Water Resources Technical Report

Interstate Highway (I-) 10 from State Highway (SH) 46 to Farm-to-Market Road (FM) 3351

Bexar and Kendall Counties, Texas

CSJ: 0072-06-082 & 0072-07-075

September 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.

TABLE OF CONTENTS

Page

1.0 Introduction and Purpose **1**

2.0 Methods **2**

2.1 Data Review 2
2.2 Field Delineation 2

3.0 Results **4**

3.1 General Description of the Project Area 4
3.1.1 Vicinity and Project Area 4
3.1.2 Geology 4
3.1.3 Soils 4

3.2 Section 404 of the Clean Water Act 5
3.2.1 Streams 5
3.2.2 Direct Impacts to Streams 6
3.2.3 Outfalls for Stormwater Management Facilities 8
3.2.4 Indirect Impacts to Streams 9
3.2.5 Construction-Phase Impacts to Streams 10
3.2.6 Post–Construction-Phase Impacts to Streams 12
3.2.7 Water Pollution Abatement Plan 13
3.2.8 Hazardous Materials Spills 13
3.2.9 Wetlands 14

3.3 Section 401 of the Clean Water Act 15
3.4 Navigable Waters 15
3.5 Floodplains 15
3.5.1 Executive Order — Floodplain Management (EO 11988) 16

3.6 Water Quality 16
3.6.1 Section 303(d) of the Clean Water Act 16
3.6.2 Section 402 of the Clean Water Act: Texas Pollutant Discharge Elimination System 16
3.6.3 Section 402 of the Clean Water Act: Municipal Separate Storm Sewer System (MS4) 17

3.7 Executive Order 11990, Wetlands 17
3.8 Texas Coastal Management Program 17
3.9 Coastal Barrier Resources Act 17
3.10 Wild and Scenic Rivers 18
3.11 Geology and Groundwater 18
3.11.1 Upper Trinity Aquifer 18

3.11.2 Middle Trinity Aquifer 18
3.11.3 Balcones Fault Zone Edwards Aquifer 19
3.11.4 Edwards Aquifer Regulatory Zones 20
3.11.5 Water Wells 20
3.11.6 Quantity Impacts to Groundwater 22
3.11.7 Quality Impacts to Groundwater 22
4.0 Conclusions 23
5.0 References 24

LIST OF ATTACHMENTS

Attachment A: Figures

Figure 1: Project Location (Aerial Photography)
Figures 2a–2b: Project Location (Topographic Map)
Figure 3: Project Area Geology
Figures 4a–4b: Project Area Soils
Figures 5a–5b: Water Resources
Figures 6a–6j Potential Waters of the U.S.
Figure 7: 303(d)-Listed Stream Segments
Figure 8: Edwards Aquifer

Attachment B: Project Area Photographs

LIST OF TABLES

Table 1: Soil Map Units within the Project Area 4
Table 2: Ephemeral and Intermittent Streams 5
Table 3: Direct Impacts to Streams 7
Table 4: USACE Section 404 Permitting Requirements 7
Table 5: Quantity Impacts to Streams 9
Table 6: Quality Impacts to Streams 10
Table 7: Wetlands 14
Table 8: Aquifers within the Project Area 19
Table 9: Summary of Wells within 0.25 Miles of the Project Area 20

1.0 Introduction and Purpose

The Texas Department of Transportation (TxDOT) San Antonio District proposes to improve Interstate Highway 10 (I-10) from State Highway (SH) 46 to Farm-to-Market Road (FM) 3351 (Ralph Fair Road) in Bexar and Kendall Counties, Texas (project). The project is located within the city limits of Boerne, Fair Oaks Ranch, and San Antonio as well as the census-designated area of Scenic Oaks.

A *Project Description Memorandum* (provided under separate cover) has been prepared and includes a comprehensive description of the existing facility and proposed action for the project.

The purpose of this Water Resources Technical Report is to evaluate potential water resources regulatory issues associated with the proposed improvements to I-10, including the potential for impacts to waters of the United States (U.S.), including wetlands, water quality, floodplains, and groundwater. Relevant water resources within the project area include Frederick, Menger, Balcones, and Leon Creeks; tributaries to those creeks; floodplains; three aquifers; and wetlands. In addition, two important regulatory zones are also present: the Edwards Aquifer Contributing Zone (EACZ) and the Edwards Aquifer Recharge Zone (EARZ).

This report also describes potentially jurisdictional wetlands and waters of the U.S. located within the proposed project area to assist in avoidance of impacts and determine whether U.S. Army Corps of Engineers (USACE) project authorization would be required. Conclusions contained in this report are the opinions of the professionals conducting the study and are subject to confirmation by the USACE Fort Worth District.

<u>Project Information</u>

Project Area:	I-10 from SH 46 to FM 3351 (**Attachment A**, **Figure 1**)
Size:	The length of the proposed project is approximately 10.07 miles
County:	Bexar and Kendall Counties, Texas
USGS 7.5' Quads:	*Boerne* and *Van Raub,* Texas (**Attachment A**, **Figure 2**)
Client:	TxDOT San Antonio District
Client Address:	4615 Northwest Loop 410, San Antonio, Texas 78229
Client Contact:	John Bryant

2.0 Methods

This Water Resources Technical Report includes a summary of waters of the U.S., including wetlands, within the project construction limits (PCL) and 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. Sources consulted included National Wetlands Inventory (NWI) maps, the National Hydrography Dataset, the Natural Resources Conservation Service (NRCS) Soil Surveys for Bexar and Kendall Counties, U.S. Geological Survey (USGS) 7.5-minute quadrangle sheets (*Boerne* and *Van Raub,* Texas), Geologic Atlas of Texas maps (San Antonio sheet), Federal Emergency Management Agency (FEMA) floodplain maps, and recent aerial photography.

2.2 Field Delineation

Qualified wetland ecologists conducted field investigations in July 2018 within the proposed project area. The routine method of wetland delineation outlined in the *Field Guide for Wetland Delineation: 1987 Corps of Engineers Manual* (Wetland Training Institute [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 waters of the U.S. delineation 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 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:

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

On August 28, 2015, the EPA finalized the Clean Water Rule: Definition of "Waters of the United States" (EPA 2015a). However, on October 9, 2015, the U.S. Court of Appeals for the Sixth Circuit issued a stay of the rule (EPA 2015b). On July 27, 2017, the EPA and the Department of the Army issued a supplemental notice of proposed rulemaking to repeal the 2015 rule and recodify the pre-2015 regulations. On August 16, 2018 U.S. District Judge David Norton for the District of South Carolina issued a nationwide injunction that reinstated the 2015 rule in 26 states including Texas. However, on September 12, 2018 Judge George Hanks Jr. of the U.S. District Court for the Southern District of Texas ruled to freeze the 2015 rule in Louisiana, Mississippi, and Texas.

For linear waters of the U.S., the ordinary high water mark (OHWM) was determined by assessing a combination of factors at each site. In accordance with Section 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. Potential waters of the U.S. were evaluated in the field, and localized hydrologic characteristics and the dominant vegetative species observed at the site were described. Potential waters of the U.S. and wetland boundaries are shown in **Attachment A, Figures 6a–6k**. Photographs of the evaluated crossings are included in **Attachment B** of this report.

3.0 Results

3.1 General Description of the Project Area

3.1.1 Vicinity and Project Area

The proposed project area is located within Bexar and Kendall Counties, Texas. The project area is existing transportation right-of-way for I-10. No new right-of-way is included for the proposed project. The project area is urban, suburban, and undeveloped. Surrounding land use is commercial, residential, and agricultural.

3.1.2 Geology

The project corridor is located on three geologic formations: upper and lower Glen Rose Formation and fluviatile terrace deposits, as shown in the Texas Natural Resource Information System (2007) (**Attachment A**, **Figure 3**).

3.1.3 Soils

Information regarding soils within the project corridor was obtained from the U.S. Department of Agriculture NRCS Soil Surveys for Kendall and Bexar Counties (NRCS 2018). Seventeen soil map units are found within the proposed project area. Information on soils is included in **Table 1,** and the soils are shown in **Attachment A**, **Figure 4**. Two soil map units are listed in the *National Hydric Soils List* as containing hydric inclusions (NRCS 2015).

Table 1: Soil Map Units within the Project Area

	Soil Map Unit Code	Soil Map Unit	Hydric (Yes/No)
Bexar County	BrE	Brackett gravelly clay loam, 12 to 20 percent slopes	No
	Ca	Anhalt clay, 0 to 2 percent slopes	No
	Cb	Crawford and Bexar stony soils	No
	Kr	Krum clay, 1 to 5 percent slopes	No
	Ok	Oakalla silty clay loam, 0 to 2 percent slopes, frequently flooded	No*
	PaB	Patrick soils, 1 to 3 percent slopes, rarely flooded	No
	TaB	Eckrant cobbly clay, 1 to 8 percent slopes	No
	TaC	Eckrant cobbly clay, 5 to 15 percent slopes	No
	VaB	Sunev loam, 1 to 3 percent slopes	No

	Soil Map Unit Code	Soil Map Unit	Hydric (Yes/No)
Kendall County	1	Anhalt clay, 1 to 3 percent slopes	No
	4	Brackett association, 1 to 8 percent slopes	No
	6	Denton silty clay, 1 to 3 percent slopes	No
	8	Doss silty clay, moist, 1 to 5 percent slopes	No
	9	Doss-Brackett association, undulating	No
	12	Krum silty clay, 1 to 3 percent slopes	No
	16	Oakalla silty clay loam, 0 to 2 percent slopes, occasionally flooded	No*
	18	Tarpley clay, 1 to 3 percent slopes	No

*May contain hydric inclusions.

Hydrology

The project area is located within the Guadalupe and San Antonio River Basins. It crosses Menger Creek and Balcones Creek, and runoff from the project area flows to Frederick and Leon Creeks (see **Attachment A**, **Figure 5**; FEMA 2019).

Project Area Vegetation

Vegetation observed within the I-10 corridor during field investigations consisted of maintained roadway right-of-way, riparian areas, and shrubland.

3.2 Section 404 of the Clean Water Act

3.2.1 Streams

Table 2 indicates the streams that would be directly or indirectly impacted by the proposed project.

Table 2: Ephemeral and Intermittent Streams

Crossing Number	Water Feature Name	Station #	Type [1]	Existing ROW Structures	Direct Impacts	Indirect Impacts
Crossing 1	Water 1 – Tributary to Frederick Creek	758+30	Ephemeral	None	No	Yes [2]
Crossing 1	Water 2 – Tributary to Frederick Creek	767+00	Ephemeral	1 culvert across ROW	No	Yes [2]

Crossing Number	Water Feature Name	Station #	Type [1]	Existing ROW Structures	Direct Impacts	Indirect Impacts
Crossing 2	Water 3 – Menger Creek	813+20	Intermittent	1 culvert across ROW	No	Yes [2]
Crossing 3	Water 4 – Tributary to Menger Creek	844+50	Ephemeral	1 culvert across ROW	No	Yes [2]
Crossing 4	Water 5 – Balcones Creek	1000+00	Intermittent	4 bridges over natural channel	No	Yes [2]
Crossing 5	Water 6 – Tributary to Leon Creek	1205+00	Ephemeral	2 culverts and concrete channel	No	Yes [2]
Crossing 6	Water 7 – Tributary to Leon Creek	1232+00	Ephemeral	2 culverts and concrete channel	Yes [3]	Yes [2]
Crossing 7	Water 8 – Tributary to Leon Creek	1271+50	Ephemeral	3 culverts and concrete channel	Yes [3]	Yes [2]

[1] These streams are subject to Section 404 of the Clean Water Act (CWA). None of the streams is subject to the Wild and Scenic Rivers Act of 1968 or the Rivers and Harbors Act (RHA) of 1899.
[2] Indirect impacts would be reasonably foreseeable in downstream extents of streams crossed by the project. See Section 3.2.4 Indirect Impacts to Streams.
[3] Temporary and/or permanent direct impacts would occur. See Section 3.2.2 Direct Impacts to Streams.

The streams identified in **Table 2** are primarily ephemeral, except for two intermittent streams: Menger and Balcones Creeks. No perennial (i.e., always flowing) streams are located within the project limits.

Ephemeral Streams

Ephemeral streams are normally dry and flow only during and shortly after rainfall. I-10 crosses most of these streams at culverts (i.e., cross-drainage structures) that extend across the right-of-way (ROW) from frontage road to frontage road. Typically, the only portions of these streams in the ROW that are not lined with concrete are just beyond the frontage roads.

Intermittent Streams

Intermittent streams have a base flow supported by groundwater discharge, even if only briefly during the year. The proposed project intersects two intermittent streams: Menger and Balcones Creeks.

3.2.2 Direct Impacts to Streams

Under implementation of the proposed project, direct impacts to streams include the discharge of dredge or fill (**Table 3**).

Table 3: Direct Impacts to Streams

Water Feature ID	Project Activity	Temporary and Permanent Direct Impacts
Water 7	• Lengthen culvert between mainlanes and westbound frontage road to accommodate on ramp. • Add outfalls from stormwater management facilities.	• Temporary discharge of dredge or fill from construction access and construction activities in the channel bottom. • Impacts of temporary fill minimal since streambed is ephemeral and no aquatic habitat is present. • No conversion of natural streambed to concrete would occur because streambed in impact area is already concrete-lined. No permanent direct impacts would result.
Water 8	• Lengthen culverts between mainlanes and frontage roads.	• Temporary discharge of dredge or fill from construction access and construction activities in the channel bottom. • Impacts of temporary fill minimal since streambed is ephemeral and no aquatic habitat is present. • Conversion of natural streambed to concrete. Permanent direct impacts would result.

Based on the direct impacts described above, **Table 4** provides the U.S. Army Corps of Engineers (USACE) Section 404 permitting requirements for the proposed project.

Table 4: USACE Section 404 Permitting Requirements

Crossing Number	Water Feature ID	Activity	Permanent Loss of Waters of the U.S. (acres)	Temporary Loss of Waters of the U.S. (acres)	Section 404 Permit Requirement
Crossing 1	Water 1 – Tributary to Frederick Creek	None	0.0000 acre	0.000 acre	None
Crossing 1	Water 2 – Tributary to Frederick Creek	None	0.0000 acre	0.000 acre	None
Crossing 2	Water 3 – Menger Creek	None	0.0000 acre	0.000 acre	None
Crossing 3	Water 4 – Tributary to Menger Creek	None	0.0000 acre	0.000 acre	None
Crossing 4	Water 5 – Balcones Creek	None	0.0000 acre	0.000 acre	None
Crossing 5	Water 6 – Tributary to Leon Creek	None	0.0000 acre	0.000 acre	None
Crossing 6	Water 7 – Tributary to Leon Creek	See Table 2	0.3500 acres	0.000 acre	NWP 18, no PCN
Crossing 7	Water 8 – Tributary to Leon Creek	See Table 2	0.0050 acres	0.000 acre	NWP 14, no PCN

Based on the available project information and the results of field investigations, it is expected that the proposed activities would qualify under Nationwide Permit (NWP) 18, without Preconstruction Notification (PCN) to the USACE and NWP 14 without PCN.

The proposed project would expand and modify the linear transportation facility along I-10 from SH 46 to FM 3351 (Ralph Fair Rd). TxDOT would take appropriate measures to maintain normal downstream flows and to minimize flooding. Temporary fills would consist of construction-related materials and would be placed in a manner that would not be eroded by expected high flows. TxDOT would remove temporary fills in their entirety upon the completion of construction, and the affected area would be returned to preconstruction elevations and revegetated, as appropriate.

The proposed project would comply with the general and regional conditions applicable to NWP 14. A PCN for NWP 18 at Water 7 would not be required because the discharge or the volume of area excavated is not anticipated to exceed 10 cubic yards below the plane of the OHWM. Furthermore, a PCN for NWP 14 at Water 8 would not be required because the acreage of impact is below the 0.1-acre PCN trigger. The activities at each individual crossing have been identified as single and complete projects, as defined in the NWP. As such, each would be permitted under a separate NWP.

