



Water Resources Technical Report

US 59 Upgrade Redland, TX

From FM 2021 to 0.34 mi North of
State Loop 287
Angelina County, Texas
CSJ: 0176-02-118
May 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 USC 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT.

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List of Acronyms

Acronym	Definition
ac	acres
BMP	best management practice
CGP	Construction General Permit
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
EPH	ephemeral
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FM	Farm-to-Market Road
ft	feet
IP	Individual Permit
LF	linear feet
MS4	Municipal Separate Storm Sewer System
NCDC	National Climatic Data Center
NCEI	National Centers for Environmental Information
NHD	National Hydrologic Dataset
NRCS	Natural Resources Conservation Service
NOI	Notice of Intent
NWI	National Wetland Inventory
NWP	Nationwide Permits
OHWM	ordinary high-water mark
PEM	palustrine emergent
PER	perennial
PFO	palustrine forested
PUB	palustrine unconsolidated bottom
RGP	Regional General Permit
RPW	relatively permanent water
ROW	right-of-way
SWPPP	Stormwater Pollution Prevention Plan
TCEQ	Texas Commission on Environmental Quality
TPDES	Texas Pollutant Discharge Elimination System
TSS	total suspended solids
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
TNW	Traditionally navigable water
US 59	United States Highway 59
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard

Acronym	Definition
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USGS	U.S. Geological Survey
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1. Project Overview

The Texas Department of Transportation (TxDOT), Lufkin District, proposes to upgrade U.S. Highway 59 (US 59) to interstate standards by providing frontage roads from south of Farm-to-Market (FM) Road 2021 to north of Loop 287 (the Project). The existing US 59 facility includes two 12-foot-wide northbound lanes, two 12-foot-wide southbound lanes, and a 16-foot center flush median (center turn lane). The existing right-of-way (ROW) is approximately 180 feet wide with an approximate length of 2.45 miles. The proposed new ROW is approximately 58.15 acres (ac) and intersects 90 parcels.

2. Project Vicinity and Study Area

The proposed Project area is located between the town of Lufkin, Texas, and the town of Redland, Texas, in northwestern Angelina County (**Figures 1 and 2, Appendix A**). The proposed Project area lies within the Angelina River basin. The Angelina River is formed by the confluence of Barnhardt Creek and Shawnee Creek in central Rusk County. The river flows southeast for approximately 110 miles forming the boundaries between Cherokee and Nacogdoches, Angelina and Nacogdoches, and Angelina and San Augustine counties before its confluence with the Neches River in northwestern Jasper County. The river is dammed approximately 80 miles north of Beaumont to form the Sam Rayburn Reservoir (Handbook of Texas Online 2010). Three unique crossings—composed of one unnamed ephemeral stream, one unnamed intermittent stream, and one named perennial stream, Mill Creek, were identified within the proposed Project area. These streams are entirely within the Angelina River basin. Topography of the proposed Project area is gently rolling to flat, with elevations ranging from approximately 250 feet to 350 feet above mean sea level (**Figure 2, Appendix A**) (U.S. Geological Survey [USGS] 1950).

2.1 Water Wells

A search was made for water wells within a one-mile approximate radius of the proposed Project ROW. A review of the Texas Commission on Environmental Quality (TCEQ) and TWDB records revealed multiple water wells adjacent to or within the proposed ROW (TWDB 2013). Eleven public and four private water wells were identified within a one-mile approximate radius of the proposed Project area (**Figure 3, Appendix A**). Of these 15 wells, only one (Redland WSC, no address available) is located within the proposed Project ROW.

2.2 Water of the U.S. – Field Delineation

The U.S. Army Corps of Engineers (USACE) regulates the discharge of dredged and fill material into wetlands and other waters of the U.S. under Section 404, subsection 330.5(a)(21) of the Clean Water Act (CWA). Section 404 of the CWA authorizes the USACE to issue permits for the discharge of dredged or fill material into waters of the U.S., including wetlands. The intent of the CWA is to protect the nation's waters from the indiscriminate discharge of material capable of causing pollution, and to restore and maintain the chemical, physical, and biological integrity of these

waters. Any discharge into waters of the U.S. must be in accordance with Section 404(b)(1) guidelines developed by the EPA in conjunction with the USACE. Regulated activities may be permitted through the USACE via Individual Permits (IPs), Regional General Permits (RGPs), or Nationwide Permits (NWP). The *1987 Corps of Engineers Wetlands Delineation Manual* (USACE 1987) defines wetlands based on three criteria: hydrophytic vegetation, hydric soils, and wetland hydrology. In general, all three criteria must be present for an area to be characterized as a wetland. Some exceptions occur in disturbed areas or in newly formed wetlands, where one indicator (such as hydric soils) might be lacking. These areas are dealt with on an individual basis as outlined in the *1987 Corps of Engineers Wetlands Delineation Manual*. In addition to jurisdictional wetlands as defined above, the CWA regulates impacts to other waters of the U.S. The term “waters of the U.S.” has broad meaning and incorporates both deepwater aquatic habitats and special aquatic sites, including wetlands, as listed below:

- 1) The territorial seas with respect to the discharge of fill material;
- 2) Coastal and inland waters, lakes, rivers, and streams that are navigable waters of the U.S., including their adjacent wetlands;
- 3) Tributaries to navigable waters of the U.S., including adjacent wetlands;
- 4) Interstate waters and their tributaries, including adjacent wetlands; and
- 5) All other waters of the U.S. not identified above, such as lakes, intermittent streams, prairie potholes, and other waters that are not a part of a tributary system to interstate waters or navigable waters of the U.S., the degradation or destruction of which could affect interstate commerce. Note that a 2006 U.S. Supreme Court decision found that, in many instances, isolated wetlands are not subject to USACE jurisdiction (*Rapanos vs. the U.S.* [2006] and *Carabell vs. the USACE* [2004]).

Determination of Jurisdictional Areas

A review of the National Wetland Inventory (NWI), National Hydrologic Dataset (NHD) maps, and the Federal Emergency Management Agency (FEMA) floodplain maps (**Figures 3 and 4, Appendix A**), the Angelina County Soil Survey (Natural Resources Conservation Service [NRCS] 1988), USGS 7.5-minute quadrangle sheets (Westcott, Texas, USGS 1958a; and Cleveland, Texas, USGS 1958b), and recent aerial photography concluded that potential waters of the U.S. exist within the vicinity of the proposed project. Field reconnaissance conducted from June 26, 2017 through June 29, 2017 confirmed this conclusion.

Following the completion of preliminary data gathering and synthesis, the routine method of wetland delineation outlined in the *1987 Corps of Engineers Wetlands Delineation Manual* and the *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plains Region* (Version 2.0) was used for wetland determinations within the proposed project area. Field activities focused primarily on waters of the U.S. identification and mapping and

wetland determination and delineation. Per the archive of weather and climate data from the National Centers for Environmental Information (NCEI), climatic conditions (temperature, rainfall, etc.) were normal for the time of year in which the field work was performed (National Climatic Data Center [NCDC] 2017).

The wetland-upland boundary and OHWM of these waterbodies were determined in the field and delineated using a sub-meter accurate Trimble GeoXT GPS receiver. Dominant vegetative species were noted at each site. All mapped wetlands, ponds, and streams are described below and illustrated on **Figure 4, Appendix A**. Representative photographs of mapped features within the proposed project area are provided in **Appendix B**. Wetland delineation data sheets for data/observation points referenced in the feature descriptions can be found in **Appendix C**.

Ponds and Wetlands

One potentially jurisdictional pond (palustrine unconsolidated bottom, or PUB) and 12 potentially jurisdictional wetlands (all palustrine emergent, or PEM) were identified during field surveys within the proposed project area (**Table 1**).

Table 1. Potentially Jurisdictional Ponds and Wetlands Within the Proposed Project Area

Field ID	Classification ¹	Area within Prop ROW (acres)	Potentially Jurisdictional ²	Within 100-Year Floodplain ³	Quadrangle Name ⁴
Pond 1	PUB	0.551	No	—	Redland
Wetland 1A	PEM	1.025	Yes	—	Redland
Wetland 1B	PEM	0.028	Yes	—	Redland
Wetland 1C	PEM	0.053	Yes	Yes	Redland
Wetland 1D	PEM	0.017	Yes	Yes	Redland
Wetland 1E	PEM	0.038	Yes	Yes	Redland
Wetland 1F	PEM	0.043	Yes	Yes	Redland
Wetland 2	PEM	0.043	Yes	Yes	Redland
Wetland 3	PEM	0.021	Yes	Yes	Redland
Wetland 4	PEM	0.846	No	—	Redland
Wetland 5	PEM	0.116	Yes	Yes	Redland
Wetland 6	PEM	0.056	Yes	—	Redland
Wetland 7	PEM	0.052	No	—	Redland
TOTALS	PUB (1)	0.551	—	—	—
	PEM (12)	2.890	—	—	—

1 Based on Cowardin et al. (1979): PUB = Palustrine unconsolidated bottom; PEM = Palustrine emergent

2. Potentially jurisdictional determination based on hydrologic function, dominant plants, and connectivity.

3 FEMA 2015.

4 USGS 1950.

Pond 1 (PUB)

Pond 1 is an excavated open water feature located west of the existing US 59 ROW and within the proposed Project area (**Figure 4, Pages 4 and 5**). This likely non-jurisdictional feature occurs on land that has been cleared of most woody vegetation, which is used for livestock grazing. It is identified as a PUBHh (palustrine unconsolidated bottom, permanently flooded, diked/impounded) wetland by the NWI maps. The feature is approximately 0.551 acres within the proposed ROW and is not located within the 100-year floodplain.

Wetlands 1A through 1F (PEMs)

The Wetland 1 complex consists of a series of potentially jurisdictional, hydrologically interconnected PEM wetlands (1A through 1F) located along the riparian corridor of Mill Creek (1C through 1F) and along a drainage ditch directly connected to Mill Creek (1A and 1B) west of the existing US 59 ROW (**Figure 4, Page 4**). Wetlands 1A and 1B are not identified in the NWI and are not in the 100-year floodplain. Wetlands 1C through 1F are incorrectly identified in the NWI as PFO1C (palustrine forested, broad-leaved deciduous, seasonally flooded) wetlands and are in the 100-year floodplain. Plants observed included such species as *Polygonum hydropiperoides*, *Juncus effusus*, and *Hydrolea ovata* (see DP WET 01 datasheet in **Appendix C**). Wetlands 1A, through 1F are approximately 1.025, 0.028, 0.053, 0.017, 0.038, and 0.043 acres within the proposed ROW, respectively.

