Oak Hill Parkway Water Resources Technical Report

ADDENDUM #2

U.S. Highway 290 (US 290) / State Highway (SH) 71 West from State Loop 1 (Mopac) to West of Ranch-to-Market (RM) 1826 and US 290 to Silvermine Drive

Travis County, Texas

CSJ # 0113-08-060 and 0700-03-077

November 2019

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

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1. INTRODUCTION AND PURPOSE

In December 2018, the Texas Department of Transportation (TxDOT) approved a Final Environmental Impact Statement (EIS) and Record of Decision (ROD) for mobility improvements to U.S. Highway (US) 290/State Highway (SH) 71 West from State Loop 1 (MoPac) to west of Ranch-to-Market Road (RM) 1826 and from US 290 to Silvermine Drive (**Figure 1**). The proposed project, known as the Oak Hill Parkway (OHP) Project, is located in Travis County, Texas, and is shown on the USGS 7.5' quadrangle maps for *Bee Cave*, *Oak Hill*, and *Signal Hill*, Texas.

The proposed OHP Project and previous environmental analyses are described in detail in the Final EIS and ROD, and subsequent May 2019 Reevaluation (Reevaluation 1) (available online at https://www.oakhillparkway.com/environmental/).

1.1 2019 Reevaluation #2

As a result of project design changes following the 2018 Final EIS/ROD and Reevalutaion #1, TxDOT is conducting a second documented reevaluation to determine whether the previous environmental decision remains valid under circumstances listed in 43 TAC 2.85 and 23 CFR 771.129. A detailed list of design revisions is included in the Documented Reevaluation Checklist and displayed on the revised schematics (available for review at the TxDOT Austin District Office). This *Water Resources Technical Addendum #2* has been prepared to document any change in resource impacts resulting from the 2019 Reevaluation #2 design modifications.

The purpose of this technical report is to identify and describe all water resources located within the proposed project area in order to assist in avoidance of impacts and minimization of effects as a result of the construction of the proposed project. Conclusions contained in this report are the opinion of the professionals conducting the study and are subject to confirmation by the appropriate regulatory agencies. In addition, this report covers regulatory issues related to water resources that are relevant to the requirements for a Documented Reevaluation Checklist for a TxDOT Project.

2. METHODS

This *Water Resources Technical Report Addendum #2* includes a summary of waters of the United States (WOUS), including wetlands, delineated within the project area by HDR, Inc. in March 2019, as well as a compilation of published data related to water quality, floodplains, and groundwater.

2.1 Data Review

Qualified wetland ecologists reviewed several published data resources prior to the field visit to identify potentially jurisdictional crossings, floodplains, impaired stream segments, and other sensitive surface and groundwater resources. Sources consulted included U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) maps, the National Hydrography Dataset, the Natural Resources Conservation Service (NRCS) Soil Survey for Travis County, USGS 7.5-minute quadrangle sheets (*Oak Hill*, *Signal Hill*, and *Bee Cave*, Texas), Geologic Atlas of Texas maps (Austin sheet), Federal Emergency Management Agency (FEMA) floodplain maps, and recent and historic aerial photography.

2.2 Field Delineation

Qualified wetland ecologists conducted field investigations in March 2019 within the project area. No additional delineation was completed for Reevaluation #2. The routine method of wetland delineation outlined in the Field Guide for Wetland Delineation: 1987 Corps of Engineers Manual (WTI, 1991) and updated in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region, Version 2.0 (USACE, 2010) was utilized for wetland determinations within the project area. Field activities focused on wetlands and WOUS and description.

The Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 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 qualify as a wetland. Some exceptions can occur in disturbed areas or in newly formed wetlands where one indicator (such as hydric soils) might be lacking. These areas would be dealt with on an individual basis as outlined in the Field Guide for Wetland Delineation (WTI, 1991) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region, Version 2.0 (USACE, 2010).

In addition to the jurisdictional wetlands defined above, the Clean Water Act (CWA) regulates impacts to other WOUS. The term “waters of the United States” has broad meaning and incorporates both deepwater aquatic habitats and special aquatic sites, including wetlands, as listed below:

- The territorial seas with respect to the discharge of fill material;
- Coastal and inland waters, lakes, rivers, and streams that are navigable WOUS, including their adjacent wetlands;
- Tributaries to navigable WOUS, including adjacent wetlands;
- Interstate waters and their tributaries, including adjacent wetlands;

For linear WOUS, the Ordinary High Water Mark (OHWM) was determined by assessing a combination of factors at each site. In accordance with Sec. 328.3(e) of the CWA and

Regulatory Guidance Letter 05-05 (USACE December 5, 2005), the following factors were considered in determining the jurisdictional boundary:

- Natural line impressed on the bank
- Shelving
- Changes in the character of soil
- Destruction of terrestrial vegetation
- Presence of litter and debris
- Wracking
- Vegetation matted down, bent, or absent
- Sediment sorting
- Leaf litter disturbed or washed away
- Scour
- Deposition
- Multiple observed flow events
- Bed and banks
- Water staining
- Change in plant community
- Other appropriate means that consider the characteristics of the surrounding areas

Following the completion of preliminary data gathering and synthesis, the routine method of wetland determination was used to identify potentially jurisdictional areas within the project area. The crossings are listed in **Table 1** below, and photographs of the project area are included in **Attachment B** of this report.

3. RESULTS

The 2019 Reevaluation #2 proposed design revisions would not result in a change to the findings described in the Final EIS/ROD or Reevaluation #1 for the regulations listed below. Each regulation was addressed in detail during the water resources analysis conducted for the Final EIS/ROD.

- Section 401 of the CWA
- Section 402 of the CWA
- Section 402: Texas Pollutant Discharge Elimination System
- Section 402: Municipal Separate Storm Sewer System
- Water Quality Section 303(d) of the CWA
- Executive Order 11990, Wetlands
- General Bridge Act and Section 9 of the Rivers and Harbors Act
- Section 10 of the Rivers and Harbors Act
- Texas Coastal Management Program

- Coastal Barrier Resources Act
- Trinity River Corridor Development Certificate
- International Boundary and Water Commission
- Wild and Scenic Rivers
- Water wells with 500 feet of the project area
- Executive Order 11988– Floodplain Management

Additionally, the underlying hydrology of the project area has not changed since the environmental clearance of Reevaluation #1.

3.1 Section 404 of the Clean Water Act

Wetland ecologists initially conducted field investigations for aquatic features in 2015. The results of that effort were presented in the 2018 Final EIS/ROD. In March 2019, the project team acquired additional right-of-entry agreements, which allowed for additional site visits and delineation of the proposed detention pond locations. Based on the designs of the 2019 Reevaluation #2, five of those aquatic features are no longer in the project area. As a result, a total of 13 aquatic features have been delineated and remain within the project area. Aquatic features identified within the project area include three classifications: intermittent streams, ephemeral streams, and an emergent wetland (**Table 1**, **Figure 2a-b**, **Figure 3a-l**, and **Attachment C**).

The acreage of impacts of each potentially jurisdictional water body within the existing and proposed right-of-way, along with the total project area acreages, are shown in **Table 1** below. Field data sheets are included in **Attachment C** for the wetland location.