3.2.3 Outfalls for Stormwater Management Facilities

Several outfalls would be necessary to drain stormwater management facilities, such as in-line detention controls and total suspended solids (TSS) removal best management practices (BMPs). The stormwater management facilities shown on the schematic are subject to change when the detailed design is determined. The construction of outfalls may involve direct and indirect impacts to streams.

Outfalls (typically concrete pipes) would likely tie into the sides of box culverts. In these cases, no permanent loss of waters would result because they already have concrete bottoms. However, temporary discharges of fill may occur. If outfalls are required in the banks of natural substrate channels, such as Water 5 (Balcones Creek), temporary discharges of dredge or fill and a minor permanent loss of waters of the U.S. may result. During detailed design, outfall velocities would be calculated; if they are erosive, minor amounts of concrete lining may be required around the outfall, thereby resulting in minor losses of Waters of the U.S. Each outfall would be authorized by an NWP, such as NWP 18 — *Minor Discharges*.

Based on the current level of design, PCNs are not expected to be required to obtain permit coverage under NWP 14 and NWP 18. The terms and conditions of each NWP required to construct the project would be implemented. In addition, Texas Commission on Environmental Quality (TCEQ)-approved erosion, sedimentation, and post-construction TSS controls would be utilized in accordance with the TCEQ's Section 401 Certification Conditions for each NWP. During the detailed design and construction phase, project activities would be regularly evaluated to determine the appropriate permitting under Section 404 of the Clean Water Act (CWA).

3.2.4 Indirect Impacts to Streams

The primary indirect impacts to streams pertain to how runoff characteristics would change during the construction phase and during the operation and maintenance (i.e., post-construction phase) of the completed facility. The streams within the TxDOT ROW and downstream of the TxDOT ROW would experience indirect effects of work in the ROW.

For this analysis, runoff characteristics are divided into two categories:

- Quantity impacts
- Quality impacts

Quantity Impacts to Streams

Examples of quantity impacts that may result from a new highway or the modification of an existing highway are shown in **Table 5** (American Association of State Highway and Transportation Officials [AASHTO] 1999). Some of these impact types are applicable to the proposed project, but others are not. A project-specific analysis is presented in **Table 5.**

Table 5: Quantity Impacts to Streams

Examples of Quantity Impacts (AASHTO 1999)	Project Impacts and Mitigation
An increase or decrease in the existing peak and volume of runoff into receiving waters.	The proposed project would add impervious cover, which would increase runoff and peak flows. Detention of approximately 4.06 to 11.58 acre-feet (a value that includes a safety factor of 1.5 acre-feet because it was a high-level analysis with projects that were under design and construction) would be required to mitigate peak flow and runoff volume impacts. This volume is proposed to be provided within TxDOT ROW in the form of in-line ditch detention systems, as shown on the schematic. Peak flow and runoff volume impacts and mitigation are presented in detail in the Drainage Study Report (RESPEC 2019).
The storage volume in lake, reservoir, and wetland areas may be reduced. Conversely, permanent impoundments created by highways can increase storage volumes.	No lakes or reservoirs are located within the PCL. Therefore, none would be impacted under implementation of the proposed project. Wetlands are located in the PCL. However, their storage volumes would not be impacted by the proposed project. Floodplain volume impacts and mitigation are summarized in Section 3.5 - Floodplains.
Channel modifications may increase or decrease the quantity of stream length, and the highway's geometrical and pavement features may change the quantity of runoff reaching the channel.	The proposed project would not alter the length of any streams. Increased pavement may affect runoff quantity. Peak flow and runoff volume impacts and mitigation are summarized above and presented in detail in the *Drainage Study Report* (RESPEC 2019).
Cross-drainage structures may decrease the peak discharge downstream from a highway by temporarily impounding stormwater runoff.	Peak flow and runoff volume impacts and mitigation are summarized above and presented in detail in the *Drainage Study Report* (RESPEC 2019).

Examples of Quantity Impacts (AASHTO 1999)	Project Impacts and Mitigation
Storm drains may increase a stream's peak discharge.	Storm drains and outfalls would be needed to accommodate stormwater management facilities. These conveyances would be determined during the detailed design phase. Section 3.2.3 - Outfalls for Stormwater Management Facilities provides additional details.

If not mitigated, the proposed project's surface water quantity impacts may result in the following:

- Erosion of the bed and banks of streams and deposition of eroded materials downstream, involving the following receptors:
  - Ephemeral and intermittent stream habitats
  - Wetland habitats
  - Recharge areas for the Trinity Aquifer and the Edwards Aquifer

Changes in flow characteristics have been evaluated consistent with a schematic level of effort. During the detailed design phase, these characteristics would be re-examined to ensure all applicable standards and commitments are achieved.

Quality Impacts to Streams

Examples of quality impacts that may result from a new highway or the modification of an existing highway are shown in **Table 6** (AASHTO 1999). Some of these impact types are applicable to the proposed project, while others are not. A project-specific analysis is also presented in **Table 6.**

Table 6: Quality Impacts to Streams

Examples of Quality Impacts	Project-Specific Analysis and Mitigation
Changes in sediment bed load transportation and deposition can impact spawning grounds. Turbidity can cause mortality in fish.	Under implementation of the proposed project, there is limited potential for this impact mechanism because there is minimal aquatic habitat in receiving streams. Since peak flow and runoff volume impacts would be mitigated, no long-term sediment transport impacts are anticipated. However, there is the potential for short-term impacts during construction (See Construction-Phase Impacts to Streams subsection below).
Other pollutants may adhere to sediment particles and cause toxicity to fish and other aquatic species.	In order to protect surface water and groundwater quality, TCEQ has established requirements for TSS loadings as a surrogate for other pollutants (See Post–Construction-Phase Impacts to Streams subsection below).
Water quality may affect the visual quality (i.e., color, smell, appearance, accessibility, and suitability for contact recreation) of surface waters.	Under implementation of the proposed project, there is limited potential for this impact mechanism because there is no persistent water column in most of the project area.

3.2.5 Construction-Phase Impacts to Streams

Construction-phase impacts are generally short-term impacts that coincide with the reconstruction of the facility from its existing condition to the proposed project. The project's

construction phase would involve the removal of grass that stabilizes the soil and the subsequent excavation of rock and soils. Particulates would be generated by the removal of existing infrastructure (e.g., milling pavement, saw-cutting, and breaking concrete structures). The project would also require bringing in materials for construction such as earthen fill, aggregates, asphalt, concrete, concrete curing compounds, and asphalt binders. Many of these materials would be stockpiled on site. The earthen materials would be subject to erosion by wind and rain, which can carry sediments into receiving waters.

Aquatic habitats located downstream of the construction disturbance could experience short-term increases in turbidity or deposition, which can be harmful to aquatic life. The main aquatic habitat in the project area is along Balcones Creek. Any impacts to aquatic habitats would result from the combined effects of the project's runoff and runoff from the remainder of the upstream watershed.

Several environmental permits would be required for the proposed project and contain provisions for managing potential pollutants during the construction phase. These include the following:

- NWPs contain provisions for use of appropriate erosion and sedimentation controls. The TCEQ's Section 401 *Certification Conditions for Nationwide Permits* requires that specific TCEQ-approved controls be used in conjunction with NWPs.
- A Construction General Permit (CGP) under the Texas Pollutant Discharge Elimination System's (TPDES) permit program would be required. Since the project would disturb more than five acres of soil, a Notice of Intent (NOI) would be filed with the TCEQ to obtain permit coverage. A Storm Water Pollution Prevention Plan (SW3P) would be prepared and implemented. The SW3P would outline BMPs that would be used during construction to minimize erosion and offsite sedimentation and minimize other constituents from traveling offsite through stormwater. Construction BMPs may include temporary vegetation, blankets/matting, mulch, and sod for erosion control and silt fences and rock berms for sedimentation control. The BMPs would be implemented prior to construction and would be inspected and maintained throughout construction.

Additional construction-related BMPs appropriate for the project include:

  - Remove temporary dredge or fill from streambeds promptly, before rain events
  - Maintain perimeter erosion controls around stockpiles
  - Washout concrete trucks in designated washout pits
  - Promptly stabilize areas to minimize the soil disturbed at any given time

- A Water Pollution Abatement Plan (WPAP) would be prepared for the proposed project. One component of the WPAP is a Temporary Stormwater Section, which includes requirements for erosion and sediment control during construction and requires additional information regarding sensitive features.

In addition to the project-specific permits discussed above, TxDOT's Municipal Separate Storm Sewer System (MS4) Permit is applicable to activities conducted within the limits of an MS4. The proposed project is within the limits and would drain to the City of San Antonio MS4. It also contains provisions for management of construction sites.

TxDOT's Environmental Management System is intended to improve communication of environmental permits, issues, and commitments (EPICs) throughout the planning, detailed design, and construction of a project. TxDOT has specific requirements for contractor education on stormwater management topics.

3.2.6 Post–Construction-Phase Impacts to Streams

The proposed project would add approximately 0.68 acres of additional impervious cover to the EARZ and 38.5 acres of additional impervious cover to the EACZ.

Impervious cover prevents rain from seeping into the ground and thereby reduces natural soil filtration. Stormwater runoff from parking lots, highways, roof tops, yards, sidewalks, and other impervious surfaces contains suspended solids, pesticides, bacteria, petroleum residues (i.e., oil and grease), fertilizers, animal waste, and metals (Texas Register [TexReg] 1998).

The TCEQ adopted the Edwards Aquifer Rules (30 Texas Administrative Code [TAC] 213) for the specific purpose of regulating activities that have the potential to pollute the Edwards Aquifer and hydrologically connected surface water to protect existing and potential uses of groundwater and to maintain Texas Surface Water Quality Standards (TexReg 1998). The proposed project and associated activities would comply with the Edwards Aquifer rules and any applicable TCEQ guidance documents.

The proposed project would be subject to 30 TAC 213 and would require treatment of runoff. Mitigation measures would be designed, constructed, operated, and maintained to ensure that 80 percent of the incremental increase in the annual mass loading of TSS from the site caused by the regulated activity is removed. TSS does not provide a complete assessment of water quality issues associated with stormwater. However, it serves as a good indicator of significant pollutants of concern, such as oil and grease, and water quality in general. TSS correlates with other water quality constituents, including but not limited to, oil and grease (TexReg 1998).

Jellyfish were selected as the desirable BMP for the project for numerous reasons. In the ultimate condition, pavement covers the majority of the right-of-way, leaving little room for surface treatment options such as vegetative filter strips (VFS), grassy swales, and sand filter ponds. Additionally, the ultimate mainlane pavement will exceed the maximum length allowable for VFS, which is 72 feet, so VFS cannot be used. Grassy swales between the mainlane and frontage road may be feasible with incremental capture inlets, but the large drainage areas may overload them too quickly (this is an incremental calculation based on the roadway profiles). The majority of the project drains through storm sewer systems into cross culverts. This leaves two options: an in-line solution such as a Jellyfish or a large sand filter pond at each culvert outfall. The large offsite areas for each cross culvert mean the

capture volume for each pond would be unreasonably large, would require significant ROW acquisition, and may not be physically feasible. Due to these complications, this analysis assumes Jellyfish will be the only treatment.

Removing TSS may not remove dissolved constituents such as nitrogen and phosphorous (i.e., nutrients found in fertilizers). TxDOT uses fertilizers to vegetate and stabilize soils at the end of construction but does not use fertilizer as part of ongoing operation and maintenance. Therefore, the proposed project would not represent a long-term source of nutrient loads to receiving waters.

3.2.7 Water Pollution Abatement Plan

As stated above, impervious cover will increase over the EARZ and the EACZ. For this reason, it is anticipated that the project would require the preparation and implementation of a WPAP in lieu of a CZP. The WPAP would include a plan for the operation and maintenance of BMPs.

The details on TSS removal BMP types, sizes, and locations would be determined during the detailed design phase of the project. These details would be presented in a WPAP and would be subject to TCEQ review and approval before construction may commence.

3.2.8 Hazardous Materials Spills

Hazardous materials spills have the potential to pollute surface water and groundwater and are used at a variety of facilities in the watershed, such as gas stations, manufacturing facilities, and service facilities. The hazardous materials regulatory database prepared for this project contains additional information on the private and public facilities that utilize hazardous materials in the project area.

In the highway environment, hazardous materials include gasoline and diesel in vehicles' fuel tanks and a variety of solid, liquid, and gaseous materials are transported on highways as cargo. Similarly, underground sanitary sewer lines that cross the landscape carry wastewater from developments in the watershed. These materials pose a risk to water quality if released to the environment.

Hazardous materials spills may result

- from use of the existing facility;
- during the project's construction phase; or
- after the proposed project is complete.

The Non-Radioactive Hazardous Materials (NRHM) Route Plan identifies I-10 within the PCL as a hazardous materials route. Through-transport of hazardous materials is required to use NRHM routes such as I-10 and may not use other routes such as Loop 1604 for through-transport of hazardous materials.

TxDOT maintains a contract with an emergency hazardous materials response company to respond to spills as needed (e.g., in the case where the party responsible for the spill is not responsive in procuring their own clean-up company).

During construction, traffic would continue to use the I-10 facility and pose a risk of spills. The construction activity itself temporarily changes the risk scenario. A WPAP would be approved by the TCEQ and EPA before construction may commence. Hazardous materials are used in roadway construction and include fuel for equipment, asphalt emulsions, concrete additives, and curing compounds. To help reduce the risk of spills that could affect water resources, TxDOT has specific restrictions and requirements the contractor must follow during construction, including the following:

- TxDOT would not allow hazardous materials storage on TxDOT ROW within the EARZ.
- The construction contractor would be responsible for the response, cleanup, and notification of any spills related to construction.
- Following construction, traffic would continue to use the I-10 facility and pose a risk of spills. The WPAP would describe the measures that would be used to contain any spill of hydrocarbons or hazardous substances such as on a roadway (TexReg 1998).

Based on the project's environmental analysis, TxDOT has determined that no structural spill control measures would be included. The proposed facility would be operated in accordance with the Hazardous Materials Route Plan, the WPAP, and the Phase I MS4 Permit.

3.2.9 Wetlands

Two wetlands (Wetlands 1 and 2) were identified in the PCL as part of this study (**Table 7**). One of these wetlands, Wetland 1 (**Figure 6c**), was previously determined to be jurisdictional as part of a previous study *Water Resources Technical Report, IH 10 from SH 46 to Fair Oaks Parkway (CSJs: CSJ 0072-06-074, -075, 0072-07-068 and -070) Project* (Cox|McLain 2015). In addition, another previous study, *Draft Biological and Water Resources Technical Report, Interstate Highway 10 From Fair Oaks Parkway to FM 3351, Bexar County, Texas, CSJ: 0072-07-066, 067, 068*, identified a second wetland, Wetland 2 (**Figure 6j**), on the east side of I-10, upstream of Water 8 (Blanton & Associates 2015).

Table 7: Wetlands

Crossing Number	Water Feature	Location	Type	Direct Impacts	Indirect Impacts
Crossing 1	Wetland 1	In ROW	Emergent	No	No (upstream of work)
Crossing 2	Wetland 2	(Upstream easement at NCT-1)	Emergent	No	No (upstream of work)

Detailed descriptions of both wetlands are provided below:

- Wetland 1 is a non-forested emergent wetland located on the west side of I-10 adjacent to a culvert intake at the existing westside frontage road (**Photo 5**). This wetland connects to Water 4 within and outside the project area. Dominant vegetation includes black willow (*Salix nigra*) trees, eastern gamagrass (*Tripsacum dactyloides*), and common spikerush (*Eleocharis palustris*).
- Wetland 2 is a depressional wetland located on the east side of I-10 within a drainage easement. This wetland is upstream to a culvert outlet (NCT-1). Dominant vegetation

includes jungle rice (*Echinochloa colona*), curly dock (*Rumex crispus*), fragrant flat sedge (*Cyperus odorata*), and caric sedges (*Carex* spp.).