Wetland 2 (PEM)

Wetland 2 is a potentially jurisdictional PEM wetland associated with the floodplain of Mill Creek and located west of the existing US 59 ROW (**Figure 4, Page 4**). Wetland 2 is approximately 0.043 acre within the proposed ROW and is located within a low area that holds water and has developed wetland characteristics over time. Plants observed included such species as *Polygonum hydropiperoides* and *Rumex pulcher* (see DP WET 02 datasheet in **Appendix C**). Wetland 2 is incorrectly identified as a PFO1C wetland in the NWI and is located within the 100-year floodplain.

Wetland 3 (PEM)

Wetland 3 is a potentially jurisdictional PEM wetland associated with the floodplain of Mill Creek and located west of the existing US 59 ROW (**Figure 4, Page 4**). Wetland 3 is approximately 0.021 acre within the proposed ROW and is located within a low area that holds water and has developed wetland characteristics over time. Plants observed included such species as *Polygonum hydropiperoides* and *Carex cherokeensis* (see DP WET 03 datasheet in **Appendix C**). Wetland 3 is incorrectly identified as a PFO1C wetland in the NWI and is located within the 100-year floodplain.

Wetland 4 (PEM)

Wetland 4 is a likely non-jurisdictional PEM wetland located west of the existing US 59 ROW (**Figure 4, Page 3**). Wetland 4 is approximately 0.846 acres within the proposed ROW and is located within a low area that holds water and has developed wetland characteristics over time. Due to its lack of a hydrologic connection, other than sheet flow, to the 100-year floodplain, a relatively permanent water (RPW), or a traditionally navigable water (TNW), Wetland 4 is likely a non-jurisdictional feature. Plants observed included such species as *Carex cherokeensis*, *Axonopus fissifolius*, *Juncus effusus*, *Polygonum hydropiperoides*, and *Diodia virginiana* (see DP WET 04 datasheet in **Appendix C**). Wetland 4 is not identified in the NWI and is not located within the 100-year floodplain.

Wetland 5 (PEM)

Wetland 5 is a potentially jurisdictional PEM wetland associated with the floodplain of Mill Creek and located west of the existing US 59 ROW (**Figure 4, Page 4**). Wetland 5 is approximately 0.116 acre within the proposed ROW and is located within a low area that holds water and has developed wetland characteristics over time. Plants observed included such species as *Polygonum hydropiperoides* (see DP WET 05 datasheet in **Appendix C**). Wetland 5 is not identified in the NWI and is located within the 100-year floodplain.

Wetland 6 (PEM)

Wetland 6 is a potentially jurisdictional PEM wetland associated with drainage ditch directly connected to Mill Creek and located west of the existing US 59 ROW (**Figure 4, Page 4**). Wetland 6 is approximately 0.056 acre within the proposed ROW and is located within a low area that holds water and has developed wetland characteristics over time. Plants observed included such species as *Urochloa platyphylla*, *Paspalum urvillei*, and *Diodia virginiana* (see DP WET 06 datasheet in **Appendix C**). Wetland 6 is not identified in the NWI and is not located within the 100-year floodplain.

Wetland 7 (PEM)

Wetland 7 is a likely non-jurisdictional PEM wetland associated with the spillway of Pond 01 and located west of the existing US 59 ROW (**Figure 4, Page 4**). Wetland 7 is approximately 0.052 acres within the proposed ROW and is located within a low area that holds water and has developed wetland characteristics over time. Due to its lack of a hydrologic connection, other than sheet flow, to the 100-year floodplain, a RPW, or a TNW, Wetland 7 is likely a non-jurisdictional feature. Plants observed included such species as *Polygonum hydropiperoides*, *Paspalum urvillei*, and *Hydrolea ovata* (see DP WET 07 datasheet in **Appendix C**). Wetland 7 is not identified in the NWI and is not located within the 100-year floodplain.

Streams

Three potentially jurisdictional streams (one ephemeral, one intermittent, and one perennial) were identified during field surveys within the proposed Project area. Mill Creek, a perennial stream located within the proposed Project ROW, is a direct tributary to Paper Mill Creek, which then feeds into the Angelina River and the Sam Rayburn Reservoir. **Table 2** details the proposed impacts to potentially jurisdictional waters of the U.S. within the construction limits of the proposed Project.

Table 2. Potentially Jurisdictional Streams Within the Proposed Project Area

Field ID	Stream Name	Class ¹	OHWM Width (feet) ²	Length within Proposed ROW (feet) ²	Potentially Jurisdictional ³	Within 100-Year Floodplain ⁴
Creek 1	Unnamed Tributary to Mill Creek	INT	4.00	688.20	Yes	No
Creek 2	Unnamed Tributary to Mill Creek	EPH	6.00	411.00	Yes	No
Creek 3	Mill Creek	PER	15.00 – 25.00	474.10	Yes	Yes
TOTALS	Ephemeral (1) Intermittent (1) Perennial (1)	–	–	1,573.30	–	–

¹ Based upon Cowardin et al. (1979): EPH = Ephemeral; INT = Intermittent; PER = Perennial

² Linear feet

³ Potentially jurisdictional determination based on hydrologic function and connectivity.

⁴ FEMA 2015.

Creek 1: Unnamed Tributary to Mill Creek

Creek 1 is an intermittent, potentially jurisdictional, unnamed tributary to Mill Creek that extends across the current and proposed US 59 ROWs (**Figure 4, Page 2**). Creek 1 crosses from the west side to the east side of US 59 via a cross culvert structure. Within the proposed Project ROW, Creek 1 is approximately 688.20 linear feet (LF) in length and connects to Mill Creek approximately 840 LF east of the proposed ROW. Creek 1 is not located within the 100-year floodplain.

Creek 2: Unnamed Tributary to Mill Creek

Creek 2 is an ephemeral, potentially jurisdictional, unnamed tributary to Mill Creek that extends across the current and proposed US 59 ROWs (**Figure 4, Page 5**). Creek 2 crosses from the west side to the east side of US 59 via a multi-box cross culvert structure. Within the proposed Project ROW, Creek 2 is approximately 411.00 LF in length and connects to Mill Creek approximately 4,025 LF east of the proposed ROW. Creek 2 is not located within the 100-year floodplain.

Creek 3: Mill Creek

Creek 3, Mill Creek, is a potentially jurisdictional, perennial stream that measures approximately 474.10 LF in length within the proposed Project ROW (**Figure 4, Page 4**). Mill Creek flows west to east across the proposed Project area and extends past the existing and proposed Project area. Mill Creek is spanned via bridge structures and is within defined bed and banks. Mill Creek is within the 100-year floodplain, but is incorrectly classified as PFO1C by the NWI.

2.3 Section 404 of the Clean Water Act

The USACE regulates the discharge of dredged or fill material into water of the U.S., including wetlands, pursuant to Section 404 of the CWA. Section 404 permitting is anticipated, and TxDOT will coordinate with the USACE to ensure compliance with permitting requirements.

2.4 Section 401 of the Clean Water Act: Water Quality Certification

The TCEQ conducts section 401 certification reviews of projects requiring a Section 404 permit from the USACE for the discharge of dredged or fill material into waters of the U.S., including wetlands. As Section 404 permitting is anticipated, TxDOT would coordinate with the TCEQ to ensure compliance with Section 401 certification requirements.

2.5 Executive Order 11990, Wetlands

Executive Order 11990 requires federal agencies to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. There are no practicable alternatives to the proposed project that would result in no impacts to wetlands. TxDOT will coordinate with the USACE prior to construction in order to minimize wetland impacts that could not be avoided.

2.6 Rivers and Harbors Act of 1899 and the General Bridge Act of 1946

Section 9 of the Rivers and Harbors Act of 1899 prohibits the construction of any bridge or causeway over or in navigable waterways of the U.S. without Congressional consent and approval through the Secretary of Transportation. Under Section 10 of the Rivers and Harbors Act, the building of any wharfs, piers, jetties, and other structures is prohibited without Congressional approval, and excavation or fill within navigable waters requires USACE approval. The typical permitting process for bridges and causeways, however, was modified by the General Bridge Act of 1946, which granted the consent of Congress for any construction, maintenance, and operation of bridges and approaches over navigable waters of the U.S. that are approved by the U.S. Coast Guard (USCG). This Project would not involve work in or over a navigable water of the U.S.; therefore, Sections 9 and 10 of the Rivers and Harbors Act and the General Bridge Act of 1946 do not apply (USACE 2012).

2.7 Section 303(d) of the Clean Water Act

The State of Texas is required, under Sections 305(b) and 303(d) of the federal CWA, to prepare biennial statewide water quality assessments that identify the status of use attainment for waterbodies, and to identify waterbodies for which effluent limitations are not stringent enough to implement water quality standards. Based on the assessments, there are three unique crossings in the proposed Project ROW. These waterbodies are not listed as impaired on the 2014 Texas Section 303(d) List (TCEQ 2014).

Paper Mill Creek, an impaired stream listed for high bacterial count, is located directly downstream of the proposed Project and Mill Creek. TxDOT will implement best management practices (BMPs) to avoid any degradation in water quality in the Project area or downstream. A map of the closest impaired stream segments is presented in **Figure 5, Appendix A**.

2.8 Clean Water Act Section 402

The proposed Project would impact more than five acres of earth disturbance. TxDOT would comply with the TCEQ's Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit (CGP). A Stormwater Pollution Prevention Plan (SWPPP) would be implemented, and a construction site notice would be posted at the construction site. A Notice of Intent (NOI) would be required.

The Project is not located within the boundaries of a regulated Phase I Municipal Separate Storm Sewer System (MS4), therefore MS4 requirements would not apply.

2.9 Floodplains

Executive Order 11988, "Floodplain Management," requires federal agencies to avoid actions, to the greatest extent practicable, that would result in development within floodplains and/or affect floodplain values. The Project is located within Federal Emergency Management Agency (FEMA)-designated map panels 48347C0475C and 48005C0150E, effective 05/2/2010 and 09/29/2010 respectively (**Figure 4, Appendix A**). According to Flood Insurance Rate Maps of Angelina County, a portion of the proposed Project is located within the 100-year floodplain. Areas within the 100-year floodplain are located entirely along Mill Creek (FEMA 2015). The proposed Project area occurs within the limits of the base floodplain. The hydraulic design for this Project would be in accordance with current Federal Highway Administration (FHWA) and TxDOT design policies.

The proposed Project would not increase the base flood elevation to a level that would violate applicable floodplain regulations and ordinances. TxDOT will coordinate with the FEMA coordinator in regards to floodplain regulations and ordinances.

