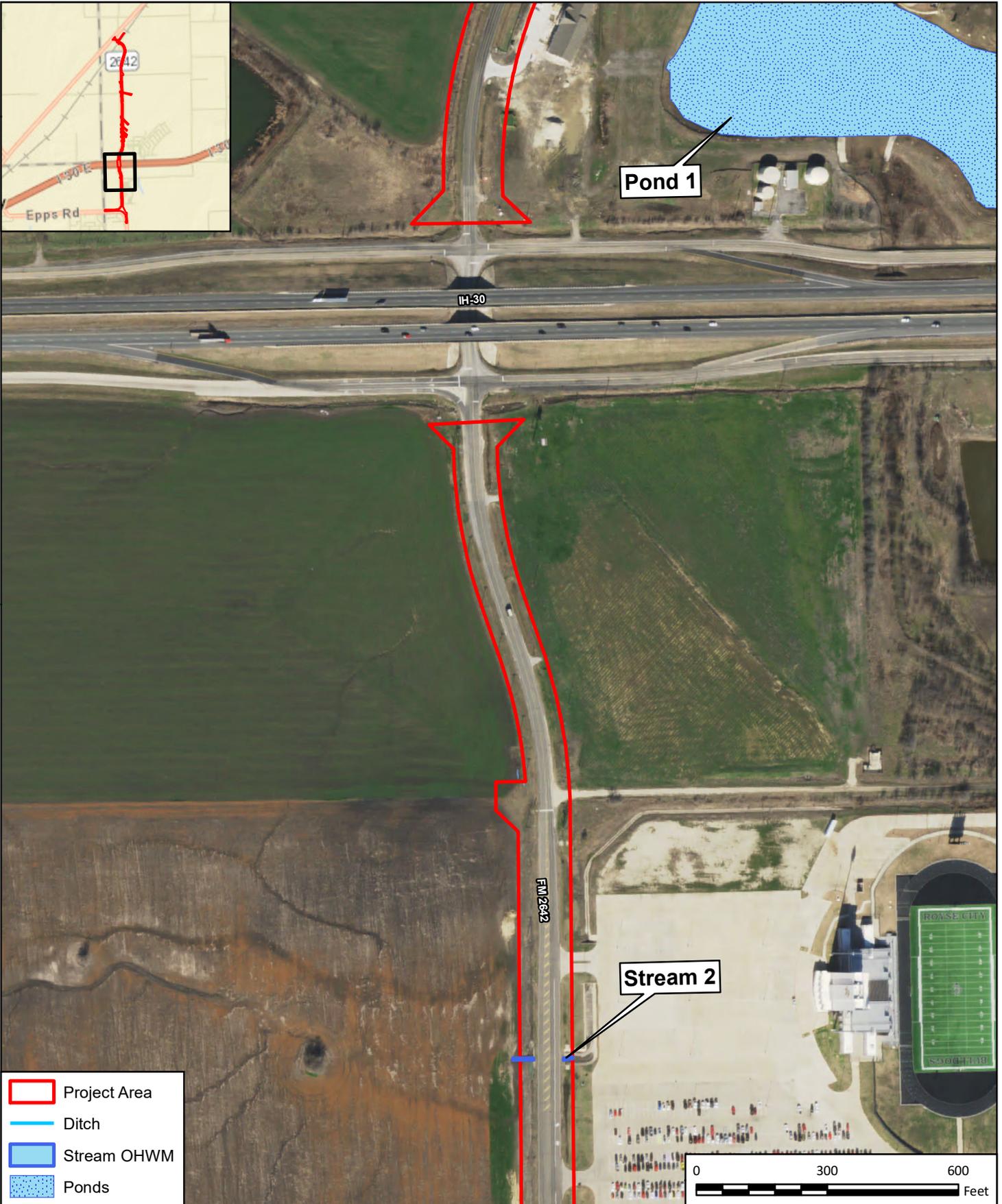


HUNT COUNTY
FM 2642 (FM 35 to SH 66)
Water Features Map

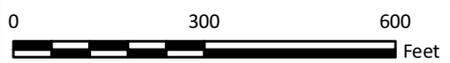
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7.1