The U.S. Fish and Wildlife Service (USFWS) NWI map shows other potential wetlands in the watershed (**Figure 5**).

The proposed project would have no direct impacts to wetlands because they are located outside the frontage roads where no construction would be required. Wetlands 1 and 2 are located upstream of all work areas and should not experience indirect effects such as those described in Section 3.2.4 - *Indirect Impacts to Streams*. The mitigation plans for streams would also protect wetlands.

3.3 Section 401 of the Clean Water Act

Erosion control, sediment control, and post-construction TSS controls would be incorporated into the construction plan to provide for the protection of surface water quality.

3.4 Navigable Waters

No navigable waterways pursuant to Section 9 or Section 10 of the RHA or the General Bridge Act are located within the proposed project area.

3.5 Floodplains

The project is in Kendall and Bexar Counties, both of which are participants in the National Flood Insurance Program. According to the FEMA Flood Insurance Rate Map (FIRM) Community Panel Numbers 48259C0415F, 48259C0525F, 48029C0085F, and 48029C0095F, the project intersects the FEMA-designated 100-year floodplains associated with Menger Creek, an unnamed tributary to Menger Creek, Balcones Creek, and two unnamed tributaries to Leon Creek (see **Attachment A**, **Figure 5**).

The project would require the placement of fill in some portions of the floodplain and the removal of earth materials from the floodplain in other areas. Detailed cut and fill calculations for the PCL have not been performed yet. FEMA regulations require that fill in the 100-year floodplain be compensated with an equal amount of cut below the 100-year floodplain elevation in an area with flow connectivity to the main channel floodplain. The floodplain fill compensation would be accommodated within the ROW. Coordination with the local Floodplain Administrator would be required.

The hydraulic design for this project would be in accordance with current Federal Highway Administration and TxDOT design policies. The facility would permit the conveyance of the 100-year flood, inundation of the roadway being acceptable, without causing significant damage to the facility, stream, or other property. The proposed project would not increase the base flood elevation to a level that would violate applicable floodplain regulations and ordinances.

The proposed action may be considered a significant encroachment on the floodplain as defined by 23 Code of Federal Regulations (CFR) 650.105. Therefore, it is necessary to demonstrate that the significant encroachment is the only practicable alternative. The following support documentation would be required:

- The reasons why the proposed action must be in the floodplain
- The alternatives considered and why they were not practicable
- A statement indicating whether the action conforms to applicable state or local floodplain protection standards.

The existing alignment of I-10 is in the floodplain. There are no alternative transportation corridors of similar functional class connecting I-10 at SH 46 to FM 3351 (Ralph Fair Road) that would avoid the floodplain. Designs that utilize the existing ROW and mitigate for floodplain impacts would be practicable. The project would be designed to conform with applicable state and local floodplain protection standards. Based on this information, an encroachment on the floodplain would be the only practicable alternative.

3.5.1 Executive Order — Floodplain Management (EO 11988)

Executive Order (EO) 11988 directs each federal agency to act to reduce the risk of losses associated with floods, to minimize the impact of floods on human health and safety, and to preserve the beneficial values of floodplains. Compliance with EO 11988 is addressed programmatically through the implementation of the TxDOT Hydraulic Design Manual, which includes notification and coordination with local floodplain administrators.

3.6 Water Quality

3.6.1 Section 303(d) of the Clean Water Act

The project area is located within the Leon Creek and Cibolo Creek watersheds within the San Antonio River Basin. For the purposes of monitoring water quality, the TCEQ has divided the major water bodies within the San Antonio River Basin into 13 discrete segments. Water runoff from the project area drains to Segment 1908 – Upper Cibolo Creek and to Segment 1907 – Upper Leon Creek. Stormwater flowing to Cibolo Creek would flow to assessment units 1908_01, 1908_02, and 1908_03 while stormwater flowing to Leon Creek would flow to assessment unit 1907_01. Assessment units 1908_01, 1908_02, and 1908_03 of Cibolo Creek are listed as impaired due to elevated bacteria levels; unit 1907_01 of Leon Creek is not listed as impaired. The impaired units are less than five miles downstream of the project area, but the proposed project is not expected to contribute to the constituent of concern for the impaired units of Cibolo Creek. The TCEQ 2016 303(d) list, accepted on October 17, 2018, was utilized in this assessment. See **Attachment A**, **Figure 7**.

3.6.2 Section 402 of the Clean Water Act: Texas Pollutant Discharge Elimination System

The proposed project would include five or more acres of earth disturbance. TxDOT would comply with the TCEQ's TPDES CGP. Efforts would be made to avoid and minimize impacts to

the aquatic ecosystem during roadway design. Minimization would be achieved by preparing and implementing a SW3P and by implementing BMPs, including temporary erosion, sedimentation, and TSS water pollution controls. All temporary erosion controls would follow TxDOT Standard Specifications and would be in place, according to the construction plans, prior to commencement of construction-related activities. The contractor would take appropriate measures to prevent, minimize, and control the spill of fuels, lubricants, and hazardous materials in the construction staging area. A construction site notice would be posted. An NOI and Notice of Termination would be required.

3.6.3 Section 402 of the Clean Water Act: Municipal Separate Storm Sewer System (MS4)

The portion of the project area that is in Bexar County lies within an MS4 area. Since TPDES CGP authorization and compliance (and the associated documentation) occur outside the environmental clearance process, compliance is ensured by the policies and procedures that govern the design and construction phases of the projects. The Project Development Process Manual and the Plans, Specifications, and Estimates (PS&E) Preparation Manual require a SW3P be included in the plans of all projects that disturb one or more acres. The Construction Contract Administration Manual requires that the appropriate CGP authorization documents (NOI or site notice) be completed, posted, and submitted, when required by the CGP, to TCEQ and the MS4 operator. It also requires that projects be inspected to ensure compliance with the CGP.

3.7 Executive Order 11990, Wetlands

EO 11990, Protection of Wetlands (issued in 1977), requires federal agencies to minimize the destruction or modification of wetlands. Two wetlands were identified within the proposed project area. However, neither of the wetlands would be impacted by the proposed project; therefore, EO 11990 would not apply.

3.8 Texas Coastal Management Program

The project is located within Bexar and Kendall Counties, which are completely outside the Coastal Zone Boundary. The proposed project does not lie within the boundary. No coordination would be required.

3.9 Coastal Barrier Resources Act

The Coastal Barrier Resources Act (CBRA) was enacted in 1982 to discourage development in certain coastal areas along the Atlantic and Gulf coasts. The act designated certain undeveloped coastal areas as coastal barrier/system units under the Coastal Barrier Resources System (CBRS) and made those units ineligible for most new federal expenditures and financial assistance.

The proposed project is located within Bexar and Kendall Counties and is not located within a CBRS system unit or otherwise protected area; therefore, CBRA is not applicable.

3.10 Wild and Scenic Rivers

This project would not involve work within a segment of any river designated as a Wild and Scenic River, and it would not harm the free-flowing condition, water quality, or outstanding resource values of any designated Wild and Scenic Rivers.

3.11 Geology and Groundwater

The project area is underlain by the Upper and Lower members of the Glen Rose Formation (See Kgru and Kgrl on **Figure 3**). These are host rocks of the Upper and Middle Trinity Aquifers, respectively (**Table 8**). Edwards Limestones, which are host rocks for the Edwards Aquifer, have mostly been eroded from the area, although some remnants of Edwards Limestone can be found on the tops of some distant hills (See Ked on **Figure 3**). These remnants are not part of the Balcones Fault Zone Edwards Aquifer (Edwards Aquifer) which is a sole source aquifer relied upon by San Antonio. The Edwards Aquifer crosses IH 10 approximately 5 miles south of the project limits, near La Cantera Blvd, where faults have protected Edwards limestone from erosion.

The host rocks of these aquifers contain limestone layers that have experienced dissolution (dissolving) over time. This process is known as "karstification" and has created small- to large-scale voids (i.e. karst features) in the formations. These voids facilitate the movement and storage of groundwater within the rock. Large-scale voids include solution cavities and caves.

3.11.1 Upper Trinity Aquifer

The Upper Trinity Aquifer is the least productive and least utilized of the three aquifers. Its host rock is the Upper Member of the Glen Rose Formation (upper Glen Rose). Water well yields of the Upper Trinity are low due to low porosity and permeability, and water quality is poor due to the presence of gypsum layers within the formation (South Central Texas Regional Water Planning Group [SCTRWPG] 2010). The majority of the project limits overlie the Upper Glen Rose Formation where infiltration would recharge the Upper Trinity Aquifer.

3.11.2 Middle Trinity Aquifer

The Middle Trinity Aquifer is the most widely used part of the Trinity Aquifer in the South Central Texas Region (SCTRWPG, 2010). Its host rocks are the Lower Member of the Glen Rose (lower Glen Rose) and the Cow Creek Limestone member of the Pearsall Formation. The Trinity Aquifer (including the Upper, Middle and Lower Trinity) provides water to all or parts of 55 counties in Texas, including six counties (Hays, Comal, Kendall, Bexar, Medina, and Uvalde) in the South Central Texas Region (SCTRWPG, 2010). The project overlies the Lower Glen Rose Formation near Balcones Creek (**Figure 3**) and infiltration in this area would recharge the Middle Trinity Aquifer. It is interesting to note that the Balcones Creek is mapped as Edwards Aquifer Recharge Zone (EARZ) as shown on Figure 8 and that work within the EARZ is subject to the TCEQ's Edwards Aquifer Rules found in 30 TAC 213.

Table 8: Aquifers within the Project Area

Geologic Subdivisions		Aquifer
Geologic Formation	Geologic Member	
Georgetown [1]	-	Edwards Aquifer (450 feet)[3]
Person [1]	Cyclic and Marine	
	Leached and Collapsed	
	Regional Dense	
	Grainstone	
Kainer [1]	Kirschberg Evaporite	
	Dolomitic	
	Basal Nodular	
Glen Rose	Upper Member (410 feet)[2]	Upper Trinity Aquifer
	Lower Member (320 feet)[2]	Middle Trinity Aquifer
Pearsall (aka Travis Peak)	Bexar Shale	
	Cow Creek Limestone	

[1] Informally, these are the "Edwards limestones"
[2] Member thickness from Clark (2003)
[3] Aquifer thickness from Stein and Ozuna (1995)

3.11.3 Balcones Fault Zone Edwards Aquifer

The Balcones Fault Zone Edwards Aquifer (Edwards Aquifer) is the most productive and most regulated of the aquifers discussed in this report. Collectively, the Georgetown, Person, and Kainer Formations (a.k.a. Edwards limestones) are the host rocks for the Edwards Aquifer. Where the Edwards limestones are exposed at the surface, the karst terrain is characterized by the presence of sinkholes, sinking (losing) streams, and caves. Underground, water moves through highly permeable fractures and voids, which results in prolific wells, but also reduces the aquifer's ability to filter potential contaminants. This characteristic makes the aquifer's water quality highly dependent on the quality of surface water flowing over the recharge zone. The project does not overlie any Edwards limestones and infiltration within the project limits would not directly recharge the Edwards Aquifer; it recharges the Upper Trinity and Middle Trinity aquifers. The closest extent of the Edwards Aquifer is located approximately 5 miles south of the project limits where I-10 crosses La Cantera Blvd. The Edwards limestone is exposed at the surface in this area and direct recharge to the Edwards Aquifer occurs there.

3.11.4 Edwards Aquifer Regulatory Zones

The TCEQ's Edwards Aquifer Rules found in 30 TAC 213 define several regulatory zones to protect the quality of groundwater in the Edwards Aquifer. These rules do not apply in Kendall County but they do apply in Bexar County.

A small portion of the project limits along Balcones Creek within Bexar County is mapped as the Edwards Aquifer Recharge Zone (EARZ) as shown on **Figure 8**. This is atypical compared to most areas that area mapped as EARZ because there is no Edwards Limestone or Edwards Aquifer in or near the mapped EARZ boundary along Balcones Creek. Any infiltration to the subsurface along Balcones Creek in this area would recharge the Middle Trinity Aquifer. There are areas where groundwater may flow freely between the Middle Trinity Aquifer and the Edwards Aquifer, but these areas are approximately 5 miles away from the project. The Edwards Limestone has been completely eroded away from the project limits. The nearest location where flow between the Trinity and Edwards Aquifers may occur is near I-10 at La Cantera Blvd, where Edwards limestones are present. Regardless of the atypical regulatory mapping, the area mapped as EARZ is subject to 30 TAC 213.

The remainder of the project limits within Bexar County is mapped as the Edwards Aquifer Contributing Zone (EACZ) as shown on **Figure 8**. TCEQ requires treatment of runoff from the EARZ and EACZ to protect the Edwards Aquifer (30 TAC 213).

3.11.5 Water Wells

Based on the Texas Water Development Board's (TWDB's) Groundwater Database there are 38 water wells within 0.25 miles of the project area. **Table 9** shows the well numbers, well types, and depths to water for the 38 wells. None of the wells lie within the ROW, and no impacts to any of the wells are anticipated (see **Attachment A**, **Figure 5**).

Table 9: Summary of Wells within 0.25 Miles of the Project Area

Well Number	County	Aquifer	Well Type	Depth to Water	Date of Measurement
6811704	Kendall	Upper Trinity	Withdrawal of Water	77.40	8/24/1965
6811712	Kendall	Middle Trinity	Withdrawal of Water	11.52	11/30/1964
6811714	Kendall	Middle Trinity	Withdrawal of Water	80.00	11/1964
6811718	Kendall	Upper Trinity	Test Hole	33.00	7/1/1977
6811719	Kendall	Middle Trinity	Withdrawal of Water	365.00	5/1972
6811720	Kendall	Upper Trinity	Withdrawal of Water	78.00	11/3/59
6811721	Kendall	Middle Trinity	Withdrawal of Water	240.00	5/28/1963
6811722	Kendall	Upper Trinity	Withdrawal of Water	55.00	2/28/1969
6811723	Kendall	Upper Trinity	Withdrawal of Water	65.80	11/6/1974

Well Number	County	Aquifer	Well Type	Depth to Water	Date of Measurement
6811724	Kendall	Upper Trinity	Withdrawal of Water	66.00	11/6/1974
6811725	Kendall	Upper Trinity	Withdrawal of Water	46.10	11/6/1974
6811726	Kendall	Upper Trinity	Withdrawal of Water	None reported	N/A
6811802	Kendall	Middle Trinity	Withdrawal of Water	231.80	11/30/1964
6811803	Kendall	Middle Trinity	Withdrawal of Water	30.00	1950
6811808	Kendall	Middle Trinity	Withdrawal of Water	280.00	4/8/1969
6811809	Kendall	Middle Trinity	Withdrawal of Water	167.00	7/22/1974
6811811	Kendall	Middle Trinity	Withdrawal of Water	279.51*	Multiple dates
6811812	Kendall	Middle Trinity	Withdrawal of Water	253.00	6/10/1988
6819202	Kendall	Middle Trinity	Withdrawal of Water	237.00 and 241.00	12/14/1964 1/15/1965
6819206	Bexar	Middle Trinity	Withdrawal of Water	300.00	7/2/1968
6819208	Bexar	Middle Trinity	Test Hole	461.42*	Multiple dates
6819212	Bexar	Middle Trinity	Withdrawal of Water	None reported	N/A
6819213	Bexar	Middle Trinity	Withdrawal of Water	None reported	N/A
6819326	Bexar	Middle Trinity	Withdrawal of Water	460	11/4/2002
6819328	Bexar	Middle Trinity	Withdrawal of Water	None reported	N/A
6819329	Bexar	Middle Trinity	Withdrawal of Water	None reported	N/A
6819331	Bexar	Middle Trinity	Withdrawal of Water	302	3/1/2006
6819606	Bexar	Middle Trinity	Withdrawal of Water	275	6/10/1967
6819607	Bexar	Middle Trinity	Withdrawal of Water	None reported	N/A
6819617	Bexar	Middle Trinity	Withdrawal of Water	199.07	Multiple dates
6819621	Bexar	Middle Trinity	Withdrawal of Water	266	9/1/1989
6819622	Bexar	Middle Trinity	Withdrawal of Water	320	5/10/1995
6819626	Bexar	Middle Trinity	Withdrawal of Water	188.5*	Multiple dates
6819627	Bexar	Middle Trinity	Withdrawal of Water	219*	Multiple dates
6819638	Bexar	Middle Trinity	Withdrawal of Water	None reported	N/A
6819639	Bexar	Middle Trinity	Withdrawal of Water	270	5/16/1999
6819642	Bexar	Middle Trinity	Test Hole	None reported	N/A

Source: TWDB 2019
*Averaged

3.11.6 Quantity Impacts to Groundwater

The principal threats to groundwater quantities is long-term groundwater pumping, which this project would not involve and drought. The Trinity Aquifer is being stressed due to rapid growth in the number of wells being drilled to supply new homes and commercial establishments (SCTRWPG, 2010). The proposed project would add impervious cover, which would reduce infiltration through soil and potential recharge to the Upper and Middle Trinity aquifers, respectively. Since most of the PCL overlie the upper Glen Rose, recharge impacts would primarily affect the Upper Trinity Aquifer, which has lower yields and lower natural water quality compared to the Edwards and Middle Trinity aquifers.