3. Summary

A total of one potentially jurisdictional pond (PUB), 12 potentially jurisdictional wetlands (all PEM), and three potentially jurisdictional streams (one ephemeral, one intermittent, and one perennial) were identified within the project area that would likely be impacted by the proposed project. These waters are summarized above in Tables 1 and 2. TxDOT anticipates Section 404 permitting will be required prior to construction, and floodplain impacts will be coordinated with the Certified Floodplain Administrator for Angelina County.

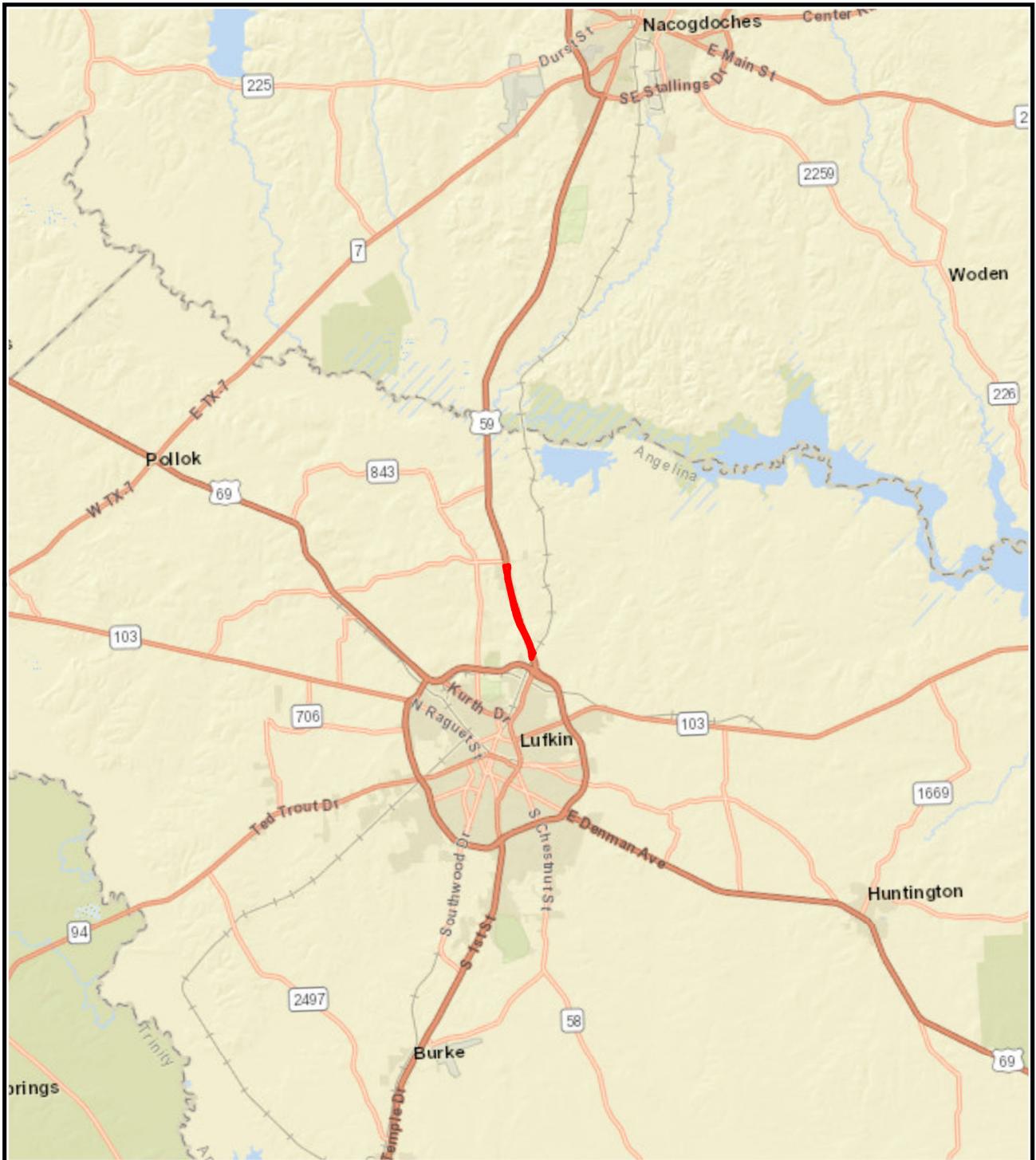
The proposed project is located in Angelina County which is outside the Texas Coastal Management Program Boundary; therefore, a consistency determination would not be required. A corridor development certificate would not be required since the project is located outside the Trinity River Corridor development regulatory zone. The project area is not located within any contributing, recharge or transition zones of the Edwards Aquifer; therefore, an Edwards Aquifer Protection Plan would not be required. The project is located outside of the jurisdiction of the International Boundary and water commission therefore no coordination would be required.

4. References

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- U.S. Army Corps of Engineers (USACE) Environmental Library. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, Mississippi.
- _____. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual, Atlantic and Gulf Coastal Plain Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-20. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center.
- _____. 2012. Navigable Waters within the Galveston District Regulatory Boundaries.
- U.S. Geological Survey (USGS). 1950. 7.5-minute series topographic maps, Redland, Texas, quadrangle.

Appendix A

Figures



Legend

Project Location

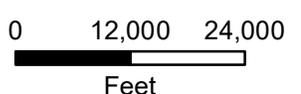
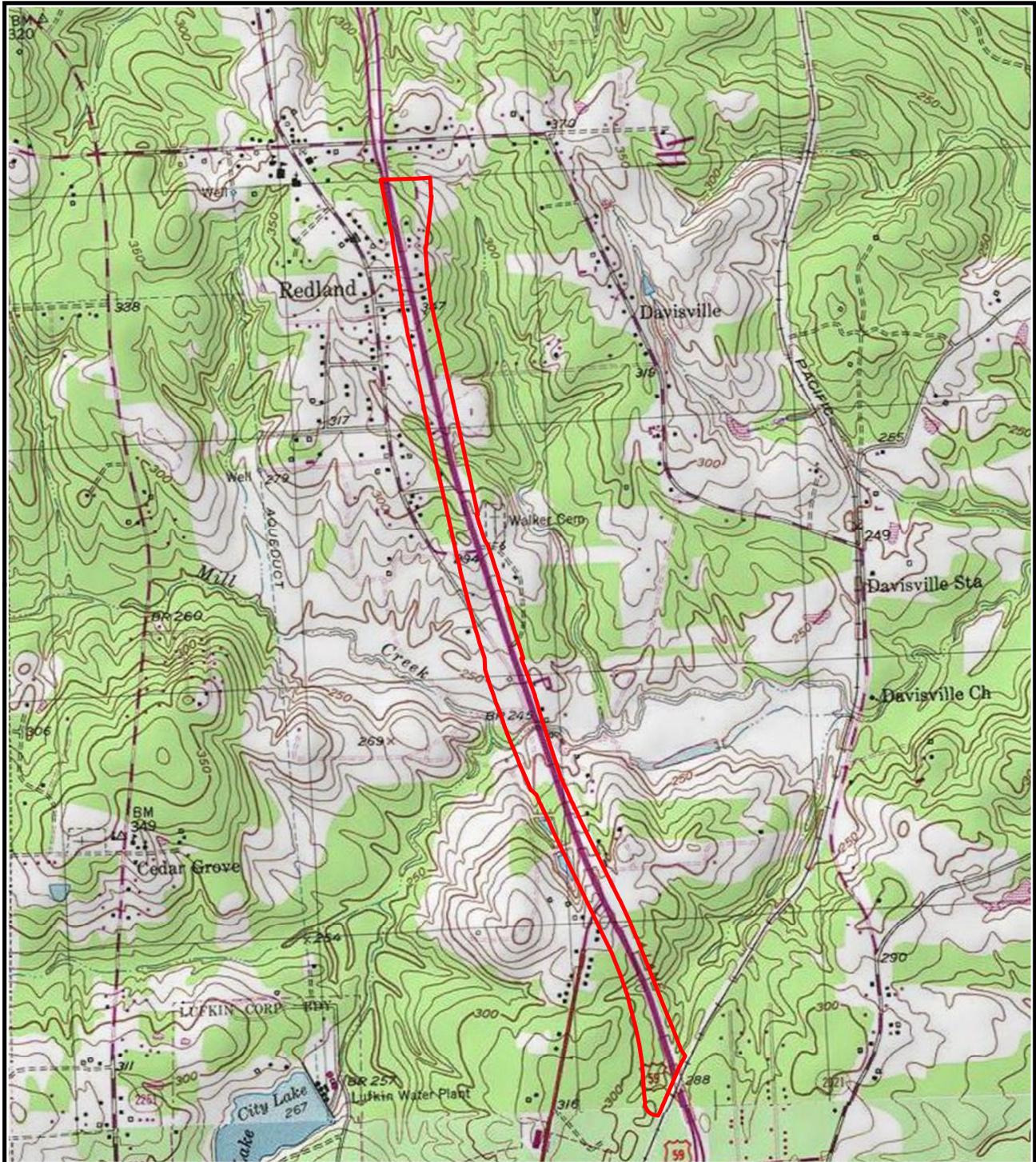


FIGURE 1
PROJECT VICINITY MAP
US 59: UPGRADE REDLAND, TX
FROM SOUTH OF FM 2021 TO NORTH OF LOOP 287
ANGELINA COUNTY, TEXAS
CSJ: 0176-02-118

Esri, DeLorme, HERE, USGS, Intermap, iPC, NRCAN, METI, TomTom, World Street Map, March 2014, 1:63,360; generated by Atkins, using ArcMap. <http://server.arcgisonline.com/ArcGIS/rest/services/World_Street_Map/MapServer/> (25 July 2018).