FIGURE



- Project Area
- Ditch
- Stream OHWM
- Ponds



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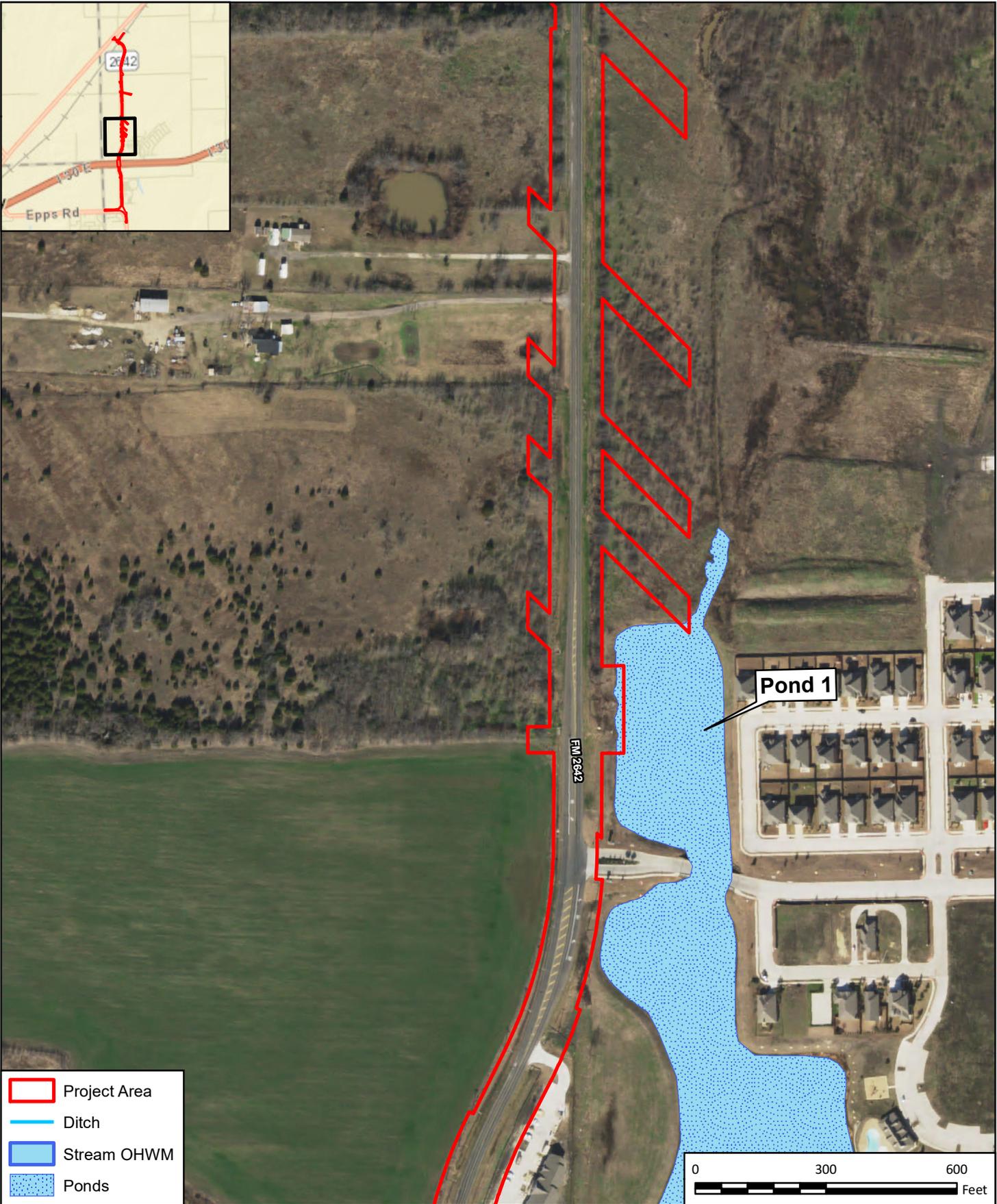
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7.2