3.11.7 Quality Impacts to Groundwater

Project activities that impact surface waters may also affect groundwater if affected surface water recharges underlying aquifers. During a rain event, runoff from the project may concentrate in streams, mix with runoff from the remainder of the watershed, and potentially infiltrate to the Trinity or Edwards Aquifers where further mixing with groundwater may occur. TCEQ regulations protect groundwater by protecting surface water.

Sensitive features such as solution cavities, solution fractures, and caves may be point locations of recharge, with the volume of recharge dependent upon feature attributes (size, infilling, etc.) and the size of its drainage area. Filling sensitive features may reduce recharge. A Geological Assessment was conducted according to TCEQ requirements to find geologic features and to determine if they rank as sensitive using a defined scoring system. No sensitive features were found.

If any sensitive feature is discovered on the mapped EARZ during construction, all regulated activities near the sensitive feature would be suspended and the TCEQ would be notified. Regulated activities near the sensitive feature would not proceed until the TCEQ has reviewed and approved the methods proposed to protect the sensitive feature and the Edwards Aquifer from potentially adverse impacts to water quality.

As previously discussed, a Water Pollution Protection Plan (WPAP) would be prepared in accordance with the TCEQ's Edwards Aquifer Rules. The project would include the treatment of runoff in Bexar County to protect surface and groundwater quality. The treatment would be based on the actual amount of impervious cover proposed which would be determined during final design.

4.0 Conclusions

Ten potentially jurisdictional waters of the U.S. at seven crossings were identified within the project limits. The potential waters of the U.S. consisted of two tributaries to Frederick Creek, Menger Creek, a tributary to Menger Creek with an adjacent wetland, Balcones Creek, and three tributaries to Leon Creek, one of which had an adjacent wetland. It is anticipated that impacts would be permitted under NWP #14 without PCN and NWP #18 without PCN.

The project would be required to apply for authorization under the CGP. As such, completion and implementation of a SW3P, filing of an NOI with TCEQ, and posting of a site notice would be required.

An NOI would be submitted to the local MS4 operator, and possible floodplain impacts would be coordinated through the local Floodplain Administrator.

Possible impacts to the Edwards Aquifer would be coordinated through the Edwards Aquifer Rules and would include the completion of a WPAP for the Bexar County portion of the project area for submittal to TCEQ for review and approval.

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This report was prepared on behalf of the Texas Department of Transportation by:

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Attachment A
Figures

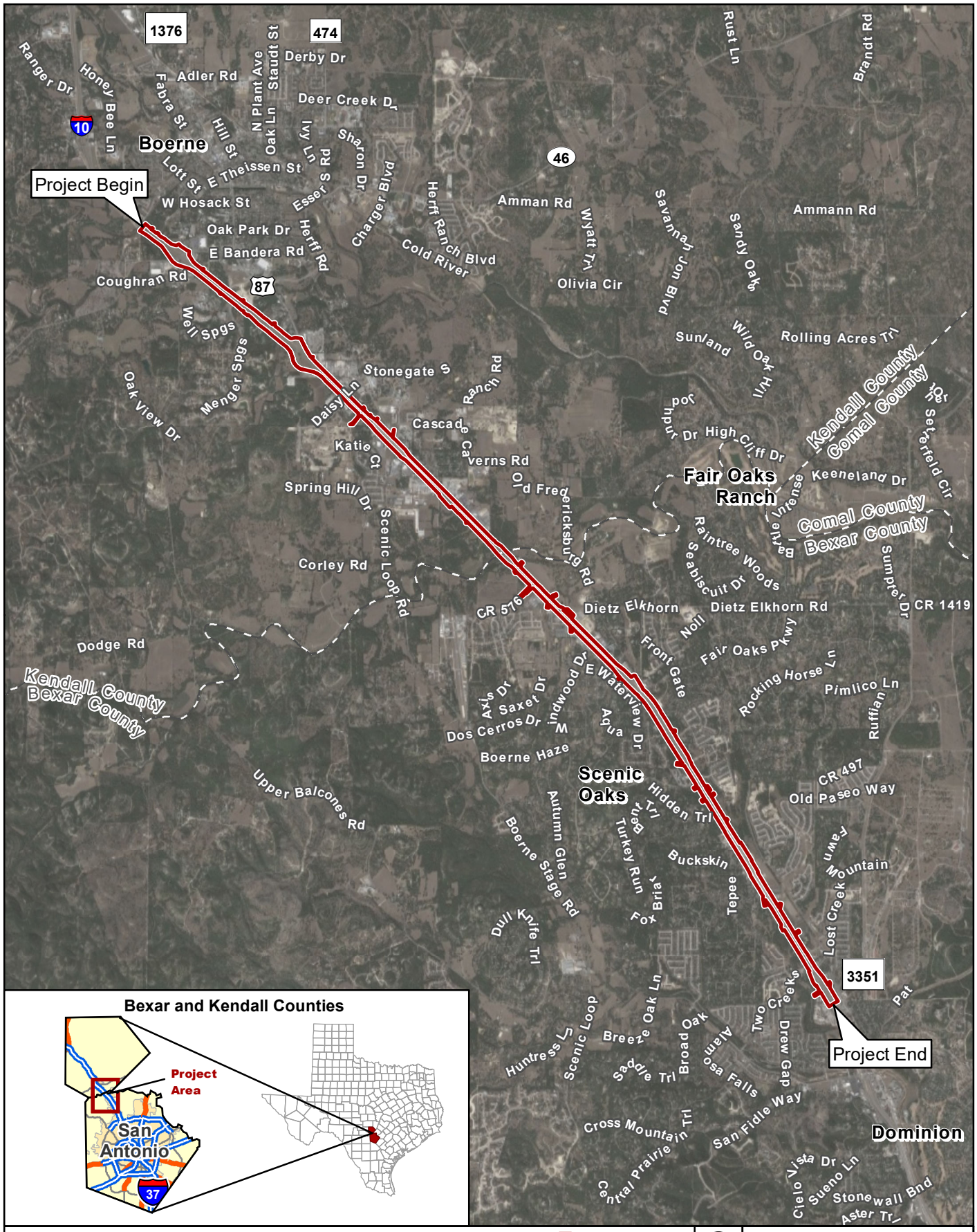

Figure 1

Project Location (Aerial Base)

I-10 from SH 46 to FM 3351

Project Location

Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 1.25 Miles

0 1.5 Kilometers

1 in = 1.25 miles

Scale: 1:79,200

Date: 2/13/2019

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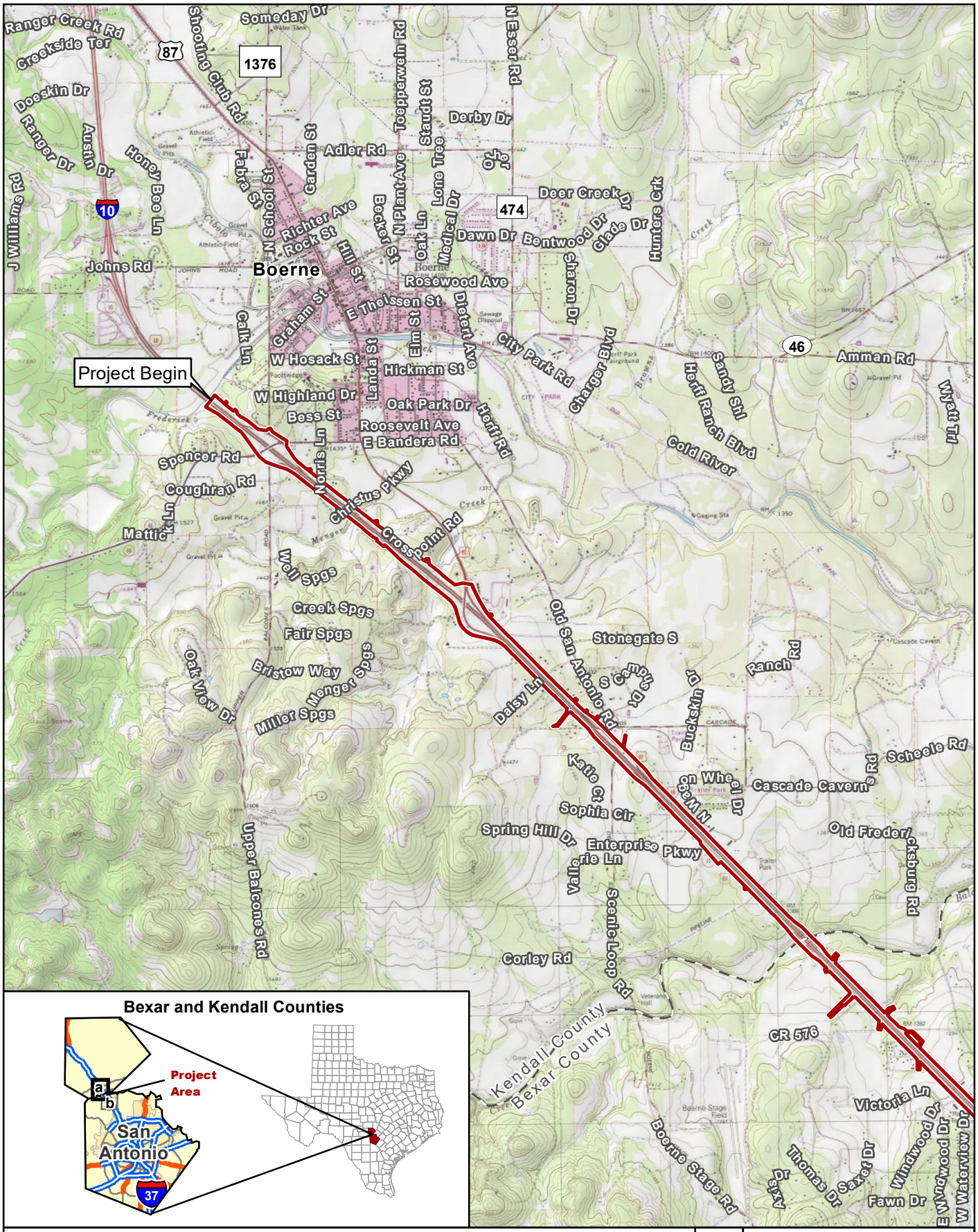

Figure 2a

Project Location (Topographic Base)

I-10 from SH 46 to FM 3351

Project Location

Basemap Source: USGS Boerne and Van Raub 7.5' Quadrangles (1982, 1991)

CSJs: 0072-06-082 & 0072-07-075

0 — 0.76 Miles
0 — 1 Kilometers

1 in = 0.76 miles
Scale: 1:48,000
Date: 2/14/2019

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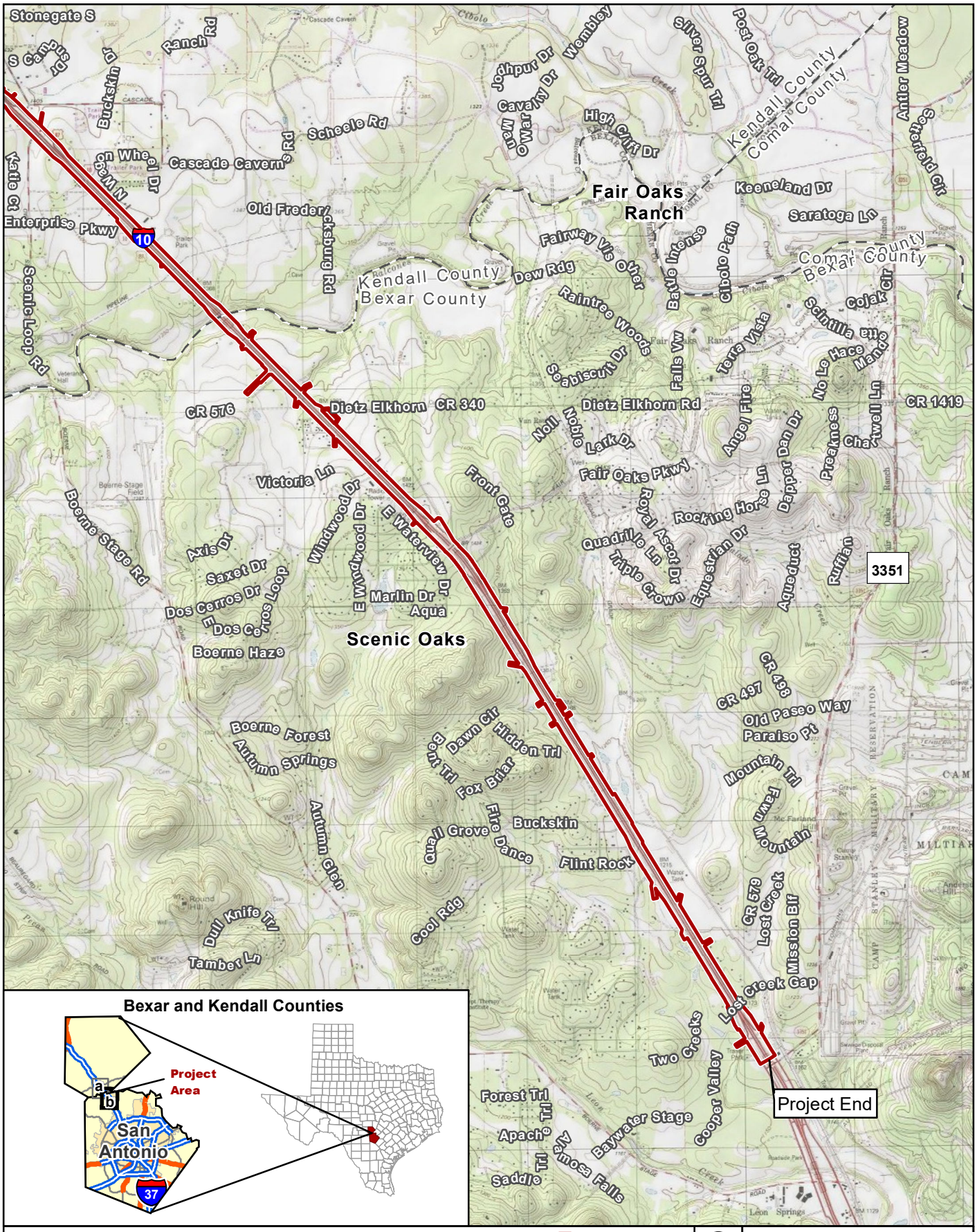

Figure 2b

Project Location (Topographic Base)

I-10 from SH 46 to FM 3351

Project Location

Basemap Source: USGS Boerne and Van Raub 7.5' Quadrangles (1982, 1991)

CSJs: 0072-06-082 & 0072-07-075

0 — 0.76 Miles
0 — 1 Kilometers

1 in = 0.76 miles
Scale: 1:48,000
Date: 2/14/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 2_Project Location_Topo_20190213.mxd