Legend

 Proposed ROW

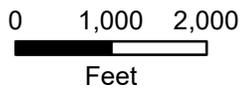
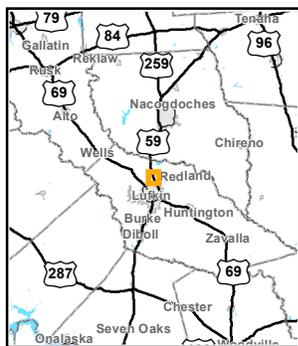
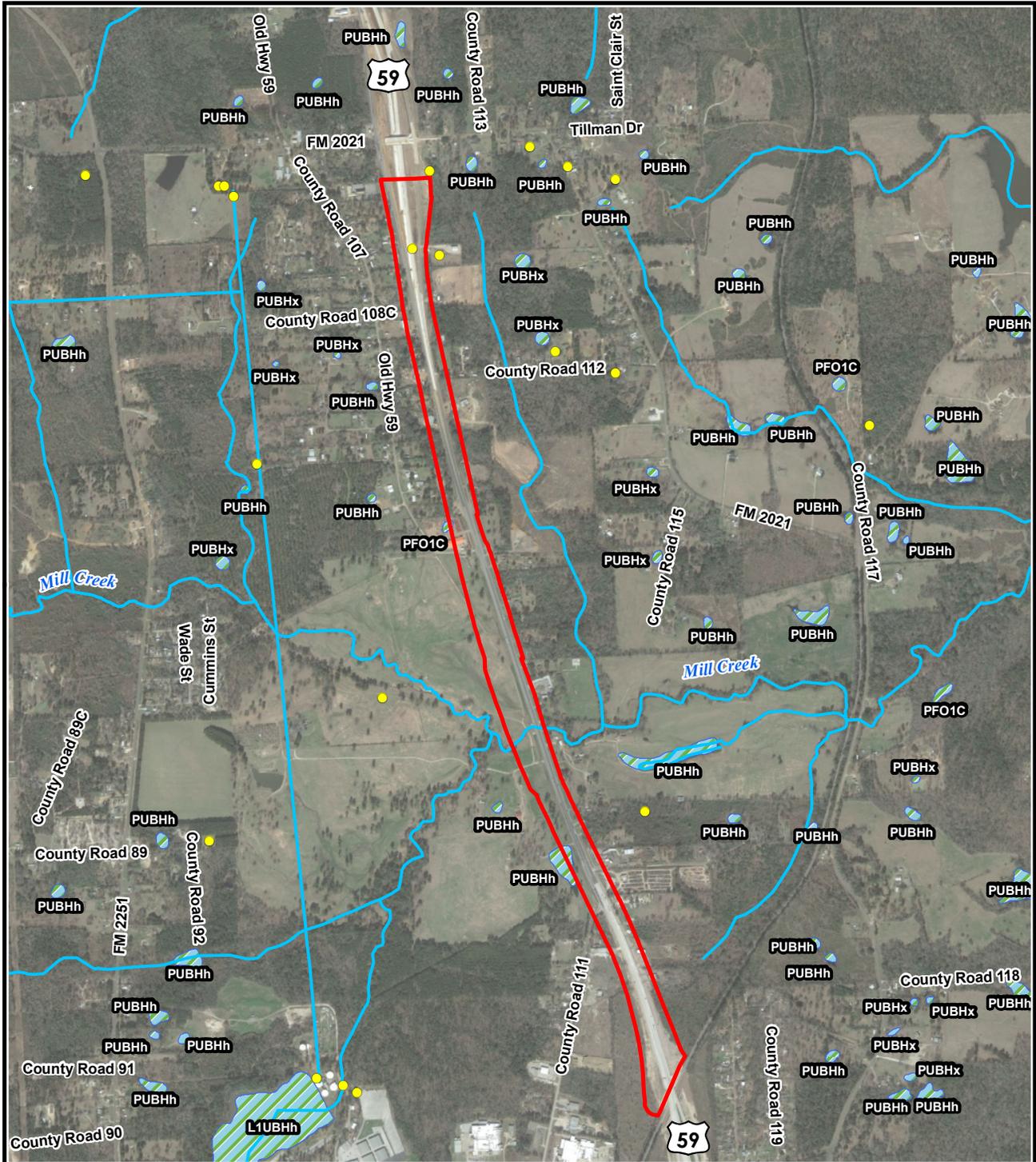


FIGURE 2
TOPOGRAPHIC MAP
US 59: UPGRADE REDLAND, TX
FROM SOUTH OF FM 2021 TO NORTH OF LOOP 287
ANGELINA COUNTY, TEXAS
CSJ: 0176-02-118

Google, TNRS. Texas Google Imagery Service. 2015. 1:24,000; generated by Atkins; using ArcMap. < <https://tnris.org/texas-google-imagery/> > (25 July 2018).



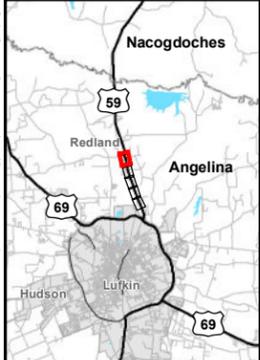
Legend

- Water Wells
 - Proposed ROW
 - River / Stream (NHD)
 - National Wetland Inventory
 - 59 US Route
- 0 1,000 2,000
 Feet



**FIGURE 3
 ENVIRONMENTAL CONSTRAINTS
 (WATER SOURCES)
 US 59: UPGRADE REDLAND, TX
 FROM SOUTH OF FM 2021 TO NORTH OF LOOP 287
 ANGELINA COUNTY, TEXAS
 CSJ: 0176-02-118**

Google, TNRS. Texas Google Imagery Service. 2015. 1:72,000; generated by Atkins; using ArcMap.
 < https://tnris.org/texas-google-imagery/> (25 July 2018); NHD USGS (2013)



- Potential WOTUS
- Upland Data Point (UDP)
- Proposed ROW
- Existing ROW
- Stream Crossing
- Wetland
- Pond
- 100-year Floodplain
- 59 US Route

Google, TNRS, Texas Google Imagery Service, 2015, 1:6,000; generated by Atkins; using ArcMap.
 < <https://tnris.org/texas-google-imagery/> (25 July 2018);



0 100 200
 Feet

FIGURE 4
MAPPED POTENTIAL WATERS OF THE US
US 59: UPGRADE REDLAND, TX
FROM SOUTH OF FM 2021 TO NORTH OF LOOP 287
ANGELINA COUNTY, TEXAS
CSJ: 0176-02-118



- Potential WOTUS
- Upland Data Point (UDP)
- - - Proposed ROW
- Existing ROW
- Stream Crossing
- Wetland
- Pond
- 100-year Floodplain
- 59 US Route

Google, TNRS, Texas Google Imagery Service, 2015, 1:6,000; generated by Atkins; using ArcMap.
 < <https://tnris.org/texas-google-imagery/> (25 July 2018);



0 100 200
 Feet

FIGURE 4
MAPPED POTENTIAL WATERS OF THE US
US 59: UPGRADE REDLAND, TX
FROM SOUTH OF FM 2021 TO NORTH OF LOOP 287
ANGELINA COUNTY, TEXAS
CSJ: 0176-02-118

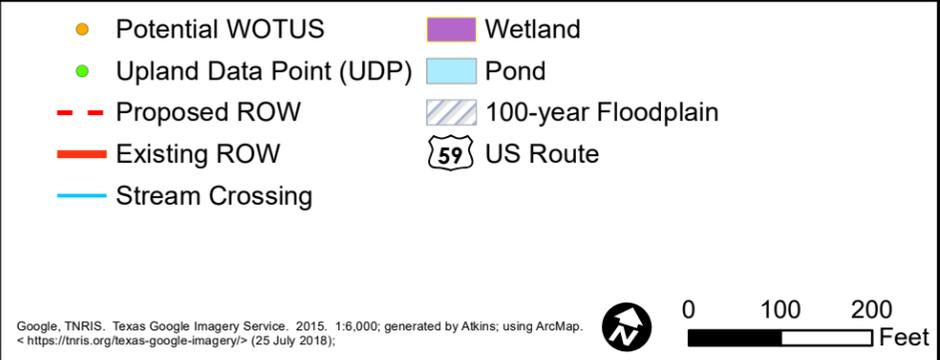
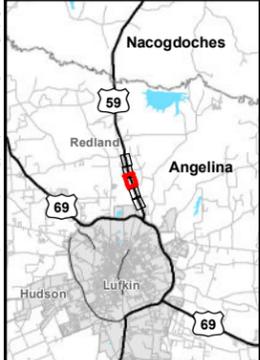
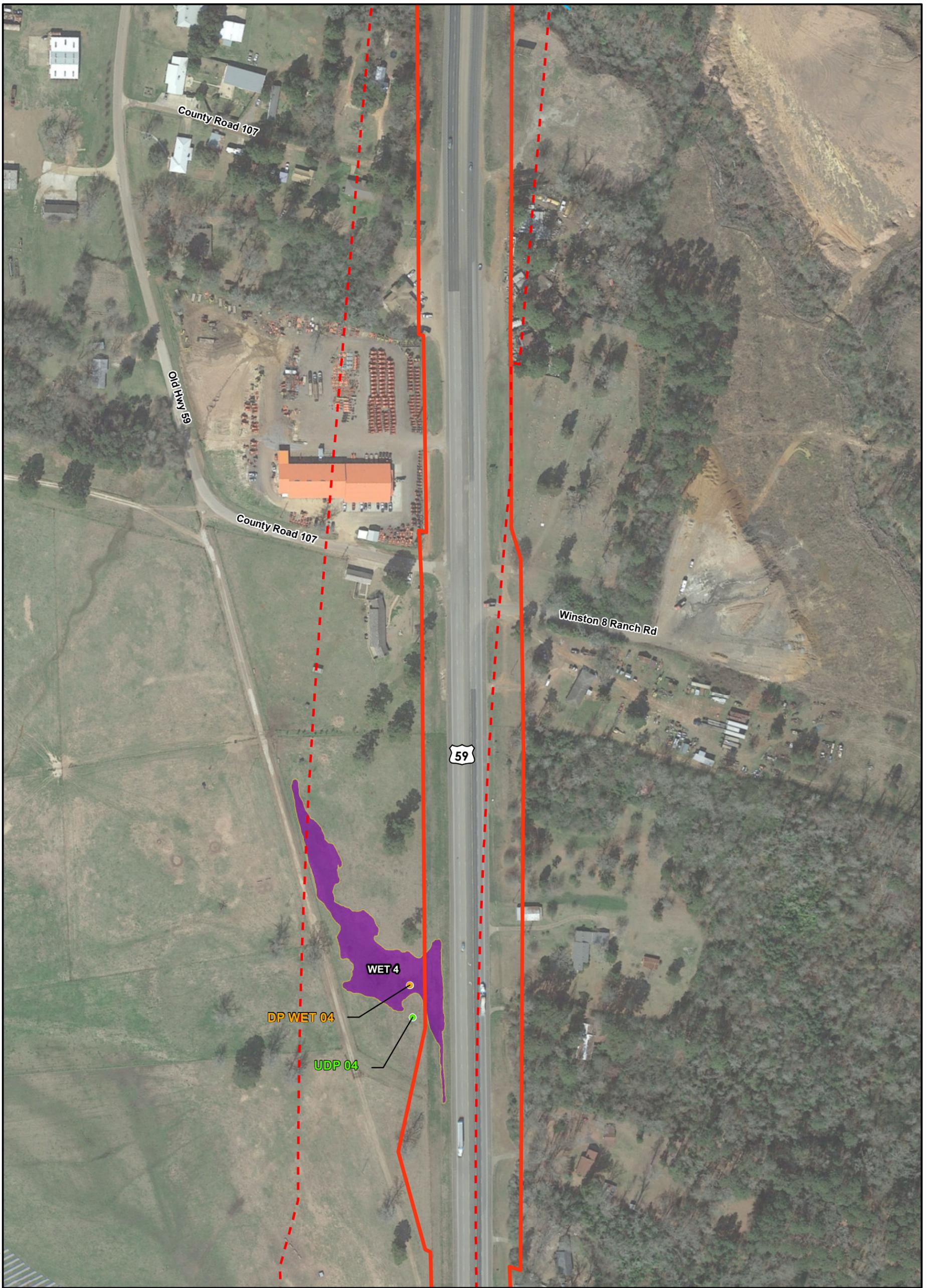