Table 1– Evaluated Aquatic Features within the OHP Corridor

Aquatic Resource ID	Description	Approx. OHWM (feet)	Acreage/Linear Feet within the Project Area	Acreage/Linear Feet of Potential Impacts	Potential Permitting Requirements
Wetland 1	Emergent Wetland	NA	0.0322/NA	0.0075/NA	NWP 14 with a PCN
Wetland 2*	Emergent Wetland adjacent to S-11	NA	--	--	--
S-1	Ephemeral Stream to Scenic Brook Tributary-Unnamed Tributary	3	0.0026/37	0.0019/28	NWP 14
S-2	Ephemeral Stream – Unnamed Tributary to Wheeler Branch	2	0.0350/760	0.0195/426	NWP 14 with a PCN
S-3	Ephemeral Stream - Wheeler Branch	11	0.4258/1770	0.4258/1770	NWP 14 with a PCN
S-4	Ephemeral Stream - Scenic Brook Tributary to Williamson Creek	19	0.0865/202	0.0820/195	NWP 14
S-5	Intermittent Stream, perennial pools - Headwaters of Williamson Creek at SH 71 bridge	6	0.0389/264	0.0/0.0	--
S-6	Intermittent Stream - Williamson Creek	15	1.6406/4723	0.0244/12	NWP 14
S-7	Ephemeral Stream - Unnamed Tributary to Williamson Creek	5	0.0294/255	0.0123/171	NWP 14
S-8	Ephemeral Stream - Unnamed Tributary to Williamson Creek	4	0.0066/71	0.0/0.0	--
S-9	Ephemeral Stream - Unnamed Tributary to Williamson Creek	4	0.0093/103	0.0/0.0	--
S-10*	Ephemeral Stream - Unnamed Tributary to Williamson Creek	2	--	--	--
S-11*	Intermittent Stream - Unnamed Tributary to Williamson Creek (SH 71 detention pond)	10	--	--	--
S-12	Ephemeral Stream – Braided channel along Unnamed Tributary to Williamson Creek (Bee Cave detention pond)	8	0.3132/1670	0.0104/75	NWP 14
S-13	Ephemeral Stream - Unnamed Tributary to Williamson Creek (Bee Cave detention pond)	4	0.0245/266	0.0/0.0	--
S-14	Ephemeral Stream – Devil's Pen Creek	14	0.1935/160	0.0/0.0	--

Aquatic Resource ID	Description	Approx. OHWM (feet)	Acreage/Linear Feet within the Project Area	Acreage/Linear Feet of Potential Impacts	Potential Permitting Requirements
Open Water 1*	Excavated Pond on channel of S-11	NA	--	--	--
Open Water 2*	Excavated Pond on channel of S-11	NA	--	--	--
Total Within the Project Area			2.83/ 10,280	0.58 / 2,677	

Project Team, 2019

*These crossings were identified within the survey area in 2019 but have been determined not to lie within the Reevaluation #2 project limits.

Note: The impact calculations are based on the schematic design and are not based on actual limits of construction, as this level of detail is not available at this point in project development. Therefore, the calculations are an estimated value that assume complete loss for waters that occur within or beneath at-grade improvements. The calculations have not accounted for the removal of waters contained within existing culverts, as this information was not available at the time of report production.

Summary of Impacts

The project area contains 12 potentially jurisdictional streams and one potentially jurisdictional wetland. Of the delineated streams and wetland, 8 features would be impacted by the proposed project. The impacts to these waters would occur from extending existing culverts, placing fill for concrete aprons and/or rock rip rap at bridges, and placing temporary fills during construction. Exact fill types and amounts would be determined once design is finalized, but impacts are anticipated to be permitted with a Nationwide Permit (NWP) 14 with Pre-construction Notification (PCN) for linear transportation projects from US Army Corps of Engineers. It is likely that a PCN would be required due to impacts associated with the wetland and impacts exceeding 0.1 acres or 300 linear feet at individual crossings. Preliminary design indicates that many of the stream crossings would be bridged, which would minimize or avoid potential fill impacts at these locations.

3.2 Floodplains

New rainfall data, referred to as Atlas 14, was released by the National Oceanic and Atmospheric Administration (NOAA) in September 2018. Atlas 14 rainfall data, with increased rainfall values, has been incorporated in to the OHP hydrologic and hydraulic analysis (provided under separate cover). A result of incorporating the Atlas 14 data is the removal of one of the two originally proposed upstream detention ponds, the SH 71 pond, from the project design. The new data has also resulted in changes of elevations of several roadway locations at intersections with creeks.

The SH 71 pond was removed from the project design because, after incorporating the Atlas 14 rainfall data, the pond resulted in additional flooding (compared to existing) along Williamson Creek downstream of the pond and upstream of the SH 71 crossing, through a heavily-developed area of the creek. This additional flooding, not present in the pre-Atlas 14 modeling, is the result of additional peak flows and a change in peak flow timing between the outfalls of the SH 71 pond and an existing nearby City of Austin detention pond. The flows of this existing pond meet the flows of the SH 71 pond approximately 1,000' downstream of the two ponds pond. The SH 71 pond delayed the peak flows leaving the pond by 6 minutes, compared to the existing conditions. This subtle shift caused the peak flows from the SH 71 pond to coincide with the peak flows form the existing City of Austin pond, resulting in an overall increase in peak flows at the confluence of the two ponds. This increase in peak flows resulted in the additional flooding downstream of the ponds and upstream of the SH 71 crossing.

Multiple options, including outfall and dam reconfiguration to both the SH 71 pond and the existing City of Austin pond, were considered to address the additional flooding in the Atlas-14 modeling. The only option that addressed the additional flooding without causing flood impacts in other areas was the removal of the SH 71 pond. The reductions in peak flows (compared to existing) through the project area, while still substantial, are less when the SH 71 pond is removed. Proposed bridges and channels were modified to account for this increase in peak flows without creating impacts to off-site properties. Additionally, a reduction in potential impacts to jurisdictional waters and wetlands (S-11, Wetland 2, and Open Waters 1 and 2) was an added benefit to the removal of the SH 71 pond.

The Atlas 14 modeling indicates two areas of increased 100-year water surface elevations (compared to existing) outside the project right-of-way, which were not addressed in the Final EIS/ROD or Reevaluation #1. These two areas are labeled as "Area of Potential Flood Impact" in **Attachment D**. There are no other areas of increased 100-year water surface elevations outside the project right-of-way indicated by the modeling of the Atlas 14 data.

3.3 Groundwater and Edwards Aquifer

The Safe Drinking Water Act, the Edwards Aquifer Rules (30 TAC 213), and the TxDOT and Texas Commission on Environmental Quality (TCEQ) Memorandum of Understanding (MOU) regulate project activities that have a potential to affect the Edwards Aquifer. The Final EIS/ROD and supporting material provided an in-depth analysis of the OHP project's effects to groundwater and the Edwards Aquifer. No change to the baseline conditions for these resources have occurred as a result of the 2019 design revisions. A summary of these topics is included below.