FIGURE



- Project Area
- Ditch
- Stream OHWM
- Ponds



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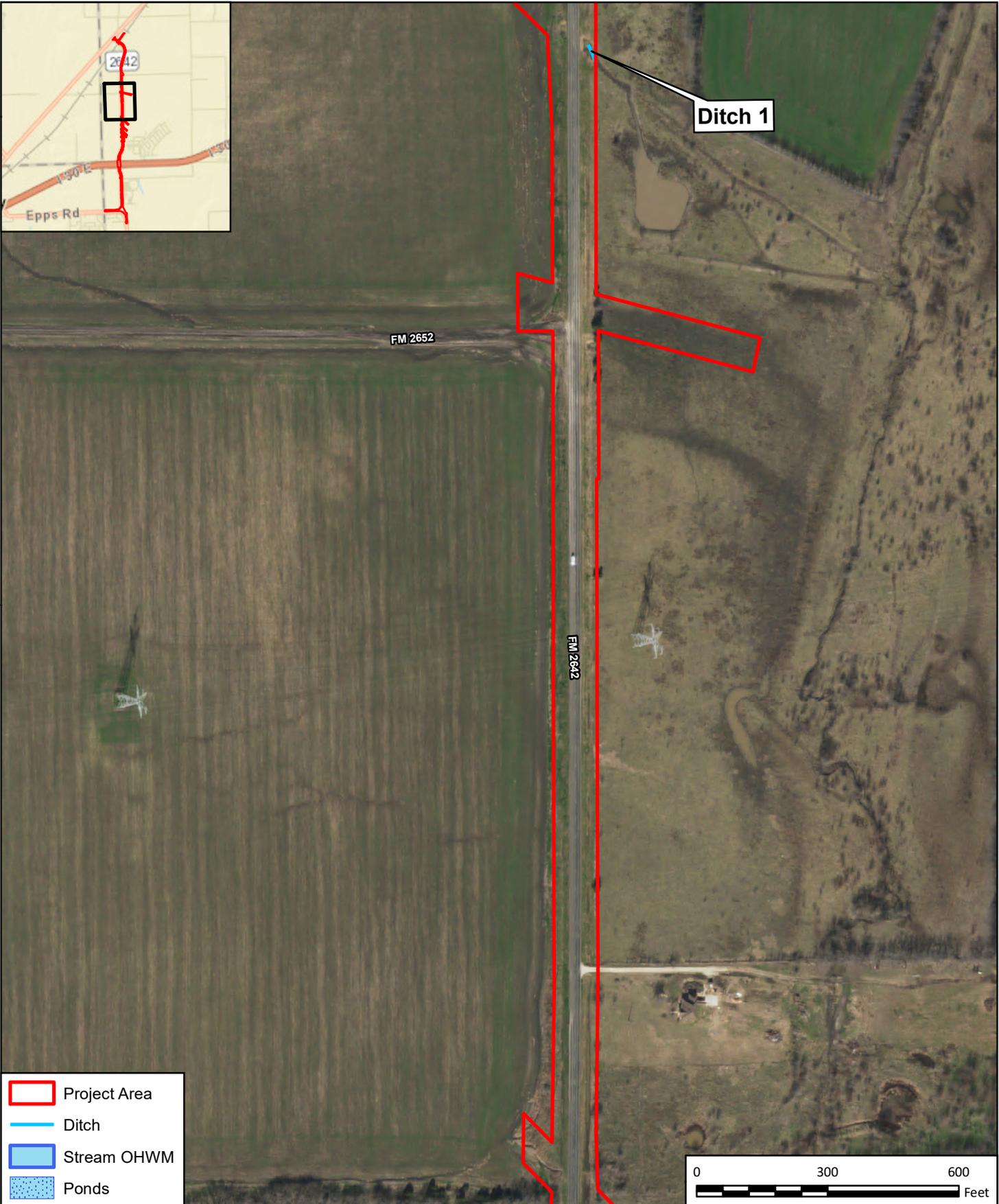