FIGURE 4
MAPPED POTENTIAL WATERS OF THE US
US 59: UPGRADE REDLAND, TX
FROM SOUTH OF FM 2021 TO NORTH OF LOOP 287
ANGELINA COUNTY, TEXAS
CSJ: 0176-02-118

Page 3 of 6

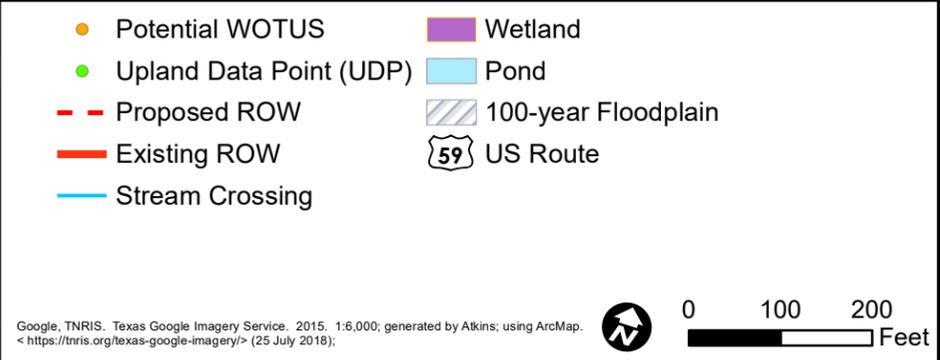
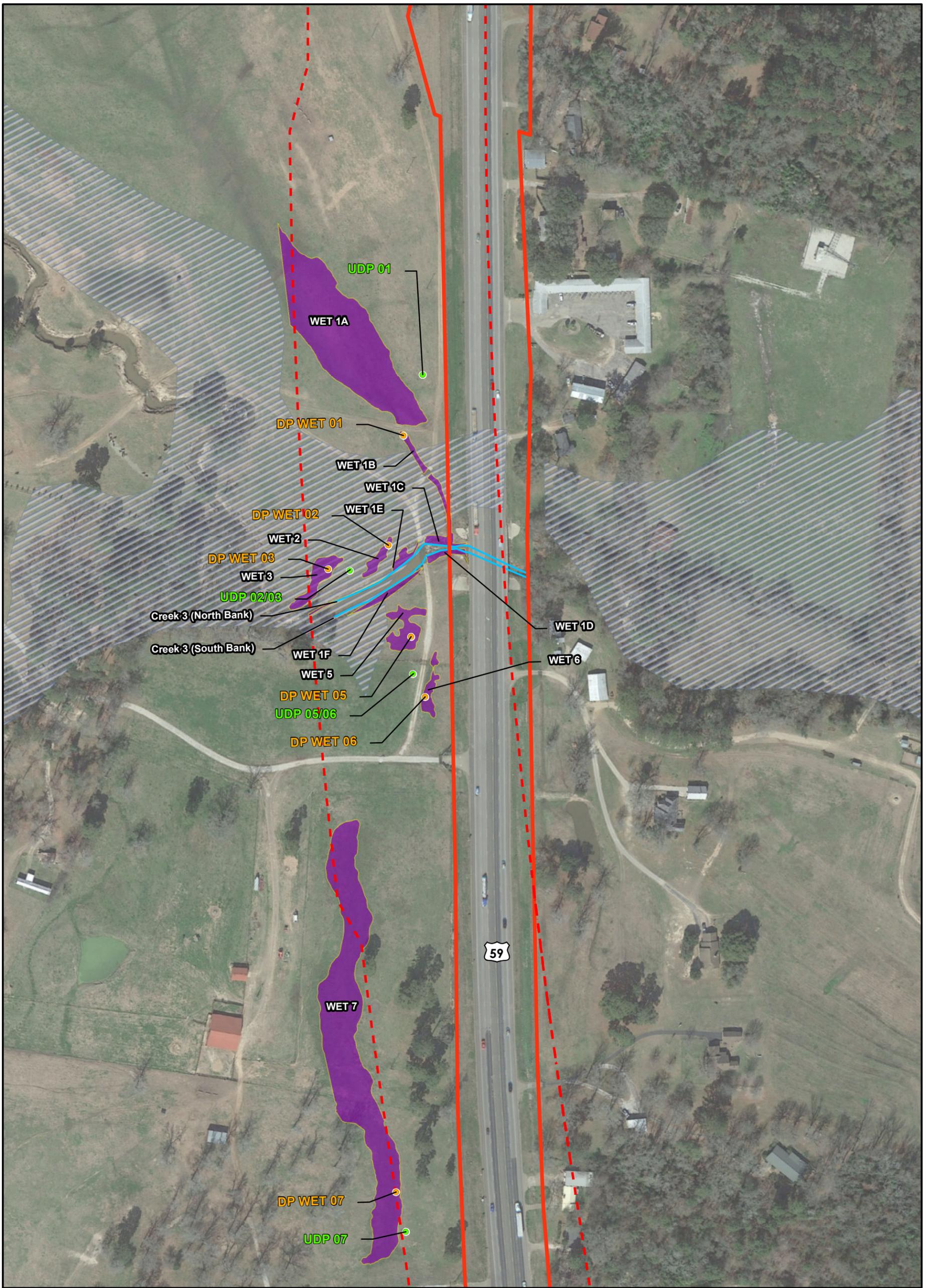
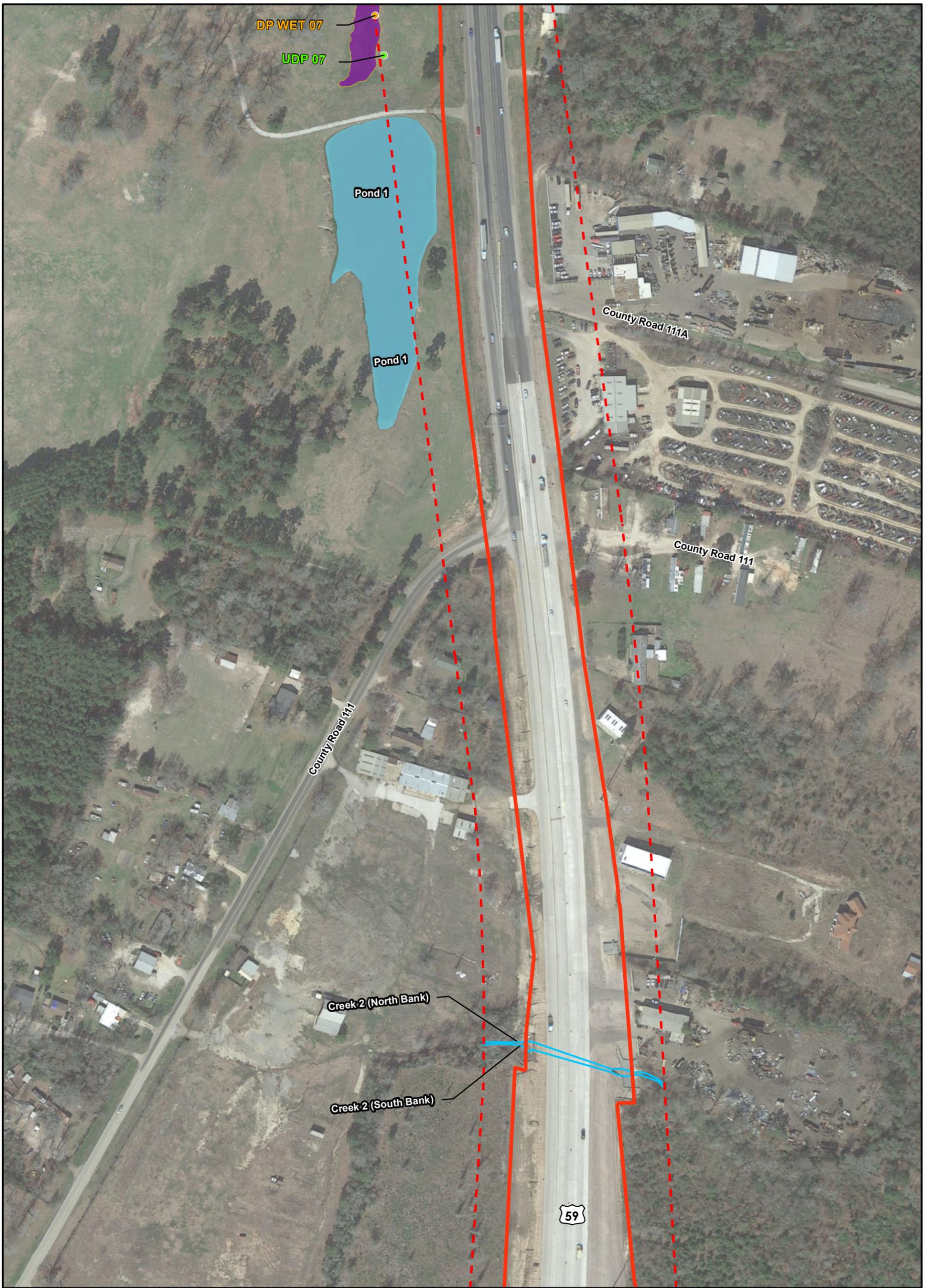


FIGURE 4
MAPPED POTENTIAL WATERS OF THE US
US 59: UPGRADE REDLAND, TX
FROM SOUTH OF FM 2021 TO NORTH OF LOOP 287
ANGELINA COUNTY, TEXAS
CSJ: 0176-02-118



- Potential WOTUS
- Upland Data Point (UDP)
- Proposed ROW
- Existing ROW
- Stream Crossing
- Wetland
- Pond
- 100-year Floodplain
- 59 US Route