The Edwards Aquifer includes three primary zones: the Contributing Zone, the Recharge Zone, and the Transition/Artesian Zone. The OHP Project crosses the Recharge and Contributing Zones. Within the project area, the Contributing Zone is located approximately 800 feet west of the intersection of US 290 and William Cannon Drive and the Recharge Zone is located to the east of the intersection of US 290 and William Cannon Drive (see **Figure 3**). As required by the TxDOT-TCEQ MOU, TxDOT completed coordination with the TCEQ for the OHP Project in May 2018. The TCEQ did not provide comments on the project or the EIS document. TxDOT has committed to a number of best management practices (BMPs) to protect water quality within the project area and a revised *Preliminary Water Quality Analysis & Design Report* has been prepared to address the water quality commitments, including TSS reductions resulting from the design modifications (KFA, 2019). Additionally, TxDOT and TCEQ met on July 31, 2019 to discuss permitting the OHP Project (KFA, 2019). At the meeting, it was agreed that a phased permitting approach would be acceptable; due to the fact that the project is located over both the Contributing Zone and the Recharge Zone, different phases will require a different Edwards Aquifer Protection Plans, either a Contributing Zone Plan or Water Pollution Abatement Plan. The revised commitments for obtaining compliance with the Edwards Aquifer Rules are included in the *Preliminary Water Quality Analysis & Design Report,* which is available for review at the TxDOT Austin District.

4. CONCLUSIONS

This *Water Resources Technical Addendum #2* has been prepared to document new ecological impacts resulting from the 2019 Reevaluation #2 design changes. The results of the additional analysis are summarized below:

- No additional water features were identified in the 2019 Reevaluation #2. Five water features were determined to no longer lie within the proposed project area.
- It is anticipated that a NWP 14 with PCN would be required for impacts at eight crossings.

No additional water resource commitments would be required in order to achieve NEPA clearance on the 2019 Reevaluation #2.

5. REFERENCES

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A176912.

K. Friese & Associates (KFA). 2019. *Preliminary Water Quality Analysis & Design Report*. Prepared for the Texas Department of Transportation. November 2019.

U.S. Army Corps of Engineers. (USACE). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-20. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Fish and Wildlife Service. (USFWS). 2018. National Wetlands Inventory Mapper. Available at: https://www.fws.gov/wetlands/data/mapper.html. Accessed December 2018.

U.S. Geological Survey. (USGS) 2019. USGS National Map Viewer. https://viewer.nationalmap.gov/advanced-viewer/#. Accessed November 18, 2019.

Wetland Training Institute, Inc. (WTI). 1991. Field Guide for Wetland Delineation: 1987 Corps of Engineers Manual. WTI 91-2. 133 pp.

Attachment A: Figures

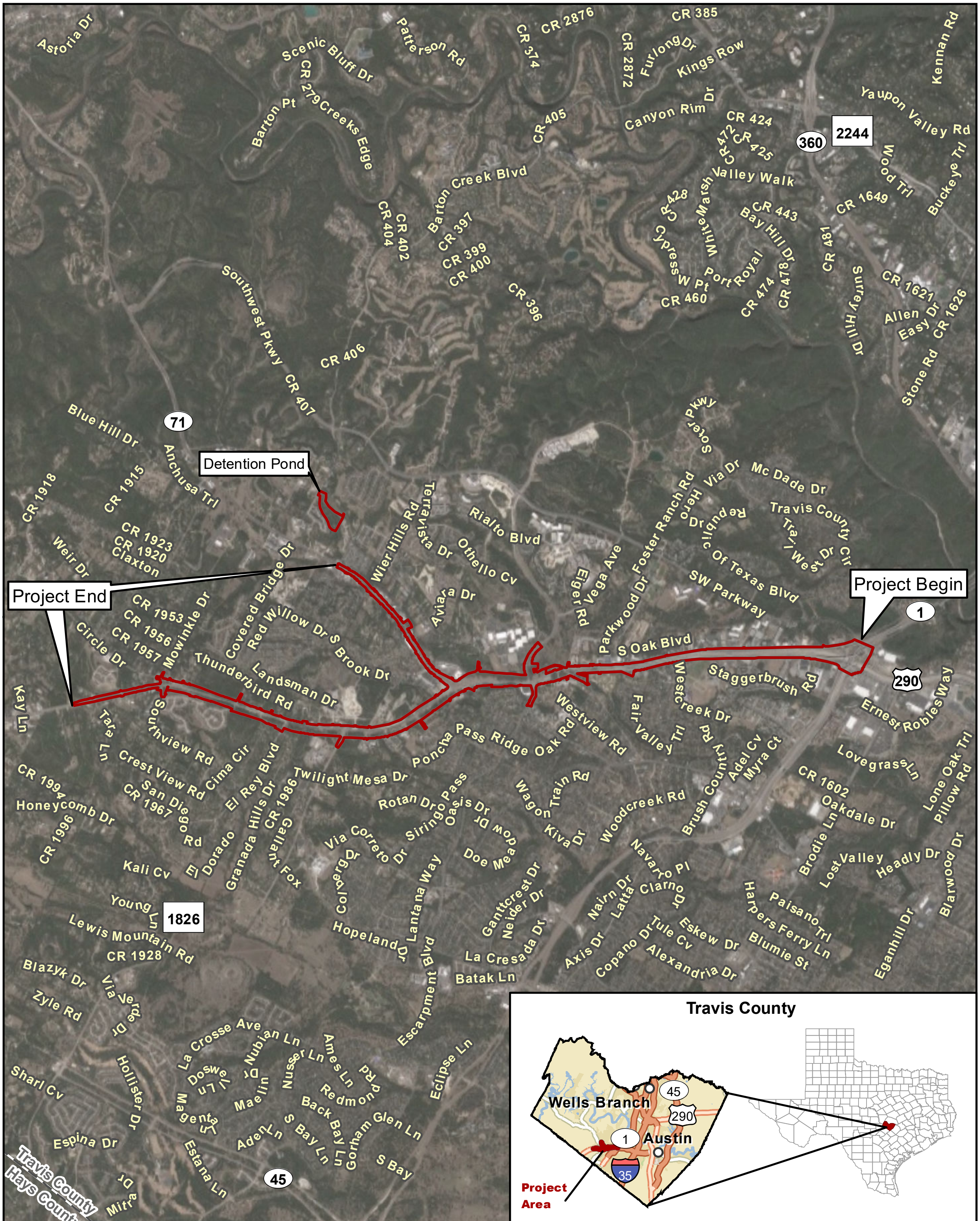

Figure 1. Project Location (Aerial Base)

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Project Location

0 1 Mile
0 1.5 Kilometers

Basemap Source: Google (2018)

Prepared for: TxDOT	1 in = 1 mile
	Scale: 1:63,360
CSJ: 0113-08-060 and 0700-03-077	Date: 11/15/2019

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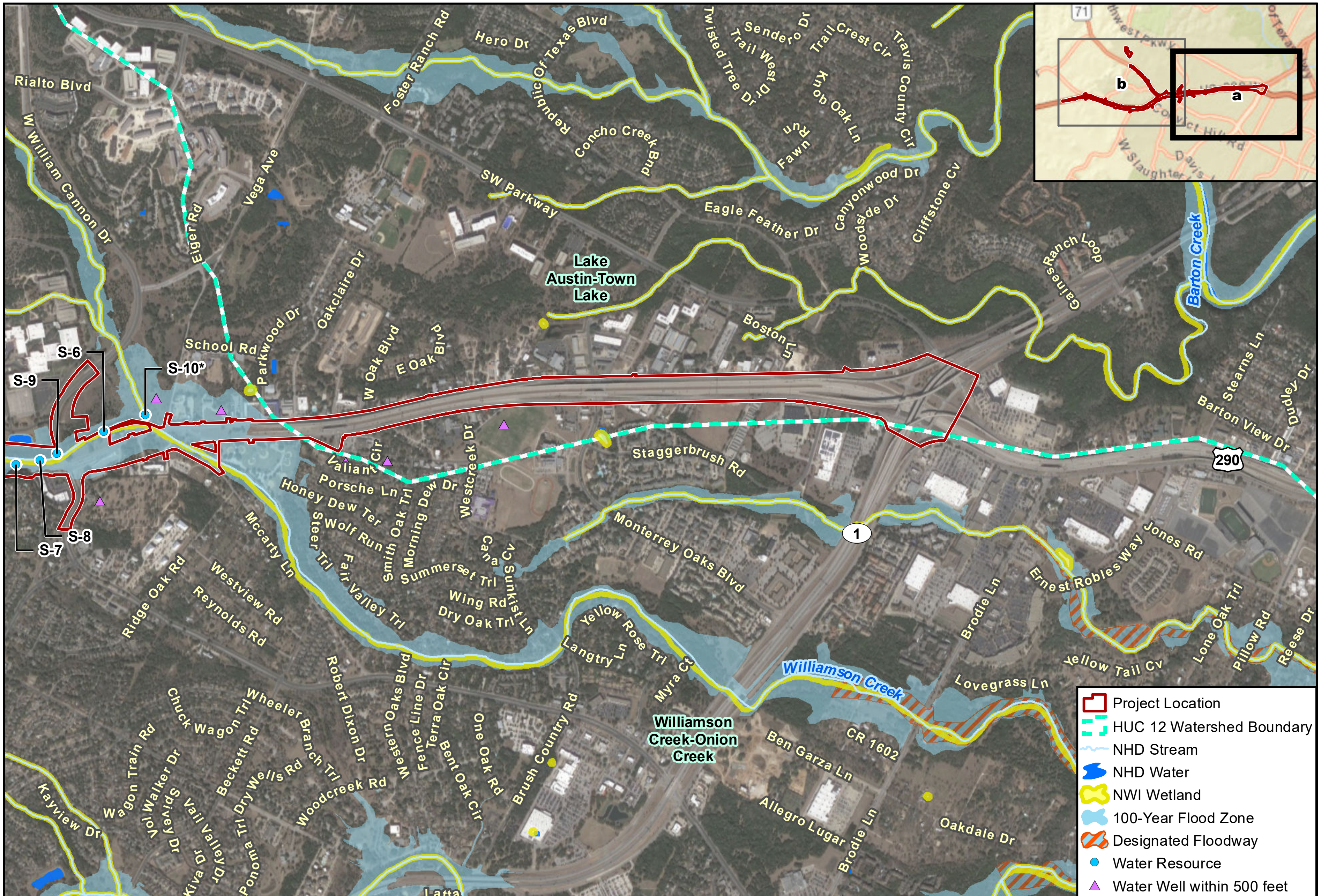

Figure 2a. Water Resources

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

*Resource no longer located within the Project Location

Data Sources: NHD (2018), NWI (2018), FEMA NFHL (2018), TWDB (2019), HDR (2019)
Aerial Source: Google (2018)

Prepared for: TxDOT	1 in = 2,000 feet
	Scale: 1:24,000
CSJ: 0113-08-060 and 0700-03-077	Date: 11/20/2019

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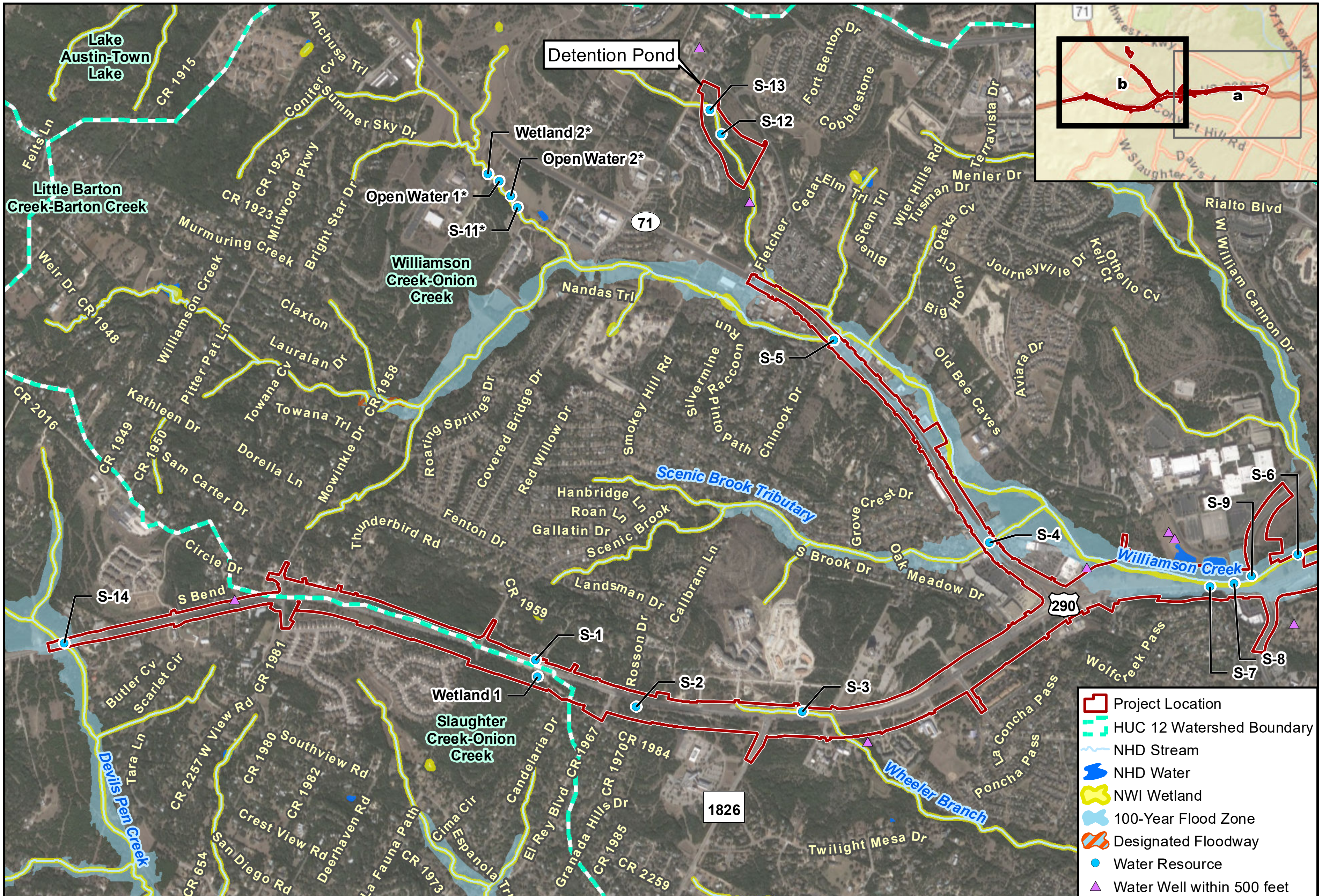

Figure 2b. Water Resources

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

*Resource no longer located within the Project Location

Data Sources: NHD (2018), NWI (2018), FEMA NFHL (2018), TWDB (2019), HDR (2019)
Aerial Source: Google (2018)

0 — 2,000 Feet
0 — 600 Meters

Prepared for: TxDOT	1 in = 2,000 feet
	Scale: 1:24,000
CSJ: 0113-08-060 and 0700-03-077	Date: 11/20/2019

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Figure 3a. Water Crossings

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: HDR (2019)
Aerial Source: Google (2018)

0 200 Feet
0 60 Meters

Prepared for: TxDOT
CSJ: 0113-08-060 and 0700-03-077
1 in = 200 feet
Scale: 1:2,400
Date: 11/20/2019

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Figure 3b. Water Crossings

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: HDR (2019)
Aerial Source: Google (2018)

Prepared for: TxDOT
CSJ: 0113-08-060 and 0700-03-077

1 in = 200 feet
Scale: 1:2,400
Date: 11/20/2019

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Figure 3c. Water Crossings

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: HDR (2019)
Aerial Source: Google (2018)

Prepared for: TxDOT	1 in = 200 feet
	Scale: 1:2,400
CSJ: 0113-08-060 and 0700-03-077	Date: 11/20/2019

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Figure 3d. Water Crossings

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: HDR (2019)
Aerial Source: Google (2018)

0 200 Feet
0 60 Meters

Prepared for: TxDOT	1 in = 200 feet
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CSJ: 0113-08-060 and 0700-03-077	Date: 11/20/2019

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Figure 3e. Water Crossings

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: HDR (2019)
Aerial Source: Google (2018)

0 — 200 Feet; 0 — 60 Meters	
Prepared for: TxDOT	1 in = 200 feet
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CSJ: 0113-08-060 and 0700-03-077	Date: 11/20/2019

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Figure 3f. Water Crossings

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: HDR (2019)
Aerial Source: Google (2018)

Prepared for: TxDOT
CSJ: 0113-08-060 and 0700-03-077
1 in = 200 feet
Scale: 1:2,400
Date: 11/20/2019

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Figure 3g. Water Crossings

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: HDR (2019)
Aerial Source: Google (2018)

0 200 Feet
0 60 Meters

Prepared for: TxDOT	1 in = 200 feet
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CSJ: 0113-08-060 and 0700-03-077	Date: 11/20/2019

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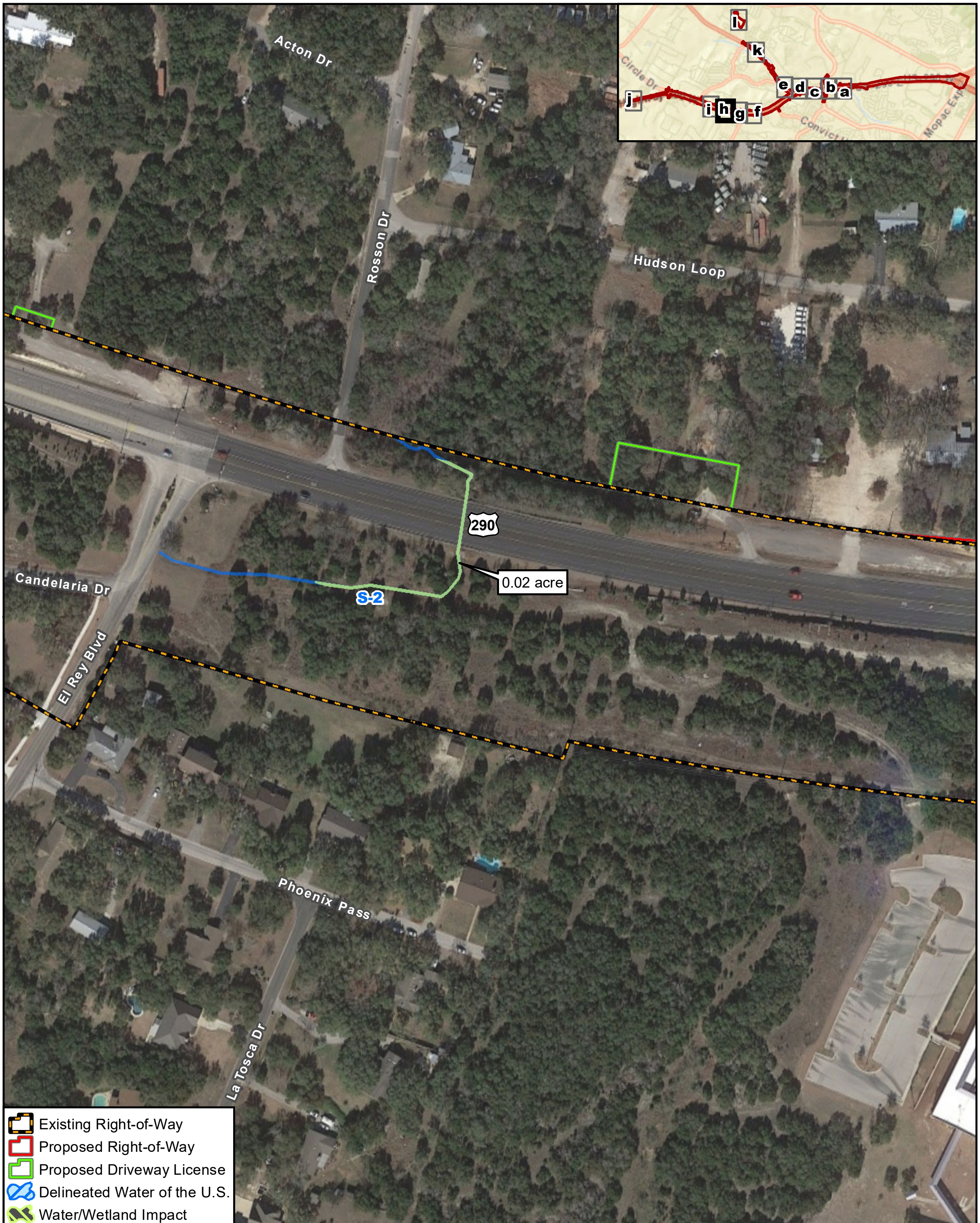

Figure 3h. Water Crossings

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: HDR (2019)
Aerial Source: Google (2018)

0 200 Feet
0 60 Meters

Prepared for: TxDOT	1 in = 200 feet
	Scale: 1:2,400
CSJ: 0113-08-060 and 0700-03-077	Date: 11/20/2019

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Figure 3i. Water Crossings

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: HDR (2019)
Aerial Source: Google (2018)

Prepared for: TxDOT	1 in = 200 feet
	Scale: 1:2,400
CSJ: 0113-08-060 and 0700-03-077	Date: 11/20/2019

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Figure 3j. Water Crossings

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: HDR (2019)
Aerial Source: Google (2018)

Prepared for: TxDOT	1 in = 200 feet
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CSJ: 0113-08-060 and 0700-03-077	Date: 11/20/2019

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Figure 3k. Water Crossings

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: HDR (2019)
Aerial Source: Google (2018)

0 200 Feet
0 60 Meters

Prepared for: TxDOT
1 in = 200 feet
Scale: 1:2,400
CSJ: 0113-08-060 and 0700-03-077
Date: 11/20/2019