HUNT COUNTY
FM 2642 (FM 35 to SH 66)
Water Features Map

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7.3

FIGURE



- Project Area
- Ditch
- Stream OHWM
- Ponds



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Water Features Map

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7.4

FIGURE



	Project Area
	Ditch
	Stream OHWM
	Ponds



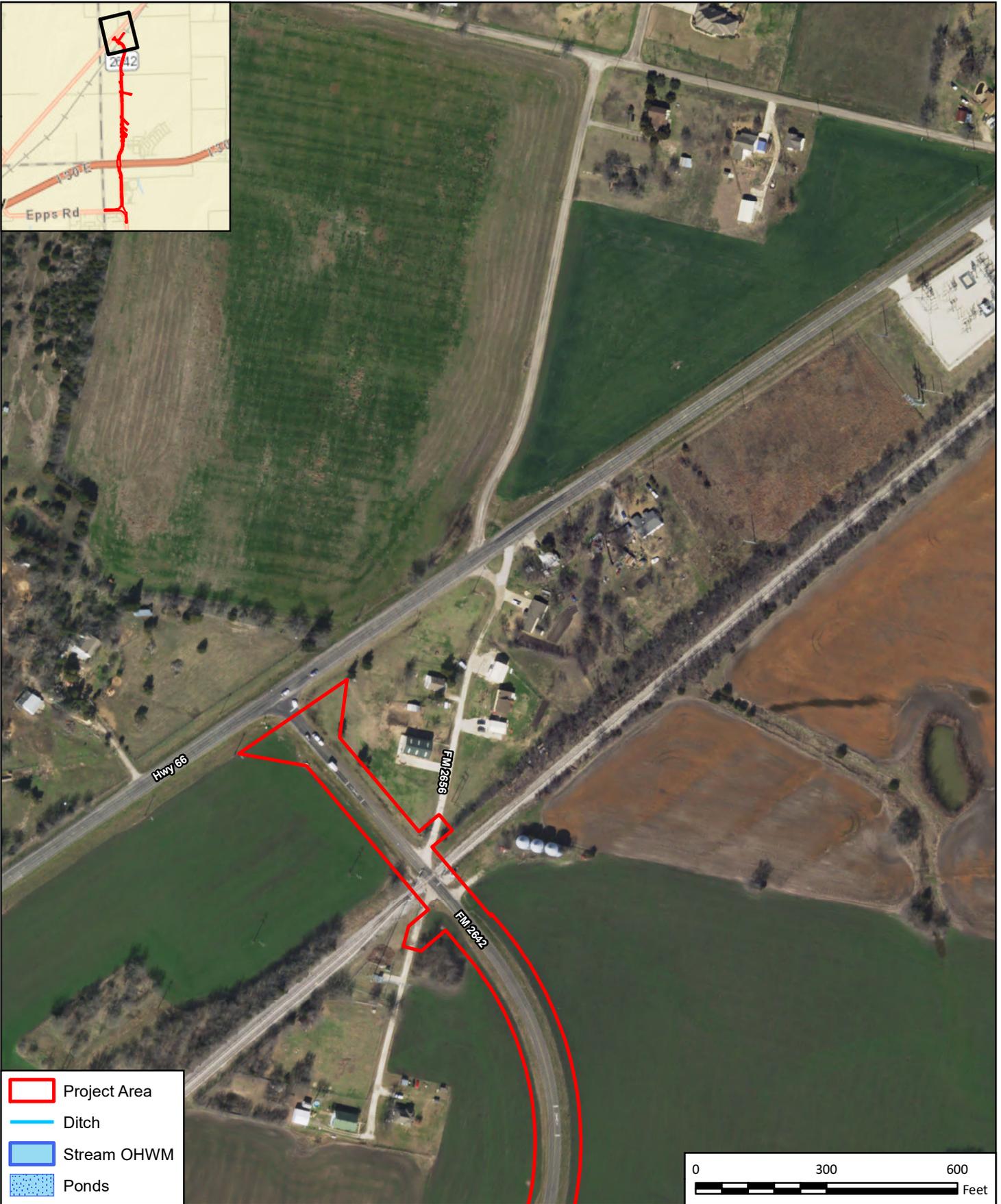
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HUNT COUNTY
FM 2642 (FM 35 to SH 66)
Water Features Map

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7.5
FIGURE



	Project Area
	Ditch
	Stream OHWM
	Ponds



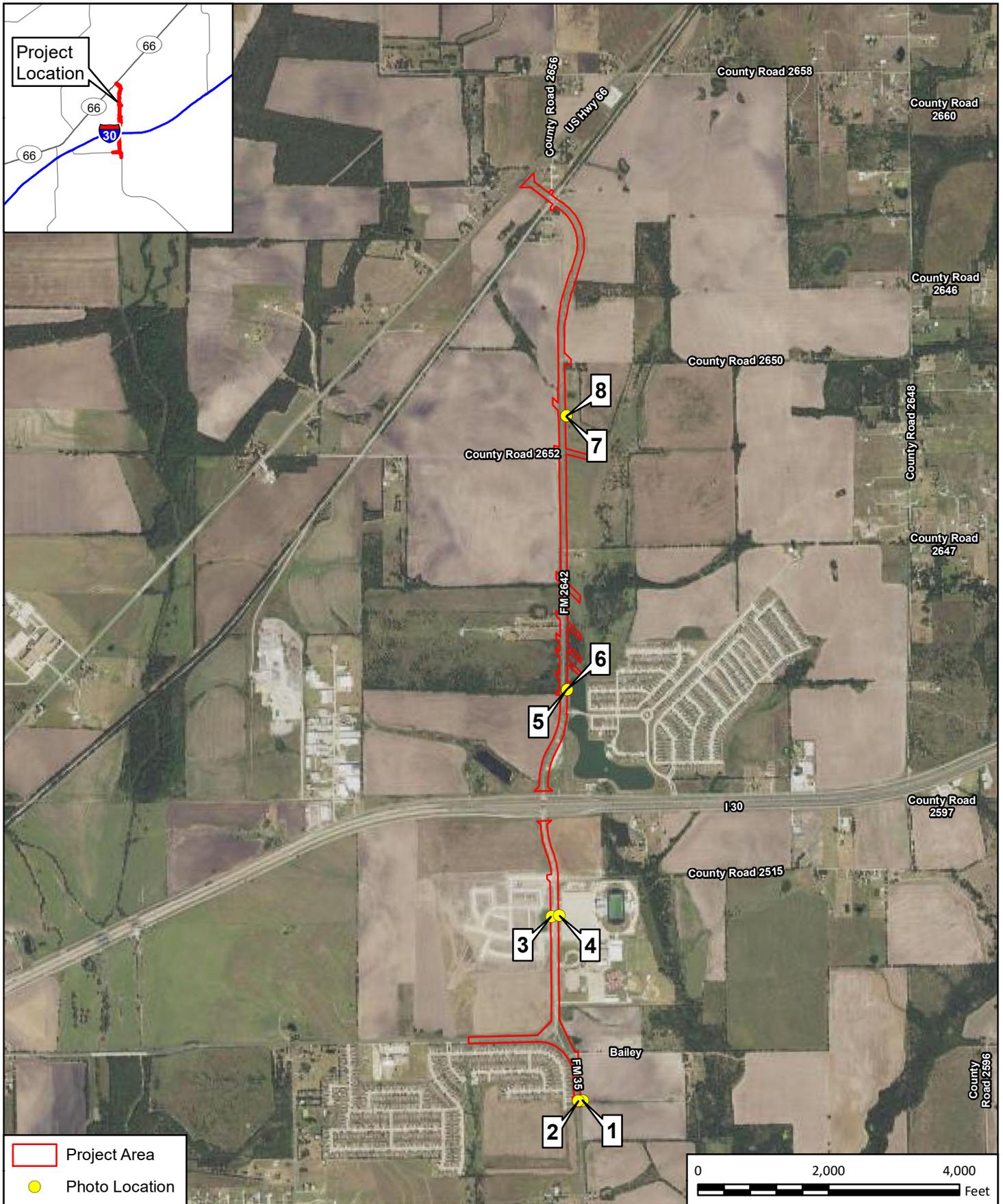
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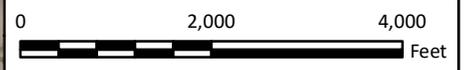
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FM 2642 (FM 35 to SH 66)
Water Features Map

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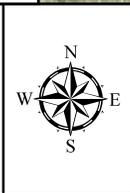
7.6
FIGURE



Project Area
● Photo Location



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HUNT COUNTY
FM 2642 (FM 35 to SH 66)
Photo Location Map

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8

FIGURE

Appendix B: Site Photographs



Photograph 1. Stream 1 looking upstream (West) from east side of FM 35.



Photograph 2. Stream 1 looking downstream (East) from east side of FM 35.



Photograph 3. Stream 2 looking downstream (East) from west side of FM 2642.



Photograph 4. Stream 2 looking upstream (East) from east side of FM 2642.



Photograph 5. Pond 1 drainage impact area looking North from east side of FM 2642.



Photograph 6. Pond 1 drainage impact area looking South from east side of FM 2642.



Photograph 7. Ditch 1 looking Northwest from east side of FM 2642.



Photograph 8. Ditch 1 looking Southeast from east side of FM 2642.