FIGURE 4
MAPPED POTENTIAL WATERS OF THE US
US 59: UPGRADE REDLAND, TX
FROM SOUTH OF FM 2021 TO NORTH OF LOOP 287
ANGELINA COUNTY, TEXAS
CSJ: 0176-02-118



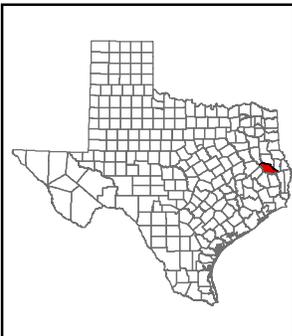
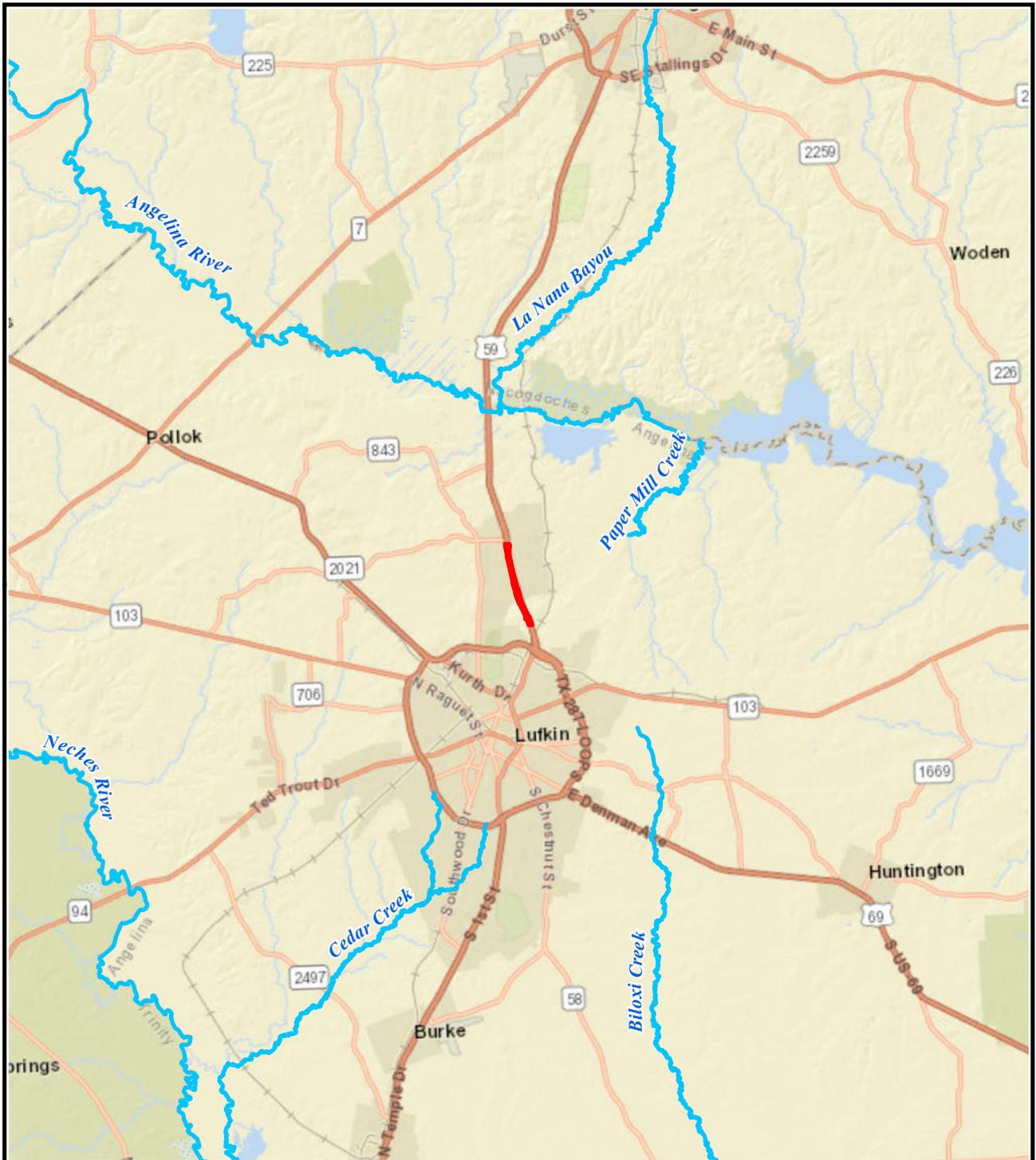
- Potential WOTUS
- Upland Data Point (UDP)
- - - Proposed ROW
- Existing ROW
- Stream Crossing
- Wetland
- Pond
- 100-year Floodplain
- 59 US Route

Google, TNRS, Texas Google Imagery Service, 2015, 1:6,000; generated by Atkins; using ArcMap.
 < <https://tnris.org/texas-google-imagery/> (25 July 2018);



0 100 200
 Feet

FIGURE 4
MAPPED POTENTIAL WATERS OF THE US
US 59: UPGRADE REDLAND, TX
FROM SOUTH OF FM 2021 TO NORTH OF LOOP 287
ANGELINA COUNTY, TEXAS
CSJ: 0176-02-118



Legend

- Project Location
- Impaired Segment (TCEQ)

0 12,000 24,000

 Feet

FIGURE 5
303 (D) IMPAIRED ASSESSMENT UNITS
US 59: UPGRADE REDLAND, TX
FROM SOUTH OF FM 2021 TO NORTH OF US 59/SL 287
ANGELINA COUNTY, TEXAS
CSJ: 0176-02-118

Esri, DeLorme, HERE, USGS, Intermap, iPC, NRCAN, METI, TomTom, World Street Map, March 2014, 1:63,360; generated by Atkins, using ArcMap. <http://server.arcgisonline.com/ArcGIS/rest/services/World_Street_Map/MapServer/> (30 November 2017).

Appendix B

Project Area Photographs

US 59 Upgrade – Lufkin to Redland
Attachment C: Representative Photographs of Proposed Area (July & August 2017)
CSJ: 0176-02-118



Photo 1: Mill Creek (Creek 3), a potentially jurisdictional perennial stream, located on the west side of US 59, facing upstream (31.388887°, -94.715974°).



Photo 2: Mill Creek (Creek 3), a potentially jurisdictional perennial stream, located on the west side of US 59, facing downstream (31.388887°, -94.715974°).

US 59 Upgrade – Lufkin to Redland
Attachment C: Representative Photographs of Proposed Area (July & August 2017)
CSJ: 0176-02-118



Photo 3: Creek 1, a potentially jurisdictional intermittent stream, located on the west side of US 59, facing upstream (31.398883°, -94.718981°).



Photo 4: Creek 1, a potentially jurisdictional intermittent stream, located on the west side of US 59, facing upstream (31.398883°, -94.718981°).

US 59 Upgrade – Lufkin to Redland
Attachment C: Representative Photographs of Proposed Area (July & August 2017)
CSJ: 0176-02-118



Photo 5: Pond 1, a potentially non-jurisdictional body of water, located west of US 59, facing west (31.383558°, -94.714049°).



Photo 6: Pond 1, a potentially non-jurisdictional body of water, located west of US 59, facing south (31.383558°, -94.714049°).

US 59 Upgrade – Lufkin to Redland
Attachment C: Representative Photographs of Proposed Area (July & August 2017)
CSJ: 0176-02-118



Photo 7: Wetland 7, a PEM wetland adjacent to Pond 1, facing north (31.385204°, -94.714944°).



Photo 8: Wetland 7, a PEM wetland adjacent to Pond 1, facing south (31.385204°, -94.714944°).

US 59 Upgrade – Lufkin to Redland
Attachment C: Representative Photographs of Proposed Area (July & August 2017)
CSJ: 0176-02-118



Photo 9: Wetland 1, a PEM wetland adjacent to Mill Creek, west of US 59, facing south east (31.389492°, -94.716155°)



Photo 10: Wetland 1, a PEM wetland adjacent to Mill Creek, west of US 59, facing east (31.389492°, -94.716155°).

Appendix C

Wetland Delineation Data Sheets

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: US HWY 59 Redland City/County: Angelina Sampling Date: 08/01/2017
 Applicant/Owner: TxDOT State: TX Sampling Point: DP WET 01
 Investigator(s): Mike Dyke/Virginia Brown Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Topo Depression Local relief (concave, convex, none): Concave Slope (%): 0-1
 Subregion (LRR or MLRA): Inner Coastal Plain (LRR P) Lat: 31.389584° Long: -94.716284° Datum: WGS 84
 Soil Map Unit Name: Keithville-Sawtown complex, gently undulating (Kb) NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input type="checkbox"/> Surface Water (A1)</td> <td style="width: 50%; border: none;"><input type="checkbox"/> Aquatic Fauna (B13)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> High Water Table (A2)</td> <td style="border: none;"><input type="checkbox"/> Marl Deposits (B15) (LRR U)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Saturation (A3)</td> <td style="border: none;"><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water Marks (B1)</td> <td style="border: none;"><input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Sediment Deposits (B2)</td> <td style="border: none;"><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Drift Deposits (B3)</td> <td style="border: none;"><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td style="border: none;"><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Iron Deposits (B5)</td> <td style="border: none;"><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Marl Deposits (B15) (LRR U)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		Secondary Indicators (minimum of two required) <table style="width: 100%; border: none;"> <tr><td style="border: none;"><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td style="border: none;"><input checked="" type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td style="border: none;"><input checked="" type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> FAC-Neutral Test (D5)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> FAC-Neutral Test (D5)	<input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Aquatic Fauna (B13)																															
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Marl Deposits (B15) (LRR U)																															
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<input type="checkbox"/> FAC-Neutral Test (D5)																																
<input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)																																
Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes _____ No <u>X</u> Depth (inches): _____	Wetland Hydrology Present? Yes <u>X</u> No _____																															
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																
Remarks:																																

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP WET 01

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Sapling/Shrub Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>30'</u>)				
1.	<u>Polygonum hydropiperoides</u>	<u>25</u>	<u>Y</u>	<u>OBL</u>
2.	<u>Juncus effusus</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>
3.	<u>Hydrolea ovata</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>
4.	<u>Paspalum urvillei</u>	<u>15</u>	<u>N</u>	<u>FAC</u>
5.	<u>Diodia virginiana</u>	<u>15</u>	<u>N</u>	<u>FACW</u>
6.				
7.				
8.				
9.				
10.				
11.				
12.				
<u>95</u> = Total Cover				
50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>				
Woody Vine Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<p>Dominance Test worksheet:</p> <p>Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)</p> <p>Total Number of Dominant Species Across All Strata: _____ (B)</p> <p>Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)</p> <hr/> <p>Prevalence Index worksheet:</p> <p>Total % Cover of: _____ Multiply by: _____</p> <p>OBL species _____ x 1 = _____</p> <p>FACW species _____ x 2 = _____</p> <p>FAC species _____ x 3 = _____</p> <p>FACU species _____ x 4 = _____</p> <p>UPL species _____ x 5 = _____</p> <p>Column Totals: _____ (A) _____ (B)</p> <p>Prevalence Index = B/A = _____</p> <hr/> <p>Hydrophytic Vegetation Indicators:</p> <p><input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation</p> <p><input checked="" type="checkbox"/> 2 - Dominance Test is >50%</p> <p><input type="checkbox"/> 3 - Prevalence Index is ≤3.0¹</p> <p><input type="checkbox"/> Problematic Hydrophytic Vegetation¹ (Explain)</p> <p>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</p> <hr/> <p>Definitions of Four Vegetation Strata:</p> <p>Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.</p> <p>Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.</p> <p>Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.</p> <p>Woody vine – All woody vines greater than 3.28 ft in height.</p> <hr/> <p>Hydrophytic Vegetation Present? Yes <u>x</u> No _____</p>				
Remarks: (If observed, list morphological adaptations below).				