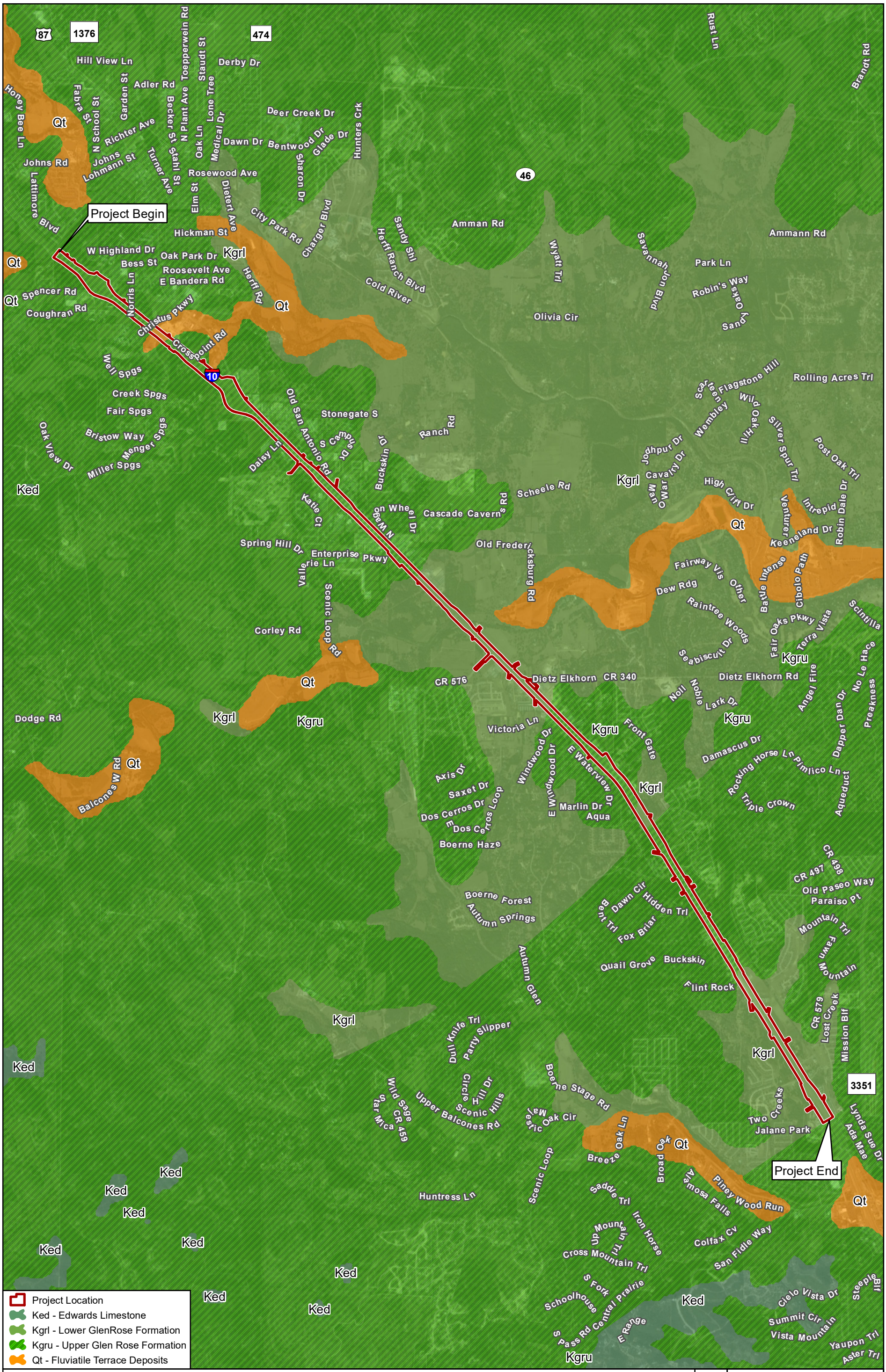

Figure 3

Project Area Geology

I-10 from SH 46 to FM 3351

Data Source: Geologic Database of Texas (2007)/
Geologic Atlas of Texas San Antonio Sheet (1982)
Aerial Source: Google (2018)

CSJ: 0072-06-082 & 0072-07-075

0 4,000 Feet
0 1,000 Meters

1 in = 4,000 feet
Scale: 1:48,000
Date: 2/11/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 3_Geology_20190208.mxd

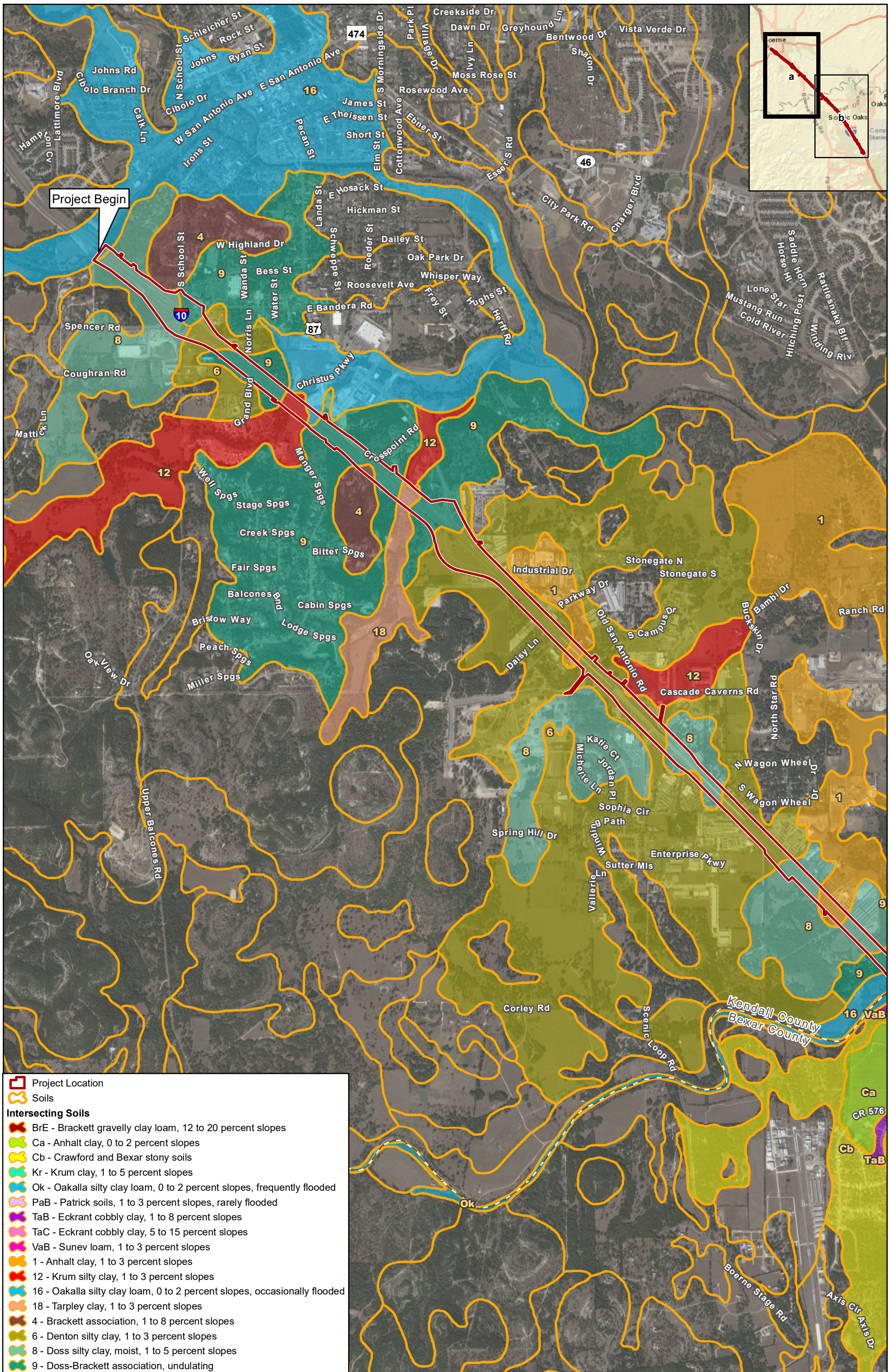

Figure 4a

Project Area Soils

I-10 from SH 46 to FM 3351

Data Source: NRCS (2018)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 2,000 Feet
0 500 Meters

1 in = 2,000 feet
Scale: 1:24,000
Date: 2/13/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 4_Soils_20180208.mxd

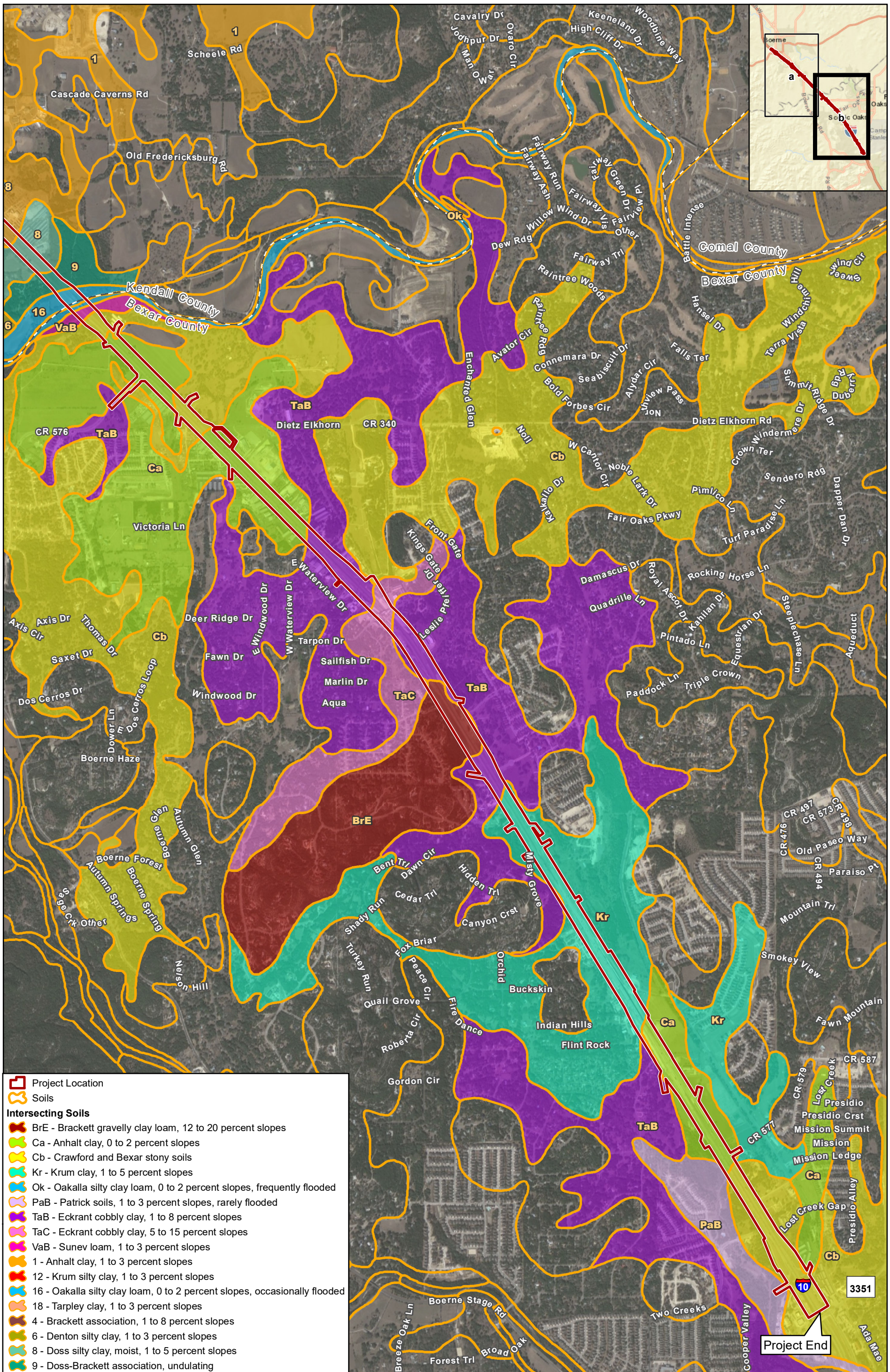

Figure 4b

Project Area Soils

I-10 from SH 46 to FM 3351

Data Source: NRCS (2018)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 2,000 Feet
0 500 Meters

1 in = 2,000 feet
Scale: 1:24,000
Date: 2/13/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 4_Soils_20180208.mxd

Figure 5a

Water Resources

I-10 from SH 46 to FM 3351

Data Sources: NHD (2018), NWI (2018), TWDB (2019)
FEMA NFHL (2018), Blanton (2018), CMEC (2015)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 2,000 Feet
0 600 Meters

1 in = 2,000 feet
Scale: 1:24,000
Date: 6/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 5_Water Resources_20190520.mxd

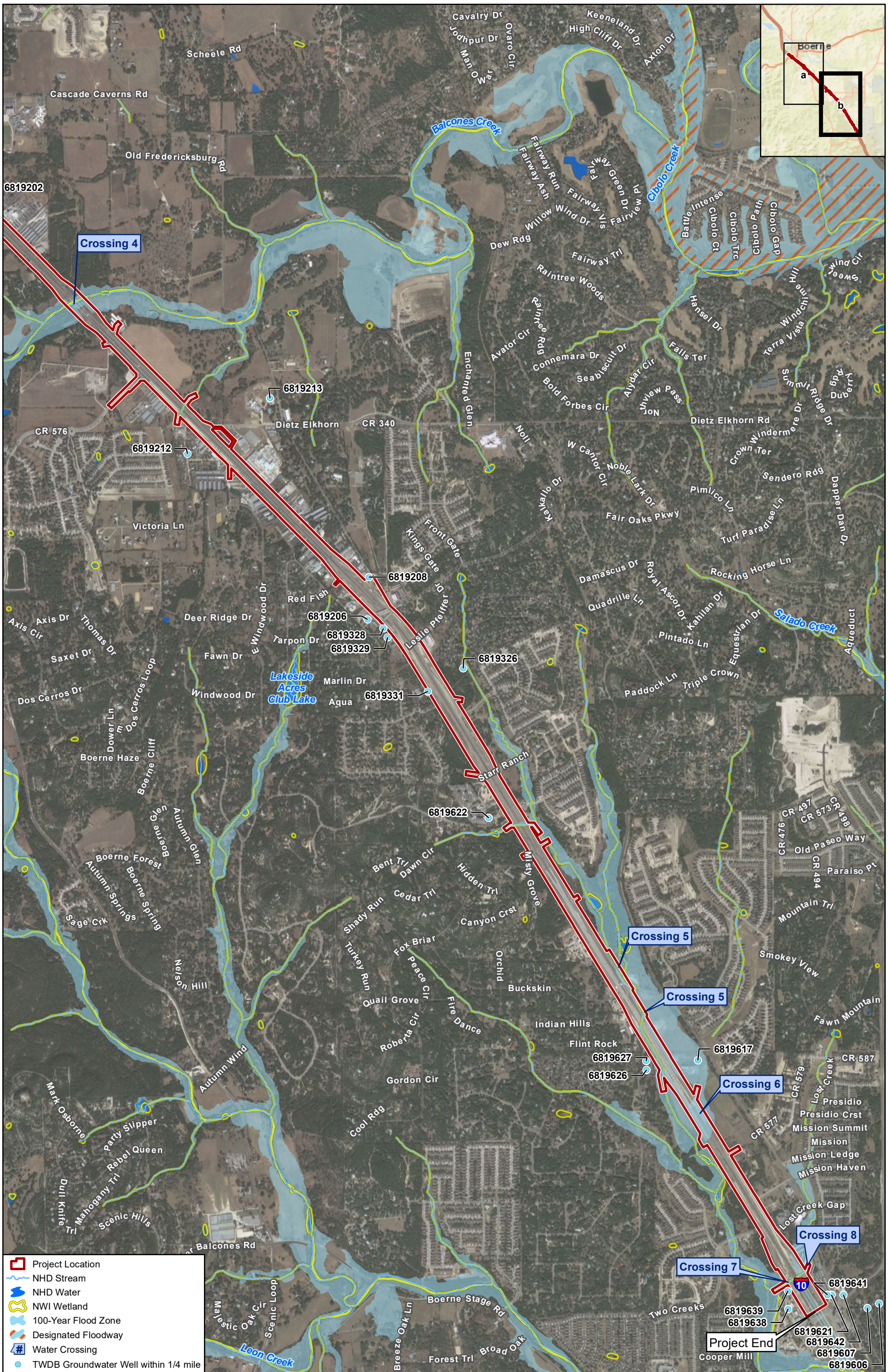

Figure 5b

Water Resources

I-10 from SH 46 to FM 3351

Data Sources: NHD (2018), NWI (2018), TWDB (2019)
FEMA NFHL (2018), Blanton (2018), CMEC (2015)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 2,000 Feet
0 600 Meters

1 in = 2,000 feet
Scale: 1:24,000
Date: 6/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 5_Water Resources_20190520.mxd

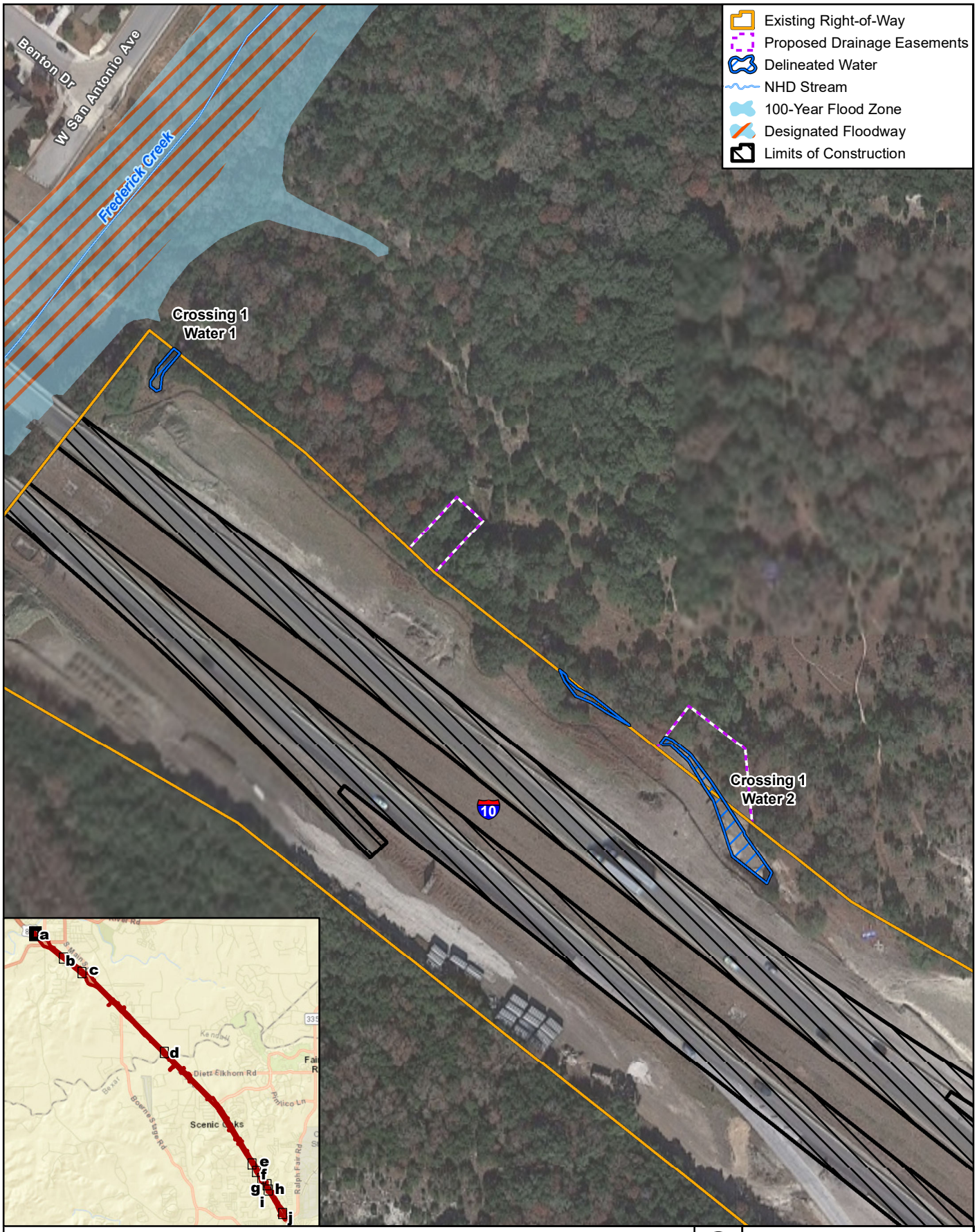

Figure 6a

Potential Waters of the U.S.

I-10 from SH 46 to FM 3351

Data Sources: FEMA NFHL (2018)
NHD (2018)
Blanton (2018), CMEC (2015)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 150 Feet
0 40 Meters

1 in = 150 feet
Scale: 1:1,800
Date: 6/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 6_Crossings_20190520.mxd

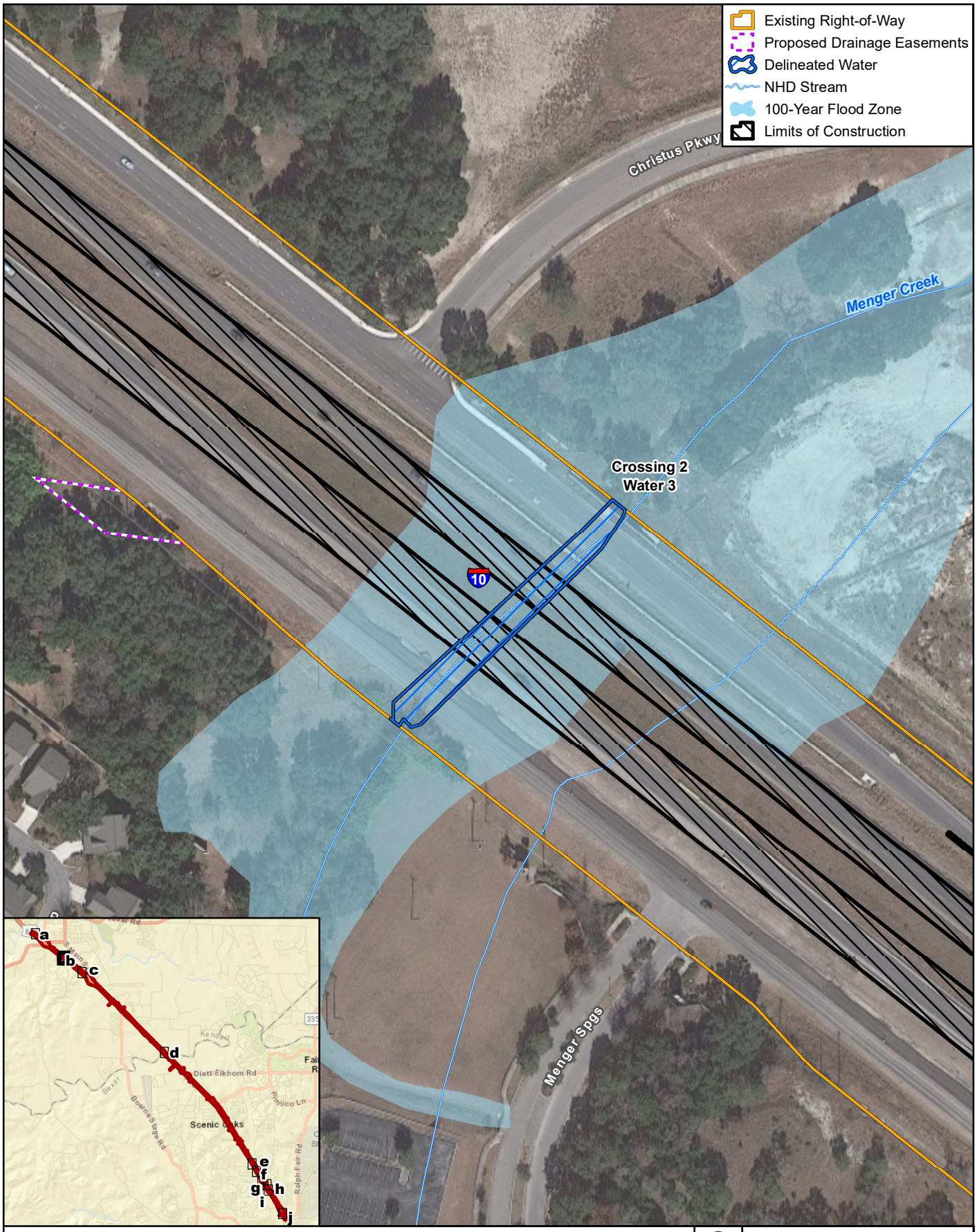

Figure 6b

Potential Waters of the U.S.

I-10 from SH 46 to FM 3351

Data Sources: FEMA NFHL (2018)
NHD (2018)
Blanton (2018), CMEC (2015)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 150 Feet
0 40 Meters

1 in = 150 feet
Scale: 1:1,800
Date: 6/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 6_Crossings_20190520.mxd

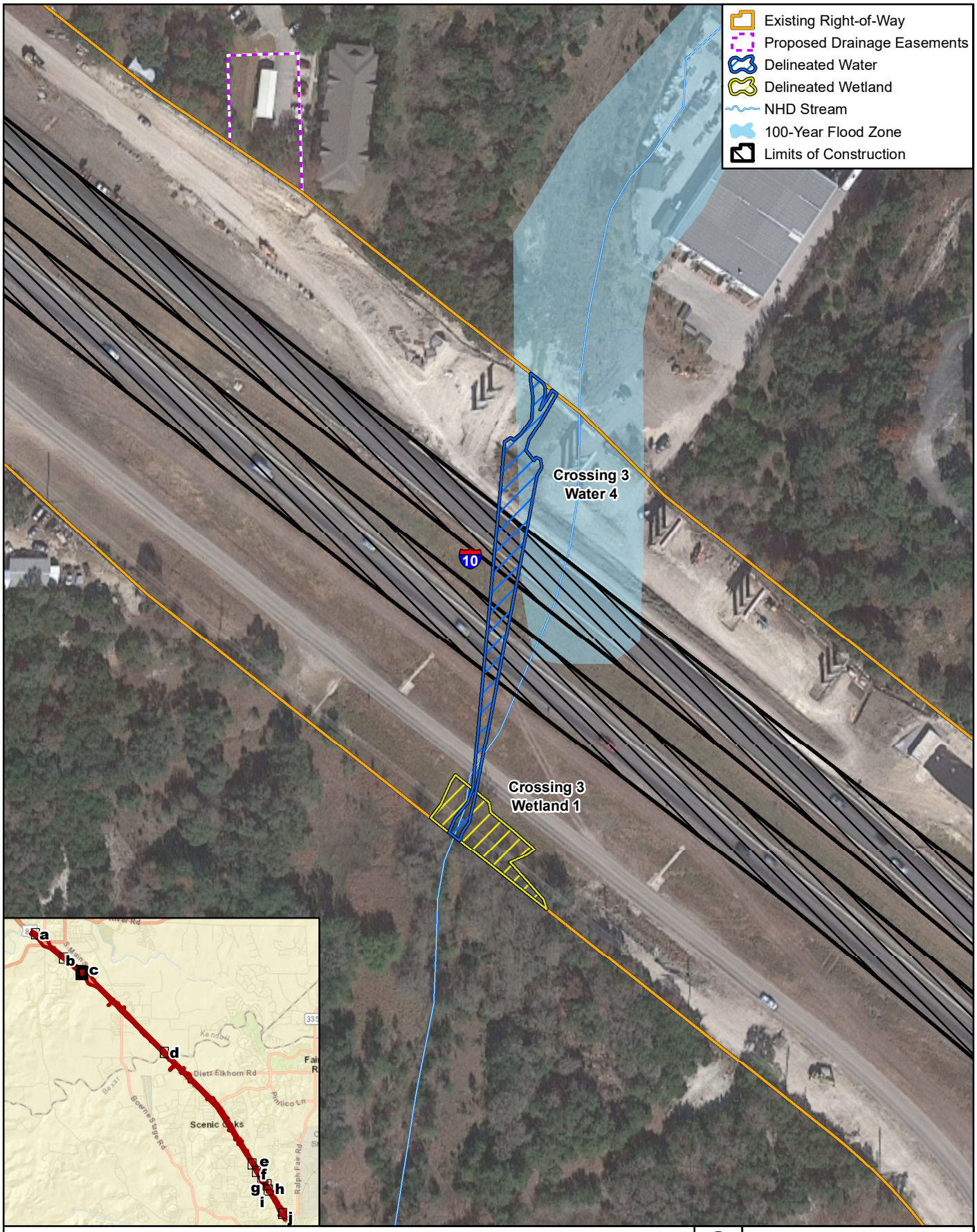

Figure 6c

Potential Waters of the U.S.

I-10 from SH 46 to FM 3351

Data Sources: FEMA NFHL (2018)
NHD (2018)
Blanton (2018), CMEC (2015)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 150 Feet
0 40 Meters

1 in = 150 feet
Scale: 1:1,800
Date: 6/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 6_Crossings_20190520.mxd

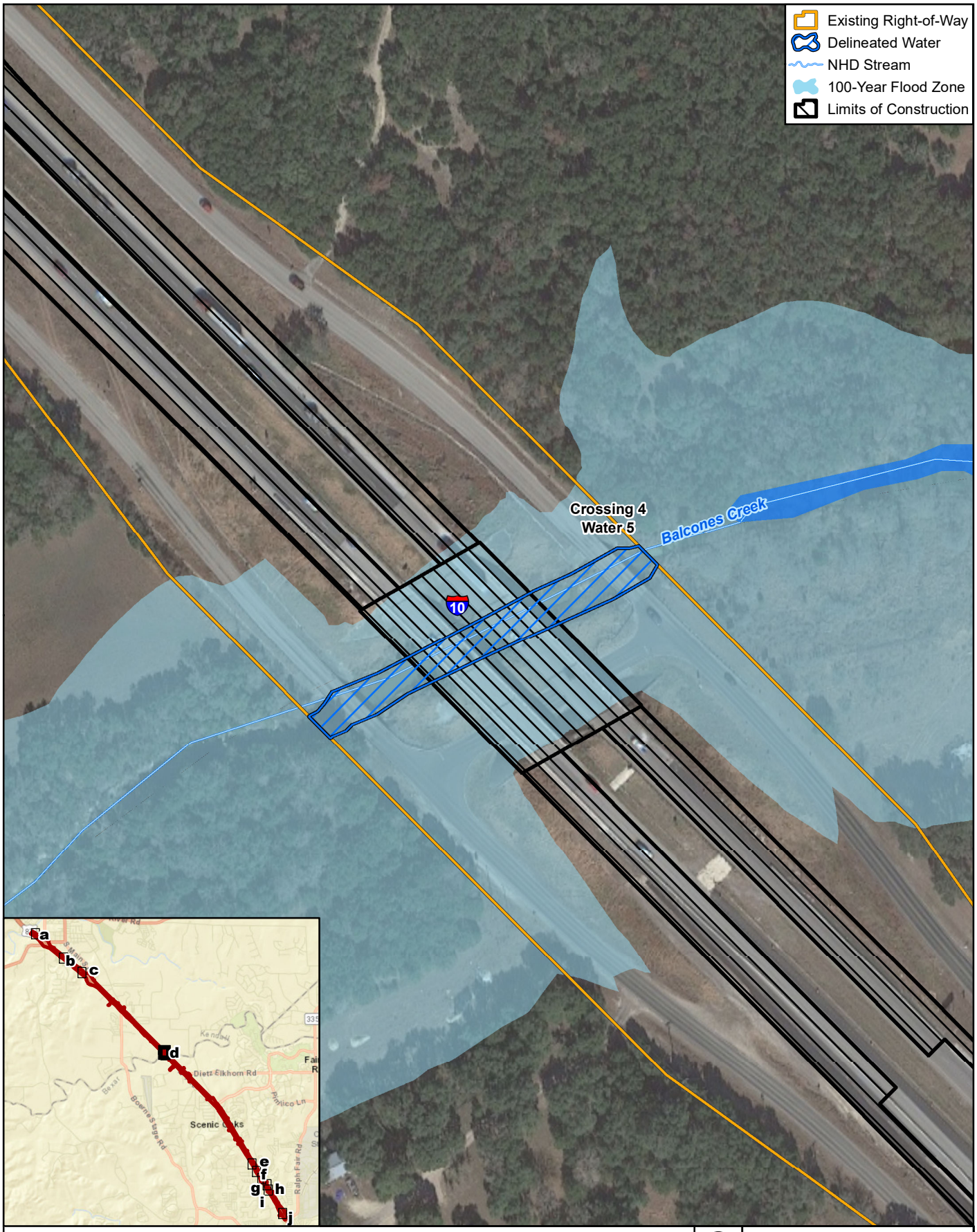

Figure 6d

Potential Waters of the U.S.

I-10 from SH 46 to FM 3351

Data Sources: FEMA NFHL (2018)
NHD (2018)
Blanton (2018), CMEC (2015)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 150 Feet
0 40 Meters

1 in = 150 feet
Scale: 1:1,800
Date: 6/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 6_Crossings_20190520.mxd

Figure 6e

Potential Waters of the U.S.

I-10 from SH 46 to FM 3351

Data Sources: FEMA NFHL (2018)
NHD (2018)
Blanton (2018), CMEC (2015)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 150 Feet
0 40 Meters

1 in = 150 feet
Scale: 1:1,800
Date: 6/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 6_Crossings_20190520.mxd

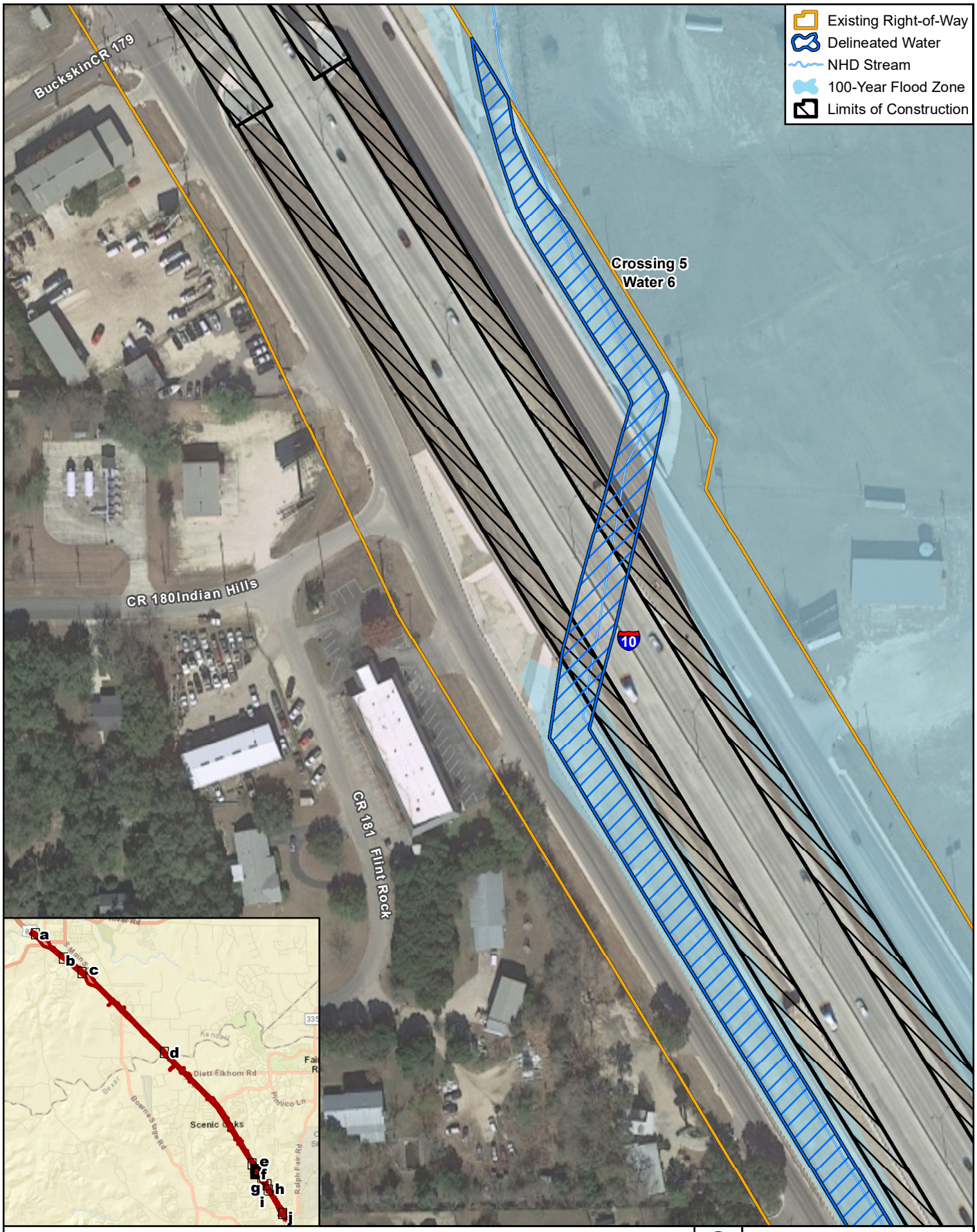

Figure 6f

Potential Waters of the U.S.

I-10 from SH 46 to FM 3351

Data Sources: FEMA NFHL (2018)
NHD (2018)
Blanton (2018), CMEC (2015)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 150 Feet
0 40 Meters

1 in = 150 feet
Scale: 1:1,800
Date: 6/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 6_Crossings_20190520.mxd

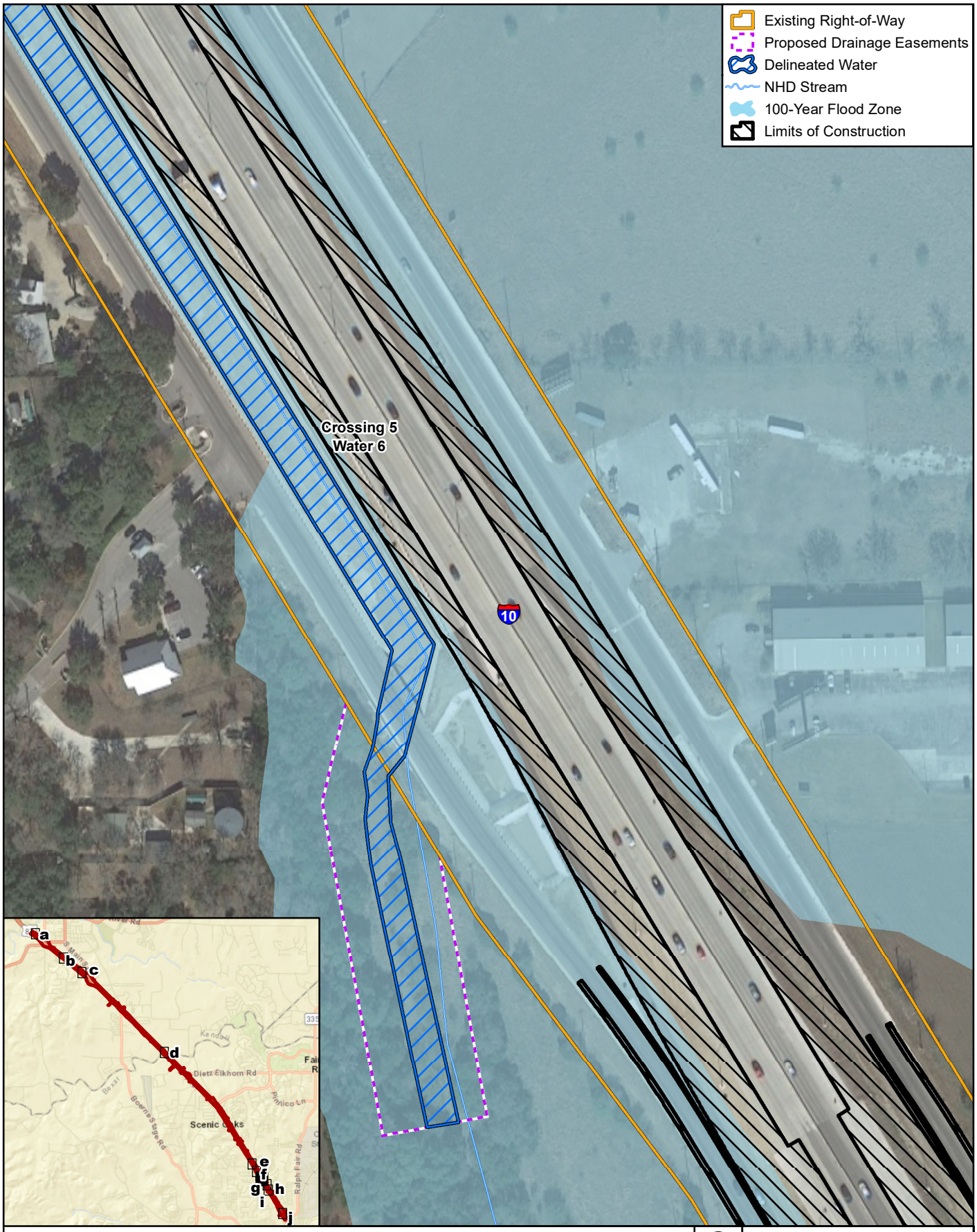

Figure 6g

Potential Waters of the U.S.

I-10 from SH 46 to FM 3351

Data Sources: FEMA NFHL (2018)
NHD (2018)
Blanton (2018), CMEC (2015)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 150 Feet
0 40 Meters

1 in = 150 feet
Scale: 1:1,800
Date: 6/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 6_Crossings_20190520.mxd

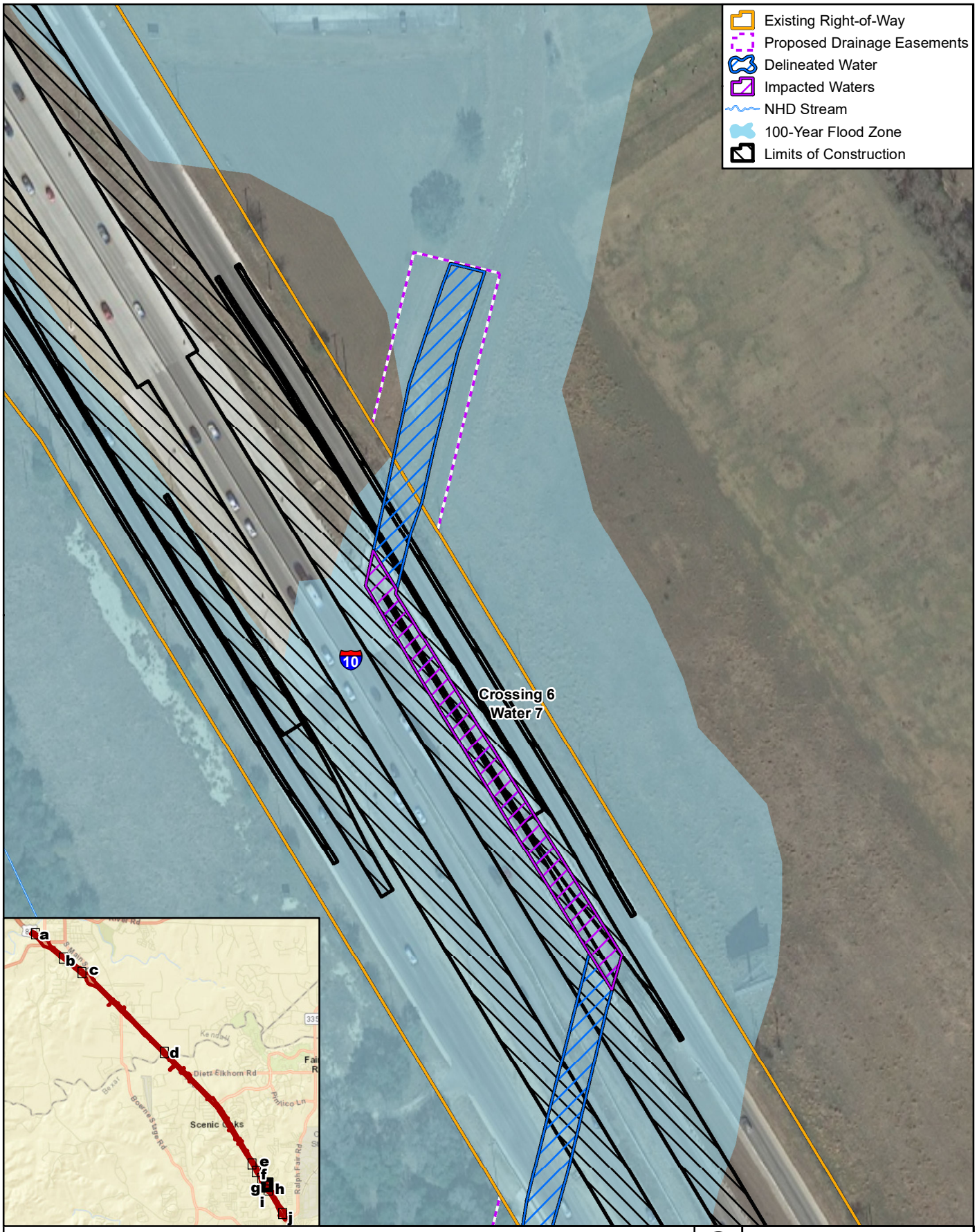

Figure 6h

Potential Waters of the U.S.

I-10 from SH 46 to FM 3351

Data Sources: FEMA NFHL (2018)
NHD (2018)
Blanton (2018), CMEC (2015)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 150 Feet
0 40 Meters

1 in = 150 feet
Scale: 1:1,800
Date: 6/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 6_Crossings_20190520.mxd

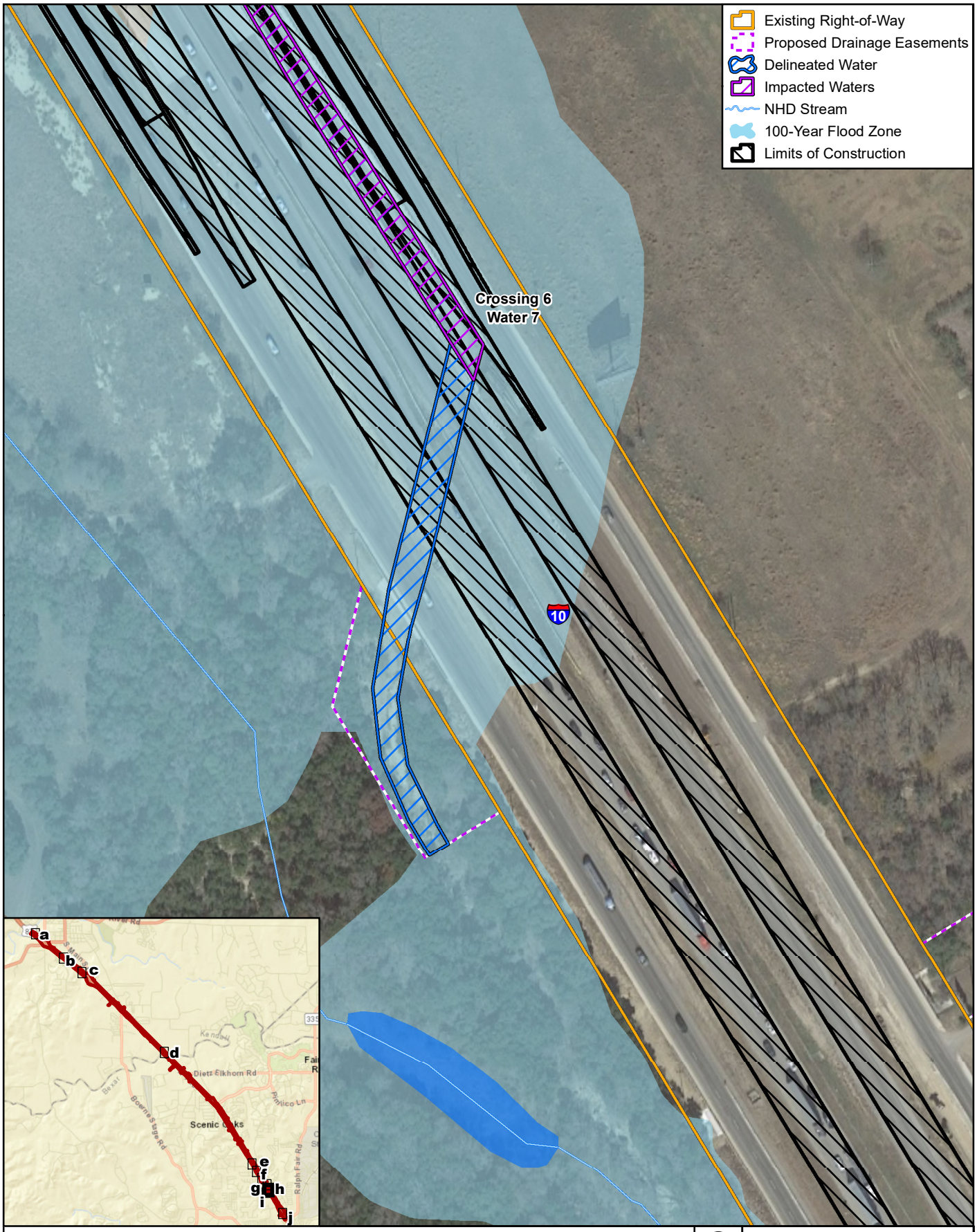

Figure 6i

Potential Waters of the U.S.

I-10 from SH 46 to FM 3351

Data Sources: FEMA NFHL (2018)
NHD (2018)
Blanton (2018), CMEC (2015)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 150 Feet
0 40 Meters

1 in = 150 feet
Scale: 1:1,800
Date: 6/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 6_Crossings_20190520.mxd

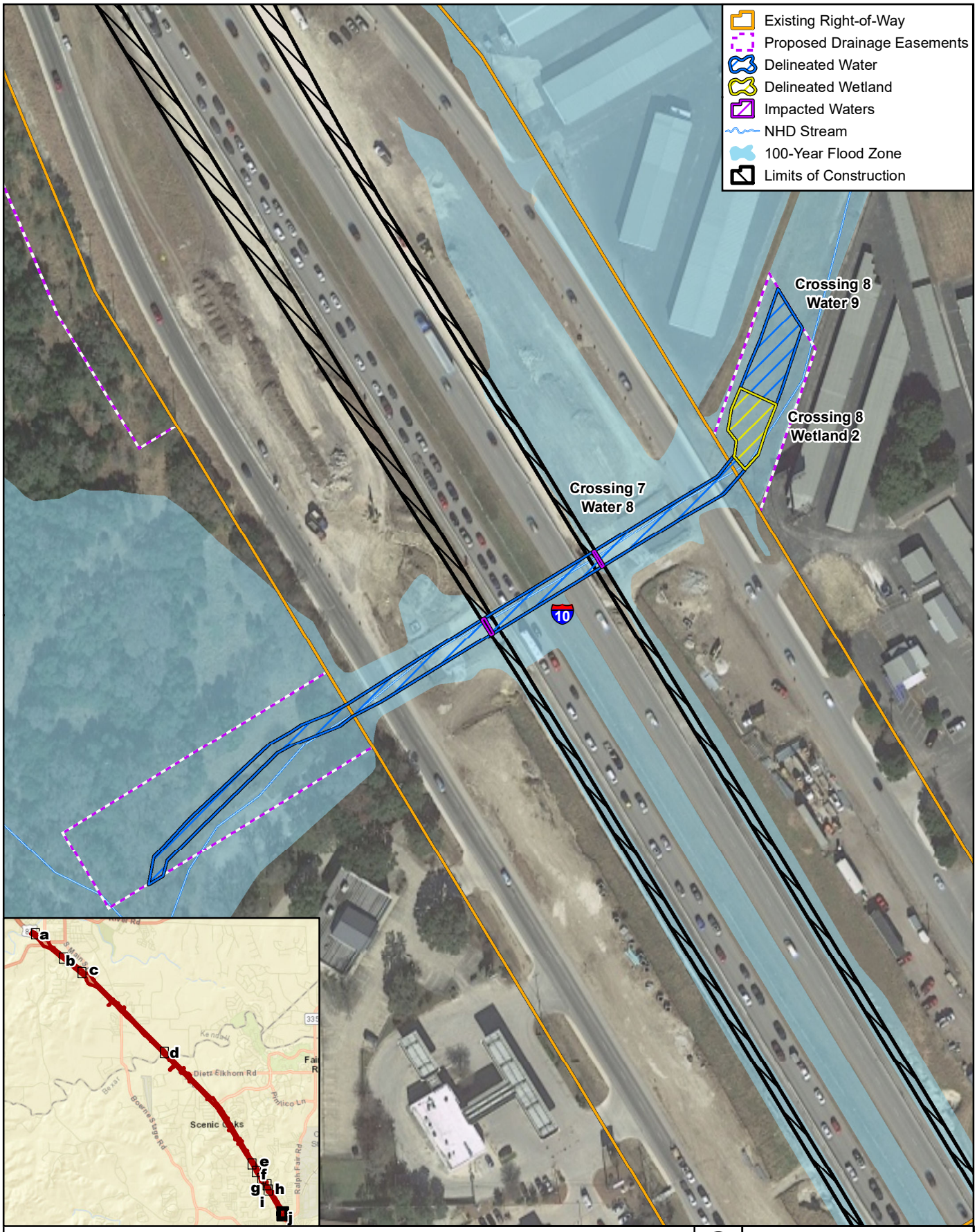

Figure 6j

Potential Waters of the U.S.

I-10 from SH 46 to FM 3351

Data Sources: FEMA NFHL (2018)
NHD (2018)
Blanton (2018), CMEC (2015)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 150 Feet
0 40 Meters

1 in = 150 feet
Scale: 1:1,800
Date: 6/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 6_Crossings_20190520.mxd

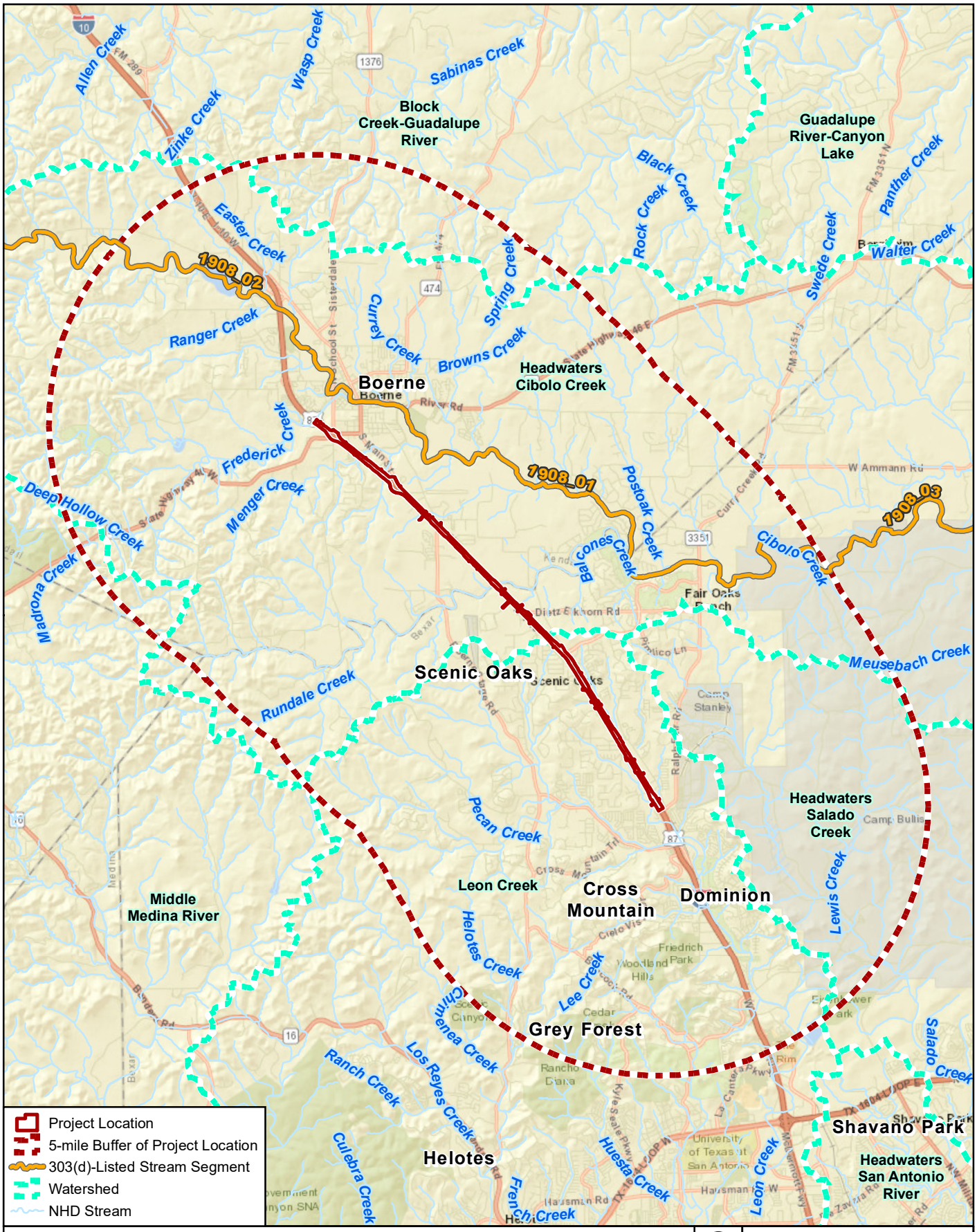

Figure 7

303(d)-Listed Stream Segments

I-10 from SH 46 to FM 3351

Data Sources: TCEQ (2005), NHD (2018)
Basemap Source: ESRI (2019)

CSJs: 0072-06-082 & 0072-07-075

0 2.5 Miles
0 3 Kilometers

1 in = 2.5 miles
Scale1:158,500
Date: 5/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 7_303d_20190520.mxd

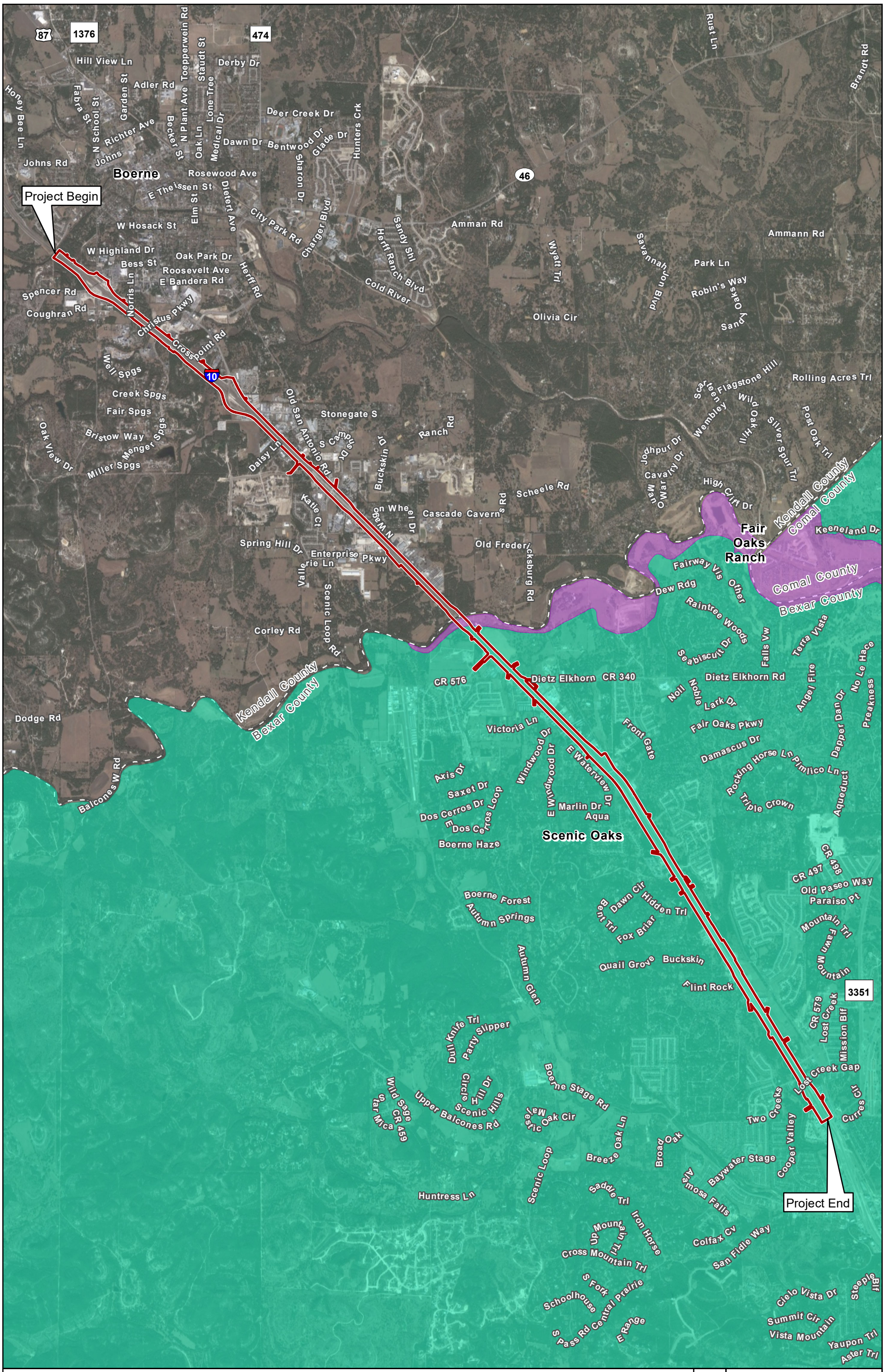

Figure 8

Edwards Aquifer

I-10 from SH 46 to FM 3351

Project Location
Edwards Aquifer Contributing Zone
Edwards Aquifer Recharge Zone

Data Source: TCEQ (2005)
Aerial Source: Google (2018)

CSJs: 0072-06-082 & 0072-07-075

0 4,000 Feet
0 1,000 Meters

1 in = 4,000 feet
Scale: 1:48,000
Date: 5/20/2019

G:\Projects\TXDOT\IH10_SH46_to_FM3351\JD_Figure 8_Aquifer_20190520.mxd

Attachment B
Project Area Photographs

Photograph 1: Crossing 1, Water 1, looking south from north edge of right-of-way.

Photograph 2: Crossing 1, Water 2, looking northwest.

Photo 3: Crossing 2, Water 3 (Menger Creek), looking upstream from eastbound frontage road.

Photo 4: Crossing 3, Water 4, looking upstream from eastbound frontage road.

Photo 5: Crossing 3, Wetland 1, impacted by ongoing contract.

Photo 6: Crossing 4, Water 5, looking south from eastbound frontage road.

Photo 7: Crossing 4, Water 5, looking north from eastbound frontage road.

Photo 8: Crossing 5, Water 6, west of Old Fredericksburg Road, looking north.

Photo 9: Crossing 5, Water 6, looking east from Old Fredericksburg Road.