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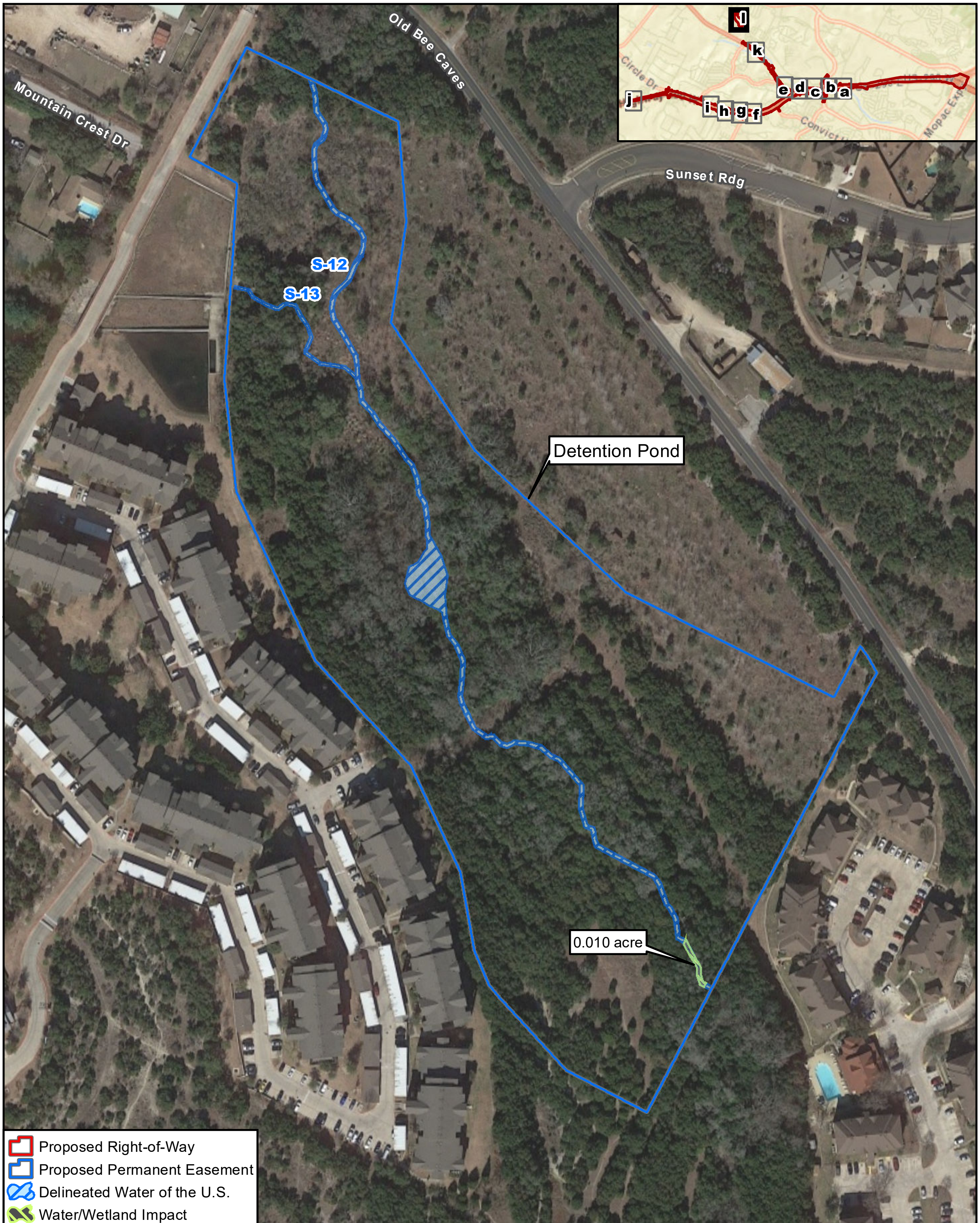

Figure 3l. Water Crossings

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: HDR (2019)
Aerial Source: Google (2018)

0 200 Feet
0 60 Meters

Prepared for: TxDOT
1 in = 200 feet
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Date: 11/22/2019

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Attachment B: Project Area Photographs

Photograph 1: Commercial land use along SH 71 south of Williamson Creek crossing; facing south.

Photograph 2: Urban land use and commercial properties along US 290; facing east.

Photograph 3: Disturbed oak-juniper vegetation along US 290 (foreground) and residential development in background; facing southeast.

Photograph 4: Project eastern terminus at Mopac; facing east.

Photograph 5: Oak-juniper woodland and native-invasive vegetation along US 290; facing west.

Photograph 6: Urban low intensity along US 290 adjacent to roadway and disturbed oak-juniper vegetation adjacent to the fenceline; facing east.

Photograph 7: Live Oak grove at Circle Drive and US 290; facing northeast

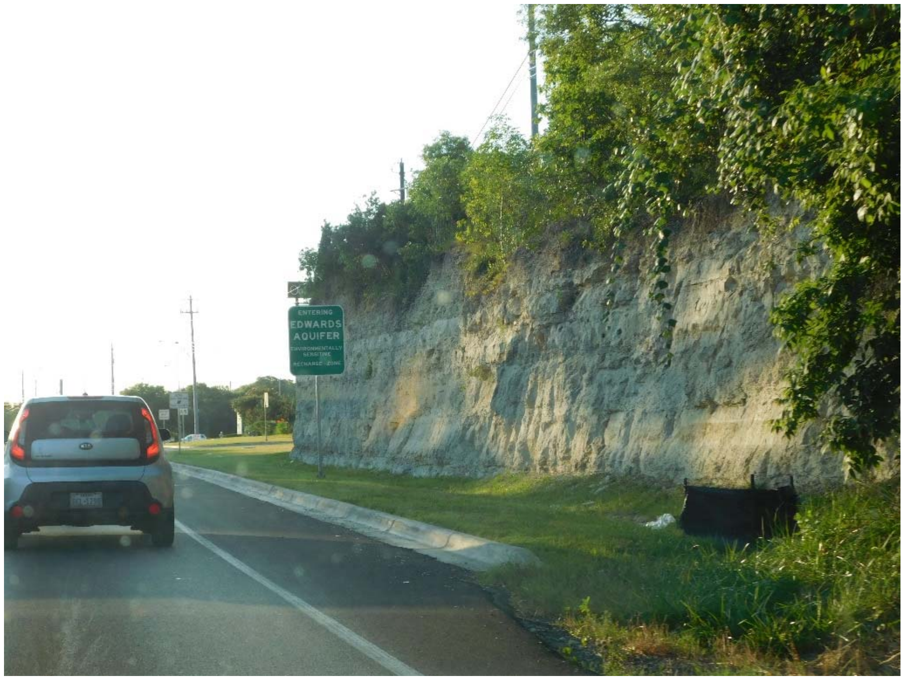
Photograph 8: Woodland vegetation type along US 290; facing north.

Photograph 9: Riparian vegetation at SH 71 Williamson Creek crossing (S-5); facing southeast.

Photograph 10: Riparian vegetation along Williamson Creek (S-6) at Joe Tanner; facing northwest towards US 290/SH71.

Photograph 11: Riparian vegetation along Williamson Creek (S-6) at Old Bee Caves Road; facing east.

Photograph 12: Limestone outcrop along US 290; facing west.



Photograph 13: Urban Low Intensity vegetation and limestone cliff at the start of Recharge Zone along US290/SH71 at William Cannon; facing east.

Photograph 14: Utility infrastructure within the Bee Cave detention pond; facing west.

Photograph 15: Vegetated woodland within the Bee Cave detention pond; facing west.

Photograph 16: S-1; facing north.

Photograph 17: S-2; facing north.

Photograph 18: Wheeler Branch (S-3) south of 290; facing north.

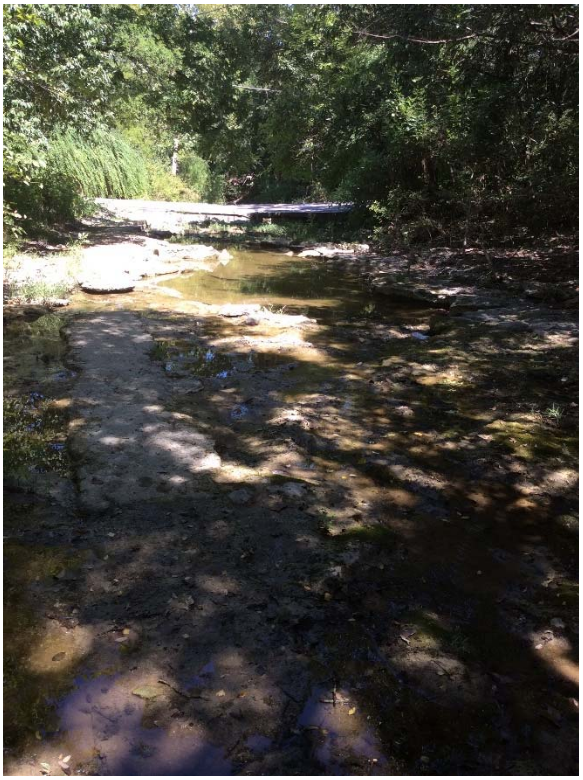
Photograph 19: Wheeler Branch (S-3) north of US 290; facing south.

Photograph 20: Scenic Brook Tributary (S-4) from south of SH 71; facing north.

Photograph 21: S-5 under SH 71 looking west

Photograph 22: S-5 looking east

Photograph 23: Along Williamson Creek (S-6) north of US 290/SH 71; facing east.



Photograph 24: Williamson Creek (S-6) west of low water crossing at Old Bee Caves Road; facing east.

Photograph 25: Perennial pool areas along S-6, Williamson Creek east of William Cannon; viewing east.

Photograph 26: Perennial pool areas along S-6, Williamson Creek, east of William Cannon; viewing east.

Photograph 27: Williamson Creek (S-6) upstream of US 290/SH 71 crossing; facing south.

Photograph 28: Downstream of US 290/SH 71 crossing of Williamson Creek (S-6); facing south.

Photograph 29: Williamson Creek (S-6) at William Cannon Road crossing; facing east.

Photograph 30: Unnamed tributary to Williamson Creek (S-7) south of US 290/SH 71; facing east.

Photograph 31: Unnamed tributary to Williamson Creek (S-8) north of US 290/SH 71; facing south.

Photograph 32: S-10, dry creek bed (no longer in the project area); facing north.

Photograph 33: Unnamed tributary to Williamson Creek (S-11) (no longer in the project area) within SH 71 detention pond site; facing south.

Photograph 34: Unnamed tributary to Williamson Creek (S-11) (no longer in the project area) within SH 71 detention pond site; facing north.

Photograph 35: Unnamed tributary to Williamson Creek (S-12) within the Bee Cave detention pond site; facing northwest.

Photograph 36: Unnamed tributary to Williamson Creek (S-12) within Bee Cave detention pond site; facing south.

Photograph 37: Devil's Pen Creek (S-14) at the US 290 crossing at the western project terminus; facing north.

Photograph 38: Excavated on-channel stock pond (Open Water 1) (no longer in the project area) located within SH 71 detention pond; facing north.

Photograph 39: Excavated on-channel stock pond (Open Water 2) (no longer in the project area) within SH 71 detention pond; facing southwest.

Photograph 40: Wetland (Wetland 1) near Boling Drive, within the project area; facing south.

Photograph 41: Wetland (Wetland 2) (no longer in the project area) within the SH 71 detention pond; facing south.

Attachment C: Wetland Determination Point

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: 290/71 Oakhill Parkway City/County: Travis Sampling Date: 7/20/2015

Applicant/Owner: TxDOT State: Tx Sampling Point: W-1

Investigator(s): C. Magers, S. Moren Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): - Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): I (Southwest Plateaus) Lat: 30.231008 Long: -97.899092 Datum: NAD 83

Soil Map Unit Name: Brackett-Rock outcrop complex, 1 to 12 percent slopes NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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.

	Yes	No
Hydrophytic Vegetation Present?	✓	
Hydric Soil Present?		✓
Wetland Hydrology Present?	✓	

Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks:

Appears to be a dry pond that was dug in uplands during construction of roadway with a cut into an existing stream.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1. none			
2.			
3.			
4.			
	- = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Baccharis halimifolia	5	yes	FAC
2. Salix nigra	5	yes	FACW
3. Sapium sebiferum	5	yes	FAC
4. Juniperus ashei	5	yes	NI
5. Melia azedarach	5	yes	FACU
	25 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Polygonum hydropiperoides	30	yes	OBL
2. Muhlenbergia reverchonii	15	no	FAC
3. Typha latifolia	5	no	OBL
4. Yucca rupicola	5	no	NI
5.			
6.			
7.			
8.			
9.			
10.			
	55 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. Lonicera japonica	20	yes	FACU
2.			
	20 = Total Cover		

% Bare Ground in Herb Stratum 45

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 4 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 57% (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 ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: W-1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 6/2						gravel	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: 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) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: gravel

Depth (inches): 2

Hydric Soil Present? Yes ___ No ✓

Remarks:

Soil appears to be greatly affected by adjacent roadway. Gravel was found at surface level and restricted digging below 2 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
✓ Water Marks (B1)
✓ Sediment Deposits (B2)
___ Drift Deposits (B3)
✓ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
✓ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

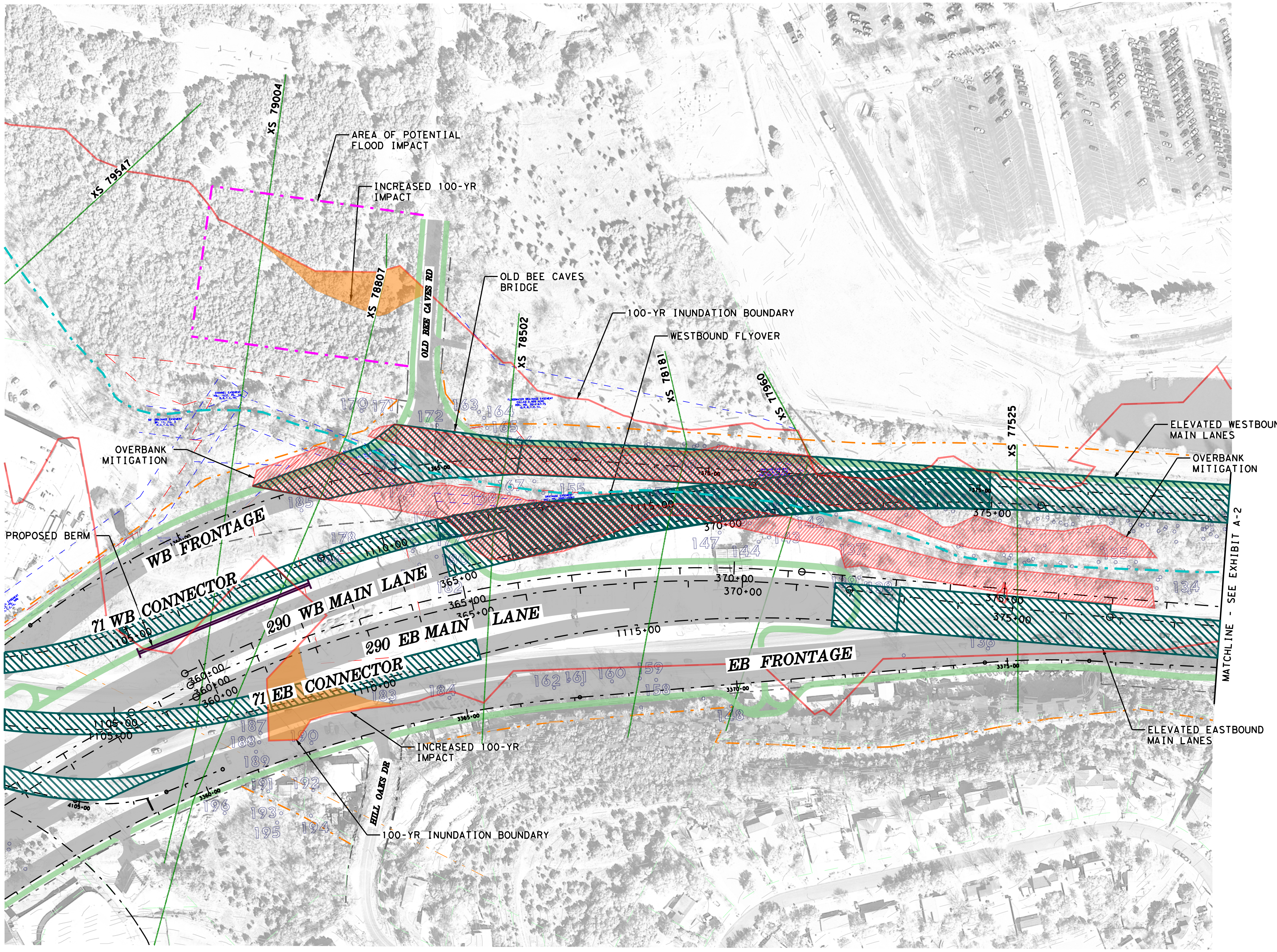
Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth aerial photograph

Remarks:

Attachment D: Hydraulic Exhibits



N

0 100' 200'
SCALE: 1"=200'

LEGEND

	EXISTING ROW
	PROPOSED ROW
	EXISTING CONTOUR
	HEC-RAS CROSS-SECTION
	EXISTING STREAM
	PROPOSED BRIDGE
	PROPOSED MITIGATION AREA
	INCREASED INUNDATION AREA

PRELIMINARY
SUBJECT TO CHANGE

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FIRM REGISTRATION NO. F-230
tnp

OAK HILL PARKWAY
US 290 - HWY 71
WILLIAMSON CREEK
PROPOSED OVERBANK MITIGATION

11/1/2019 | EXHIBIT A-1

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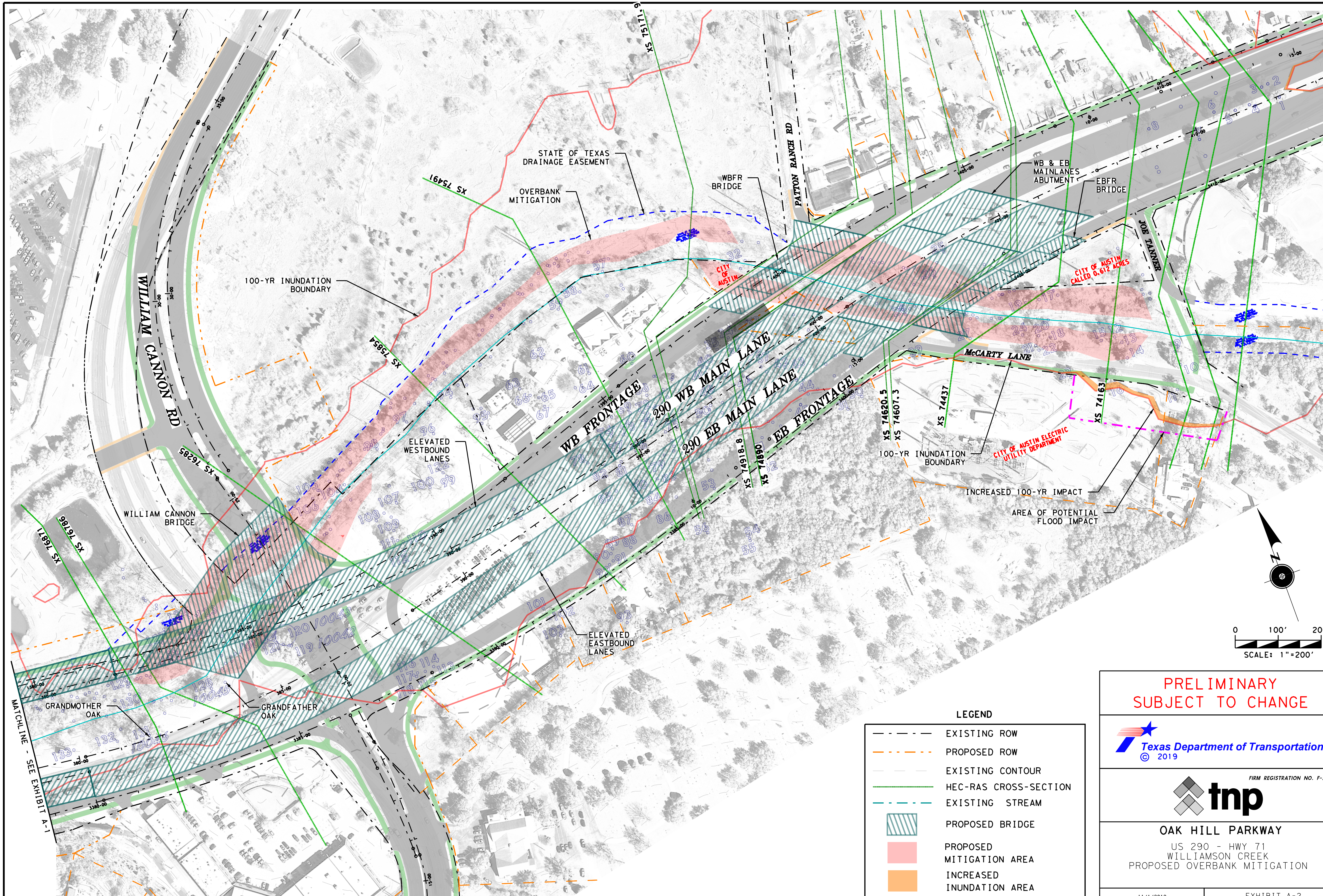

PRELIMINARY
SUBJECT TO CHANGE

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OAK HILL PARKWAY

US 290 - HWY 71
WILLIAMSON CREEK
PROPOSED OVERBANK MITIGATION

11/1/2019 | EXHIBIT A-2