SOIL

Sampling Point: DP WET 01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 4/4	90	10YR 6/3	10	C	M/PL	Loamy sand	
6-16"	10YR 5/1	75	10YR 5/8	5	C	M/PL	Loamy sand	
			10YR 6/3	20	C	M/PL		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LRR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LRR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)

- Polyvalue Below Surface (S8) (LRR S, T, U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: US HWY 59 Redland City/County: Angelina Sampling Date: 08/01/2017
 Applicant/Owner: TxDOT State: TX Sampling Point: DP WET 01
 Investigator(s): Mike Dyke/Virginia Brown Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Topo Depression Local relief (concave, convex, none): Concave Slope (%): 0-1
 Subregion (LRR or MLRA): Inner Coastal Plain (LRR P) Lat: 31.389584° Long: -94.716284° Datum: WGS 84
 Soil Map Unit Name: Keithville-Sawtown complex, gently undulating (Kb) NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Surface Water (A1)</td> <td><input type="checkbox"/> Aquatic Fauna (B13)</td> </tr> <tr> <td><input type="checkbox"/> High Water Table (A2)</td> <td><input type="checkbox"/> Marl Deposits (B15) (LRR U)</td> </tr> <tr> <td><input type="checkbox"/> Saturation (A3)</td> <td><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td><input type="checkbox"/> Water Marks (B1)</td> <td><input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)</td> </tr> <tr> <td><input type="checkbox"/> Sediment Deposits (B2)</td> <td><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td><input type="checkbox"/> Drift Deposits (B3)</td> <td><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td><input type="checkbox"/> Iron Deposits (B5)</td> <td><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Marl Deposits (B15) (LRR U)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		Secondary Indicators (minimum of two required) <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Surface Soil Cracks (B6)</td> </tr> <tr> <td><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Drainage Patterns (B10)</td> </tr> <tr> <td><input type="checkbox"/> Moss Trim Lines (B16)</td> </tr> <tr> <td><input type="checkbox"/> Dry-Season Water Table (C2)</td> </tr> <tr> <td><input type="checkbox"/> Crayfish Burrows (C8)</td> </tr> <tr> <td><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Geomorphic Position (D2)</td> </tr> <tr> <td><input type="checkbox"/> Shallow Aquitard (D3)</td> </tr> <tr> <td><input type="checkbox"/> FAC-Neutral Test (D5)</td> </tr> <tr> <td><input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)</td> </tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> FAC-Neutral Test (D5)	<input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
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Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes _____ No <u>X</u> Depth (inches): _____	Wetland Hydrology Present? Yes <u>X</u> No _____																															
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																
Remarks:																																

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP WET 01

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Sapling/Shrub Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Herb Stratum (Plot size: <u>30'</u>)				
1.	<u>Polygonum hydropiperoides</u>	<u>25</u>	<u>Y</u>	<u>OBL</u>
2.	<u>Juncus effusus</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>
3.	<u>Hydrolea ovata</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>
4.	<u>Paspalum urvillei</u>	<u>15</u>	<u>N</u>	<u>FAC</u>
5.	<u>Diodia virginiana</u>	<u>15</u>	<u>N</u>	<u>FACW</u>
6.				
7.				
8.				
9.				
10.				
11.				
12.				
	<u>95</u> = Total Cover			
	50% of total cover: <u>47.5</u>		20% of total cover: <u>19</u>	
Woody Vine Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Remarks: (If observed, list morphological adaptations below).				

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by: _____

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No

SOIL

Sampling Point: DP WET 01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 4/4	90	10YR 6/3	10	C	M/PL	Loamy sand	
6-16"	10YR 5/1	75	10YR 5/8	5	C	M/PL	Loamy sand	
			10YR 6/3	20	C	M/PL		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LRR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LRR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)

- Polyvalue Below Surface (S8) (LRR S, T, U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: US HWY 59 Redland City/County: Angelina Sampling Date: 08/01/2017
 Applicant/Owner: TxDOT State: TX Sampling Point: DP WET 01
 Investigator(s): Mike Dyke/Virginia Brown Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Topo Depression Local relief (concave, convex, none): Concave Slope (%): 0-1
 Subregion (LRR or MLRA): Inner Coastal Plain (LRR P) Lat: 31.389584° Long: -94.716284° Datum: WGS 84
 Soil Map Unit Name: Keithville-Sawtown complex, gently undulating (Kb) NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input type="checkbox"/> Surface Water (A1)</td> <td style="width: 50%; border: none;"><input type="checkbox"/> Aquatic Fauna (B13)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> High Water Table (A2)</td> <td style="border: none;"><input type="checkbox"/> Marl Deposits (B15) (LRR U)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Saturation (A3)</td> <td style="border: none;"><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water Marks (B1)</td> <td style="border: none;"><input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Sediment Deposits (B2)</td> <td style="border: none;"><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Drift Deposits (B3)</td> <td style="border: none;"><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td style="border: none;"><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Iron Deposits (B5)</td> <td style="border: none;"><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Marl Deposits (B15) (LRR U)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		Secondary Indicators (minimum of two required) <table style="width: 100%; border: none;"> <tr><td style="border: none;"><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td style="border: none;"><input checked="" type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td style="border: none;"><input checked="" type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> FAC-Neutral Test (D5)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> FAC-Neutral Test (D5)	<input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																
Remarks:																																

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP WET 01

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Sapling/Shrub Stratum (Plot size: <u>30'</u>)				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>30'</u>)				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation _____ 2 - Dominance Test is >50% _____ 3 - Prevalence Index is ≤3.0 ¹ _____ Problematic Hydrophytic Vegetation ¹ (Explain)
1. <u>Polygonum hydropiperoides</u>	25	Y	OBL	
2. <u>Juncus effusus</u>	20	Y	OBL	
3. <u>Hydrolea ovata</u>	20	Y	OBL	
4. <u>Paspalum urvillei</u>	15	N	FAC	
5. <u>Diodia virginiana</u>	15	N	FACW	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
95 = Total Cover				
50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>				
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (If observed, list morphological adaptations below).				Hydrophytic Vegetation Present? Yes <u>x</u> No _____

SOIL

Sampling Point: DP WET 01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 4/4	90	10YR 6/3	10	C	M/PL	Loamy sand	
6-16"	10YR 5/1	75	10YR 5/8	5	C	M/PL	Loamy sand	
			10YR 6/3	20	C	M/PL		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LRR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LRR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)

- Polyvalue Below Surface (S8) (LRR S, T, U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: US HWY 59 Redland City/County: Angelina Sampling Date: 08/01/2017
 Applicant/Owner: TxDOT State: TX Sampling Point: DP WET 01
 Investigator(s): Mike Dyke/Virginia Brown Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Topo Depression Local relief (concave, convex, none): Concave Slope (%): 0-1
 Subregion (LRR or MLRA): Inner Coastal Plain (LRR P) Lat: 31.389584° Long: -94.716284° Datum: WGS 84
 Soil Map Unit Name: Keithville-Sawtown complex, gently undulating (Kb) NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input type="checkbox"/> Surface Water (A1)</td> <td style="width: 50%; border: none;"><input type="checkbox"/> Aquatic Fauna (B13)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> High Water Table (A2)</td> <td style="border: none;"><input type="checkbox"/> Marl Deposits (B15) (LRR U)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Saturation (A3)</td> <td style="border: none;"><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water Marks (B1)</td> <td style="border: none;"><input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Sediment Deposits (B2)</td> <td style="border: none;"><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Drift Deposits (B3)</td> <td style="border: none;"><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td style="border: none;"><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Iron Deposits (B5)</td> <td style="border: none;"><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Marl Deposits (B15) (LRR U)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Aquatic Fauna (B13)																				
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Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes _____ No <u>X</u> Depth (inches): _____	Wetland Hydrology Present? Yes <u>X</u> No _____																				
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																					
Remarks:																					

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP WET 01

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
_____ = Total Cover				
50% of total cover: _____				20% of total cover: _____
Sapling/Shrub Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
_____ = Total Cover				
50% of total cover: _____				20% of total cover: _____
Herb Stratum (Plot size: <u>30'</u>)				
1.	<u>Polygonum hydropiperoides</u>	<u>25</u>	<u>Y</u>	<u>OBL</u>
2.	<u>Juncus effusus</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>
3.	<u>Hydrolea ovata</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>
4.	<u>Paspalum urvillei</u>	<u>15</u>	<u>N</u>	<u>FAC</u>
5.	<u>Diodia virginiana</u>	<u>15</u>	<u>N</u>	<u>FACW</u>
6.				
7.				
8.				
9.				
10.				
11.				
12.				
_____ = Total Cover				
50% of total cover: <u>47.5</u>				20% of total cover: <u>19</u>
Woody Vine Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
_____ = Total Cover				
50% of total cover: _____				20% of total cover: _____
<p>Remarks: (If observed, list morphological adaptations below).</p>				

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by: _____

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0¹

___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes x No _____

SOIL

Sampling Point: DP WET 01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 4/4	90	10YR 6/3	10	C	M/PL	Loamy sand	
6-16"	10YR 5/1	75	10YR 5/8	5	C	M/PL	Loamy sand	
			10YR 6/3	20	C	M/PL		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LRR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LRR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)

- Polyvalue Below Surface (S8) (LRR S, T, U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: US HWY 59 Redland City/County: Angelina Sampling Date: 08/01/2017
 Applicant/Owner: TxDOT State: TX Sampling Point: DP WET 01
 Investigator(s): Mike Dyke/Virginia Brown Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Topo Depression Local relief (concave, convex, none): Concave Slope (%): 0-1
 Subregion (LRR or MLRA): Inner Coastal Plain (LRR P) Lat: 31.389584° Long: -94.716284° Datum: WGS 84
 Soil Map Unit Name: Keithville-Sawtown complex, gently undulating (Kb) NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input type="checkbox"/> Surface Water (A1)</td> <td style="width: 50%; border: none;"><input type="checkbox"/> Aquatic Fauna (B13)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> High Water Table (A2)</td> <td style="border: none;"><input type="checkbox"/> Marl Deposits (B15) (LRR U)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Saturation (A3)</td> <td style="border: none;"><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water Marks (B1)</td> <td style="border: none;"><input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Sediment Deposits (B2)</td> <td style="border: none;"><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Drift Deposits (B3)</td> <td style="border: none;"><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td style="border: none;"><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Iron Deposits (B5)</td> <td style="border: none;"><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Marl Deposits (B15) (LRR U)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		Secondary Indicators (minimum of two required) <table style="width: 100%; border: none;"> <tr><td style="border: none;"><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td style="border: none;"><input checked="" type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td style="border: none;"><input checked="" type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> FAC-Neutral Test (D5)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> FAC-Neutral Test (D5)	<input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																
Remarks:																																

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP WET 01

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Sapling/Shrub Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Herb Stratum (Plot size: <u>30'</u>)				
1.	<u>Polygonum hydropiperoides</u>	<u>25</u>	<u>Y</u>	<u>OBL</u>
2.	<u>Juncus effusus</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>
3.	<u>Hydrolea ovata</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>
4.	<u>Paspalum urvillei</u>	<u>15</u>	<u>N</u>	<u>FAC</u>
5.	<u>Diodia virginiana</u>	<u>15</u>	<u>N</u>	<u>FACW</u>
6.				
7.				
8.				
9.				
10.				
11.				
12.				
	<u>95</u> = Total Cover			
	50% of total cover: <u>47.5</u>		20% of total cover: <u>19</u>	
Woody Vine Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Remarks: (If observed, list morphological adaptations below).				

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)
 Total Number of Dominant Species Across All Strata: _____ (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species _____ x 1 = _____
 FACW species _____ x 2 = _____
 FAC species _____ x 3 = _____
 FACU species _____ x 4 = _____
 UPL species _____ x 5 = _____
 Column Totals: _____ (A) _____ (B)
 Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
 1 - Rapid Test for Hydrophytic Vegetation
 ___ 2 - Dominance Test is >50%
 ___ 3 - Prevalence Index is ≤3.0¹
 ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:
Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes x No _____

SOIL

Sampling Point: DP WET 01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 4/4	90	10YR 6/3	10	C	M/PL	Loamy sand	
6-16"	10YR 5/1	75	10YR 5/8	5	C	M/PL	Loamy sand	
			10YR 6/3	20	C	M/PL		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LRR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LRR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)

- Polyvalue Below Surface (S8) (LRR S, T, U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: US HWY 59 Redland City/County: Angelina Sampling Date: 08/01/2017
 Applicant/Owner: TxDOT State: TX Sampling Point: DP WET 01
 Investigator(s): Mike Dyke/Virginia Brown Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Topo Depression Local relief (concave, convex, none): Concave Slope (%): 0-1
 Subregion (LRR or MLRA): Inner Coastal Plain (LRR P) Lat: 31.389584° Long: -94.716284° Datum: WGS 84
 Soil Map Unit Name: Keithville-Sawtown complex, gently undulating (Kb) NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Surface Water (A1)</td> <td><input type="checkbox"/> Aquatic Fauna (B13)</td> </tr> <tr> <td><input type="checkbox"/> High Water Table (A2)</td> <td><input type="checkbox"/> Marl Deposits (B15) (LRR U)</td> </tr> <tr> <td><input type="checkbox"/> Saturation (A3)</td> <td><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td><input type="checkbox"/> Water Marks (B1)</td> <td><input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)</td> </tr> <tr> <td><input type="checkbox"/> Sediment Deposits (B2)</td> <td><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td><input type="checkbox"/> Drift Deposits (B3)</td> <td><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td><input type="checkbox"/> Iron Deposits (B5)</td> <td><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Marl Deposits (B15) (LRR U)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		Secondary Indicators (minimum of two required) <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Surface Soil Cracks (B6)</td> </tr> <tr> <td><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Drainage Patterns (B10)</td> </tr> <tr> <td><input type="checkbox"/> Moss Trim Lines (B16)</td> </tr> <tr> <td><input type="checkbox"/> Dry-Season Water Table (C2)</td> </tr> <tr> <td><input type="checkbox"/> Crayfish Burrows (C8)</td> </tr> <tr> <td><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Geomorphic Position (D2)</td> </tr> <tr> <td><input type="checkbox"/> Shallow Aquitard (D3)</td> </tr> <tr> <td><input type="checkbox"/> FAC-Neutral Test (D5)</td> </tr> <tr> <td><input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)</td> </tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> FAC-Neutral Test (D5)	<input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
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Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes _____ No <u>X</u> Depth (inches): _____	Wetland Hydrology Present? Yes <u>X</u> No _____																															
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																
Remarks:																																

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP WET 01

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Sapling/Shrub Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>30'</u>)				
1.	<u>Polygonum hydropiperoides</u>	<u>25</u>	<u>Y</u>	<u>OBL</u>
2.	<u>Juncus effusus</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>
3.	<u>Hydrolea ovata</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>
4.	<u>Paspalum urvillei</u>	<u>15</u>	<u>N</u>	<u>FAC</u>
5.	<u>Diodia virginiana</u>	<u>15</u>	<u>N</u>	<u>FACW</u>
6.				
7.				
8.				
9.				
10.				
11.				
12.				
<u>95</u> = Total Cover				
50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>				
Woody Vine Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<p>Dominance Test worksheet:</p> <p>Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)</p> <p>Total Number of Dominant Species Across All Strata: _____ (B)</p> <p>Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)</p> <hr/> <p>Prevalence Index worksheet:</p> <p>Total % Cover of: _____ Multiply by: _____</p> <p>OBL species _____ x 1 = _____</p> <p>FACW species _____ x 2 = _____</p> <p>FAC species _____ x 3 = _____</p> <p>FACU species _____ x 4 = _____</p> <p>UPL species _____ x 5 = _____</p> <p>Column Totals: _____ (A) _____ (B)</p> <p>Prevalence Index = B/A = _____</p> <hr/> <p>Hydrophytic Vegetation Indicators:</p> <p><input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation</p> <p>___ 2 - Dominance Test is >50%</p> <p>___ 3 - Prevalence Index is ≤3.0¹</p> <p>___ Problematic Hydrophytic Vegetation¹ (Explain)</p> <p>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</p> <hr/> <p>Definitions of Four Vegetation Strata:</p> <p>Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.</p> <p>Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.</p> <p>Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.</p> <p>Woody vine – All woody vines greater than 3.28 ft in height.</p> <hr/> <p>Hydrophytic Vegetation Present? Yes <u>x</u> No _____</p>				
Remarks: (If observed, list morphological adaptations below).				

SOIL

Sampling Point: DP WET 01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 4/4	90	10YR 6/3	10	C	M/PL	Loamy sand	
6-16"	10YR 5/1	75	10YR 5/8	5	C	M/PL	Loamy sand	
			10YR 6/3	20	C	M/PL		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LRR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LRR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)

- Polyvalue Below Surface (S8) (LRR S, T, U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: US HWY 59 Redland City/County: Angelina Sampling Date: 08/01/2017
 Applicant/Owner: TxDOT State: TX Sampling Point: DP WET 01
 Investigator(s): Mike Dyke/Virginia Brown Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Topo Depression Local relief (concave, convex, none): Concave Slope (%): 0-1
 Subregion (LRR or MLRA): Inner Coastal Plain (LRR P) Lat: 31.389584° Long: -94.716284° Datum: WGS 84
 Soil Map Unit Name: Keithville-Sawtown complex, gently undulating (Kb) NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width:100%; border: none;"> <tr> <td style="width:50%; border: none;"><input type="checkbox"/> Surface Water (A1)</td> <td style="width:50%; border: none;"><input type="checkbox"/> Aquatic Fauna (B13)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> High Water Table (A2)</td> <td style="border: none;"><input type="checkbox"/> Marl Deposits (B15) (LRR U)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Saturation (A3)</td> <td style="border: none;"><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water Marks (B1)</td> <td style="border: none;"><input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Sediment Deposits (B2)</td> <td style="border: none;"><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Drift Deposits (B3)</td> <td style="border: none;"><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td style="border: none;"><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Iron Deposits (B5)</td> <td style="border: none;"><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Marl Deposits (B15) (LRR U)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		Secondary Indicators (minimum of two required) <table style="width:100%; border: none;"> <tr><td><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td><input checked="" type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td><input checked="" type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td><input type="checkbox"/> FAC-Neutral Test (D5)</td></tr> <tr><td><input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> FAC-Neutral Test (D5)	<input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
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Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes _____ No <u>X</u> Depth (inches): _____	Wetland Hydrology Present? Yes <u>X</u> No _____																															
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																
Remarks:																																

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP WET 01

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Sapling/Shrub Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Herb Stratum (Plot size: <u>30'</u>)				
1.	<u>Polygonum hydropiperoides</u>	<u>25</u>	<u>Y</u>	<u>OBL</u>
2.	<u>Juncus effusus</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>
3.	<u>Hydrolea ovata</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>
4.	<u>Paspalum urvillei</u>	<u>15</u>	<u>N</u>	<u>FAC</u>
5.	<u>Diodia virginiana</u>	<u>15</u>	<u>N</u>	<u>FACW</u>
6.				
7.				
8.				
9.				
10.				
11.				
12.				
	<u>95</u> = Total Cover			
	50% of total cover: <u>47.5</u>		20% of total cover: <u>19</u>	
Woody Vine Stratum (Plot size: <u>30'</u>)				
1.				
2.				
3.				
4.				
5.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Remarks: (If observed, list morphological adaptations below).				

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by: _____

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0¹

___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes x No _____

SOIL

Sampling Point: DP WET 01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 4/4	90	10YR 6/3	10	C	M/PL	Loamy sand	
6-16"	10YR 5/1	75	10YR 5/8	5	C	M/PL	Loamy sand	
			10YR 6/3	20	C	M/PL		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LRR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LRR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)

- Polyvalue Below Surface (S8) (LRR S, T, U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: