WILD ASSOCIATES
Engineering & Environmental Consulting

www.wildassociates.net 281.844.3747 info@wildassociates.net TBPE FIRM NO. 19012

Monday, October 30, 2023
WA Project No. 21.01.016

Mr. Dane Rau, PE
City of Brenham
P.O. Box 1059
Brenham, TX 77834
979-337-7407
drau@cityofbrenham.org

RE: NEPA Environmental Assessment
Brenham Family Park
Brenham, Washington County, Texas

Dear Mr. Rau:

Wild Associates LLC is please to submit the attached Environmental Assessment document for the above-referenced project. If you have any questions or need additional information, please contact me at (281) 844-3747 or by e-mail at paul.wild@wildassociates.net. We appreciated the opportunity to serve the City of Brenham and look forward to future opportunities.

Regards,
Wild Associates LLC

Paul R. Wild, CAPM
President

Christy Wild
CEO

Ron Arceneaux, PE
Principal Engineer

STATE OF TEXAS
RONALD J. ARCENEAUX
50052
LICENSED PROFESSIONAL ENGINEER

10/30/2023

NEPA Environmental Assessment
Brenham Family Park
Brenham, Washington County, Texas

Prepared for:
City of Brenham
Brenham, Texas

and

National Park Service
Interior Regions 3, 4, & 5
601 Riverfront Drive
Omaha, NE 68102

Prepared by:
Wild Associates LLC

Wild Associates Project Number 21.01.016

October 2023

WILD ASSOCIATES
Engineering & Environmental Consulting

3318 Hwy 365 #238 Nederland, TX 77627 281-844-3747 info@wildassociates.net www.wildassociates.net TBPE FIRM NO. 19012

Contents

LIST OF FIGURES

LIST OF APPENDICES

1 EXECUTIVE SUMMARY

The City of Brenham has been awarded a grant from Texas Parks and Wildlife Department (TPWD) to construct hike and bike trails and ancillary facilities to serve the proposed 40.67-acre Brenham Family Park (Site) just south of Highway 290 off South Chappell Hill Street in Brenham, Washington County, Texas. The grant is authorized by Section 6(f) of the Land and Water Conservation Fund (LWCF) Act, as administered by the National Park Service (NPS), which establishes a grant program for states and local governments to acquire and develop public outdoor recreation sites and facilities. A provision of the grant is that the City of Brenham must complete the NPS National Environmental Policy Act (NEPA) Environmental Assessment (EA) document for the project. The City submitted an application to NPS on December 17, 2021; the approval of the application is subject to approval of this EA. Construction is anticipated to begin September 2024 and be completed by February 2025.

The project's purpose is to provide recreational facilities to the citizens of Brenham, specifically hiking and biking trails, public gathering and play areas, and support facilities (parking, detention ponds, restrooms, trail lighting) within natural, forested riparian and prairie ecosystems. The EA is designed to evaluate the potential for adverse environmental impacts of developing the Site, hopefully to indicate that no additional study is warranted, with a Finding of No Significant Impact (FONSI).

The EA scope of work generally complied with *Texas Parks and Wildlife Department Suggested Guidelines for Preparation of Environmental Assessment Documents*. The work involved identification of the natural resources and the human environment at and in proximity to the Site, coupled with an identification of potential, adverse impacts caused by Site development and use, followed by mitigative measures to ameliorate potential impacts. Major elements of the work include descriptions of physiography, hydrogeology, air quality, flora, fauna, water quality, socioeconomics, and the like, with discussions of the potential impacts of the Site development plan on those resources and avoidance/minimization measures. An alternatives analysis is also provided. Additional requirements not typical for an EA were identification of plant communities along ten transects and identification of trees at or exceeding 36 inches diameter at breast height (DBH).

Ecosystems within the Site include a prairie with diverse, native flowers and a forested area bisected by a creek. The creek is severely degraded with respect to slope stability, with severe incising and erosional undercutting of banks, thereby reducing the presence of fringe wetlands to negligible levels. The forested area contains significant growth of native trees with dense undergrowth, with 36 trees documented at 36 inches DBH or greater and heights up to 90 ft. The water quality of the creek is sufficient to sustain beneficial, aquatic species. No construction is planned within the creek, and engineering controls will mitigate potential impacts from storm water runoff; therefore, the potential for impacts to the creek is negligible. The prairie does not have ideal habitat suitable for a federally-listed, endangered flower (Navasota ladies'-tresses), and no evidence of the flower was observed; WA's position is that the flower does not exist at the Site.

No significant historical, cultural, or archeological resources were documented by other workers under separate cover, although fragments of historical ceramic, glass, and metal were encountered. The subject matter experts for that work recommended additional excavation work in two places on the Site because of Site-specific characteristics conducive to finding deeply buried artifacts; however, the design engineer has avoided these areas, such that no impacts will occur. With respect to other natural and human resources (geology, climatology, groundwater, socioeconomics, etc.), nothing of remark was noted, and the Site generally appears suitable for development with the proposed facilities for the intended purpose. The project is anticipated to enhance the social and economic dynamics of the City.

With respect to actual or potential impacts to the Site, the following impacts with avoidance and minimization responses are presented as follows:

1. Loss of vegetated areas cannot be avoided during construction. Undergrowth clearing adjacent to the 10 ft – 16 ft wide trails will be negligible to reestablish native growth up to the limits of the facilities that will likely have been damaged during the construction phase. The proposed 10 ft – 16 ft wide trail system, roads, parking and pavilion are to be at existing grades as much as possible in order to minimize undergrowth loss and provide positive, natural, drainage patterns. In locations where fill or cut must be placed, the City will reestablish native vegetation comparable to existing conditions up to the limits of the facilities. For the pond facility, side slopes will be gradually sloped and grass lined, and reestablishment of the same vegetation for erosion control and minimization will be utilized.
2. Ponds will be lined only below the static water surface elevation with an impermeable liner and a slowly impermeable, compacted clay layer in order to minimize or preclude artificial recharge of the shallow groundwater system and potential seepage into downgradient areas.
3. Noise cannot be avoided during construction and operational phases, although excessive noise levels are anticipated to be either short-lived during construction or minor during park operations. Noise is not anticipated to be a significant, long-term impact during the operation of the park facility.
4. Erosion around impervious facilities through increased drainage velocities will be minimized through best management practices (BMP) of silt fencing, sedimentation socks, hay bales, vegetation strips, and gravel during construction. Engineering design includes energy dissipators of various means, including rock rip-rap, gravel- or vegetation-filled swales, vegetation strips, geotextiles, and the like to slow drainage velocities to minimize erosion potential. Infiltration loss causing increased runoff will be controlled through diversion of drainage to the detention pond. With the pond being wet bottom with a constant static water surface elevation, it will act as an additional sedimentation control and stormwater quality device to filter solids prior to discharge.
5. Engineering design with proper pond slope gradients accounting for the geotechnical properties of the soils will overcome the potential for slope failure and erosion. Vegetated slopes of the pond will be used to minimize erosion and gentle enough to encourage park

visitors to sit and enjoy the park. Slopes will not exceed a 10% gradient above the static surface water elevation, per City specifications.

6. Sign placement to encourage proper visitor behavior combined with ample waste depositories situated in trafficked areas will minimize municipal solid waste mismanagement by visitors. Periodic monitoring of park visitors by City personnel with the authority to dispense punitive citations for littering may be warranted. Placement of remotely operated security cameras may be warranted.
7. Sign placement will be implemented to warn visitors against collecting flora and fauna for their personal use. Periodic monitoring of park visitors by City personnel with the authority to dispense punitive citations for "takings" may be warranted. Placement of remotely operated security cameras may be warranted.
8. Sign placement can be implemented to warn visitors against vagrancy. Periodic monitoring of park visitors by City personnel with the authority to dispense punitive citations for vagrancy may be warranted. Placement of remotely operated security cameras may be warranted.
9. As for Item 4, BMPs will be implemented during construction and until vegetation growth has been established to avoid soil loss through erosion. Dust suppression through water spraying will be implemented to minimize soil loss through windblown removal.
10. Spills and releases of fuels and vehicle maintenance fluids during construction will be addressed through a storm water management plan under a TPDES Stormwater Construction General Permit, supplemented with a site-specific Spill Prevention, Control, and Countermeasure (SPCC) plan. Visitor vehicles with minor fuel and maintenance fluids drippage in parking areas are anticipated to be inconsequential. Additionally, grassed drainage swales will be implemented as viable methods to minimize oily fluids runoff into the ponds and then creek via filtering through biologically active substrates that biodegrade hydrocarbons and sequester solids.
11. Air quality degradation caused by construction equipment and visitor vehicles cannot be avoided but is anticipated to be temporary and negligible, since both construction and normal park operations are occurring elsewhere in Brenham without serious impacts to ambient air quality. Air impacts will be negligible.

Since these processes and procedures will be implemented, the cumulative, adverse impacts are anticipated to be negligible. The project was compared to the No Action alternative, which was considered inferior to the preferred alternative due to the Site's open access to the public without suitable controls to minimize human impacts.

2 PROJECT DESCRIPTION

The project's sponsor, scoping, scheduling, and other pertinent project issues are presented below.

2.1.1 Project Sponsor

The City of Brenham, TX, is the project sponsor. The City has been awarded a grant from the National Park Service (NPS) to be administered by the Texas Parks and Wildlife Department (TPWD) to construct hike and bike trails and ancillary facilities to serve the proposed Brenham Family Park (Site) just south of Highway 290 off South Chappell Hill Street in Brenham, Washington County, Texas. The grant is authorized by Section 6(f) of the Land and Water Conservation Fund (LWCF) Act, as administered by NPS, which establishes a grant program for states and local governments to acquire and develop public outdoor recreation sites and facilities. Section 6(f)(3) protects property acquired or developed with assistance under LWCF from conversion to another use. It states that no Section 6(f) property shall be converted to any use other than public outdoor recreation unless the US Department of Interior (DOI)/NPS approves a replacement land of at least equal value, location, and usefulness.

A provision of the grant is that the City must complete the NPS National Environmental Policy Act (NEPA) Environmental Assessment (EA) document for the project. The National Environmental Policy Act (NEPA) was signed into law on January 1, 1970, and requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions. Section 102 in Title I of the Act requires federal agencies to incorporate environmental considerations in their planning and decision-making through a systematic, interdisciplinary approach. Specifically, all federal agencies are to prepare detailed statements assessing the environmental impact of and alternatives to major federal actions significantly affecting the environment. These statements are commonly referred to as Environmental Impact Statements (EIS) and Environmental Assessments (EA).

See Figure 1 – Washington County Map and Figure 2 – Brenham Map.

2.1.2 Project Purpose

The project's purpose is to provide recreational facilities to the citizens of Brenham, specifically hiking and biking trails, public gathering and play areas, and support facilities (parking, detention/amenity pond, restrooms, trail lighting) within natural, forested riparian and prairie ecosystems. The EA is designed to evaluate the potential for adverse environmental impacts of developing the Site and qualitatively assess the magnitude of identified impacts to determine the need for a more detailed analysis to the level of an Environmental Impact Assessment (EIA) or, conversely, that no additional study is warranted, with a Finding of No Significant Impact (FONSI). At the EA stage, if impacts are identified, they may be of a minor nature such that relatively simple, mitigative measures would resolve the problem; otherwise,

if impacts are too significant, an EIA may be needed to quantify the impacts and identify mitigative measures accordingly.

Information from the project design engineer, Quiddity, previously known as Jones & Carter, Inc. (JC), indicates permanent impacts within the Site boundary are:

- 2 creek crossings
    - 2 – pedestrian only bridges spanning outside the top of bank
- 10 ft - 16 ft wide, one-mile long concrete trail around creek, from pavilion area, and access to detention/amenity pond
- Parking and concrete cul-de-sac for non-motorized sport drop-off into the detention/amenity pond
- Restroom facility
- Pavilion
- Playground
- Storm sewer and inlets to pick up flow from pavement areas and hardscape around the playground
- Detention/amenity pond facility with outfall
- Electrical conduit for low lighting along the trail
- Park signage

See Figure 3 – Proposed Facilities.

2.1.3 EA Scope of Work

The EA scope of work generally complies with *Texas Parks and Wildlife Department Suggested Guidelines for Preparation of Environmental Assessment Documents*. The work involved identification of the natural resources and the human environment at and in proximity to the Site, coupled with an identification of potential, adverse impacts caused by Site development and use, followed by mitigative measures to ameliorate potential impacts. Major elements of the work include descriptions of physiography, hydrogeology, air quality, flora, fauna, water quality, socioeconomics, and the like, with discussions of the potential impacts of the Site development plan on those resources and avoidance/minimization measures. An alternatives analysis is also provided. Additional requirements not typical for an EA were identification of plant communities along ten transects and identification of trees at or exceeding 36 inches diameter at breast height (DBH).

2.1.4 Project and Study Areas

The Site is located about 1,600 ft south of Highway 290 and adjacent to the terminus of a north-south cul-de-sac named South Chappell Hill Street. The Site was originally part of a larger 300-acre tract owned by the Kruse family. This project is for the first phase, which includes a detention/amenity pond, 1-mile long trail, restroom, parking, entrance driveway, and

lighting on 37.8 acres donated by the Kruse family to the City of Brenham. See Figure 4 – Site Map.

2.1.5 Project Schedule

As provided by JC, the schedule is presented in Appendix A. Construction is anticipated to begin September 2024 and expected to take approximately six months to complete. With respect to any federal permitting activities that may impact the schedule, none have been identified. JC consulted with the United States Army Corps of Engineers (USACE) and was informed that the existing creek running through the Site was determined to be classified as a perennial stream, and the preliminary development plan that involved instream detention with impoundment to create a pond was strongly discouraged due to the impact to the creek. The City and JC then selected a wet-bottom, uplands detention pond alternative that is outside the creek high banks, with no construction below the ordinary high water mark or construction in the creek. This design alternative removes any need for USACE permitting. Further field confirmation of the project's drainage features by USACE on June 22, 2023, confirmed no need for permitting. Documentation of USACE consultation is presented in Appendix B.

2.1.6 Required Coordination and Review

The EA document will be reviewed by NPS as the primary reviewer, although the City of Brenham and JC will review it to understand its implications for design and construction. Communication with TPWD indicated TPWD will provide a cursory review.

As a requirement of the LWCF application process, the City of Brenham and TPWD contacted the Executive Director of the Texas Historical Commission (THC), and the State Historic Preservation Officer (SHPO) regarding National Historic Preservation Act Section 106 review for the development of Brenham Family Park. The SHPO responded that no historic properties would be affected, however, an archeological survey would be required.

In January 2021, SWCA Environmental Consultants conducted an Intensive Archaeological Investigation at the site of Brenham Family Park and submitted to the SHPO for review (see Section 2.1.8). The SHPO responded with a finding of "No Further Review" to above-ground resources and "No Effect" on identified archeological sites or cultural resources for this project. The THC/SHPO concurred with the information in the SWCA report and found the report to be acceptable.

NPS formally notified the affiliated tribal governments of their opportunity to consult on this project. On February 26th, 2021, NPS sent consultation letters to the Alabama-Coushatta, Caddo Nation, Comanche Nation, and Tonkawa Tribe of Indians of Oklahoma. No concerns were raised during the tribal consultation process for this project. On March 20th, 2023, Final Determination Letters showing the NPS finding of "No Adverse Effect" were sent to the four tribes listed above.

NPS has considered the analysis and input from the SHPO and affiliated tribal governments consulted on this project. In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, and as set forth in the Advisory Council on Historic Preservation rules (36 CFR 800.2(a)(4)), NPS made a determination of "No Adverse Effect" for the undertaking and provided the final determination of effect letter to the SHPO on March 20th, 2023.

2.1.7 Public Participation

The public will be notified via local new sources and public postings at City offices to allow residents to have an opportunity to review and comment on the EA.

2.1.8 Significant Historical Information

Historical information about the Site is provided in SWCA's reports. (SWCA, 2021 and 2022) The findings of SWCA's reports indicate that the Site has no historically, culturally, or archeologically significant features that would affect the ability of the project to move forward; nevertheless, SWCA did identify some fragments of historical artifacts (ceramics, glass, metals) and recommended deeper excavation in two areas to evaluate the potential for buried artifacts. As stated in the 2021 SWCA report, "Deep testing would be required only if future impacts from the proposed project are anticipated to be deeper than 80 cm (31 inches) below surface." JC's plans indicate that no structures deeper that 31 inches will be placed; the constructed features are surficial and consist of concrete hike and bike trails. See Figure 3 – Proposed Facilities.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

The affected environment is described in terms of natural and human resources.

3.1 Natural Resources

Natural resources were documented and evaluated through documents review supplemented with field exploration conducted on July 1; August 4, 5, 26, and 27; September 2 and 7, 2021; September 7, 2022; and June 22, 2023. Documents are cited in each section and listed in the bibliography, and descriptions of field exploration methods are presented in Appendix C.

3.1.1 Geology

The Site is situated on the 1200+/- ft thick Fleming Formation, which is described generally as dominantly clay and sandstone with calcareous clays that form brownish-black soils. Sandstone units are medium to coarse grained, calcareous, thick bedded, with some light yellow-gray crossbedding weathering to light gray to medium gray. (TNRIS, 2014; TWDB, 2012; TWDB, 1978).

3.1.2 Soils

The soil textures within the Site are a combination of the following, described using the United States Department of Agriculture Natural Resource Conservation Service (NRCS) Soil textural classification system:

- 37.4% Bosque clay loam, frequently flooded (8) – Bosque clay loam is not prime farmland with a typical profile of clay loam 0 to 62 inches and is well drained.

- 36.1% Crockett fine sandy loam, 1 to 5 percent slopes (25) – Crockett fine sandy loam is classified as farmland of statewide importance with a typical profile of fine sandy loam from 0 to 7 inches, clay from 7 to 51 inches, and clay loam from 51 to 80 inches and is moderately well drained.

- 10.8% Klump loamy sand, 3 to 5 percent slopes (40) – Klump loamy sand 3-5% slopes is classified as prime farmland with a typical profile of loamy sand from 0 to 11 inches, sandy clay loam from 11 to 45 inches, and sandy loam from 45-60 inches and is well drained.

- 9.2% Carbengle clay loam, 5 to 8 percent slopes (20) – Carbengle clay loam is not prime farmland with a typical profile of clay loam from 0 to 34 inches and bedrock from 34 to 60 inches and is well drained.

- 6.5% Klump loamy sand, 5 to 8 percent slopes (41) – Klump loamy sand 5-8% slopes is not prime farmland with a typical profile of loamy sand from 0 to 13 inches, sandy clay from 13 to 56 inches, and sandy loam from 56 to 64 inches and is well drained.

None of the soils making up the Site are listed on the NRCS Hydric Soils List for Washington County, Texas. (NRCS, 2021) See Appendix D – Soils Report.

Terracon performed a geotechnical study on the Site. (Terracon, 2021) Using the ASTM D2487 Unified Soil Classification System, the boring logs indicate sandy clays, clayey sands, sand with clays, clay with sands, and silty sandy clays. Terracon encountered groundwater at 15 ft in one boring but indicated caving sands caused problems relative to obtaining water level measurements in the open borings.

3.1.3 Landforms

The Site is situated within the Gulf Coastal Plains physiographic region, generally characterized by flat plains south of Montgomery County, Waller, and Austin Counties but grading upward to more hilly topography moving northwest toward Washington County. Where it is undeveloped, the region is covered with pines and hardwoods. The Site surroundings are composed of rolling hills incised by relatively small, alluvial valleys that drain to local drainage features, such as the Site creek. (Texas Almanac, 2021)

The Site is within the Level III 32b Southern Blackland Prairies ecoregion. Soils consist dominantly of Vertisols (Calciusterts and Haplusterts), Mollisols (Calciustolls and Paleustolls), and Alfisols (Paleustalfs and Haplustalfs). Vegetation of the ecoregion is generally described as prairie tallgrasses with little bluestem, brownseed paspalum, big bluestem, yellow Indiangrass, tall dropseed, eastern gamagrass, and switchgrass. Forbs include asters, prairie bluet, prairie clovers, and black-eyed susan, with non-riparian, wooded areas characterized by post oak, blackjack oak, and eastern red cedar. Riparian forests are characterized by bur oak, Shumard oak, sugar hackberry, elm, ash, eastern cottonwood, and pecan. (Griffith, 2007).

Based on LIDAR topographic 2-ft contours (Figure 5 – LIDAR Map) sourced from Texas Natural Resources Information System the Site grades on the east side from a high of 304 ft above mean sea level (AMSL, etc.) in the northeastern-most corner to a low of 264 ft in the creek bed at the southernmost extreme. (TNRIS LIDAR, 2018) On the west side, the high is 298 ft along the western-most boundary to the low of 264 ft in the creek bed. The high banks on either side of the creek where elevations begin to abruptly decline range from 284 ft in the north to 270 ft in the south. During USACE's June 22, 2023 visit, drainage features considered not under the jurisdiction of USACE were identified as either swales or a ravine, as shown on Figure 5.

The USFWS National Wetlands Inventory (NWI) Map is presented on Figure 15 and indicates the presence of a palustrine forested wetland within the banks of the creek and an intermittent riverine system, which does not exist at the Site where it is mapped. NWI maps are based on high-altitude, aerial imagery rather than ground truthing and must be field verified; the need for field verification can be seen in the fact that the NWI map identified the creek as palustrine rather than riverine and identified a riverine system that is not on the Site. Appendices E and H document that the creek is a riverine system and that there is no riverine system where the NWI indicates it to be.

To evaluate the potential presence of wetlands, a wetlands delineation was conducted in general accordance with the USACE *Wetland Delineation Manual, Technical Report Y-87-1* (1987) and the USACE *Great Plains Regional Supplement* (2010). The USACE defines wetlands by three criteria:

- a preponderance of hydrophytic (water loving) vegetation;
- the presence of wetland hydrology; and
- the presence of hydric soils.

No wetlands were found within the areas scheduled for development or within areas subject to pedestrian traffic. Minimal areas of fringe wetlands along the creek bank toe of slope were found and constituted much less than the 0.10 acre impact limit the USACE cites in their Nationwide Permits program. The fringe wetlands are transitory and of low aquatic resource value because of their high susceptibility to erosional loss due to the unstable bank regime. Data sheets for five test pits (TP-1 to TP-5) documenting evaluation of these three criteria are presented in Appendix M, and photographs of the test pits are presented in Appendix N.

3.1.4 Climatic Factors

Washington County's climate is subtropical and humid, with an average annual precipitation of forty inches. Temperatures range from an average low of 39° F in January to an average high of 96° F in July; the growing season lasts 277 days. (TSHA, 2021)

3.1.5 Surface Water

The creek within the Site is an unnamed tributary to Woodward Creek in the Brazos River Basin Segment 1202 and is abutted by forest and prairie. The nearest named tributary, Hog Branch Segment 1202C, is less than two miles to the north; 1202C is defined as a perennial, freshwater stream with an Aquatic Life Use designation of intermediate and a dissolved oxygen criterion of 4 mg/L, suggesting that the Site creek could have no higher than that designation. Appendix D of 30 TAC 307.10(4) indicates that unnamed tributaries of Segment 1202 in Washington County have a dissolved oxygen criterion of 4.0 mg/L. (TCEQ, 2016)

The creek's headwaters are within the City of Brenham, thus it receives urban runoff in addition to prairie and forest runoff. The elevation at the upgradient entry of the creek into the Site is about 278 ft, and the elevation at its exit from the Site is about 264 ft, for a gradient of about 0.0052 ft/ft within the streambed length of about 2,700 ft. Flow measurements at a narrow, shallow location in the stream on August 4, 2021, under normal, bank flow conditions below the ordinary high water mark (OHWM) indicated flow rates ranging from roughly 10 gps to 13 gps. The OHWM was documented using a 1-meter resolution Trimble GPS meter and is shown on Figure 6 – Wetlands Test Pit and Ordinary High Water Mark Map.

The creek is indicated as intermittent on the USGS topographic map, but information provided to the City of Brenham from USACE notes that they consider it a perennial stream. The creek is a gaining stream in that it is receiving groundwater flow rather than strictly surface water drainage. The creek is deeply incised and undercut and would score poorly as severely degraded by the USACE using their stream condition assessment tools. See Figure 7 – 1989 Topographic Map.

The creek bottom is mostly very loose sands and silty sands, but in more quiescent stretches, such as just upstream of the culvert at the Site's southern-most boundary, the bottom is soft and mucky with more clay and decaying vegetation; sulfur-smelling "swamp gas" bubbles are common in such stretches. In a few locations, a hard bottom clay is exposed, and rip rap and rock exist sporadically in the upper reach of the creek from the City's storm water culvert discharge pipe northward. Sandier soils were primarily observed exposed along the banks, with more clayey soils observed in smaller stretches, consistent with the Terracon geotechnical report that indicated variability between sands and clays at the depths corresponding to the creek banks. Very loose sand bars and accretions are common within the main flow channel and below the OHWM. Relative to the normal creek high bank widths where erosional cutback has not occurred, there are much larger erosional areas that can exceed 60 ft from high bank to high bank. These erosional areas are strong indicators of the creek's unstable bank regime.

The creek flow is partially obstructed by both natural and anthropogenic debris, such as tree trunks and limbs (Appendix E – Photos 1 and 2), a drum (Appendix E – Photo 15), storage tanks (Appendix E – Photos 4 and 5), a truck frame (Appendix E – Photo 23), a gas pipeline (Appendix E – Photo 13), a cattle gate (Appendix E – Photo 16), and the remains of what appears to have been a concrete roadway (Appendix E – Photo 32). In some cases, such as the gas pipeline, the normal base flow is not obstructed by these features, but the flow would be partially obstructed, albeit minor, during high water events. The roadway is resting on crushed, steel culverts that indicate the roadway was concrete overlaying placed fill over culverts rather than a concrete bridge deck on piers. These features are documented in the photos of Appendix E showing typical features at the photographed location from the northern extent to the southern extent of the creek; photo locations are shown on Figure 9. Additional comments denoting unusual features, such as tanks and other anthropogenic features, are provided where necessary.

With respect to potential contamination issues related to the drum, storage tanks, truck frame, and gas pipeline, the drum is filled with sediment; the tanks are corroded and empty; the truck frame has no fuel or maintenance fluids, and the pipeline is under the control of the operator with no evidence of leaks. The City indicated in a letter (Appendix F) that the Site has been agricultural for over a century; the debris is likely washdown from many years ago; and the debris are inert and therefore non-hazardous. An adjacent neighbor indicated there have been no environmental issues at the Site, and the City has no knowledge of contamination on the Site. From discussions with the City, the City has no funds or plans for development in the creek and has taken the position that no work is necessary in the creek to address the inert debris. The EA report was provided to the Texas Commission on Environmental Quality (TCEQ) for comments regarding the potential for contamination related to these features; TCEQ responded in a March 27, 2023 that it did not "…see anything that would suggest a release of contaminants from the debris in the creek." See Appendix F for TCEQ's correspondence.

Where large, erosional features exist or where water flow is slow enough to mimic perennial pools, the water appears stagnant, with pollen, bacterial biofilms, and floating detritus accumulations. Water quality was documented at three locations – Site upgradient inflow point (S-3), downgradient midpoint (S-2), and downgradient outflow point (S-1). General, natural, water quality parameters were measured using both field instrumentation, field test kits, and lab testing, but additional analytes, such as residual chlorine and methylene blue active substances (surfactants), were measured to evaluate anthropogenic sources, such as chlorinated water and wash water. Results are presented in the following table with state water quality criteria, where codified.

Field Analyte	S-1	S-2	S-3	Criteria[(1)]
temperature, °C	24.9	25.8	25.8	95
pH	7.9	8.9	8.8	6.5 – 9.0
redox, mV	102	180	137	

conductivity, mS/cm	0.51	0.53	0.58	
turbidity, NTU	47.8	23.6	39.4	
dissolved oxygen	4.9	5.17	3.24	5.0/4.0[2]
residual chlorine, mg/L	0 – <0.5	0 – <0.5	0.5	
salinity, ppt	0.2	0.3	0.3	
Lab Analyte	S-1	S-2	S-3	
calcium, mg/L	92.9	88.5	97.9	
iron, mg/L	0.637	<0.2	0.417	
magnesium, mg/L	2.08	2.24	2.41	
manganese, mg/L	0.707	0.089	0.279	
potassium, mg/L	3.72	3.95	3.75	
sodium, mg/L	14.1	14.4	14.1	
phosphate, mg/L	<0.153	<0.153	<0.153	
total dissolved solids, mg/L	364	332	350	750
total suspended solids, mg/L	110	14.0	89.4	
ammonia, mg/L	<0.2	<0.2	<0.2	
residual chlorine, mg/L	0.3	0.2	0.3	
chloride, mg/L	15.4	16.9	19.5	300
nitrate, mg/L	0.686	0.842	0.912	
nitrite, mg/L	<0.1	<0.1	0.108	
sulfate, mg/L	10.1	12.6	14.0	200
fecal coliform, CFU/100 mL	89	74	71	126[3]
total coliform, MPN/100 mL	>2420	>2420	>2420	
surfactants, mg/L	NA	NA	<0.05	

(1) 30 TAC §307.10(1) Appendix A for Segment 1202 Brazos River
(2) 30 TAC §307.10(1) Appendix D for Segment 1202C Hog Branch
(3) stated as *E. coli,* the indicator bacterium for freshwater systems

As demonstrated in the table above, the creek water quality did not exceed codified water quality criteria, with the exception of S-3 where the dissolved oxygen was slightly lower than the criterion for Segment 1202C Hog Branch. Comparison to optimal water quality standards for freshwater aquatic life from Texas A&M University Agrilife Extension and Southern Region Aquiculture Center (SRAC, 2013; TAMU AE) indicates the creek's water quality falls within acceptable ranges to support freshwater aquatic life. More importantly, the presence of the various species in the creek documented in Section 3.1.10 demonstrates the suitability of the creek's water quality for sustaining aquatic life.

A copy of the ALS Labs report is present in Appendix G.

3.1.6 Groundwater

The Site is underlain by the Gulf Coast Aquifer, further divided into the Evangeline Aquifer in the southeastern-most extreme of Washington County and the Jasper Aquifer cropping out in the central portion of the County; these aquifers are separated by the Burkeville Confining

System, which is an aquitard. The lower portion of the Fleming Formation is within the Burkeville Confining System. Beneath the Site, the Jasper Aquifer is the first prolific, major, freshwater aquifer. The Jasper Aquifer is about 800 ft thick where it crops out and extends to about 1,300 ft thick near the Washington-Austin-Waller County line and is characterized by massive, gray to brown, cross bedded sands interbedded with gray clay. (TWDB, 1972; TWDB 2012; TWDB, 1978) The City of Brenham does not use this aquifer for its potable water supply and instead treats surface water from Lake Somerville roughly ten miles to the northwest.

According to USACE, the creek was determined to be a perennial stream; therefore, shallow groundwater along the banks will be shallowest according to bank height, which is typically about 8 ft to 10 ft before leveling off into the floodplain. Moving away from the creek on either side beyond the tree line, shallow groundwater is anticipated to be about 15 ft below grade and possibly deeper as the Site grades upward in elevation away from the creek. (Terracon, 2021) During a Site visit for this EA, the driller for the Terracon study indicated that groundwater was encountered about 23 ft below grade near the Site's western boundary, but caving sands precluded an end-of-day depth measurement.

Groundwater quality is expected to be comparable to the surface water quality with respect to salinity, anions and cations, pH, and other basic water quality parameters, although it must be noted that the surface water quality in the creek is affected by surface flow and exposure to air. This is to say that surface water quality will not be representative of groundwater quality for such things as bacteria, surfactants, temperature, dissolved oxygen, and residual chlorine. Overall, the shallow groundwater quality is expected to be generally superior to surface water quality and likely potable.

3.1.7 Natural Hazards

The natural hazard within the project limit is the FEMA-mapped, 100-year floodplain that generally encompasses the forested area along the creek flowline. All structured improvements (restroom, pavilion, and park facilities) within the project area are planned to be wholly outside of the floodplain limits. See Figure 8 – FEMA Map.

3.1.8 Air Quality

Historically, Brenham air quality has been defined as green, or good, with an air quality index (AQI) of 0 to 50 for the collective of EPA's five major air pollutants of ground level ozone, particulate matter of 2.5 and 10 microns, carbon monoxide, sulfur dioxide, and nitrogen oxide. Occasional excursions slightly above 50 AQI to yellow, or moderate, occur, but this level is still considered acceptable, with members of sensitive groups more susceptible to impacts but the general populace being unaffected. (IQAir, 2021; AirNow, 2021)

3.1.9 Vegetation Communities

The transects that functioned as locational guides for flora identification are presented on Figure 9 – Creek Photograph Locations and Transects Map, and representative transect photos are presented in Appendix H. Flora observed on the Site are presented as follows, with non-native species marked with an asterisk (*):

Herbaceous

Bluestem Pricklypoppy *(Argemone albiflora)*
Green Milkweed *(Asclepias viridis)*
Purple Poppymallow *(Callirhoe involucrate)*
Entireleaf Indian Paintbrush *(Castilleja indivisa)*
Texas Thistle (*Cirsium texanum)*
Bee Balm *(Monarda sp.)*
Whitemouth Dayflower (*Commelina erecta)*
Gaura (*Oenothera sp.*)
Firewheel *(Gaillardia pulchella)*
Yellow Puff (*Neptunia lutea*)
Texas Bullnettle (*Cnidoscolus texanus*)
Cuman Ragweed (*Ambrosia psilostachya*)
Canadian Goldenrod (*Solidago canadensis*)
Pink Evening Primrose *(Oenothera speciosa)*
*Gray's Feverfew (*Parthenium hysterophorus)*
Texas Vervain *(Verbena halei)*
*South American Mock Vervain *(Verbena pulchella)*
Turkey Tangle Frogfruit *(Phyla nodiflora)*
Texas Bluebonnet (Lupinus texensis)
Blackeyed Susan *(Rudbeckia hirta)*
Fringeleaf Wild Petunia *(Ruellia humilis)*
Carolina Horsenettle (*Solanum carolinense)*
Buffalobur Nightshade (*Solanum rostratum)*
*Brazilian Vervain (*Verbena brasiliensis)*
Gray Vervain (*Verbena canescens)*
Upright Prairie Coneflower (*Ratibida columnifera)*

Vines

Peppervine (*Nekemias arborea*)
*Japanese Honeysuckle (*Lonicera japonica*)
Field Blackberry (*Rubus arvensis*)
Saw Greenbrier (*Smilax bona-nox*)
Roundleaf Greenbriar (*Smilax rotundifolia*)
Mustang Grape (*Vitis mustangensis*)
Poison Ivy (*Toxicodendron radicans*)
Alabama Supplejack (*Berchemia scandens*)
Virginia Creeper (*Parthenocissus quinquefolia*)
Prairie Snoutbean (*Rhynchosia latifolia*)
Trailing Krameria (*Krameria lanceolata*)
Purple Passionflower (*Passiflora incarnata*)
Yellow Passionflower (*Passiflora lutea*)
Purple Bindweed (*Ipomoea cordatotriloba*)
Texas Bindweed (*Convolvulus equitans*)

Grasses

Little Bluestem (*Schizachyrium scoparium*)
*Johnsongrass (*Sorghum halepense*)
*Bermudagrass (*Cynodon dactylon*)

Shrubs

Roughleaf Dogwood (*Cornus drummondii*)
Possumhaw (*Ilex decidua*)
Yaupon Holly (*Ilex vomitoria*)
*Chinese Privet (*Ligustrum sinense*)

Trees

Osage Orange (*Maclura pomifera*)
Pecan (*Carya illinoinensis*)
Water Oak (*Quercus nigra*)
Honey Mesquite (*Prosopis glandulosa*)

American Elm(*Ulmus americana*)
Boxelder Maple (*Acer negundo*)
*Chinaberry (*Melia azedarach*)
Mulberry (*Morus rubra*)
Common Hackberry (*Celtis occidentalis*)
Eastern Redcedar (*Juniperus virginiana*)
*Persian Silk Tree (*Albizia julibrissin*)
American Sycamore (*Platanus occidentalis*)
Sweetgum (*Liquidambar styraciflua*)

The prairie area is dominated by flowering forbs, grasses, and vines, with some sporadic saplings and trees of mesquite and boxelder. Clumps of trees, such as hackberry, covered by mustang grape dot the prairie, and monocultures of various vines and forbs exist scattered throughout the prairie. As examples, blackberry and mustang grape form monoculture mats in the prairie, and dense stands of poison ivy intermingled with peppervine, greenbriars, and honeysuckle are common at the interface of prairie and forest. Bermuda grass is the dominant grass in the prairie. The forest has a considerable tree canopy with dense undergrowth of shrubs, woody vines, and herbaceous vines but significantly less of flowering forbs. The forest was dominated by large pecan or other *Carya spp.,* and a handful of large, American elm and water oak. Large trees exceeding 36 inches DBH are presented on Figure 10 – Large Tree Locations.

Of note are species that can cause contact dermatitis or punctures and lacerations. Within the tree category, mesquite has long, sharp thorns. Within the vine category, poison ivy causes dermatitis and is prolific throughout the forested areas and forest fringe along the prairie but less so in the prairie. Within the flowering forb category, Texas bull nettle causes dermatitis but is sporadic in the prairie. The greenbriars and blackberry have thorns and are prolific at the forest fringe, whereas the blackberry dominates in the prairie, while the greenbriers dominate in the forest. In some instances of conducting transect and tree identification, areas within the forest were inaccessible and impassable to normal machete clearing because of dense stands of hazardous vines. The current facility design indicates trails will be cleared that will allow pedestrians to traverse the park without needing to contact hazardous vegetation. The hazardous vegetation will need to be addressed in facility operations and maintenance to minimize contact potential for park visitors.

3.1.10 Fauna

Regional Setting

The Blackland Prairies ecoregion is diverse relative to fauna, with population densities varying according to surface conditions for access to water and vegetative cover (SWCA, 2021). Mammals common among this ecoregion include:

eastern mole (*Scalopus aquaticus*)
squirrel (*Sciurus spp.*)
deer (*Odocoileus spp.)*
Hispid cotton mouse (*Sigmodon hispidus*)
nine-banded armadillo (*Dasypus novemcinctus*)
deer mouse (*Peromyscus maniculatus*)
white footed mouse (*Peromyscus leucopus*)
swamp rabbit (*Sylvilagus aquaticus*),
black-tailed jack rabbit (*Lepus californicus*)

fox squirrel (*Sciurus niger*)
opossum (*Didelphis virginiana*)
eastern cottontail (*Sylvilagus floridanus*)
Baird's pocket gopher (Geomys breviceps)
coyote (*Canis latrans*)

Bird species in the ecoregion are diverse, with numerous breeding, migrant, and wintering species consisting of:

prairie scissortail flycatcher (*Tyrannus forficatus*)
black vultures (*Coragyps atratus*)
wild turkey (*Meleagris gallopavo*)
northern bobwhite quail (*Colinus virginianus*)
mourning dove (*Zenaida macroura*)
blue jay (*Cyanocitta cristata*)
American crow (*Corvus brachyrhynchos*)
eastern bluebird (*Sialia sialis*)
northern mockingbird (*Mimus polyglottos*)
northern cardinal (*Cardinalis cardinalis*)
painted bunting *(Passerina ciris*)
lark sparrow (*Chondestes grammacus*)

Reptiles and amphibians collectively are diverse in the ecoregion and include:

western box turtle (*Terrapene ornata*)
common box turtle (*Terrapene carolina*)
green anole (*Anolis carolinensis*),
eastern collared lizard (*Crotaphytus collaris*)
eastern fence lizard (*Sceloporus undulatus*)
eastern glass lizard (*Ophiosaurus ventralis*)
eastern racer (*Coluber constrictor*)
black rat snake (*Elaphe obsoleta*)
common king snake (*Lampropeltis getulus*)
ribbon snake (*Thamnophis sauritus*)
timber rattlesnake (*Crotalus horridus*)
cottonmouth (*Agkistrodon piscivorus*)
coachwhip (*Coluber flagellum*)
northern copperhead (*Agkistrodon mokasen*)
western diamondback rattlesnake (*Crotalus atrox*)
small-mouthed salamander (*Ambystoma texanum*)
lesser siren (*Siren intermedia*)
tiger salamander (*Ambystoma tigrinum*)
Couch's spadefoot toad (*Scaphiopus couchii*)
Woodhouse's toad (*Bufo woodhousii*)
southern cricket frog (*Acris gryllus*)
American bullfrog (*Rana catesbeiana*)
Gulf Coast toad (*Bufo valliceps*)
eastern spadefoot toad (*Scaphiopus holrookii*)

Site Observations
Field-observed fauna or evidence of fauna consisted of the following:

Mammal		
Common Name	**Binomen**	**Location**
eastern fox squirrel	*Sciurus niger*	forested area
whitetail deer	*Odocoileus virginianus*	high grasses of prairie area
common raccoon	*Procyon lotor*	only observed paw prints along creek bottom
indeterminate canid	*Canis spp.*	only observed paw prints along creek bottom

armadillo	*Dasypus novemcinctus*	forested area
Amphibian		
bullfrog	*Lithobates catesbeianus*	creek
Fowler's toad	*Anaxyrus fowleri*	prairie near gravel road at southwestern-most Site boundary
Southern leopard frog	*Rana sphenocephala*	creek
Bird		
common ground dove	*Columbina passerina*	near terminus of cul-de-sac
mockingbird	*Mimus polyglottos*	near terminus of cul-de-sac
cardinal	*Cardinalis cardinalis*	forested area, various
blue jay	*Cyanocitta cristata*	forested area, various, auditory only
Fish		
longear sunfish	*Lepomis megalotis*	extent of creek
redbreast or green sunfish	*Lepomis cyanellus or Lepomis auritus*	extent of creek
bluegill	*Lepomis macrochirus*	extent of creek
blacktail shiner	*Cyprinella venusta*	extent of creek
mosquitofish	*Gambusia affinis*	extent of creek
Gulf killifish	*Fundulus grandis*	extent of creek
unidentified shiner	*Cyprinella spp.*	extent of creek

No turtles were observed, and typical evidence of turtle presence, such as floating stools, was not observed. No snakes were observed, but their presence is highly probable.

3.1.11 Sensitive Ecosystems

The creek and the riparian buffers are sensitive ecosystems due to their functionalities as habitats for aquatic and terrestrial flora and fauna. The prairie is a sensitive ecosystem for native flowers. No wetlands were encountered in the prairie and forest areas, and minimal fringe wetlands along the creek banks were encountered due to extreme incising of the banks and erosional undercutting. The slopes are dominantly angled at roughly 60 degrees to 90 degrees relative to the water surface and are subject to significant variability of erosion, scouring, and deposition of sand bars and sand accretions through high water events followed by return to base flow. These conditions inhibit development of fringe, permanent, hydrophytic vegetation communities and development of long-term wetland hydrology beyond the OHWM because of rapid drainage across steep slopes.

3.1.12 Threatened and Endangered Species

Federal and State threatened and endangered species are presented as follows:

US Fish and Wildlife Service

An official species list was obtained through the United States Fish & Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) website on June 30, 2021. See Appendix I – USFWS Species List. The document contains the following listed species for Washington County, Texas:

Plant		
Common Name	**Binomen**	**Status**
Navasota ladies'-tresses	*Spiranthes parksii*	Endangered
Mollusk		
Texas fawnsfoot	*Truncilla macrodon*	candidate
Bird		
piping plover	*Charadrius melodus*	Threatened
red knot	*Calidris canutus rufa*	Threatened
whooping crane	*Grus americana*	Endangered

- Navasota ladies'-tresses

Washington County is one of 13 Texas counties known to have Navasota ladies'-tresses, although minimally so compared to Brazos and Grimes counties. It prefers flat to gently sloping terrain in lightly forested post oak savannas with acidic, sandy or loamy soils rich in fungal growth. It can be found along stream banks of upland tributaries to the Brazos River and along drip lines at the junction of forested areas and grass patches. Flowering occurs generally in October. (Wonkka, 2010)

The Site is not lightly forested post oak savanna and is not gently-sloping in that the bulk of the Site has grades greater than five percent and approaching or exceeding ten percent. The riparian buffer west of the creek is in an area dominated by flood-prone Bosque soils. This is important in that the plant is listed in the USDA's PLANTS Database but has no hydrophytic designation, and it is not listed in the USACE's Wetlands Plant List for the Atlantic and Gulf Coastal Plains or Great Plains Region. These findings indicate that the flower is likely FACU or UPL (non-hydrophytic) with low tolerance for flooding.

No plants were observed, but the abundance of other ground-level forbs at the Site would tend to obscure the basal rosettes from observation, if they existed, and field exploration visits were completed before the flowering season. Orchids generally are not hardy plants that compete well with other forbs when in dense mat or dense overgrowth environments. The dense, high grasses and ground mats at the Site would greatly inhibit the orchid. A sister

species, spring ladies' tresses, observed by WA at a park in Port Arthur, TX, is shown in the adjacent photos to demonstrate their preference for low ground cover environments and the absence of basal rosettes that would be needed to identify any *Spiranthes* orchid during non-flowering seasons.

Spiranthes vernalis, spring ladies' tresses, 5/19/22, City of Port Arthur park showing minimal,, competing ground cover.

Spiranthes vernalis, spring ladies' tresses, 5/19/22, City of Port Arthur park showing no rosettes at base.

Consultation with USFWS representative Mr. Chris Best occurred via email on May 17, 2022. Mr. Best agreed with WA's assessment that it is unlikely that the plant exists at the Site, citing lack of rainfall as a contributing factor, although he could not entirely rule out its existence. He further indicated the difficulty of finding it even if it were there. (Appendix J) In consideration of the factors stated above, it is WA's position that the plant does not exist at the Site.

- Texas fawnsfoot

Texas fawnsfoot was not observed during the kick net random sampling, nor were any other mollusks.

- Bird List

Piping plover, red knot, and whooping crane are migratory and thereby indicate the possibility of transient movement into the Site during flyovers; nevertheless, the Site does not possess the coastal habitats required by the plover and the knot nor the open, marshy areas, ponds, lakes, and tidal flats required by the crane. The potential for breeding and nesting of these species at the Site is negligible. (TAMU AR, 2021; USFWS, 2009; USFWS, 2021). The Site development plan will impact no habitat these resources would need for breeding or feeding.

Texas Parks and Wildlife Department

An official species list and occurrence records were obtained from the Texas Natural Diversity Database of TPWD on August 9, 2021. See Appendix K – TPWD Species List. The document contains the following listed species:

Plant		
Common Name	**Binomen**	**Status**
Navasota ladies'-tresses	*Spiranthes parksii*	Endangered
Amphibian		
Houston toad	*Anaxyrus houstonensis*	Endangered
Bird		
Eskimo curlew	*Numenius borealis*	Endangered
whooping crane	*Grus americana*	Endangered

interior least tern	*Sternula antillarum athalassos*	Endangered
reddish egret	*Egretta rufescens*	Threatened
white-faced ibis	*Plegadis chihi*	Threatened
wood stork	*Mycteria americana*	Threatened
swallow-tailed kite	*Elanoides forficatus*	Threatened
black rail	*Laterallus jamaicensis*	Threatened
piping plover	*Charadrius melodus*	Threatened
Fish		
smalleye shiner	*Notropis buccula*	Endangered
sharpnose shiner	*Notropis oxyrhynchus*	Endangered

- Houston Toad

With respect to the Houston toad, the soils on the site are not its preferred soils. The preferred soils include those of the Carrizo, Queen City, Reklaw, Sparta, Weches, Willis, and Goliad Formations. The Site habitat is limited for the Houston toad. The target forest ecosystem conditions for the Houston toad includes the following: (1) a mixed plant species composition, (2) canopy cover (ideally 80 percent), (3) an open understory with a diverse herbaceous component, and (4) breeding pools with shaded edges. Breeding habitats include primarily small pools of water, ephemeral ponds, and sometimes permanent water bodies. The water body present is a creek with eroded steep banks, which would not be preferred breeding habitat. (USFWS, 2017; USFWS 2020)

Regarding historical records, there are records of the Houston toad south of the site (near Cat Springs, TX) and records north of the site. Project Herpetologist Mr. Nelson spoke with Dr. Toby Hibbits, herpetology curator at the Texas Cooperative Wildlife Collection, Texas A&M University, who stated he was unaware of any verifiable records in Washington County. There does not appear to be appropriate habitat in the county.

- Bird List

The TPWD bird list for Washington County consists of migratory birds that, because of their migratory nature, could be transient through the Site area, although the possibility is remote. Collectively, their primary breeding and nesting grounds are open marshes, rivers, tidal flats, and coastal beaches, and they are documented primarily at locations other than Washington County. They are dominantly piscivorous or otherwise seek aquatic sources of food. (TAMU AR, 2021; COSEWIC, 2009) The creek is deeply incised and virtually impossible to see from the air, such that it would not attract migratory species needing resting and feeding grounds. The potential for breeding and nesting of these species at the Site is negligible.

- Shiners

Smalleye and sharpnose shiners were not observed during the seine sampling or observed *in situ*, but other species of shiners and fish in general were observed. However, Project Fisheries Specialist Dr. Silvy's opinion is that water quality metrics and overall creek dynamics indicate

that there is appropriate habitat for the presence of smalleye and sharpnose shiners at the Site. JC's development plan does not include placement of structures into the creek or direct drainage discharges into the creek, such that no impacts to this resource would occur if it exists in the creek.

3.2 Human Resources

Human resources were documented and evaluated through documents review supplemented with field exploration conducted on July 1; August 4, 5, 26, and 27; September 2 and 7, 2021; September 7, 2022; and June 22, 2023. Documents are cited in appropriate sections and listed in the bibliography, and field exploration consisted of reconnaissance of the Site, adjacent properties, and the surrounding area during the field exploration work for natural resources.

3.2.1 Historical, Cultural, and Archeological Resources

In two studies conducted in 2021 and 2022, respectively, SWCA documented no above-ground, constructed cultural resources on or adjacent to the Site. SWCA documented one newly-discovered, cultural resource consisting of a "historic-age artifact scatter" composed of ceramic, glass, and metal fragments. SWCA recommended deep excavations in two areas because of the presence of terrace deposits adjacent to water, landforms, and soils known to have higher probabilities for the presence of deeply buried cultural deposits. (SWCA, 2021) The park facilities have been designed to nearly entirely avoid these two areas and to have no construction work deep enough to impact potential artifacts below the 31 inches cited by SWCA as a lower limit of construction work.

3.2.2 Public Use and Open Space

The Site's northern extent is within about 600 ft of the southern extent of a shopping center and about 1,800 ft southeast of another shopping center. The Brenham State Supported Living Center is about 1,800 ft south-southeast of the Site, and commercial property is located about 3,800 ft east-northeast of the Site. Grasslands surround the Site extending to these properties, with some forested areas to the south. There are no residences, public parks, or recreational areas in proximity to the Site.

3.2.3 Land Uses

Portions of the Site and land adjacent to the Site are grasslands suitable for grazing of livestock, although no evidence of grazing was observed. No timber harvesting is occurring or appears to have occurred in the recent past. The Site is in a natural or naturalized state and unused for agricultural, silvicultural, or recreational purposes. See Figures 11 - 13 – Aerial Photographs.

3.2.4 Right-of-Ways, Easements, Public Utilities, and Transportation Features

The Site is readily accessible from the feeder road of SH 290 via South Chappell Hill Street. A power easement runs north-northwest to south-southeast about 600 ft from the western boundary, and another power easement transects the southern portion of the Site running northeast to southwest. The City's gas distribution line runs north to south along the eastern Site boundary, and an Energy Transfer Company natural gas transmission line transects the Site northeast to southwest between Transects 7 and 8; this line can be observed crossing the creek about 3 ft above base water level. A City sanitary sewer runs generally north to south on the east side of the Site, and a storm drain runs east to west from the cul-de-sac to the creek. See Figure 14 – Utility Map.

3.2.5 Noise

Noise currently is minimal with only sporadic, minor increases typical of slowly moving vehicles as they transit South Chappell Hill Street to the dirt and gravel roads further south, east, and west of the Site. There are no permanent structures with human occupancy or rotating equipment (generators, compressors, etc.) in proximity to the Site that would produce excessive noise. Noise will temporarily increase during construction but will return to levels typical of public parks, as explained below.

With respect to human activity at the Site, noise will be generated primarily in the parking, pond, playground, and pavilion areas through vehicle traffic, human interaction, kayaking, and possibly loudspeakers for public events. Pedestrian and bicycle traffic on the trails will produce minimal noise relative to activities at those facilities. Data provided to the City of Brenham for a proposed beacon light at Henderson Park indicates pedestrian traffic above 20 pedestrians per hour; Brenham Family Park, due to its location outside highly trafficked areas, will likely not routinely exceed that level of traffic to cause excessive noise that can be caused by large crowds. WA personnel conducted an EA for the City's hike and bike trail that includes Henderson Park and noted no nuisance noise levels; the Site is anticipated to be comparable to Henderson Park or better relative to noise.

Under Texas Penal Code Section 42.01, nuisance noise is considered levels of 85 decibels A scale (dB(A)) and above, which is consistent with Occupational Safety and Health Administration (OSHA) guidance that noise levels above 85 dB(A) should be avoided. OSHA indicates normal conversation is 60 dB(A), playing children are 80 dB(A), and heavy construction equipment, lawn mowers, and power saws are about 85 dB(A) and above (CDC NIOSH, 2021; OSHA, 2011). Using these criteria to evaluate future Site activities, noise is not anticipated to be a significant issue.

3.2.6 Public Health and Hazardous Waste Facilities

Typical facilities in urban settings that produce, use, or store hazardous materials and waste are automotive maintenance shops, dry cleaners, gas stations, auto body paint shops, fuel

storage tank farms, machine shops, solid waste transfer stations, and wastewater treatment plants. No such facilities are near the Site, nor are there any heavy industrial facilities for production or use of chemicals near the Site.

3.2.7 Socioeconomic Factors

The Site is unoccupied and has no structures for human use, thus there will be no direct impacts to humans though displacement or access limitations to facilities. The Site has been donated to the City and, therefore, requires no acts of condemnation or other litigating procedures to acquire the Site. Development of the Site will not cause economic hardship to surrounding populations, since it is not a revenue generator that might otherwise pull business away from existing, nearby businesses, and rather may enhance traffic to nearby businesses. The construction of the proposed facilities at the Site will cause a temporary increase in local labor employment and revenue generation for local materiel suppliers. The Site will likely enhance the social fabric of the City through provision of recreational facilities that will also serve an educational purpose through exposure of citizens to native flora, fauna, and landforms. The project is expected to be beneficial relative to socioeconomic factors.

4 PROJECT ALTERNATIVES

The alternatives described herein consist of the No Action alternative and the preferred Alternative A designed by JC based on the City's objectives and design guidelines.

4.1 No Action Alternative

The No Action alternative would provide no significant benefit to the community other than for the occasional citizen that may appreciate the natural state of the Site for recreational purposes. On the other hand, because it is now publicly accessible and not monitored and maintained by private parties having an economic interest in the property, it may attract citizens with no vested interest in maintaining the relative cleanliness and natural beauty of the Site; citizens could conduct unsafe or illegal activities at the Site with little monitoring by the City in the way that a public park would have. Under a No Action scenario, the Site would continue in its natural state, subject to impacts caused by citizens, as mentioned above.

4.2 Alternative A (Preferred Alternative)

Alternative A is expected to enhance the attractiveness of the City for growth through migration of people looking for affordable living conditions with access to clean, well-managed recreational areas in proximity to economic zones. Development of the Site will cause a temporary economic benefit to workers and vendors through wages and equipment/supply rentals/purchases. Ongoing operation of the park may result in additional jobs for City personnel, and local businesses are expected to be benefited through increased traffic into the area. The Site will serve as social gathering place to enhance the feeling of community and will allow recreational opportunities for personal fitness and relaxation. The Site can serve an

educational purpose for bird watching, plant identification, and other naturalist activities for students and interested citizens. Projected impacts of Alternative A are described in the following section.

5 IMPACTS ANALYSIS AND MITIGATIVE MEASURES

Alternative A impacts are discussed herein combined with measures to achieve avoidance, minimization, and compensation of impacts.

5.1 Impacts Analysis

Based on a written description and a mapped depiction of the Site development plan provided by JC, the estimated areal footprints of the facilities are shown below:

Facility	Facility Acreage	Prairie Converted to Impervious Surface	Prairie Converted to Pond/Water
1. East pond on Site	4.50	-	4.50
2. Entry road and pond road	0.50	0.50	-
3. Parking lot	0.25	0.25	-
4. Sidewalk to pavilion	0.05	0.05	-
5. Pavilion & restrooms	0.10	0.10	-
6. Walking trails	1.30	1.30	-
		2.20 ac. total	4.50 ac. total

Listed below are known and potential impacts to the natural resources of the Site:

1. Vegetated areas will be lost through placement of the facilities.
2. Artificial recharge of the shallow groundwater system and groundwater mounding could occur with possible seepage to the surface at downgradient areas toward the creek. If seepage occurs, wetlands will develop around the seeps.
3. Noise and human movement during construction and operational phases will drive larger fauna, such as deer, out of the area.
4. Surface water seepage into soils will be diminished and may cause erosion around impervious facilities through increased drainage velocities.
5. Banks of the ponds may be susceptible to slope failure and erosion.
6. Municipal solid waste produced by park visitors can serve as habitats for nuisance and disease vectors, such as rodents, insects, and scavengers (e.g., raccoons, domesticated cats, dogs). Windblown or discarded solid waste can adversely affect water quality and park aesthetics. Discarded plastics have been documented to function as traps and strangulation hazards for smaller fauna.
7. Visitors could collect flora and fauna for their personal use.
8. With the national increase of vagrants and the homeless, the park could function as a temporary camp for these individuals.

9. Soil loss through erosion and dust production may occur temporarily through the construction phase.
10. Spills and releases of fuels and vehicle maintenance fluids may occur during the construction phase and to a much lesser extent during the operational phase. On-site fueling with temporarily placed, above-ground fuel tanks is common during construction, and maintenance of heavy equipment is typically conducted on site where lubricants and coolants can be spilled. Visitor vehicles can have minor fuel and maintenance fluids drippage in parking areas that are transported elsewhere during storm events.
11. Air quality could be temporarily impacted through emissions of volatile hydrocarbons, combustion products, and dust by heavy equipment usage during construction and much less so during operations caused by visitor vehicles.

Irrespective of the known or potential impacts listed above, an over-arching concern is the instability of the creek that indicates a high probability that slope stabilization work will need to be done at a future date to protect the constructed elements crossing or abutting the creek. Temporary impacts would likely be soil deposition and sedimentation into the creek from soils disturbed by heavy equipment, mat placement, and caisson placement; dredging; and rip rap, gabions, piles, articulated blocks, select fill, or concrete cladding placement. Permanent impacts would be the structures used for slope stabilization. Temporary and permanent impacts would need to be engineered to avoid changing flow dynamics that might cause impoundments upstream of the constructed elements or increased velocities along unstable, downstream banks causing additional erosion and undercutting. The current facility design calls for bridge footings and pedestrian paths to stay well outside the main channel flow line and beyond the high banks; therefore, these resources are not anticipated to be impacted by park facilities.

5.2 Avoidance

Facilities will be constructed for the park to function as a park, but the facilities have been designed to minimize impacts through avoidance. In upland areas, there are no protected species or suitable habitats for protected species, but for desirable, non-threatened species such as deer, limitations will be placed on visitor off-trail movement into the prairie and forested areas to avoid pressures on the fauna to vacate the area.

Protected fish that may be present, such as the shiners, are less susceptible to construction within channels and can move out of the impacted area to unimpacted areas within the creek reach. However, no construction activities are planned within the creek; therefore, no impacts will occur.

Avoiding placement of trails and trail crossing support structures close to the high banks of the creek, which is consistent with the current facility design, is prudent to minimize weakening of the banks that could amplify erosion or failure.

5.3 Minimization

The following presents responses to the impacts listed above.

1. Loss of vegetated areas cannot be avoided during construction. Undergrowth clearing adjacent to the 10 ft – 16 ft wide trails will be negligible to reestablish native growth up to the limits of the facilities that will likely have been damaged during the construction phase. The proposed 10 ft – 16 ft wide trail system, roads, parking and pavilion are to be at existing grades as much as possible in order to minimize undergrowth loss and provide positive, natural, drainage patterns. In locations where fill or cut must be placed, the City will reestablish native vegetation comparable to existing conditions up to the limits of the facilities. For the pond facility, side slopes will be gradually sloped and grass lined, and reestablishment of the same vegetation for erosion control and minimization will be utilized.
2. Ponds will be lined only below the static water surface elevation with an impermeable liner and a slowly impermeable, compacted clay layer in order to minimize or preclude artificial recharge of the shallow groundwater system and potential seepage into downgradient areas.
3. Noise cannot be avoided during construction and operational phases, although excessive noise levels are anticipated to be either short-lived during construction or minor during park operations. Noise is not anticipated to be a significant, long-term impact during the operation of the park facility.
4. Erosion around impervious facilities through increased drainage velocities will be minimized through best management practices (BMP) of silt fencing, sedimentation socks, hay bales, vegetation strips, and gravel during construction. Engineering design includes energy dissipators of various means, including rock rip-rap, gravel- or vegetation-filled swales, vegetation strips, geotextiles, and the like to slow drainage velocities to minimize erosion potential. Infiltration loss causing increased runoff will be controlled through diversion of drainage to the detention ponds. With the pond being wet bottom with a constant static water surface elevation, it will act as an additional sedimentation control and stormwater quality device to filter solids prior to discharge.
5. Engineering design with proper pond slope gradients accounting for the geotechnical properties of the soils will overcome the potential for slope failure and erosion. Vegetated slopes of the pond will be used to minimize erosion and gentle enough to encourage park visitors to sit and enjoy the park. Slopes will not exceed a 10% gradient above the static surface water elevation, per City specifications.
6. Sign placement to encourage proper visitor behavior combined with ample waste depositories situated in trafficked areas will minimize municipal solid waste mismanagement by visitors. Periodic monitoring of park visitors by City personnel with the authority to dispense punitive citations for littering may be warranted. Placement of remotely operated security cameras may be warranted.
7. Sign placement will be implemented to warn visitors against collecting flora and fauna for their personal use. Periodic monitoring of park visitors by City personnel with the authority

to dispense punitive citations for "takings" may be warranted. Placement of remotely operated security cameras may be warranted.

8. Sign placement can be implemented to warn visitors against vagrancy. Periodic monitoring of park visitors by City personnel with the authority to dispense punitive citations for vagrancy may be warranted. Placement of remotely operated security cameras may be warranted.
9. As for Item 4, BMPs will be implemented during construction and until vegetation growth has been established to avoid soil loss through erosion. Dust suppression through water spraying will be implemented to minimize soil loss through windblown removal.
10. Spills and releases of fuels and vehicle maintenance fluids during construction will be addressed through a storm water management plan under a TPDES Stormwater Construction General Permit, supplemented with a site-specific Spill Prevention, Control, and Countermeasure (SPCC) plan. Visitor vehicles with minor fuel and maintenance fluids drippage in parking areas are anticipated to be inconsequential. Additionally, grassed drainage swales will be implemented as viable methods to minimize oily fluids runoff into the ponds and then creek via filtering through biologically active substrates that biodegrade hydrocarbons and sequester solids.
11. Air quality degradation caused by construction equipment and visitor vehicles cannot be avoided but is anticipated to be temporary and negligible, since both construction and normal park operations are occurring elsewhere in Brenham without serious impacts to ambient air quality. Air impacts will be negligible.

Since these processes and procedures will be implemented, the cumulative, adverse impacts are anticipated to be negligible.

5.4 Compensation

No impacted areas or areas of potential impact have been identified on the Site that would require compensatory mitigation of any type.

6 DOCUMENT PREPARERS AND THEIR QUALIFICATIONS

The EA was executed by Wild Associates LLC (WA) of Alto, Houston, and Port Arthur, Texas. The work was directed by Paul Wild, CAPM, President, with support from Christy Wild, CEO; Caleb Wild, Project Professional; Beth Silvy, Ph.D., Adjunct Professor of Biology at Lamar University and Project Fisheries Specialist; Ryan Nelson, M.S., Project Herpetologist; and Ron Arceneaux, P.E., R.P.L.S., WA Principal Engineer. Resumes are presented in Appendix L.

Paul Wild is a chemist and biologist with 39 years of experience working in the geosciences and environmental sciences. He has directed Environmental Impact Assessments, Environmental Assessments, Categorical Exclusions with Documentation, and other large, environmental programs for Federal, State, Local, and International agencies. Mr. Wild executed the EA for the City of Brenham's existing hike and bike trail in town.

Christy Wild is a horticulturist with 18 years of experience in commercial greenhouse management, wetlands delineations, stream condition assessments, threatened and endangered species surveys, and Corps of Engineers permitting.

Caleb Wild is a field exploration specialist with 18 years of experience with soil and groundwater quality data acquisition, wetlands delineations, stream condition assessments, freshwater aquatic life surveys, and construction monitoring.

Beth Silvy, Ph.D., is an aquatic life biologist focusing on ichthyology and malacology, with over ten years of advanced research and teaching in these fields. Dr. Silvy has supported WA on oyster surveys and stream condition assessments.

Ryan Nelson, M.S., is a herpetologist with over 20 years of experience in range ecology, aquatic life studies, surface water quality studies, wetlands delineations, and threatened and endangered species surveys. He worked for the International Boundary Water Commission conducting various water quality studies before working for Mr. Wild at a prior firm conducting water quality, flora, and fauna studies.

Ron Arceneaux, P.E., R.P.L.S., is a registered civil engineer and surveyor with 46 years of experience executing and directing public sector infrastructure development projects. He provides quality assurance review of WA studies.

7 BIBLIOGRAPHY

Intensive Archaeological Investigation for the City of Brenham Family Park Development Project, Washington County, Texas. Texas Antiquities Permit No. 30024. SWCA Environmental Consultants, February 2021.

Intensive Archaeological Investigation of an Additional 4.5 Acres for the City of Brenham Family Park Development Project, Washington County, Texas. Texas Antiquities Permit No. 30854, SWCA Environmental Consultants, December 2022.

Geologic Atlas of Texas 2014, Austin Sheet. Texas Natural Resources Information System. https://data.tnris.org/collection/e28d8df6-cd30-4e89-bf0f-833e1ed0e670. Accessed August 2021.

Young, Steven C., Ph.D., Ewing, Tom, Ph.D., Hamlin, Scott, Ph.D., Baker, Ernie, P.G., Lupton, Daniel. Final Report: Updating the Hydrogeologic Framework for the Northern Portion of the Gulf Coast Aquifer., Texas Water Development Board, 2012.

Baker, E.T. Stratigraphic and Hydrogeologic Framework of Part of the Coastal Plan of Texas, Open File Report 77-712. Texas Water Development Board, 1978.

Sandeen, W.M. Ground-Water Resources of Washington County, Texas, Report 162. Texas Water Development Board, 1972.

State Soil Data Access (SDA) Hydric Soils List. United States Department of Agriculture Natural Resources Conservation Service. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1316619.html. Accessed August 2021.

Geotechnical Engineering Report, Brenham Family Park Project. Terracon, 2021.

Texas Almanac Physical Regions of Texas. https://texasalmanac.com/topics/environment/physical-regions-texas. Accessed August 2021.

Griffith, Glenn, Bryce, Sandy, Omernik, James, Rogers, Anne. Ecoregions of Texas. Texas Commission on Environmental Quality, 2007.

Eastern Texas Lidar 2018. Texas Natural Resource Information System. https://data.tnris.org/collection/13563a34-6a6d-4171-ad34-fbdfb26165ae. Accessed July 2021.

Handbook of Texas, Washington County. Texas State Historical Association. https://www.tshaonline.org/handbook/entries/washington-county. Accessed August 2021.

2016 Texas Integrated Report - Water Bodies Evaluated. Texas Commission on Environmental Quality. https://www.tceq.texas.gov/assets/public/waterquality/swqm/assess/16txir/2016_waterbodies.pdf. Accessed August 2021.

Stone, Nathan, Shelton, Jay L., Haggard, Brian E., and Thomforde, Hugh K. 1II. Interpretation of Water Analysis Reports for Fish Culture. Publication No. 4606. Southern Regional Aquiculture Center, 2013.

Sink, Todd, Ph.D., House, Mikayla. Understanding Water Quality Reports for Your Pond. Texas A&M University Agrilife Extension Publication No. EWF-017.

Air Quality in Brenham. IQAir. https://www.iqair.com/us/usa/texas/brenham. Accessed August 2021.

Air Quality Index (AQI) Basics. Air Now. https://www.airnow.gov/aqi/aqi-basics/. Accessed August 2021.

Wonkka, Carissa Lyn. Large Herbivore Impacts on Demographic Characteristics and Population Dynamics of an Endangered Orchid (Spiranthes Parksii Correll). Office of Graduate Studies, Texas A&M University, 2010.

The Texas Breeding Bird Atlas. Texas A&M University Agrilife Research. https://txtbba.tamu.edu/species-accounts/. Accessed August 2021.

Piping Plover (Charadrius melodus) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, 2009.

Rufa Red Knot (Calidris canutas rufa). United States Fish and Wildlife Service. https://fws.gov/northeast/red-knot/. Accessed September 2021.

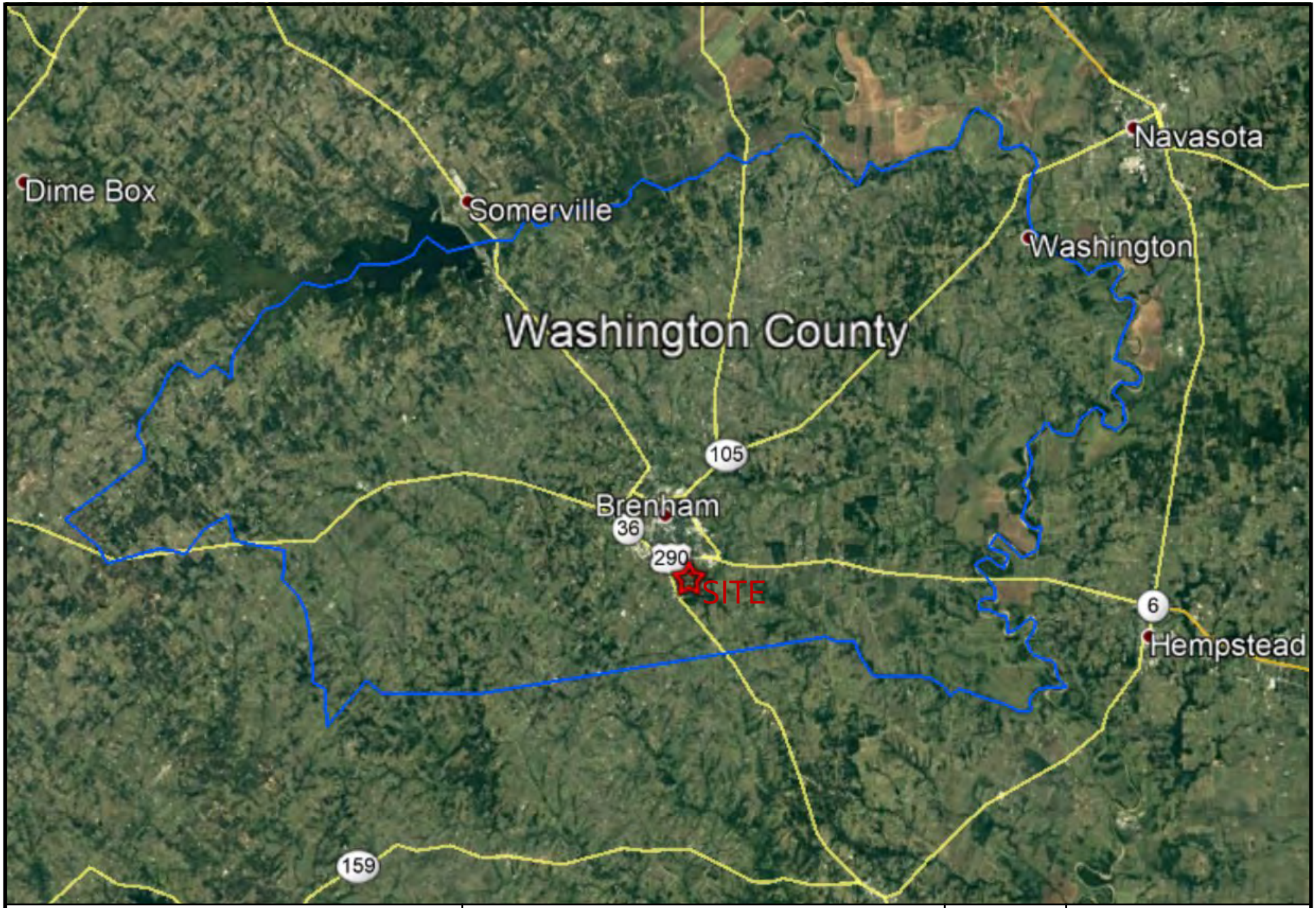
Assessment and Status Report on the Eskimo Curlew Numenius borealis in Canada. Committee on the Status of Wildlife in Canada, 2009.

Habitat Characteristics of the Houston Toad (Anaxyrus=Bufo houstonensis). U.S. Fish and Wildlife Service Austin Ecological Service Field Office, 2020.

Houston Toad Habitat Management Guidelines. U.S. Fish and Wildlife Services Austin Ecological Services Field Office, 2017.

Noise Infographic - Levels by Decibels. Centers for Disease Control, National Institute for Occupational Safety and Health. https://www.cdc.gov/niosh/topics/noise/infographic-noiselevels.html. Accessed September 2021.

OSHA Pocket Guide, Worker Safety Series, Protecting Yourself from Noise in Construction. Occupational Safety and Health Administration, 2011.



Project:
Brenham Family Park
South Chappell Hill Street
Brenham, Washington County, Texas

FIGURE 1
WASHINGTON COUNTY MAP

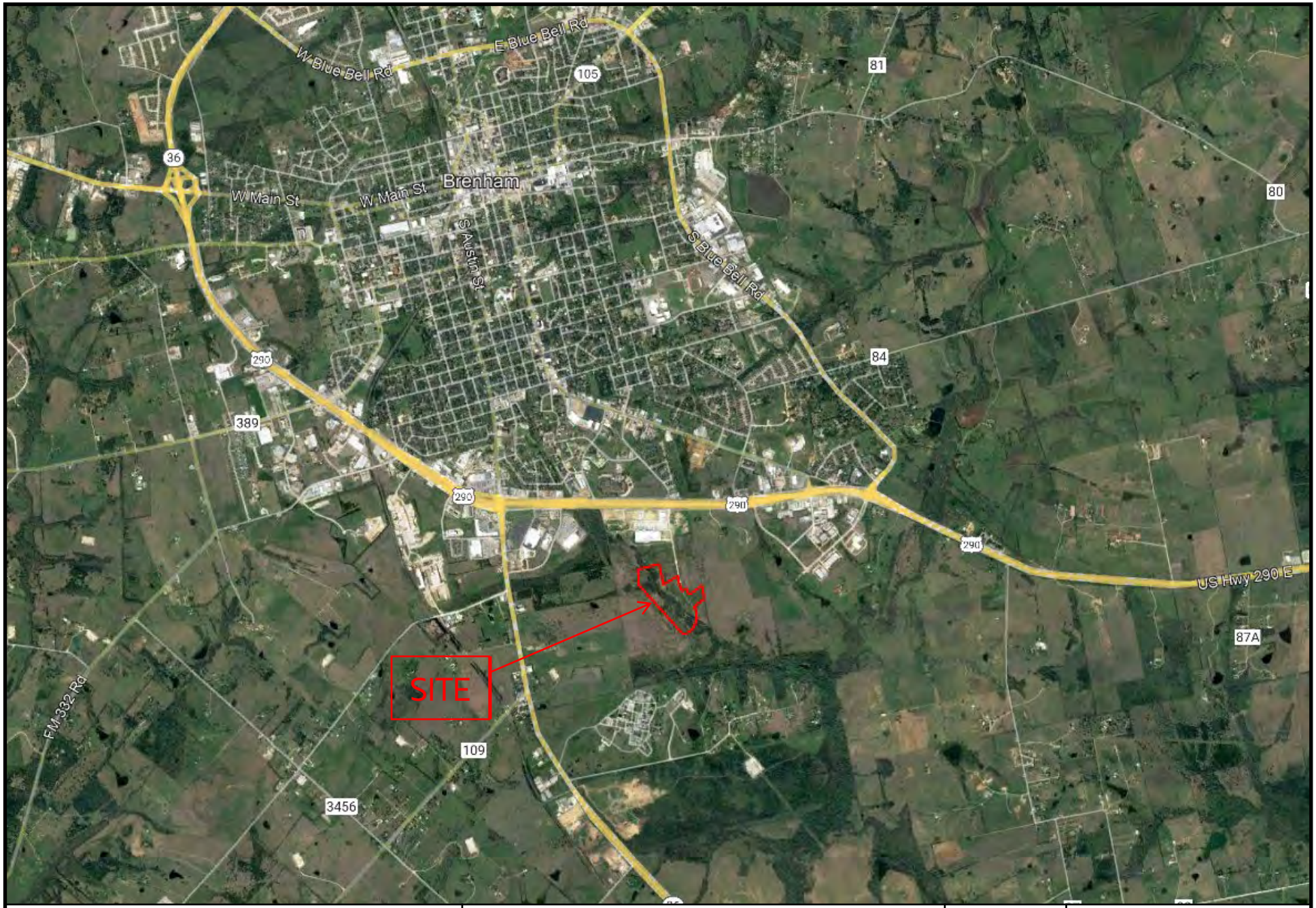
N

Scale: 1 in. ≈ 3,600 ft

Project No.: 21.01.016

WILD ASSOCIATES
Engineering & Environmental Consulting

Client: City of Brenham
Brenham, Texas



Project:
Brenham Family Park
South Chappell Hill Street
Brenham, Washington County, Texas

FIGURE 2
BRENHAM MAP

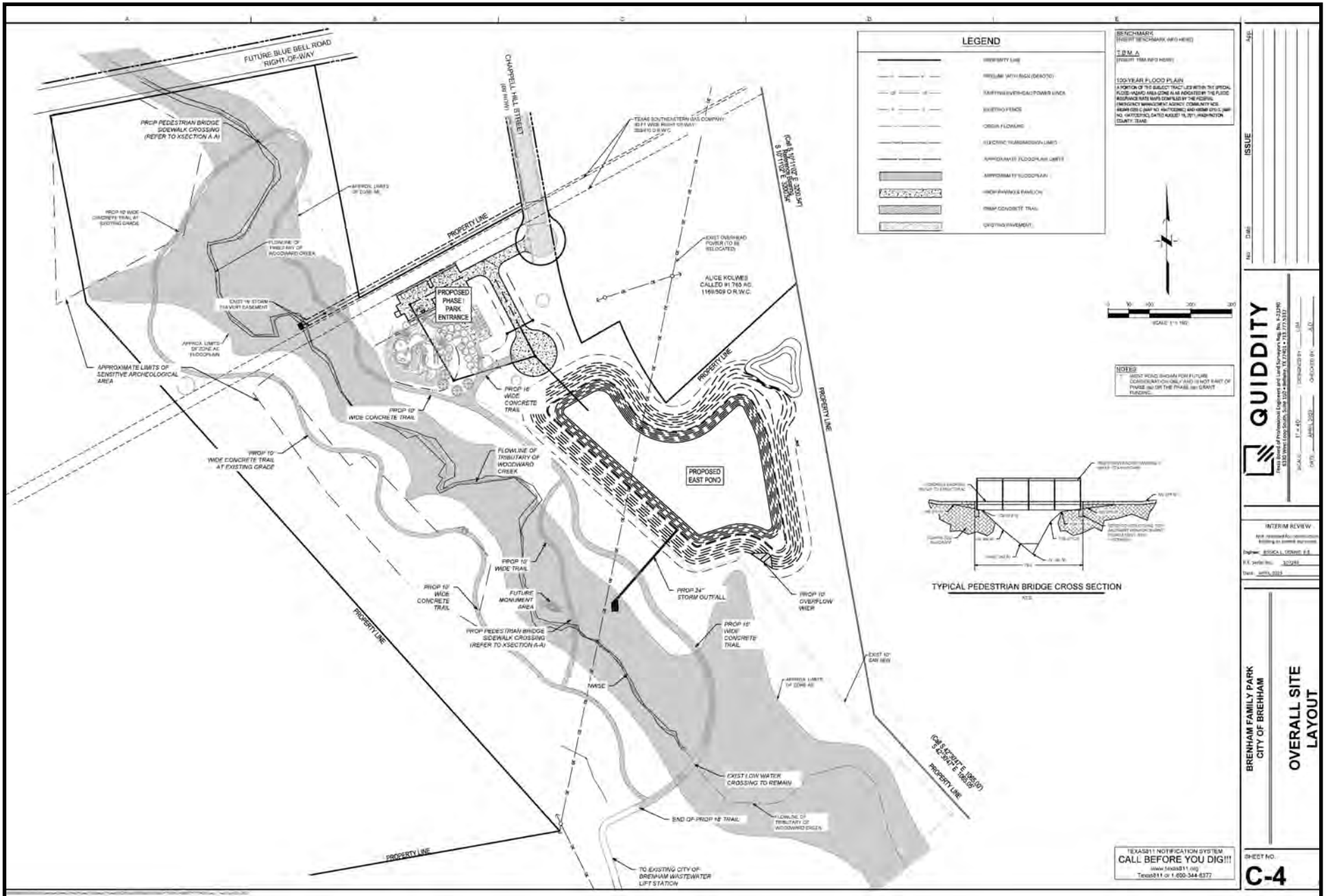
N

Scale: 1 in. ≈ 3,600 ft

Project No.: 21.01.016

WILD ASSOCIATES
Engineering & Environmental Consulting

Client: City of Brenham
Brenham, Texas



Project:
Brenham Family Park
South Chappell Hill Street
Brenham, Washington County, Texas

FIGURE 3
PROPOSED FACILITIES

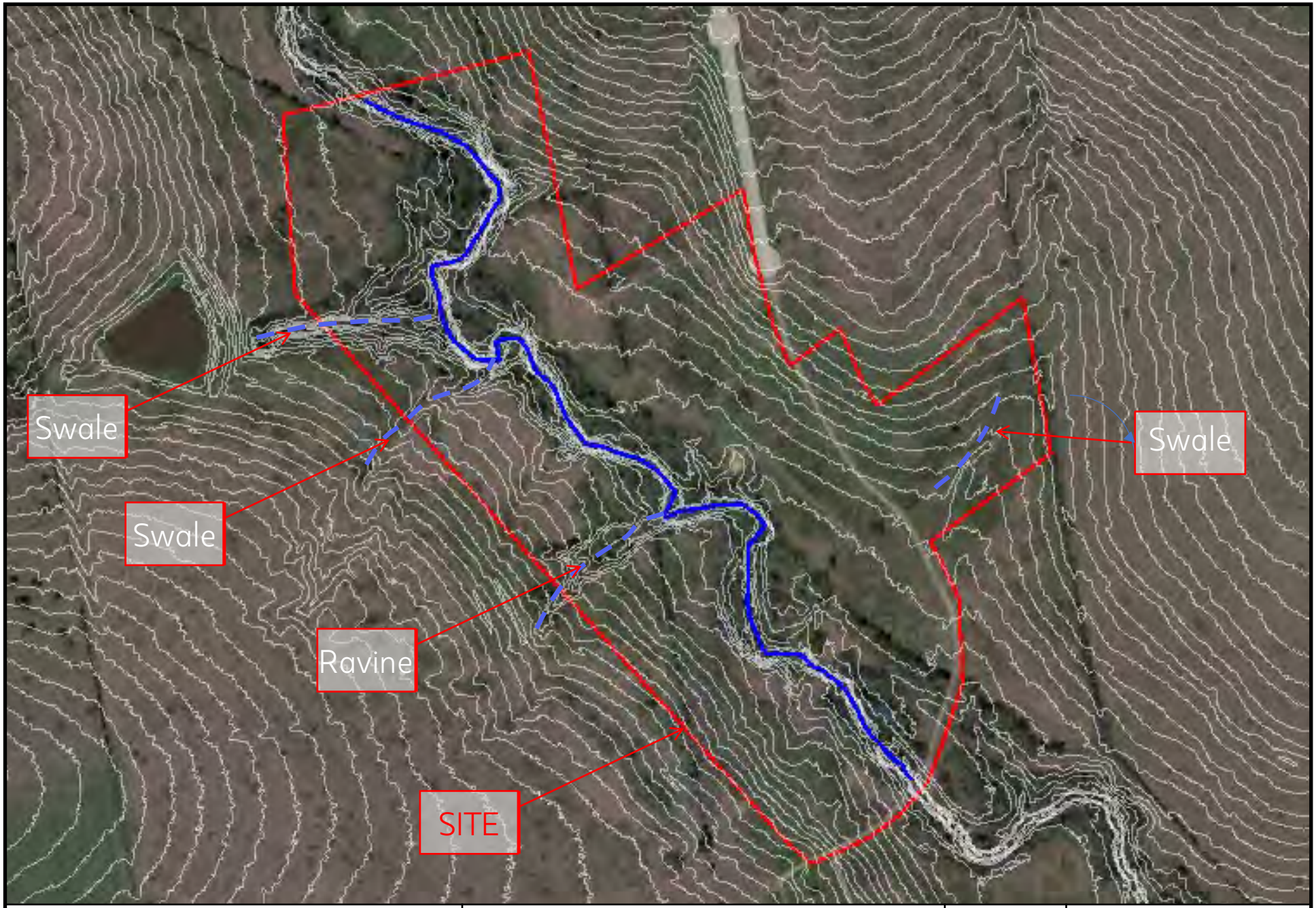
NTS

Project No.: 21.01.016

WILD ASSOCIATES
Engineering & Environmental Consulting

Client: City of Brenham
Brenham, Texas

Project: Brenham Family Park South Chappell Hill Street Brenham, Washington County, Texas	FIGURE 4 SITE MAP Image Date 1/30/2021	N	Scale: 1 in. ≈ 900 ft
	WILD ASSOCIATES Engineering & Environmental Consulting		Project No.: 21.01.016
			Client: City of Brenham Brenham, Texas



Project:
Brenham Family Park
South Chappell Hill Street
Brenham, Washington County, Texas

FIGURE 5
TNRIS LIDAR MAP
Image Date 1/30/2021

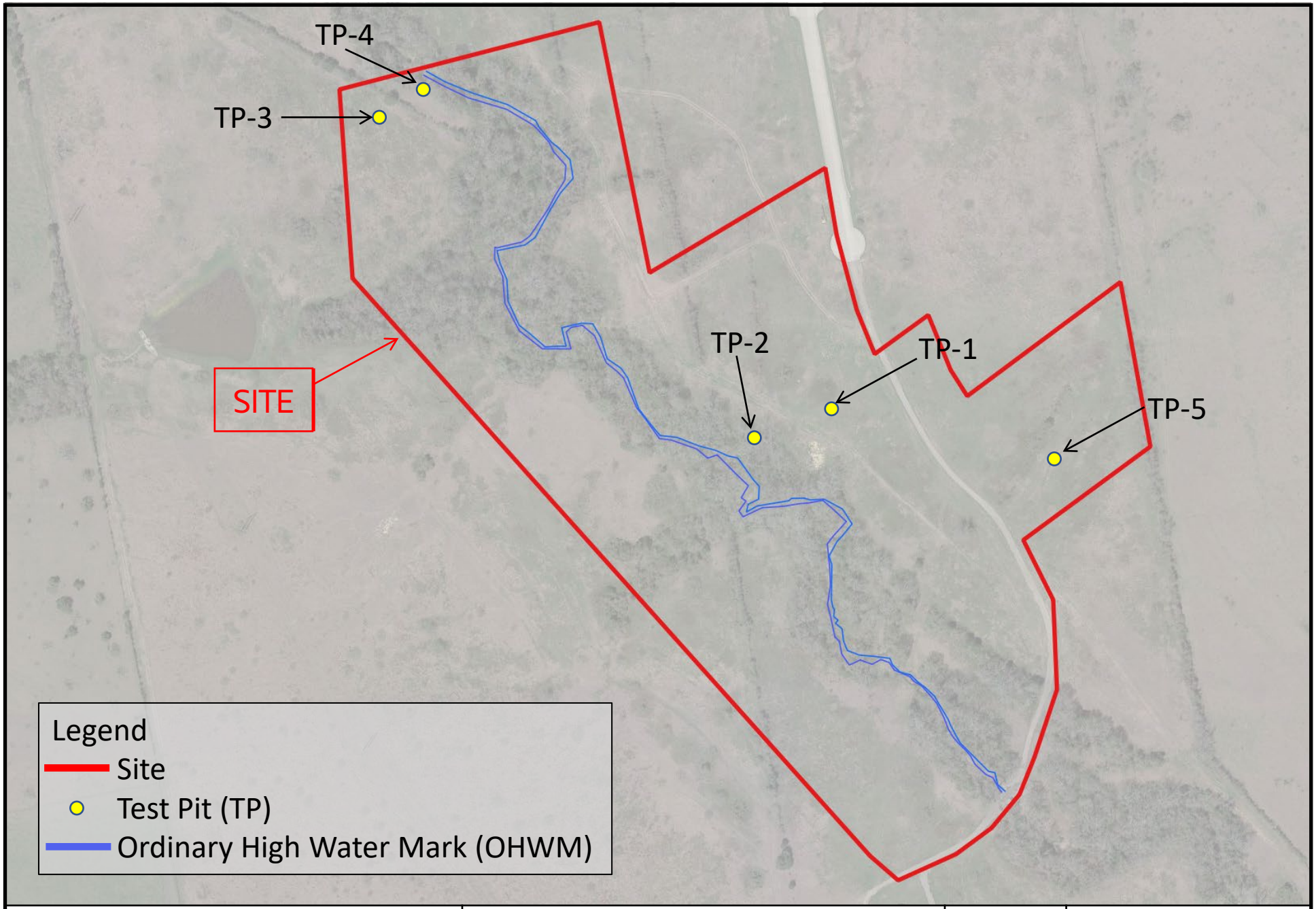
WILD ASSOCIATES
Engineering & Environmental Consulting

N

Scale: 1 in. ≈ 300 ft

Project No.: 21.01.016

Client: City of Brenham
Brenham, Texas



Project:
Brenham Family Park
South Chappell Hill Street
Brenham, Washington County, Texas

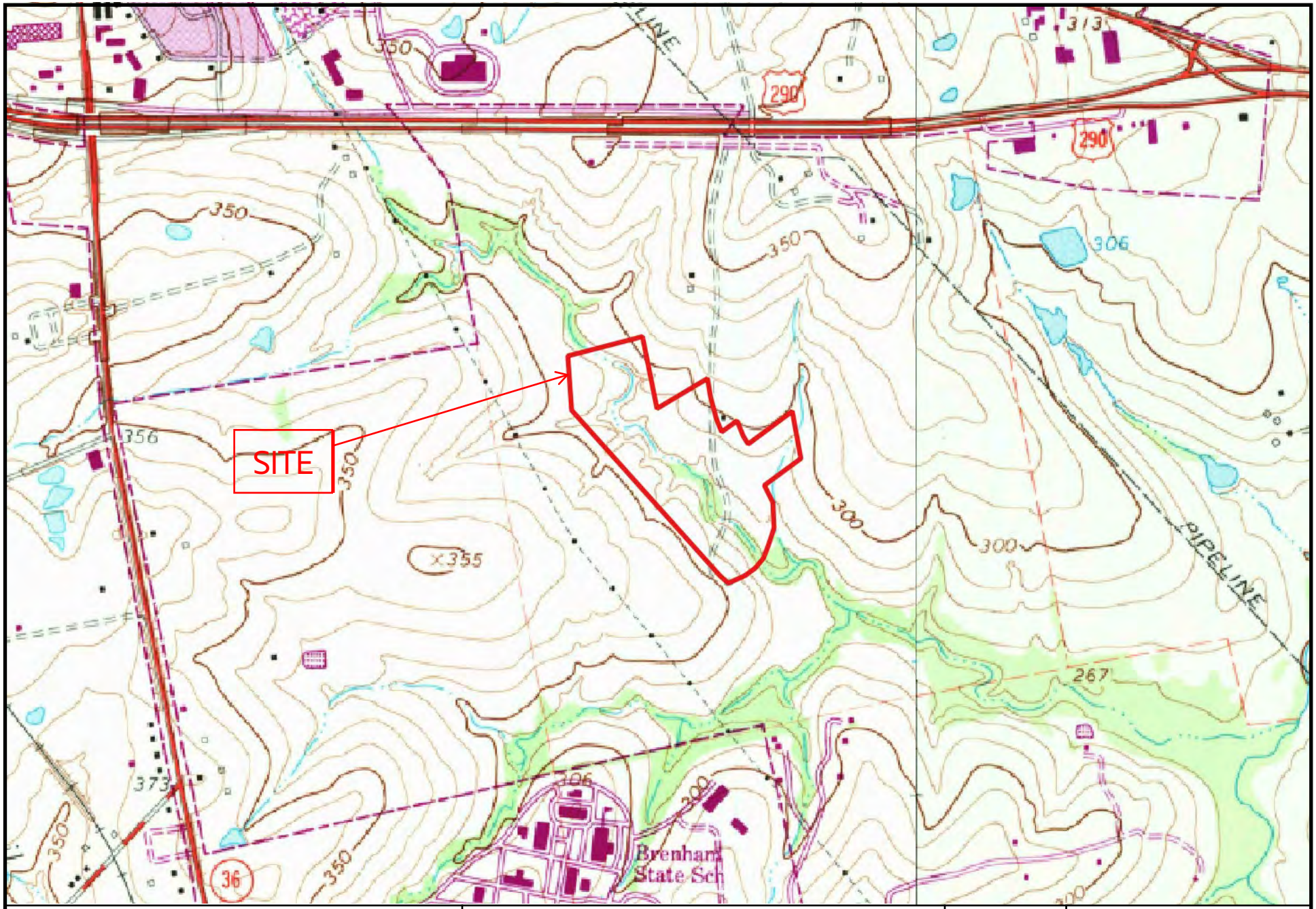
FIGURE 6
WETLAND TEST PIT AND
ORDINARY HIGH WATER MARK MAP

WILD ASSOCIATES
Engineering & Environmental Consulting

Scale: 1 in. ≈ 300 ft

Project No.: 21.01.016

Client: City of Brenham
Brenham, Texas



Project:
Brenham Family Park
South Chappell Hill Street
Brenham, Washington County, Texas

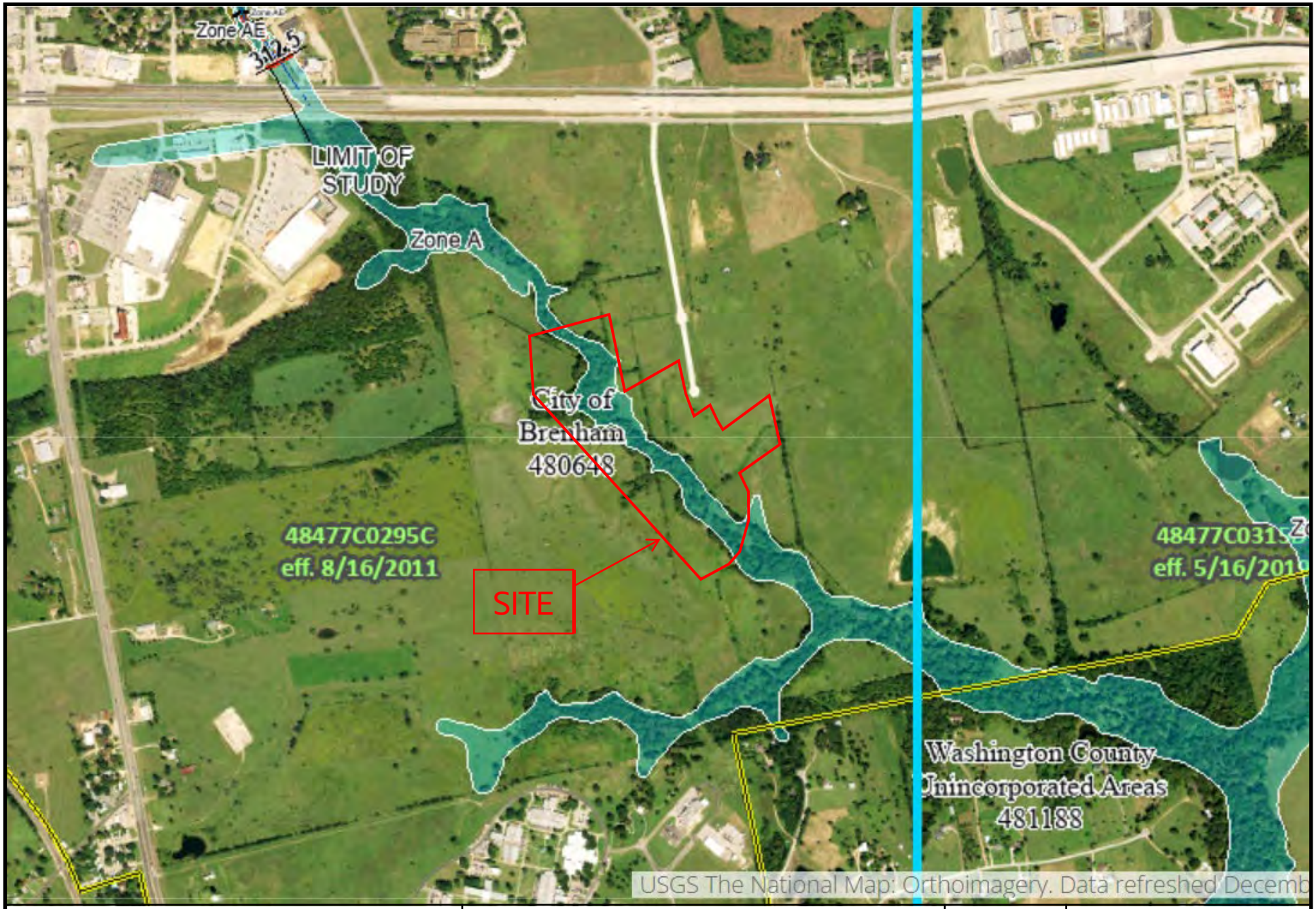
FIGURE 7
1989 TOPOGRAPHIC MAP
Brenham & Chappell Hill Quadrangles

Scale: 1 in. ≈ 1,000 ft

Project No.: 21.01.016

WILD ASSOCIATES
Engineering & Environmental Consulting

Client: City of Brenham
Brenham, Texas



Project:
Brenham Family Park
South Chappell Hill Street
Brenham, Washington County, Texas

FIGURE 8
FEMA MAP

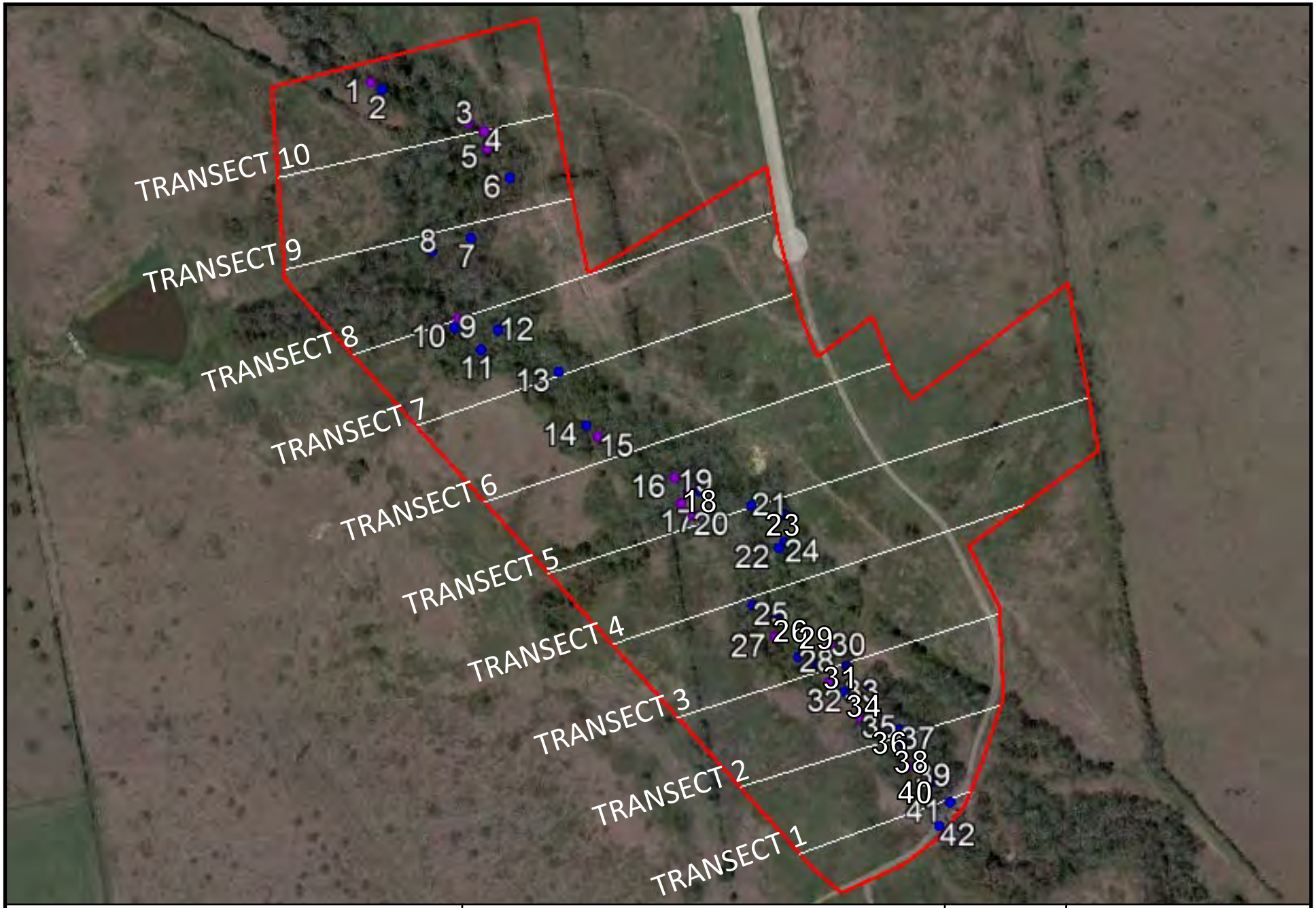
N

Scale: 1 in. ≈ 1,000 ft

Project No.: 21.01.016

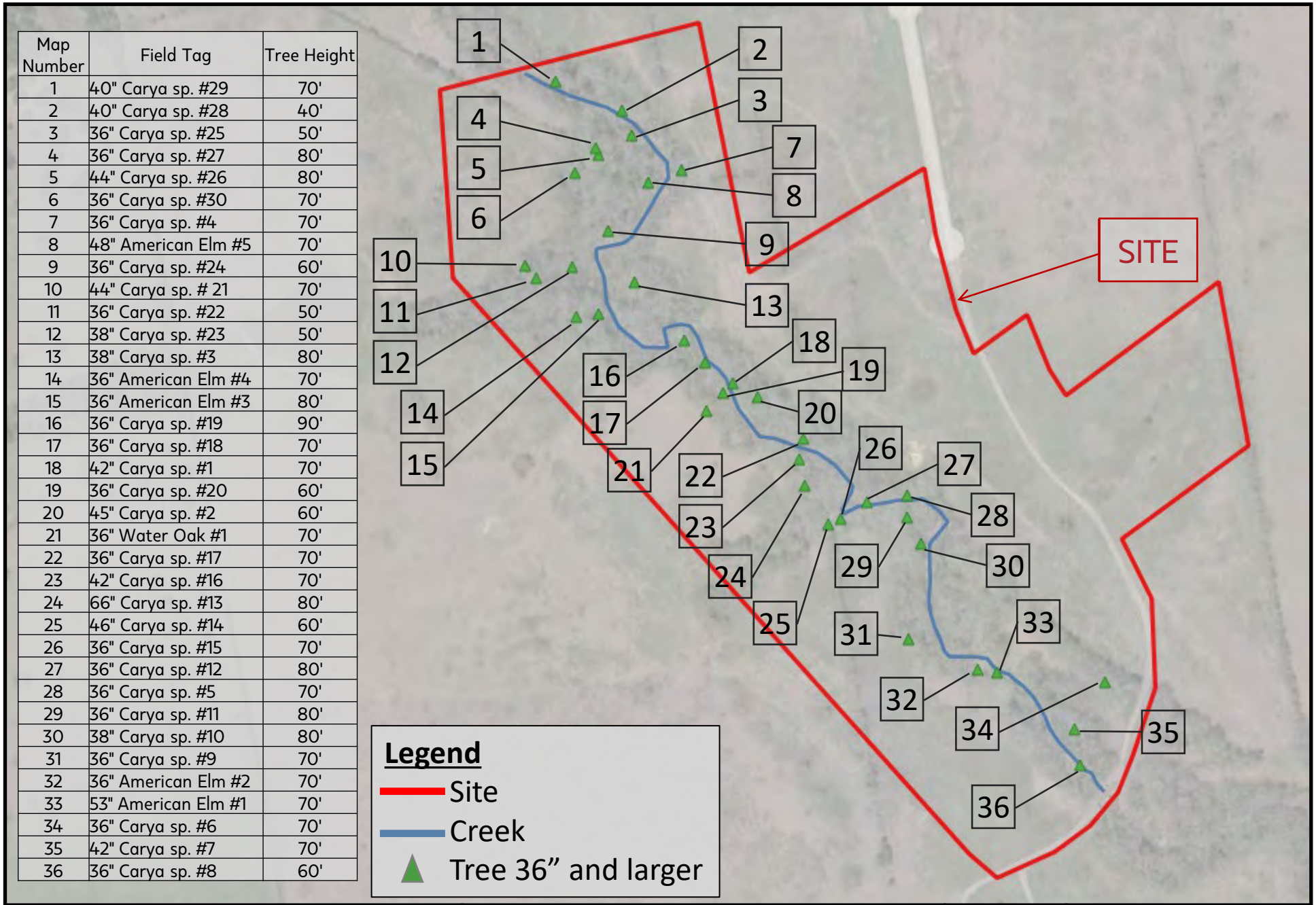
WILD ASSOCIATES
Engineering & Environmental Consulting

Client: City of Brenham
Brenham, Texas



Project: Brenham Family Park South Chappell Hill Street Brenham, Washington County, Texas	FIGURE 9 CREEK PHOTOGRAPH LOCATIONS AND TRANSECTS MAP	N	NTS Project No.: 21.01.016
	WILD ASSOCIATES Engineering & Environmental Consulting		Client: City of Brenham Brenham, Texas

Map Number	Field Tag	Tree Height
1	40" Carya sp. #29	70'
2	40" Carya sp. #28	40'
3	36" Carya sp. #25	50'
4	36" Carya sp. #27	80'
5	44" Carya sp. #26	80'
6	36" Carya sp. #30	70'
7	36" Carya sp. #4	70'
8	48" American Elm #5	70'
9	36" Carya sp. #24	60'
10	44" Carya sp. # 21	70'
11	36" Carya sp. #22	50'
12	38" Carya sp. #23	50'
13	38" Carya sp. #3	80'
14	36" American Elm #4	70'
15	36" American Elm #3	80'
16	36" Carya sp. #19	90'
17	36" Carya sp. #18	70'
18	42" Carya sp. #1	70'
19	36" Carya sp. #20	60'
20	45" Carya sp. #2	60'
21	36" Water Oak #1	70'
22	36" Carya sp. #17	70'
23	42" Carya sp. #16	70'
24	66" Carya sp. #13	80'
25	46" Carya sp. #14	60'
26	36" Carya sp. #15	70'
27	36" Carya sp. #12	80'
28	36" Carya sp. #5	70'
29	36" Carya sp. #11	80'
30	38" Carya sp. #10	80'
31	36" Carya sp. #9	70'
32	36" American Elm #2	70'
33	53" American Elm #1	70'
34	36" Carya sp. #6	70'
35	42" Carya sp. #7	70'
36	36" Carya sp. #8	60'



Project:
Brenham Family Park
South Chappell Hill Street
Brenham, Washington County, Texas

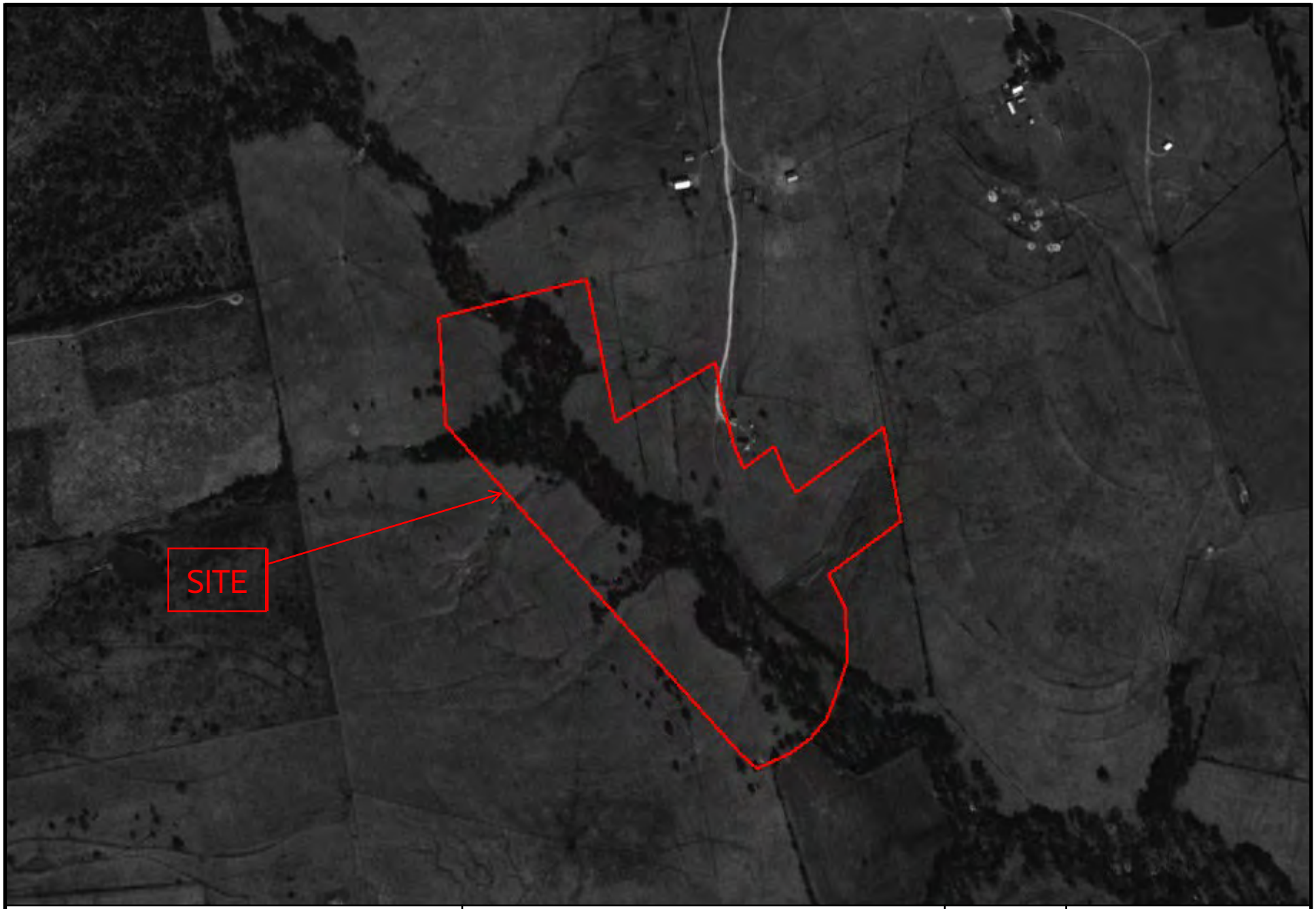
FIGURE 10
LARGE TREE LOCATIONS
36” DBH AND LARGER

WILD ASSOCIATES
Engineering & Environmental Consulting

NTS

Project No.: 21.01.016

Client: City of Brenham
Brenham, Texas



Project: Brenham Family Park South Chappell Hill Street Brenham, Washington County, Texas	FIGURE 11 1995 AERIAL PHOTOGRAPH Source: U.S. Geological Survey	N	Scale: 1 in. ≈ 500 ft Project No.: 21.01.016
	WILD ASSOCIATES Engineering & Environmental Consulting		Client: City of Brenham Brenham, Texas

Project:
Brenham Family Park
South Chappell Hill Street
Brenham, Washington County, Texas

FIGURE 12
2008 AERIAL PHOTOGRAPH
Source: Texas Orthoimagery Program

WILD ASSOCIATES
Engineering & Environmental Consulting

N

Scale: 1 in. ≈ 500 ft

Project No.: 21.01.016

Client: City of Brenham
Brenham, Texas

Project:
Brenham Family Park
South Chappell Hill Street
Brenham, Washington County, Texas

FIGURE 13
2021 AERIAL PHOTOGRAPH
Source: Google Earth

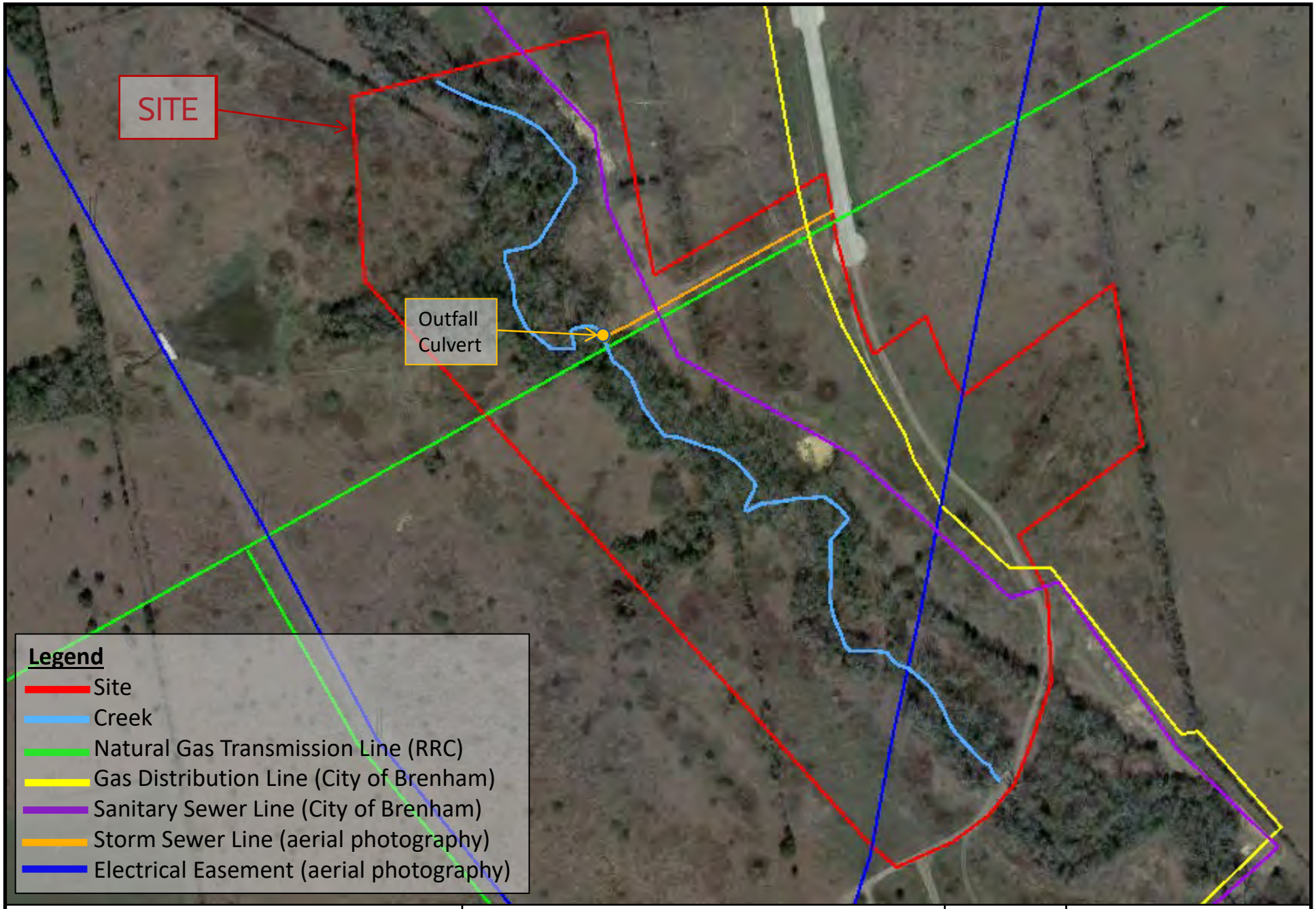
WILD ASSOCIATES
Engineering & Environmental Consulting

N

Scale: 1 in. ≈ 500 ft

Project No.: 21.01.016

Client: City of Brenham
Brenham, Texas



Project:
Brenham Family Park
South Chappell Hill Street
Brenham, Washington County, Texas

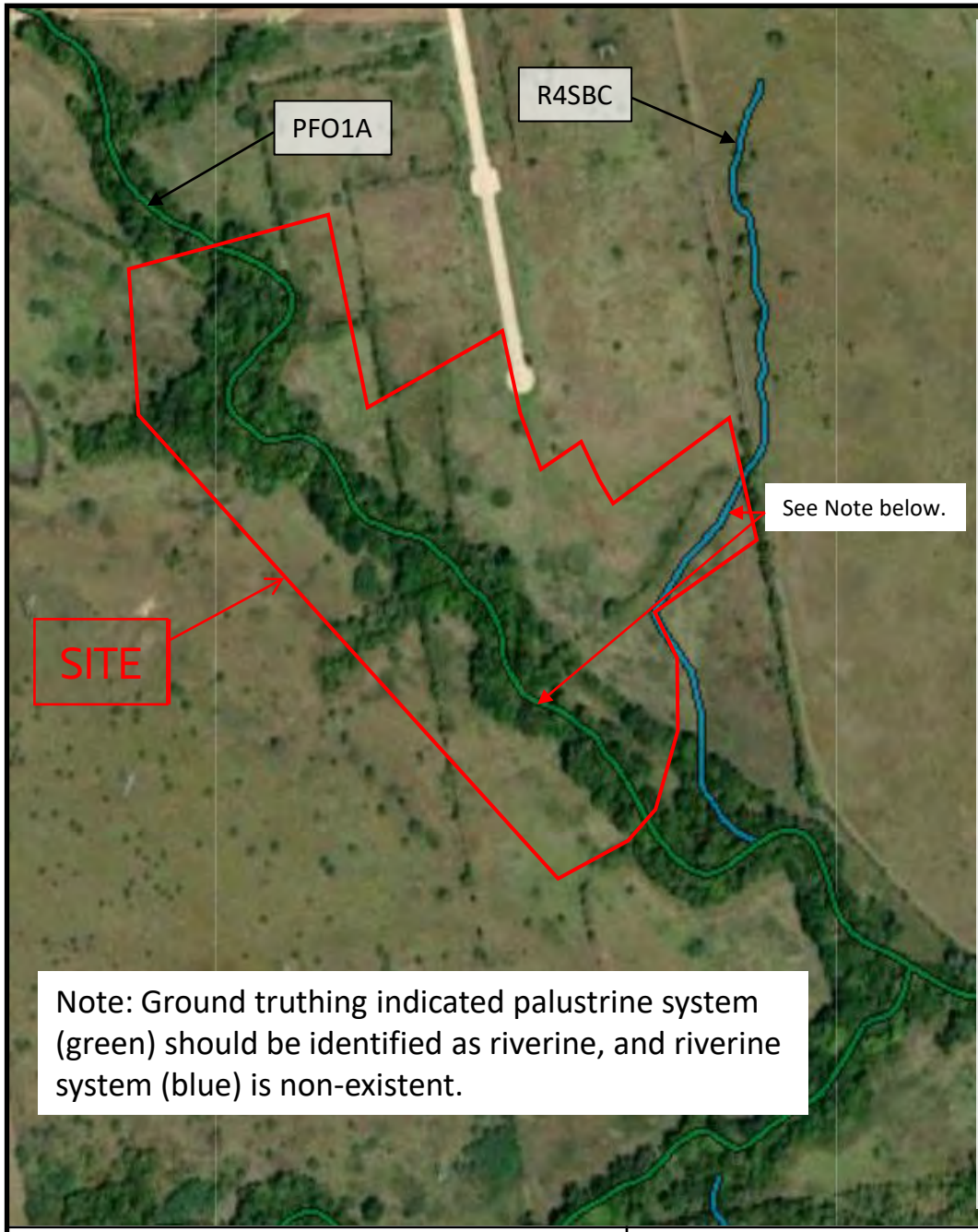
FIGURE 14
UTILITY MAP
Base Map 2021 Google Earth

WILD ASSOCIATES
Engineering & Environmental Consulting

Scale: 1 in. ≈ 300 ft

Project No.: 21.01.016

Client: City of Brenham
Brenham, Texas



Note: Ground truthing indicated palustrine system (green) should be identified as riverine, and riverine system (blue) is non-existent.

Classification code: PFO1A

System Palustrine (P) : The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2.5 m (8.2 ft) at low water; and (4) salinity due to ocean-derived salts less than 0.5 ppt.

Class Forested (FO) : Characterized by woody vegetation that is 6 m tall or taller.

Subclass Broad-Leaved Deciduous (1) : Woody angiosperms (trees or shrubs) with relatively wide, flat leaves that are shed during the cold or dry season; e.g., black ash (Fraxinus nigra).

Water Regime Temporary Flooded (A) : Surface water is present for brief periods (from a few days to a few weeks) during the growing season, but the water table usually lies well below the ground surface for the most of the season.

Classification code: R4SBC

System Riverine (R) : The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts of 0.5 ppt or greater. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water.

Subsystem Intermittent (4) : This Subsystem includes channels that contain flowing water only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent.

Class Streambed (SB) : Includes all wetlands contained within the Intermittent Subsystem of the Riverine System and all channels of the Estuarine System or of the Tidal Subsystem of the Riverine System that are completely dewatered at low tide.

Water Regime Seasonally Flooded (C) : Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.

Project:
Brenham Family Park
South Chappell Hill Street
Brenham, Washington County, Texas

FIGURE 15
NATIONAL WETLANDS INVENTORY MAP

N

NTS

Project No.: 21.01.016

WILD ASSOCIATES
Engineering & Environmental Consulting

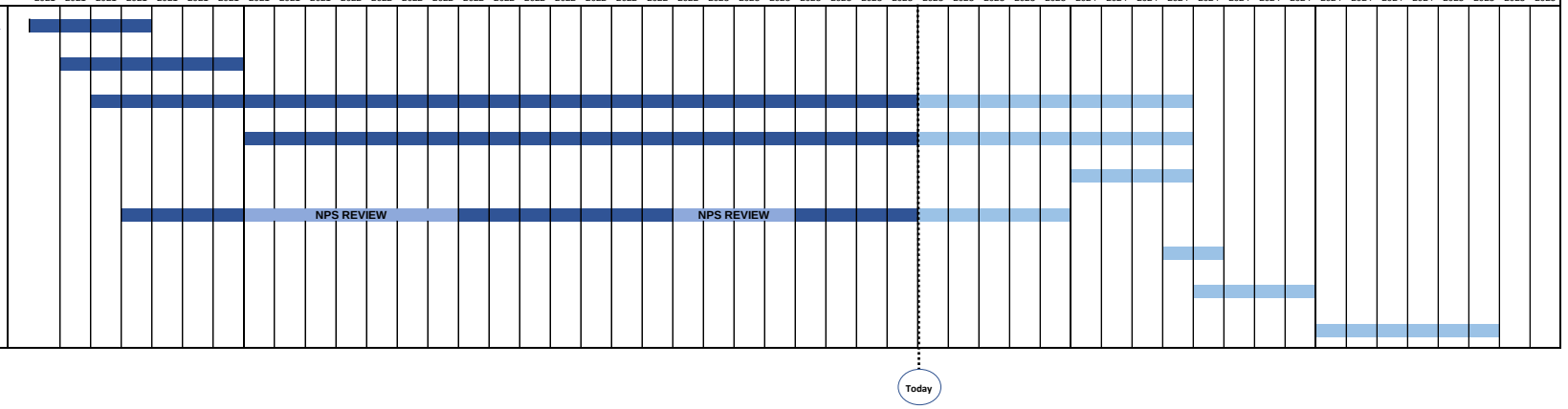
Client: City of Brenham
Brenham, Texas

APPENDIX A – PROJECT SCHEDULE

BRENHAM FAMILY PARK PHASE I - Preliminary Schedule

Date: December 7, 2022

TASKS	Actual Start	Planned Finish	Actual Finish
Conceptual Land Plan	3/22/2021		6/10/2021
Detention Analysis	3/22/2021		9/2/2022
Civil Design	4/12/2021	5/1/2023	
Landscape Design	4/12/2021	5/1/2023	
Electrical Design	2/1/2022	5/1/2023	
Environmental Assessment	6/7/2021	4/1/2023	
Grant Funding	4/1/2023	4/30/2023	
Advertising, Bidding, Contracts	4/1/2023	8/1/2023	
Construction	8/1/2023	1/31/2024	



APPENDIX B - DOCUMENTATION OF CORPS CONSULTATION

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, FORT WORTH DISTRICT
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

August 7, 2023

Regulatory Division

SUBJECT: Project Number SWF-2023-00181, Brenham Family Park

Mr. Dan Rau
City of Brenham
Director of Public Works
P.O. Box 1059
Brenham, Texas 77834
drau@cityofbrenham.org

Dear Mr. Rau:

This letter is in regard to information received April 5, 2023, and subsequent submittals dated April 28, May 4, and July 31, 2023, concerning a proposal for the development of a family park located in the City of Brenham, Washington County, Texas. This project has been assigned Project Number SWF-2023-00181. Please include this number in all future correspondence concerning this project.

Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers (USACE) regulates the discharge of dredged and fill material into waters of the United States, including wetlands. USACE responsibility under Section 10 of the Rivers and Harbors Act of 1899 is to regulate any work in, or affecting, navigable waters of the United States. Based on your description of the proposed work, a site visit conducted June 22, 2023, the figure entitled "Figure 6 Wetland Test Pit and Ordinary High Water Mark Map," and other information available to us, we have determined this project will not involve activities subject to the requirements of Section 404 or Section 10. Therefore, it will not require Department of the Army authorization pursuant to Section 404 and/or Section 10.

Thank you for your interest in our nation's water resources. If you have any questions concerning our regulatory program, please refer to our website at or contact Mrs. Julianna Kurpis at the address above, by telephone (817) 692-6139, or by email julianna.k.kurpis@usace.army.mil, and refer to your assigned project number.

Please help the regulatory program improve its service by completing the survey.

Sincerely,

Julianna Kurpis

For: Brandon W. Mobley
Chief, Regulatory Division

Copy Furnished: Paul Wild, Wild Associates LLC
paul.wild@wildassociates.net

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

July 6, 2018

Regulatory Division

SUBJECT: Project Number SWF-2018-00262, Brenham Family Park

Mr. G. Taylor Stinson
320 Graham Road
College Station, Texas 77845

Dear Mr. Stinson:

Thank you for your letter received July 3, 2018, concerning a proposal by the City of Brenham to construct a recreation lake and roadway extension located in Brenham, Washington County, Texas. Mr. Joseph L. Shelnutt has been assigned as the regulatory project manager. The project has been assigned Project Number SWF-2018-00262, please include this number in all future correspondence concerning this project.

Mr. Joseph L. Shelnutt has been assigned as the regulatory project manager for your request and will be evaluating it as expeditiously as possible.

You may be contacted for additional information about your request. For your information, please reference the Fort Worth District Regulatory Division homepage at www.swf.usace.army.mil/Missions/Regulatory and particularly guidance on submittals at www.media.swf.usace.army.mil/pubdata/environ/regulatory/introduction/submital.pdf and mitigation at www.usace.army.mil/Missions/Regulatory/Permitting/Mitigation that may help you supplement your current request or prepare future requests.

If you have any questions about the evaluation of your submittal or would like to request a copy of one of the documents referenced above, please refer to our website at http://www.swf.usace.army.mil/Missions/Regulatory or contact Mr. Joseph L. Shelnutt at the address above or telephone (817) 886-1738 and refer to your assigned project number. Please note that it is unlawful to start work without a Department of the Army permit if one is required.

Please help the regulatory program improve its service by completing the survey on the following website: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey

Stephen L. Brooks
Chief, Regulatory Division

U.S. Army Corps of Engineers (USACE), Fort Worth District
Pre-Application Meeting Request

Box 1 Basic Project Information Project Name:City of Brenham Park and Thoroughfare Improvements		Date: 02/16/2015
City Brenham	County Washington	State TX
Total Size of Property in Acres 106.8	Latitude (NAD 83, DD.ddddd) 30.13498	Longitude (NAD 83, -DD.ddddd) -96.38098
Box 2 Property Owner Name City of Brenham		Email GLischka@cityofbrenham.org
Mailing Address 200 W. Vulcan St. Brenham, TX 77833		Phone 979-337-7220
Box 3 Applicant Name City of Brenham		Email GLischka@cityofbrenham.org
Mailing Address 200 W. Vulcan St. Brenham, TX 77833		Phone 979-337-7220
Box 4 Agent Name Rick Conlin; CME Testing and Engineering, Inc.		Email rick@cmetesting.com
Mailing Address 320 Graham Rd. College Station, TX 77845		Phone 979-690-3600

Box 5 Information Required to Accompany Request - check as much information as is available:

Project Description: Provide a brief summary of the proposed project including development plans, size in acres, potential impacts to Waters of the U.S., existing land use/cover, etc.: ☒ The project site currently consists of undeveloped farm pasture owned by the City of Brenham and dedicated as city park land. The total area of park is approximately 107 acres. Plans for development of the park include recreational paths, benches, pavilions, ball fields, an 8-acre lake, and an extention of S. Chapell Hill St. southward to eventually connect with Texas S.H. 36. An embankment is proposed by the city that would act as a platform for the proposed thoroughfare and also an earthen dam for the potential lake. Approximately 1000 linear feet of the intermittent stream will be widened and graded to shape the area into a typical lake section. Including the length of stream altered by dam embankment and the need for energy dissapation and bank stabilization downstream of the embankment outlet structures, the total length of streambed impacted by the proposed project is expected to be approximately 1300 linear feet. This project is predicted to positively impact the Waters of the U.S. The stream in its current state suffers from severe bank eroision problems which contributes large amounts of sediment to the waters downstream. The construction of a lake is expected to buffer peak storm flow events, controlling bank erosion and decreasing overall downstream sediment load.

Project Purpose: ☒ The purpose of this project is to improve the city park land by extending a thoroughfare across the property which will allow the City of Brenham to provide unique recreational opportunities to its residents while also improving stream quality. The portion of streambed converted to lake front will become much more serviceable to the community as the steep, unstable banks of the stream are graded to levels more suitable for recreation. It is our hope that the conversion of a portion of this stream into a lake will also make it a more habitable ecosystem, allowing fish and wildlife to flourish in the area.

☒ Accurate Location Maps (from County map, USGS Quad Sheet, Aerial Photos, etc.)
☒ Map of the Project Site
☒ Conceptual Site Plans for the Overall Development
☒ Approximate acreage of wetland impact: 0 acres.
☒ Approximate linear feet of stream impact: 1,300 linear feet.
☒ Impact Type: (e.g., Forested Wetland, Emergent Wetland, Intermittent Stream, etc.) Intermittent Stream
☐ Pre-Application Meeting Agenda

Box 6 Optional Additional Information: Any information you can provide about the proposal, project site, and/or surrounding area will facilitate a more effective pre-application meeting. Additional information may include, but is not limited to:

- ☐ Delineation of the Waters of the U.S. on the Property or a Jurisdictional Determination from the USACE
- ☐ Threatened or Endangered Species Information, and/or Any Coordination With USFWS
- ☐ Historic Properties Cultural Resources Information, and/or Any Coordination With the SHPO
- ☐ Conceptual Mitigation Information
- ☒ Floodplain Information
- ☒ Color Photographs
- ☒ Aerial Photograph
- ☐ Other Authorizations Obtained or Required
- ☐ Other:

The applicant will be responsible for taking meeting notes and submitting them to the USACE for review.

Copies of this request may be obtained at: **http://www.swf.usace.army.mil/Missions/Regulatory.aspx**

Please mail this form to:
Regulatory Branch (CESWF-PER-R)
Fort Worth District
U.S. Army Corps of Engineers
819 Taylor Street, Room 3A37
P.O. Box 17300
Fort Worth, Texas 76102-0300

APPENDIX C – FIELD EXPLORATION

Appendix C - Field Exploration

The field exploration program began with flower identification, basic plant community identification, and general Site layout observations on July 1, 2021. Follow-up visits on August 4, 5, 26, 27, September 2 and 7, and September 7, 2022, addressed wetlands, water sampling and testing, aquatic fauna identification, OHWM determination, transect observations, large tree identification, and supplemental plant identification.

Wetlands Delineation

The purpose of the wetlands and water bodies delineation was to determine the presence and extent of wetlands and water bodies, as defined by Section 404 of the Clean Water Act. Section 404 waters include navigable waters, tributaries to navigable waters, intermittent streams, and adjacent wetlands. The Corps of Engineers has been assigned jurisdiction over these waters and, as such, has permitting authority for dredge or fill operations occurring in these waters. The Corps' definition of a wetland is as follows:

> *Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.*

The three criteria for defining a wetland are:

- a preponderance of hydrophytic vegetation;
- the presence of wetland hydrology; and
- the presence of hydric soils.

These three criteria were evaluated through identification of hydrophytic vegetation and their combined population densities relative to non-hydrophytic vegetation; identification of areas with saturated soils and other indicators of wetland hydrology; and identification of hydric soils via observation of soil hue, value, chroma, mottling, organic horizons, and other visual indicators. Wetlands delineation tasks were conducted in general accordance with the Corps' *Wetland Delineation Manual, Technical Report Y-87-1* and the Corps' *Atlantic & Gulf Coastal Plain Regional Supplement.*

Based on the USFWS National Wetlands Inventory map (Figure 15 – NWI Map), there are no wetlands shown on the Site outside the creek. WA dug five test pits, TP-1 to TP-5, to document soil conditions, hydrology, and vegetation, three of which were on the east side of the creek and two on the west side. Of TP-1 to TP-4, one test pit on each side was dug in the prairie vegetation community, and the other was dug in the forested vegetation community, while TP-5 was dug in an isolated swale with no connectivity to the creek. The swale is a remnant of a former drainage feature shown on NWI and USGS maps that no longer exists. The test pit locations are shown on Figure 6. Data sheets are presented in Appendix M, and test pit

photos are presented in Appendix N. WA also determined the OHWM during the creek investigation. Test pit locations and the OHWM were determined using a Trimble 1-meter resolution GPS meter rented from Allterra, Houston, Texas. The findings indicate no wetlands beyond the banks of the creek and negligible fringe wetlands along the creek.

The OHWM line is shown 2-dimensionally with x and y coordinates but no z coordinate, or elevation coordinate. In many cases, to correlate the x and y coordinates to the OHWM line, the GPS-measured point had to be placed high on the bank slope to approximate the location of the line due to extreme undercutting or vertical sloping. In such cases, if the x and y coordinates were placed over an accurate topographic map, say at 6-in. to 1-ft contour intervals, the OHWM would have over-stated elevations. In reality, the OHWM is typically about 6 to 12 and at most 18 inches above the base flow level of the stream, depending on base flow conditions. If structures are anticipated to be placed below the OHWM, a location-specific determination of the OHWM elevation would need to be conducted to estimate cut and fill volumes necessary for Corps permitting. The OHWM is the limit of the Corps' jurisdiction unless fringe wetlands would be impacted above the OHWM.

Water Quality

WA measured three locations, specifically upstream, midstream, and downstream (S-3, S-2, S-1), within the reach of the Site's segment of the creek using a Horiba water quality meter calibrated by and rented from Ajax Environmental rentals, Houston, Texas. The meter recorded temperature, pH, oxidation-reduction potential (redox), conductivity, turbidity, dissolved oxygen, and salinity, which are general water quality parameters to evaluate both natural and treated waters. WA used commercial off-the-shelf pool chlorine test strips to measure residual chlorine, since the creek has the potential to receive chlorine-treated potable water from upstream urban areas.

WA sampled the three locations for lab-tested water quality parameters. The samples were placed into lab-supplied plasticware, packed into an ice-filled cooler, and transported to ALS Labs, Houston, Texas, with chain-of-custody documentation the day of sampling. ALS tested for various cations and anions, iron, ammonia, solids, residual chlorine, surfactants, and coliform bacteria, which are general water quality parameters to evaluate both natural and treated waters. The findings indicated suitable conditions for aquatic life. The ALS report is presented in Appendix G.

Aquatic Fauna

WA sampled for mollusks using a D-frame, kick net sampler at random locations through the entire reach of the creek but observed none. This is not to say that none exist but only that, if they do, they are not prolific. The kick net sampling was not conducted to the level of stringency of the Corps of Engineers Level 2 Stream Condition Assessment that requires multiple sampling attempts within 350-ft transects spaced a maximum of 150 ft apart within the entire stream reach of a project.

WA sampled for fin fish under a catch and release scenario using a seine at random locations within the creek and photographed the fish for documentation. WA also observed and photographed *in situ* fish. Representative photos are presented in Appendix E. In the same manner as for mollusks, the seine sampling was not conducted to the level of stringency of the Corps of Engineers Level 2 Stream Condition Assessment. The findings indicated several species of fin fish, including some within the genus of related TPWD T&E shiner fish, but no T&E shiner fish were observed, although the creek is suitable as habit for them.

Trees

WA established ten transects at locations shown on Figure 9. WA used the transects as baselines to check for large trees, defined as those greater than 36 inches in diameter at breast height (DBH) within each transect and branched off from there to identify other large trees between transects. Trees were measured using a folding ruler wherein the ruler was folded 90 degrees at each end to create a half square placed on either side of the trees to measure diameters. The diameters were generally measured at stomach to chest height owing to variability in sloping at ground level around the tree, and the measurement locations were selected based on the greatest visual assessment of diameter due to variability of trunk shapes. If a tree measured less than 36 inches diameter but was close, say within 2 inches, it was conservatively normalized to 36 inches to account for these variabilities in measurement conditions.

WA estimated heights visually on ten-ft increments without instrumentation (clinometer) or taping using the trigonometric method (height = Tan Angle x distance) due to uneven ground, significant undergrowth blocking taping and angle measurement, and significant overgrowth for line of site angle measurement. Trees were identified by leaf type and to a lesser extent by bark, but in some cases the leaves were very high up the trees and visually obstructed by canopies of dense poison ivy leaves or other undergrowth. Dead leaves at the bases of trees and seeds (e.g., acorns, pecans) were not always available to assist in identification. Nevertheless, 30 *Carya* (pecans and/or hickories), one water oak, and five American elms were identified as meeting the size criterion. Once a tree was identified, its approximate location was documented by a smart phone Google Earth image screen shot followed by flagging with pink tape labeled with tree type and diameter. The flagging was affixed to the bark of the tree with wide, green, plastic-capped nails typically used for attaching plastic sheeting to plywood or sheetrock. However, some trees were not flagged because they were across the creek from the observation point, and their locations were documented based on estimated distances from the observation point. The tree locations are shown on Figure 10.

APPENDIX D – SOILS REPORT

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Washington County, Texas

September 28, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

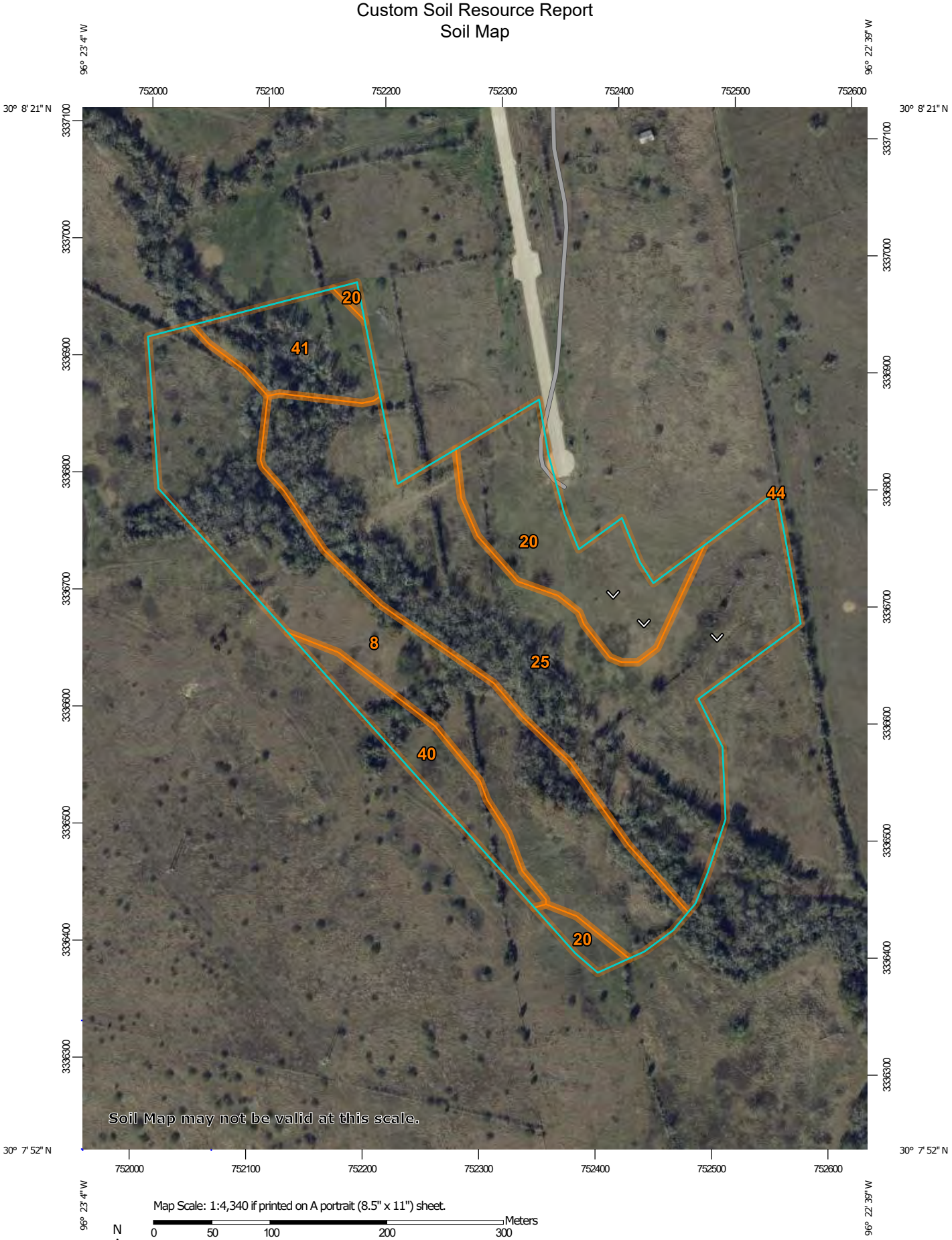
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:4,340 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washington County, Texas
Survey Area Data: Version 18, Sep 10, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 14, 2019—Dec 18, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Bosque clay loam, frequently flooded	12.2	31.9%
20	Carbengle clay loam, 5 to 8 percent slopes	5.0	13.2%
25	Crockett fine sandy loam, 1 to 5 percent slopes	16.4	42.9%
40	Klump loamy sand, 3 to 5 percent slopes	2.1	5.5%
41	Klump loamy sand, 5 to 8 percent slopes	2.5	6.5%
44	Latium clay, 5 to 8 percent slopes	0.0	0.0%
Totals for Area of Interest		**38.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Washington County, Texas

8—Bosque clay loam, frequently flooded

Map Unit Setting

National map unit symbol: djbw
Elevation: 200 to 1,400 feet
Mean annual precipitation: 28 to 40 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 275 days
Farmland classification: Not prime farmland

Map Unit Composition

Bosque and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bosque

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium of holocene age derived from mixed sources

Typical profile

H1 - 0 to 22 inches: clay loam
H2 - 22 to 62 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B
Ecological site: R086BY006TX - Loamy Bottomland
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 20 percent
Hydric soil rating: No

20—Carbengle clay loam, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2ssgx
Elevation: 130 to 550 feet
Mean annual precipitation: 41 to 45 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 260 to 265 days
Farmland classification: Not prime farmland

Map Unit Composition

Carbengle and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carbengle

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous sandstone in fleming and oakville formations of miocene age

Typical profile

A - 0 to 12 inches: clay loam
Bk - 12 to 34 inches: clay loam
Cr - 34 to 60 inches: bedrock

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 65 percent
Gypsum, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C

Ecological site: R086BY003TX - Clay Loam
Hydric soil rating: No

Minor Components

Carbengle
Percent of map unit: 8 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086BY003TX - Clay Loam
Hydric soil rating: No

Renish
Percent of map unit: 7 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086BY001TX - Chalky Ridge
Hydric soil rating: No

25—Crockett fine sandy loam, 1 to 5 percent slopes

Map Unit Setting
National map unit symbol: dj95
Elevation: 200 to 800 feet
Mean annual precipitation: 32 to 45 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 275 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Crockett and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Crockett

Setting
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from shale of tertiary age

Typical profile

H1 - 0 to 7 inches: fine sandy loam
H2 - 7 to 14 inches: clay
H3 - 14 to 26 inches: clay
H4 - 26 to 51 inches: clay
H5 - 51 to 80 inches: clay loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086BY002TX - Claypan Prairie
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 15 percent
Hydric soil rating: No

40—Klump loamy sand, 3 to 5 percent slopes

Map Unit Setting

National map unit symbol: dj9q
Elevation: 200 to 550 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 260 to 280 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Klump and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klump

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone in the fleming formation of miocene age

Typical profile

H1 - 0 to 11 inches: loamy sand
H2 - 11 to 45 inches: sandy clay loam
H3 - 45 to 60 inches: sandy loam

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R086BY003TX - Clay Loam
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 15 percent
Hydric soil rating: No

41—Klump loamy sand, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: dj9r
Elevation: 200 to 550 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 260 to 280 days

Farmland classification: Not prime farmland

Map Unit Composition

Klump and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klump

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone in the fleming formation of miocene age

Typical profile

H1 - 0 to 13 inches: loamy sand
H2 - 13 to 56 inches: sandy clay loam
H3 - 56 to 64 inches: sandy loam

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R086BY003TX - Clay Loam
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 15 percent
Hydric soil rating: No

44—Latium clay, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: dj9v
Elevation: 150 to 600 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 260 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Latium and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Latium

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous shale and marl in the fleming formation of miocene age

Typical profile

H1 - 0 to 4 inches: clay
H2 - 4 to 70 inches: clay
H3 - 70 to 80 inches: clay

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D

Ecological site: R086BY004TX - Eroded Blackland
Hydric soil rating: No

Minor Components

Unnamed
Percent of map unit: 15 percent
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX E – CREEK PHOTOGRAPHS

Photo 1: Upstream-facing view.

Photo 2: Upstream-facing view.

Photo 3: Upstream-facing view.

Photo 4: West-facing view of the tank in creek from Transect 10.

Photo 5: Upstream-facing view of the tank in creek near Transect 10.

Photo 6: Upstream-facing view.

CREEK PHOTOGRAPHS

City of Brenham

Brenham Family Park

Brenham, Washington County, Texas

WILD ASSOCIATES
Engineering & Environmental Consulting

Photo 7: Upstream-facing view.

Photo 8: Upstream-facing view.

Photo 9: West-facing from Transect 8.

Photo 10: Upstream-facing view..

Photo 11: Upstream-facing view.

Photo 12: Upstream-facing view.

CREEK PHOTOGRAPHS

City of Brenham

Brenham Family Park

Brenham, Washington County, Texas

WILD ASSOCIATES
Engineering & Environmental Consulting

Photo 13: Upstream-facing of gas pipeline.

Photo 14: Upstream-facing view.

Photo 15: Upstream-facing view of a drum.

Photo 16: Upstream-facing view of remnants of a metal gate crossing the creek.

Photo 17: Upstream-facing view.

Photo 18: Downstream-facing view.

CREEK PHOTOGRAPHS

City of Brenham

Brenham Family Park

Brenham, Washington County, Texas

WILD ASSOCIATES
Engineering & Environmental Consulting

Photo 19: Nesting bluegill.

Photo 20: Downstream-facing view.

Photo 21: West-facing view of the creek from Transect 5.

Photo 22: Downstream-facing view.

Photo 23: Upstream-facing view of a truck.

Photo 24: Upstream-facing view of truck and surrounding conditions.

CREEK PHOTOGRAPHS

City of Brenham

Brenham Family Park

Brenham, Washington County, Texas

WILD ASSOCIATES
Engineering & Environmental Consulting

Photo 25: Downstream-facing view.

Photo 26: Juvenile bullfrog.

Photo 27: Downstream-facing view.

Photo 28: Upstream-facing view.

Photo 29: Upstream-facing view.

Photo 30: Downstream-facing view of creek and collapsed road.

CREEK PHOTOGRAPHS

City of Brenham

Brenham Family Park

Brenham, Washington County, Texas

WILD ASSOCIATES
Engineering & Environmental Consulting

Photo 31: Crushed culvert under collapsed road.

Photo 32: Collapsed road.

Photo 33: Downstream-facing view.

Photo 34: Downstream-facing view.

Photo 35: Downstream-facing view.

Photo 36: Downstream-facing view.

CREEK PHOTOGRAPHS

City of Brenham

Brenham Family Park

Brenham, Washington County, Texas

WILD ASSOCIATES
Engineering & Environmental Consulting

Photo 37: Racoon track.

Photo 38: Downstream-facing view.

Photo 39: Downstream-facing view.

Photo 40: Downstream-facing view of southern dirt road and culvert.

Photo 41: Upstream-facing view from dirt road crossing culvert.

Photo 42: North-facing view of the dirt road crossing the culvert at the southern terminus of the Site.

CREEK PHOTOGRAPHS

City of Brenham

Brenham Family Park

Brenham, Washington County, Texas

WILD ASSOCIATES
Engineering & Environmental Consulting

Photo 43: Left - Green sunfish (*Lepomis cyanellus*). Top Right - Blacktail shiner (*Cyprinella venusta*).

Photo 44: Redbreast sunfish (*Lepomis auritus*) or Green sunfish (*Lepomis cyanellus*).

Photo 45: Blacktail shiner (*Cyprinella venusta*). Small fish - Mosquitofish (*Gambusia affinis*).

Photo 46: Gulf Killifish (*Fundulus grandis*).

Photo 47: Blacktail shiner (*Cyprinella venusta*).

Photo 48: Unknown, body type suggests Shiner, (Family Cyprinidae).

CREEK PHOTOGRAPHS

City of Brenham

Brenham Family Park

Brenham, Washington County, Texas

WILD ASSOCIATES
Engineering & Environmental Consulting

APPENDIX F – CITY OF BRENHAM CONTAMINATION SURVEY LETTER

City of BRENHAM

Wild Associates LLC
3318 HWY 365
Nederland, TX 77627

5/17/2022

Mr. Paul Wild,

Mr. Wild, in response to the NPS concern about the contamination issue and your inquiry about the City's historical knowledge of that issue, we have conducted an internal investigation.

This letter aims to provide some history of the tract of land the City of Brenham (City) was deeded and earmarked for future park property. In December 2013, the City was given two separate tracts of land: Tract 1 is 32.49 acres, presently being designed for Phase I(a) of the Brenham Family Park, and Tract 2 is 74.30 acres for a total of 106.79 acres. This was part of a larger 300-acre tract purchased by Ed and Evelyn Kruse in 2013. From the 1900s to 2013, the 300 acres were used for cattle grazing, hay production, and farming. All portions of the 300 acres are natural and have abundant plant growth, wildlife, and native species with no known environmental impacts.

The lower part of the tract contains an unnamed tributary. Over the last 50 years, this tributary received significant runoff from upstream development. Before that, it was a natural waterway that joined Woodward Creek. The Environmental Assessment (EA) noted a truck bed, an empty 55-gallon drum, and an old tank found in the channel along the banks. These items are inert and were most likely washed downstream many years ago. As stated in the EA, there is abundant plant growth and thriving wildlife such as bullfrogs, black-tail shiner minnows, sunfish, and raccoons indicating no environmental impact.

As an employee of the City for 19 years and a lifelong resident, there is no known history of contamination on this property. I reached out to longtime Brenham resident and neighboring property owner Perry Thomas. Thomas stated that this property had no environmental issues or abuse and echoed that it was a raw tract of land with two homesteads used for cattle grazing and farming.

We appreciate your time and understanding on this matter.

Dane Rau
Director of Public Works

From: Michael Smith
To: Paul Wild
Subject: RE: Brenham EA
Date: Monday, March 27, 2023 9:38:07 AM
Attachments: image001.png
Importance: High

Hi Paul-

I took a look at the NEPA evaluation report for the future Brenham Family Park. A couple of things:

- I would agree that the debris in the creek (truck bed, old steel drum, steel gate, etc.) are likely remnants deposited on-site by historical flooding in the area.
- It does not appear that these remnants found in the creek would constitute a "release" or "spill" as defined by 30 TAC 327 Texas Spill Prevention and Control Rules.
- Generally for any spill there would have to be some type of sheen on the water (for petroleum products) or a quantity of 100 lbs or more for industrial solid waste or other substances. The drum and other debris appear to be heavily weathered, rusted through, full of sediment and likely inert. Unless we see some type of sheening or something actionable (smell, lack of wildlife, fish kills, etc.) in the creek there likely would not be a reason to suggest contamination is present.
- There also appears to be a robust aquatic community in and around the creek.
- Although we do not have extensive contaminant data, there are a few water quality constituents for which the TCEQ has surface water screening benchmarks. Those parameters include the following:
    - Iron – highest measured concentration (0.637 mg/L) / TCEQ surface water benchmark = 1 mg/L
    - Manganese – highest measured concentration (0.707 mg/L) / TCEQ surface water benchmark = 1.310 mg/L
    - Nitrate – highest measured concentration (0.912 mg/L) / TCEQ surface water benchmark = 13.0 mg/L
    - Ammonia – highest measured concentration (<0.2 mg/L) / TCEQ surface water benchmark = 0.41 mg/L
    - Chloride – highest measured concentration (19.5 mg/L) / TCEQ surface water benchmark = 230 mg/L
- As you can see, all of the water quality constituents, for which we have TCEQ aquatic screening benchmarks, fall below those benchmarks suggesting "normal" water quality conditions for those constituents.
- In short, I don't see anything that would suggest a release of contaminants from the debris in the creek.

Please let me know if you have any questions or if you need more information on TCEQ reporting requirements and/or TCEQ Ecological Risk Assessment screening benchmarks.

The links to information on those topics can be found here:
https://www.tceq.texas.gov/remediation/eco
https://www.tceq.texas.gov/response/spills

Thank you,

Michael Smith
Ecological Risk Assessor
Texas Commission on Environmental Quality
Remediation Division, Technical Program Support Team
12100 Park 35 Circle, Bldg. D | Austin, Texas 78753
512-239-5338 (o)
michael.smith@tceq.texas.gov

From: Paul Wild <Paul.Wild@wildassociates.net>
Sent: Monday, March 27, 2023 8:10 AM
To: Michael Smith <michael.smith@tceq.texas.gov>
Subject: Brenham EA

Michael, I appreciate your help. Thanks.

Regards,

Paul Wild, CAPM / President
Paul.Wild@wildassociates.net / 281.844.3747

Wild Associates LLC
wildassociates.net
WILD ASSOCIATES
Engineering & Environmental Consulting

TBPE Firm No. 19012

APPENDIX G – ALS LABS REPORT

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

August 11, 2021

Paul Wild
Wild Associates
7419 Sheffield Bend Ct
Houston, TX 77095

Work Order: **HS21080147**

Laboratory Results for: **Brenham Family Park.**

Dear Paul Wild,

ALS Environmental received 3 sample(s) on Aug 04, 2021 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL
Ragen Giga
Project Manager

Client: Wild Associates
Project: Brenham Family Park.
Work Order: HS21080147

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS21080147-01	S-1	Water		04-Aug-2021 11:40	04-Aug-2021 16:32	☐
HS21080147-02	S-2	Water		04-Aug-2021 13:00	04-Aug-2021 16:32	☐
HS21080147-03	S-3	Water		04-Aug-2021 13:30	04-Aug-2021 16:32	☐

Client: Wild Associates **CASE NARRATIVE**
Project: Brenham Family Park.
Work Order: HS21080147

Work Order Comments

- Sample coolers received @ 16:32, Total & Fecal coliform sample containers logged in and delivered to Subcontract Lab. @ 16:45. CL-RS out of hold.

Work Order Comments

- The analyses for Fecal Coliform and Total Coliform were subcontracted to Envirodyne Laboratories, Inc. in Houston, TX. Final report attached.

Metals by Method E200.8

Batch ID: 168858

Sample ID: S-1 (HS21080147-01MSD)

- The MS and/or MSD recovery was outside of the control limits; however, the result in the parent sample is greater than 4x the spike amount. (Calcium,Manganese)

WetChemistry by Method M2540D

Batch ID: R389173

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method SM4500CL F

Batch ID: R389292

- Samples received outside method holding time for Residual Chlorine. Residual Chlorine is an immediate test. Sample results are flagged with an "H" qualifier.

WetChemistry by Method SM4500 NH3-D

Batch ID: R389180

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method M2540C

Batch ID: R389037

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method SW9056

Batch ID: R388941

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method E365.3

Batch ID: 169030

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method SM5540C

Batch ID: 168832

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

Client: Wild Associates
Project: Brenham Family Park.
Sample ID: S-1
Collection Date: 04-Aug-2021 11:40

ANALYTICAL REPORT
WorkOrder:HS21080147
Lab ID:HS21080147-01
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
TOTAL METALS BY E200.8, REV 5.4, 1994		**Method:E200.8**		Prep:E200.8 / 06-Aug-2021		Analyst: JHD
Calcium	**92,900**		**500**	**ug/L**	1	06-Aug-2021 15:55
Iron	**637**		**200**	**ug/L**	1	06-Aug-2021 15:55
Magnesium	**2,080**		**500**	**ug/L**	1	06-Aug-2021 15:55
Manganese	**707**		**5.00**	**ug/L**	1	06-Aug-2021 15:55
Potassium	**3,720**		**500**	**ug/L**	1	06-Aug-2021 15:55
Sodium	**14,100**		**200**	**ug/L**	1	06-Aug-2021 15:55
PHOSPHORUS BY E365.3-1978		**Method:E365.3**		Prep:E365.3 / 11-Aug-2021		Analyst: JHD
Phosphate, Total	ND		0.153	mg/L	1	11-Aug-2021 16:31
TOTAL DISSOLVED SOLIDS BY SM2540C -2011		**Method:M2540C**				Analyst: KAH
Total Dissolved Solids (Residue, Filterable)	**364**		**10.0**	**mg/L**	1	05-Aug-2021 15:00
TOTAL SUSPENDED SOLIDS BY SM 2540D-2011		**Method:M2540D**				Analyst: KAH
Suspended Solids (Residue, Non -Filterable)	**110**		**2.00**	**mg/L**	1	09-Aug-2021 11:15
AMMONIA AS N BY SM4500 NH3-D-11 (ISE)		**Method:SM4500 NH3-D**				Analyst: YP
Nitrogen, Ammonia (as N)	ND		0.20	mg/L	1	10-Aug-2021 14:55
RESIDUAL CHLORINE BY SM4500CL F-2011		**Method:SM4500CL F**				Analyst: YP
Chlorine	**0.30**	H	**0.10**	**mg/L**	1	11-Aug-2021 16:08
ANIONS BY SW9056A		**Method:SW9056**				Analyst: YP
Chloride	**15.4**		**0.500**	**mg/L**	1	04-Aug-2021 18:25
Nitrogen, Nitrate (As N)	**0.686**		**0.100**	**mg/L**	1	04-Aug-2021 18:25
Nitrogen, Nitrite (As N)	ND		0.100	mg/L	1	04-Aug-2021 18:25
Sulfate	**10.1**		**0.500**	**mg/L**	1	04-Aug-2021 18:25
SUBCONTRACT ANALYSIS - FECAL COLIFORM		**Method:NA**				Analyst: EDL
Subcontract Analysis	See Attached				1	11-Aug-2021 10:49
SUBCONTRACT ANALYSIS - TOTAL COLIFORM/E.COLI		**Method:NA**				Analyst: EDL
Subcontract Analysis	See Attached			NA	1	11-Aug-2021 10:49

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Wild Associates
Project: Brenham Family Park.
Sample ID: S-2
Collection Date: 04-Aug-2021 13:00

ANALYTICAL REPORT
WorkOrder:HS21080147
Lab ID:HS21080147-02
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
TOTAL METALS BY E200.8, REV 5.4, 1994		**Method:E200.8**		Prep:E200.8 / 06-Aug-2021		Analyst: JHD
Calcium	**88,500**		**500**	**ug/L**	1	06-Aug-2021 16:01
Iron	ND		200	ug/L	1	06-Aug-2021 16:01
Magnesium	**2,240**		**500**	**ug/L**	1	06-Aug-2021 16:01
Manganese	**89.2**		**5.00**	**ug/L**	1	06-Aug-2021 16:01
Potassium	**3,950**		**500**	**ug/L**	1	06-Aug-2021 16:01
Sodium	**14,400**		**200**	**ug/L**	1	06-Aug-2021 16:01
PHOSPHORUS BY E365.3-1978		**Method:E365.3**		Prep:E365.3 / 11-Aug-2021		Analyst: JHD
Phosphate, Total	ND		0.153	mg/L	1	11-Aug-2021 16:31
TOTAL DISSOLVED SOLIDS BY SM2540C -2011		**Method:M2540C**				Analyst: KAH
Total Dissolved Solids (Residue, Filterable)	**332**		**10.0**	**mg/L**	1	05-Aug-2021 15:00
TOTAL SUSPENDED SOLIDS BY SM 2540D-2011		**Method:M2540D**				Analyst: KAH
Suspended Solids (Residue, Non -Filterable)	**14.0**		**2.00**	**mg/L**	1	09-Aug-2021 11:15
AMMONIA AS N BY SM4500 NH3-D-11 (ISE)		**Method:SM4500 NH3-D**				Analyst: YP
Nitrogen, Ammonia (as N)	ND		0.20	mg/L	1	10-Aug-2021 14:55
RESIDUAL CHLORINE BY SM4500CL F-2011		**Method:SM4500CL F**				Analyst: YP
Chlorine	**0.20**	H	**0.10**	**mg/L**	1	11-Aug-2021 16:08
ANIONS BY SW9056A		**Method:SW9056**				Analyst: YP
Chloride	**16.9**		**0.500**	**mg/L**	1	04-Aug-2021 18:47
Nitrogen, Nitrate (As N)	**0.842**		**0.100**	**mg/L**	1	04-Aug-2021 18:47
Nitrogen, Nitrite (As N)	ND		0.100	mg/L	1	04-Aug-2021 18:47
Sulfate	**12.6**		**0.500**	**mg/L**	1	04-Aug-2021 18:47
SUBCONTRACT ANALYSIS - FECAL COLIFORM		**Method:NA**				Analyst: EDL
Subcontract Analysis	See Attached				1	11-Aug-2021 10:49
SUBCONTRACT ANALYSIS - TOTAL COLIFORM/E.COLI		**Method:NA**				Analyst: EDL
Subcontract Analysis	See Attached			NA	1	11-Aug-2021 10:49

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Wild Associates
Project: Brenham Family Park.
Sample ID: S-3
Collection Date: 04-Aug-2021 13:30

ANALYTICAL REPORT
WorkOrder:HS21080147
Lab ID:HS21080147-03
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
TOTAL METALS BY E200.8, REV 5.4, 1994		**Method:E200.8**		Prep:E200.8 / 06-Aug-2021		Analyst: JHD
Calcium	**97,900**		**500**	**ug/L**	1	06-Aug-2021 16:03
Iron	**417**		**200**	**ug/L**	1	06-Aug-2021 16:03
Magnesium	**2,410**		**500**	**ug/L**	1	06-Aug-2021 16:03
Manganese	**279**		**5.00**	**ug/L**	1	06-Aug-2021 16:03
Potassium	**3,750**		**500**	**ug/L**	1	06-Aug-2021 16:03
Sodium	**14,100**		**200**	**ug/L**	1	06-Aug-2021 16:03
PHOSPHORUS BY E365.3-1978		**Method:E365.3**		Prep:E365.3 / 11-Aug-2021		Analyst: JHD
Phosphate, Total	ND		0.153	mg/L	1	11-Aug-2021 16:31
TOTAL DISSOLVED SOLIDS BY SM2540C -2011		**Method:M2540C**				Analyst: KAH
Total Dissolved Solids (Residue, Filterable)	**350**		**10.0**	**mg/L**	1	05-Aug-2021 15:00
TOTAL SUSPENDED SOLIDS BY SM 2540D-2011		**Method:M2540D**				Analyst: KAH
Suspended Solids (Residue, Non -Filterable)	**89.4**		**2.00**	**mg/L**	1	09-Aug-2021 11:15
AMMONIA AS N BY SM4500 NH3-D-11 (ISE)		**Method:SM4500 NH3-D**				Analyst: YP
Nitrogen, Ammonia (as N)	ND		0.20	mg/L	1	10-Aug-2021 14:55
RESIDUAL CHLORINE BY SM4500CL F-2011		**Method:SM4500CL F**				Analyst: YP
Chlorine	**0.30**	H	**0.10**	**mg/L**	1	11-Aug-2021 16:08
SURFACTANTS (MBAS) BY SM5540C		**Method:SM5540C**		Prep:SM5540C / 05-Aug-2021		Analyst: TH
MBAS	ND		0.0500	mg/L 340 MW LAS	1	05-Aug-2021 20:59
ANIONS BY SW9056A		**Method:SW9056**				Analyst: YP
Chloride	**19.5**		**0.500**	**mg/L**	1	04-Aug-2021 18:55
Nitrogen, Nitrate (As N)	**0.912**		**0.100**	**mg/L**	1	04-Aug-2021 18:55
Nitrogen, Nitrite (As N)	**0.108**		**0.100**	**mg/L**	1	04-Aug-2021 18:55
Sulfate	**14.0**		**0.500**	**mg/L**	1	04-Aug-2021 18:55
SUBCONTRACT ANALYSIS - FECAL COLIFORM		**Method:NA**				Analyst: EDL
Subcontract Analysis	See Attached				1	11-Aug-2021 10:49
SUBCONTRACT ANALYSIS - TOTAL COLIFORM/E.COLI		**Method:NA**				Analyst: EDL
Subcontract Analysis	See Attached			NA	1	11-Aug-2021 10:49

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Weight / Prep Log

Client: Wild Associates
Project: Brenham Family Park.
WorkOrder: HS21080147

Batch ID: 168832 **Start Date:** 05 Aug 2021 17:00 **End Date:** 05 Aug 2021 20:00
Method: MBAS - PREPARATION **Prep Code:** MBAS_PR

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS21080147-03		400 (mL)	400 (mL)	1	1-liter amber glass, Neat

Batch ID: 168858 **Start Date:** 06 Aug 2021 09:00 **End Date:** 06 Aug 2021 13:00
Method: TOTAL METALS PREP BY E200.8, REV 5.4, 1994 **Prep Code:** 200.8PR

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS21080147-01		10 (mL)	10 (mL)	1	120 plastic HNO3
HS21080147-02		10 (mL)	10 (mL)	1	120 plastic HNO3
HS21080147-03		10 (mL)	10 (mL)	1	120 plastic HNO3

Batch ID: 169030 **Start Date:** 11 Aug 2021 11:30 **End Date:** 11 Aug 2021 14:30
Method: PHOSPHOROUS **Prep Code:** P_TW_PR

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS21080147-01		50 (mg/L)	50 (mL)	1	500 mL plastic, H2SO4 to pH <2
HS21080147-02		50 (mg/L)	50 (mL)	1	500 mL plastic, H2SO4 to pH <2
HS21080147-03		50 (mg/L)	50 (mL)	1	500 mL plastic, H2SO4 to pH <2

Client: Wild Associates
Project: Brenham Family Park.
WorkOrder: HS21080147

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 168832 (0)	**Test Name :** SURFACTANTS (MBAS) BY SM5540C				**Matrix:** Water	
HS21080147-03	S-3	04 Aug 2021 13:30		05 Aug 2021 17:00	05 Aug 2021 20:59	1
Batch ID: 168858 (0)	**Test Name :** TOTAL METALS BY E200.8, REV 5.4, 1994				**Matrix:** Water	
HS21080147-01	S-1	04 Aug 2021 11:40		06 Aug 2021 13:00	06 Aug 2021 15:55	1
HS21080147-02	S-2	04 Aug 2021 13:00		06 Aug 2021 13:00	06 Aug 2021 16:01	1
HS21080147-03	S-3	04 Aug 2021 13:30		06 Aug 2021 13:00	06 Aug 2021 16:03	1
Batch ID: 169030 (0)	**Test Name :** PHOSPHORUS BY E365.3-1978				**Matrix:** Water	
HS21080147-01	S-1	04 Aug 2021 11:40		11 Aug 2021 11:30	11 Aug 2021 16:31	1
HS21080147-02	S-2	04 Aug 2021 13:00		11 Aug 2021 11:30	11 Aug 2021 16:31	1
HS21080147-03	S-3	04 Aug 2021 13:30		11 Aug 2021 11:30	11 Aug 2021 16:31	1
Batch ID: R388941 (0)	**Test Name :** ANIONS BY SW9056A				**Matrix:** Water	
HS21080147-01	S-1	04 Aug 2021 11:40			04 Aug 2021 18:25	1
HS21080147-02	S-2	04 Aug 2021 13:00			04 Aug 2021 18:47	1
HS21080147-03	S-3	04 Aug 2021 13:30			04 Aug 2021 18:55	1
Batch ID: R389037 (0)	**Test Name :** TOTAL DISSOLVED SOLIDS BY SM2540C-2011				**Matrix:** Water	
HS21080147-01	S-1	04 Aug 2021 11:40			05 Aug 2021 15:00	1
HS21080147-02	S-2	04 Aug 2021 13:00			05 Aug 2021 15:00	1
HS21080147-03	S-3	04 Aug 2021 13:30			05 Aug 2021 15:00	1
Batch ID: R389173 (0)	**Test Name :** TOTAL SUSPENDED SOLIDS BY SM 2540D-2011				**Matrix:** Water	
HS21080147-01	S-1	04 Aug 2021 11:40			09 Aug 2021 11:15	1
HS21080147-02	S-2	04 Aug 2021 13:00			09 Aug 2021 11:15	1
HS21080147-03	S-3	04 Aug 2021 13:30			09 Aug 2021 11:15	1
Batch ID: R389180 (0)	**Test Name :** AMMONIA AS N BY SM4500 NH3-D-11 (ISE)				**Matrix:** Water	
HS21080147-01	S-1	04 Aug 2021 11:40			10 Aug 2021 14:55	1
HS21080147-02	S-2	04 Aug 2021 13:00			10 Aug 2021 14:55	1
HS21080147-03	S-3	04 Aug 2021 13:30			10 Aug 2021 14:55	1
Batch ID: R389245 (0)	**Test Name :** SUBCONTRACT ANALYSIS - TOTAL COLIFORM/E.COLI				**Matrix:** Water	
HS21080147-01	S-1	04 Aug 2021 11:40			11 Aug 2021 10:49	1
HS21080147-01	S-1	04 Aug 2021 11:40			11 Aug 2021 10:49	1
HS21080147-02	S-2	04 Aug 2021 13:00			11 Aug 2021 10:49	1
HS21080147-02	S-2	04 Aug 2021 13:00			11 Aug 2021 10:49	1
HS21080147-03	S-3	04 Aug 2021 13:30			11 Aug 2021 10:49	1
HS21080147-03	S-3	04 Aug 2021 13:30			11 Aug 2021 10:49	1
Batch ID: R389292 (0)	**Test Name :** RESIDUAL CHLORINE BY SM4500CL F-2011				**Matrix:** Water	
HS21080147-01	S-1	04 Aug 2021 11:40			11 Aug 2021 16:08	1
HS21080147-02	S-2	04 Aug 2021 13:00			11 Aug 2021 16:08	1
HS21080147-03	S-3	04 Aug 2021 13:30			11 Aug 2021 16:08	1

Client: Wild Associates
Project: Brenham Family Park.
WorkOrder: HS21080147

QC BATCH REPORT

Batch ID: 168858 (0) **Instrument: ICPMS05** **Method: TOTAL METALS BY E200.8, REV 5.4, 1994**

MBLK Sample ID: **MBLK-168858** Units: **ug/L** Analysis Date: **06-Aug-2021 15:40**
Client ID: Run ID: **ICPMS05_389006** SeqNo: **6218482** PrepDate: **06-Aug-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	ND	500								
Iron	ND	200								
Magnesium	ND	500								
Manganese	ND	5.00								
Potassium	ND	500								
Sodium	ND	200								

LCS Sample ID: **LCS-168858** Units: **ug/L** Analysis Date: **06-Aug-2021 15:42**
Client ID: Run ID: **ICPMS05_389006** SeqNo: **6218483** PrepDate: **06-Aug-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	4737	500	5000	0	94.7	85 - 115				
Iron	4884	200	5000	0	97.7	85 - 115				
Magnesium	4935	500	5000	0	98.7	85 - 115				
Manganese	47.97	5.00	50	0	95.9	85 - 115				
Potassium	4978	500	5000	0	99.6	85 - 115				
Sodium	4891	200	5000	0	97.8	85 - 115				

MS Sample ID: **HS21080147-01MS** Units: **ug/L** Analysis Date: **06-Aug-2021 15:57**
Client ID: **S-1** Run ID: **ICPMS05_389006** SeqNo: **6219084** PrepDate: **06-Aug-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	92400	500	5000	92890	-9.72	70 - 130				SO
Iron	5239	200	5000	636.7	92.1	70 - 130				
Magnesium	6838	500	5000	2082	95.1	70 - 130				
Manganese	710.1	5.00	50	707.5	5.31	70 - 130				SO
Potassium	8248	500	5000	3719	90.6	70 - 130				
Sodium	18530	200	5000	14150	87.6	70 - 130				

Client: Wild Associates
Project: Brenham Family Park.
WorkOrder: HS21080147

QC BATCH REPORT

Batch ID: 168858 (0) **Instrument: ICPMS05** **Method: TOTAL METALS BY E200.8, REV 5.4, 1994**

MSD Sample ID: **HS21080147-01MSD** Units: **ug/L** Analysis Date: **06-Aug-2021 15:59**
Client ID: **S-1** Run ID: **ICPMS05_389006** SeqNo: **6219085** PrepDate: **06-Aug-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	92740	500	5000	92890	-3.02	70 - 130	92400	0.362	20	SO
Iron	5174	200	5000	636.7	90.8	70 - 130	5239	1.24	20	
Magnesium	6667	500	5000	2082	91.7	70 - 130	6838	2.53	20	
Manganese	695.4	5.00	50	707.5	-24.1	70 - 130	710.1	2.09	20	SO
Potassium	8113	500	5000	3719	87.9	70 - 130	8248	1.66	20	
Sodium	17870	200	5000	14150	74.5	70 - 130	18530	3.59	20	

The following samples were analyzed in this batch: HS21080147-01 HS21080147-02 HS21080147-03

Client: Wild Associates
Project: Brenham Family Park.
WorkOrder: HS21080147

QC BATCH REPORT

Batch ID: 168832 (0) **Instrument: UV-2450** **Method: SURFACTANTS (MBAS) BY SM5540C**

MBLK Sample ID: **MBLK-168832** Units: **mg/L 340 MW LAS** Analysis Date: **05-Aug-2021 20:59**
Client ID: Run ID: **UV-2450_388966** SeqNo: **6216764** PrepDate: **05-Aug-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
MBAS	ND	0.0500								

LCS Sample ID: **LCS-168832** Units: **mg/L 340 MW LAS** Analysis Date: **05-Aug-2021 20:59**
Client ID: Run ID: **UV-2450_388966** SeqNo: **6216762** PrepDate: **05-Aug-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
MBAS	0.516	0.0500	0.5	0	103	85 - 115				

LCSD Sample ID: **LCSD-168832** Units: **mg/L 340 MW LAS** Analysis Date: **05-Aug-2021 20:59**
Client ID: Run ID: **UV-2450_388966** SeqNo: **6216763** PrepDate: **05-Aug-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
MBAS	0.515	0.0500	0.5	0	103	85 - 115	0.516	0.194	20	

MS Sample ID: **HS21080147-03MS** Units: **mg/L 340 MW LAS** Analysis Date: **05-Aug-2021 20:59**
Client ID: **S-3** Run ID: **UV-2450_388966** SeqNo: **6216761** PrepDate: **05-Aug-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
MBAS	0.503	0.0500	0.5	-0.001	101	80 - 120				

The following samples were analyzed in this batch: HS21080147-03

Client: Wild Associates
Project: Brenham Family Park.
WorkOrder: HS21080147

QC BATCH REPORT

Batch ID: 169030 (0) **Instrument: UV-2450** **Method: PHOSPHORUS BY E365.3-1978**

MBLK Sample ID: **MBLK-169030** Units: **mg/L** Analysis Date: **11-Aug-2021 16:31**
Client ID: Run ID: **UV-2450_389294** SeqNo: **6224547** PrepDate: **11-Aug-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphate, Total	ND	0.153								

LCS Sample ID: **LCS-169030** Units: **mg/L** Analysis Date: **11-Aug-2021 16:31**
Client ID: Run ID: **UV-2450_389294** SeqNo: **6224546** PrepDate: **11-Aug-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphate, Total	0.7295	0.153	0.766	0	95.2	80 - 120				

MS Sample ID: **HS21080147-01MS** Units: **mg/L** Analysis Date: **11-Aug-2021 16:31**
Client ID: **S-1** Run ID: **UV-2450_389294** SeqNo: **6224544** PrepDate: **11-Aug-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphate, Total	0.874	0.153	0.766	0.1349	96.5	80 - 120				

MSD Sample ID: **HS21080147-01MSD** Units: **mg/L** Analysis Date: **11-Aug-2021 16:31**
Client ID: **S-1** Run ID: **UV-2450_389294** SeqNo: **6224545** PrepDate: **11-Aug-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphate, Total	0.877	0.153	0.766	0.1349	96.9	80 - 120	0.874	0.343	20	

The following samples were analyzed in this batch: HS21080147-01 HS21080147-02 HS21080147-03

Client: Wild Associates
Project: Brenham Family Park.
WorkOrder: HS21080147

QC BATCH REPORT

Batch ID: R388941 (0) **Instrument: ICS-Integrion** **Method: ANIONS BY SW9056A**

MBLK Sample ID: **MBLK** Units: **mg/L** Analysis Date: **04-Aug-2021 18:10**
Client ID: Run ID: **ICS-Integrion_388941** SeqNo: **6216312** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	0.500								
Nitrogen, Nitrate (As N)	ND	0.100								
Nitrogen, Nitrite (As N)	ND	0.100								
Sulfate	ND	0.500								

LCS Sample ID: **LCS** Units: **mg/L** Analysis Date: **04-Aug-2021 18:18**
Client ID: Run ID: **ICS-Integrion_388941** SeqNo: **6216313** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	19.85	0.500	20	0	99.3	80 - 120				
Nitrogen, Nitrate (As N)	4.025	0.100	4	0	101	80 - 120				
Nitrogen, Nitrite (As N)	4.065	0.100	4	0	102	80 - 120				
Sulfate	20.11	0.500	20	0	101	80 - 120				

MS Sample ID: **HS21080147-01MS** Units: **mg/L** Analysis Date: **04-Aug-2021 18:33**
Client ID: **S-1** Run ID: **ICS-Integrion_388941** SeqNo: **6216315** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	24.85	0.500	10	15.43	94.2	80 - 120				
Nitrogen, Nitrate (As N)	2.661	0.100	2	0.6859	98.8	80 - 120				
Nitrogen, Nitrite (As N)	1.972	0.100	2	0.0937	93.9	80 - 120				
Sulfate	19.78	0.500	10	10.09	96.9	80 - 120				

MSD Sample ID: **HS21080147-01MSD** Units: **mg/L** Analysis Date: **04-Aug-2021 18:40**
Client ID: **S-1** Run ID: **ICS-Integrion_388941** SeqNo: **6216316** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	24.75	0.500	10	15.43	93.2	80 - 120	24.85	0.407	20	
Nitrogen, Nitrate (As N)	2.666	0.100	2	0.6859	99.0	80 - 120	2.661	0.169	20	
Nitrogen, Nitrite (As N)	1.984	0.100	2	0.0937	94.5	80 - 120	1.972	0.637	20	
Sulfate	19.84	0.500	10	10.09	97.5	80 - 120	19.78	0.32	20	

The following samples were analyzed in this batch: HS21080147-01 HS21080147-02 HS21080147-03

Client: Wild Associates
Project: Brenham Family Park.
WorkOrder: HS21080147

QC BATCH REPORT

Batch ID: R389037 (0) **Instrument:** Balance1 **Method:** TOTAL DISSOLVED SOLIDS BY SM2540C-2011

MBLK Sample ID: **WBLK-080521** Units: **mg/L** Analysis Date: **05-Aug-2021 15:00**
Client ID: Run ID: **Balance1_389037** SeqNo: **6218513** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Filterable)	ND	10.0								

LCS Sample ID: **WLCS-080521** Units: **mg/L** Analysis Date: **05-Aug-2021 15:00**
Client ID: Run ID: **Balance1_389037** SeqNo: **6218514** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Filterable)	1052	10.0	1000	0	105	85 - 115				

DUP Sample ID: **HS21080147-03DUP** Units: **mg/L** Analysis Date: **05-Aug-2021 15:00**
Client ID: **S-3** Run ID: **Balance1_389037** SeqNo: **6218510** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Filterable)	358	10.0					350	2.26	5	

DUP Sample ID: **HS21071616-02DUP** Units: **mg/L** Analysis Date: **05-Aug-2021 15:00**
Client ID: Run ID: **Balance1_389037** SeqNo: **6218492** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Filterable)	1140	10.0					1152	1.05	5	

The following samples were analyzed in this batch: HS21080147-01 HS21080147-02 HS21080147-03

Client: Wild Associates
Project: Brenham Family Park.
WorkOrder: HS21080147

QC BATCH REPORT

Batch ID: R389173 (0) **Instrument:** Balance1 **Method:** TOTAL SUSPENDED SOLIDS BY SM 2540D-2011

MBLK Sample ID: **WBLKW1-080921** Units: **mg/L** Analysis Date: **09-Aug-2021 11:15**
Client ID: Run ID: **Balance1_389173** SeqNo: **6221824** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Suspended Solids (Residue, Non-Filterable)	ND	2.00								

LCS Sample ID: **WLCSW1-080921** Units: **mg/L** Analysis Date: **09-Aug-2021 11:15**
Client ID: Run ID: **Balance1_389173** SeqNo: **6221825** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Suspended Solids (Residue, Non-Filterable)	89	2.00	100	0	89.0	85 - 115				

DUP Sample ID: **HS21080147-03DUP** Units: **mg/L** Analysis Date: **09-Aug-2021 11:15**
Client ID: **S-3** Run ID: **Balance1_389173** SeqNo: **6221813** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Suspended Solids (Residue, Non-Filterable)	86.8	2.00					89.4	2.95	5	

DUP Sample ID: **HS21080147-01DUP** Units: **mg/L** Analysis Date: **09-Aug-2021 11:15**
Client ID: **S-1** Run ID: **Balance1_389173** SeqNo: **6221810** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Suspended Solids (Residue, Non-Filterable)	112	2.00					110.4	1.44	5	

The following samples were analyzed in this batch: HS21080147-01 HS21080147-02 HS21080147-03

Client: Wild Associates
Project: Brenham Family Park.
WorkOrder: HS21080147

QC BATCH REPORT

Batch ID: R389180 (0) **Instrument: WetChem_HS** **Method: AMMONIA AS N BY SM4500 NH3-D-11 (ISE)**

MBLK Sample ID: **MBLK-R389180** Units: **mg/L** Analysis Date: **10-Aug-2021 14:55**
Client ID: Run ID: **WetChem_HS_389180** SeqNo: **6222007** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (as N)	ND	0.20								

LCS Sample ID: **LCS-R389180** Units: **mg/L** Analysis Date: **10-Aug-2021 14:55**
Client ID: Run ID: **WetChem_HS_389180** SeqNo: **6222006** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (as N)	10.14	0.20	10	0	101	85 - 115				

MS Sample ID: **HS21080074-01MS** Units: **mg/L** Analysis Date: **10-Aug-2021 14:55**
Client ID: Run ID: **WetChem_HS_389180** SeqNo: **6222009** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (as N)	11.2	0.20	10	0.138	111	80 - 120				

MSD Sample ID: **HS21080074-01MSD** Units: **mg/L** Analysis Date: **10-Aug-2021 14:55**
Client ID: Run ID: **WetChem_HS_389180** SeqNo: **6222008** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (as N)	10.74	0.20	10	0.138	106	80 - 120	11.2	4.22	20	

The following samples were analyzed in this batch: HS21080147-01 HS21080147-02 HS21080147-03

Client: Wild Associates
Project: Brenham Family Park.
WorkOrder: HS21080147

QC BATCH REPORT

Batch ID: R389292 (0) **Instrument:** WetChem_HS **Method:** RESIDUAL CHLORINE BY SM4500CL F-2011

MBLK Sample ID: **MBLK-R389292** Units: **mg/L** Analysis Date: **11-Aug-2021 16:08**
Client ID: Run ID: **WetChem_HS_389292** SeqNo: **6224484** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chlorine	ND	0.10								

LCS Sample ID: **LCS-R389292** Units: **mg/L** Analysis Date: **11-Aug-2021 16:08**
Client ID: Run ID: **WetChem_HS_389292** SeqNo: **6224483** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chlorine	2.7	0.10	3.14	0	86.0	85 - 115				

LCSD Sample ID: **LCSD-R389292** Units: **mg/L** Analysis Date: **11-Aug-2021 16:08**
Client ID: Run ID: **WetChem_HS_389292** SeqNo: **6224482** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chlorine	2.8	0.10	3.14	0	89.2	85 - 115	2.7	3.64	20	

MS Sample ID: **HS21080147-02MS** Units: **mg/L** Analysis Date: **11-Aug-2021 16:08**
Client ID: **S-2** Run ID: **WetChem_HS_389292** SeqNo: **6224485** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chlorine	3.2	0.10	3.14	0.2	95.5	80 - 120				

The following samples were analyzed in this batch: HS21080147-01 HS21080147-02 HS21080147-03

Client: Wild Associates
Project: Brenham Family Park.
WorkOrder: **HS21080147**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	21-022-0	26-Mar-2022
Dept of Defense	PJLA L20-507-R2	22-Dec-2021
Florida	E87611-33	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2021-2022	30-Apr-2022
Louisiana	03087, 2021-2022	30-Jun-2022
North Carolina	624-2021	31-Dec-2021
Oklahoma	2020-165	31-Aug-2021
Texas	T104704231-21-27	30-Apr-2022

Sample Receipt Checklist

Work Order ID: HS21080147 **Date/Time Received:** **04-Aug-2021 16:32**

Client Name: Wild Associates **Received by:** **Paresh M. Giga**

Completed By: */S/ Paresh M. Giga* 04-Aug-2021 16:58 **Reviewed by:** */S/ Ragen Giga* 05-Aug-2021 12:14

eSignature Date/Time eSignature Date/Time

Matrices: **Water** Carrier name: **Client**

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	1 Page(s)
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	COC IDs:245997
Samplers name present on COC?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	4.0C U/c	IR31	
Cooler(s)/Kit(s):	43655		
Date/Time sample(s) sent to storage:	8/4/2021 17:10		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐
pH adjusted by:			

Login Notes: Fecals logged in and sent to Envirodyne @ 16:45.
CL-RS out of hold.

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

Cincinnati, OH +1 513 733 5336
Everett, WA +1 425 356 2600
Fort Collins, CO +1 970 490 1511
Holland, MI +1 616 399 6070

Chain of Custody Form

Page 1 of 1

COC ID: 245997

HS21080147

Wild Associates
Brenham Family Park

Customer Information		Project Information		ALS Project Manager:
Purchase Order		Project Name	Brenham Family Park	
Work Order		Project Number		
Company Name	Wild Associates	Bill To Company	Wild Associates	
Send Report To	Paul Wild	Invoice Attn	Paul Wild	
Address	7419 Sheffield Bend Ct	Address	7419 Sheffield Bend Ct	
City/State/Zip	Houston, TX 77095	City/State/Zip	Houston TX 77095	
Phone	(281) 844-3747	Phone	(281) 844-3747	
Fax		Fax		
e-Mail Address	Paul.Wild@wildassociates.net	e-Mail Address	Paul.Wild@wildassociates.net	

A: 9056_anions_W (*NO2*,*NO3*,SO4,Cl)
B: SURFCT (Surfactants (*MBAS*))
C: 200.8 (K,Na,Ca,Mg,Fe,Mn)
D: NIT_AMM_W_ISE (Ammonia)
E: P_TW (Phosphate)
F: TDS_W 2540C (Total Dissolved Solids)
G: TSS_W 2540D (Total Suspended Solids)
H: SUB_*Total Coliform* (Sub Envirodyne)
I: SUB_*Fecal Coliform* (Envirodyne-8 hour Hold Time)
J: CL_RS (Chlorine, Residual)

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	S-1	11:40	8/4/21	W		8	X	X	X	X	X	X	X	X	X	X	
2	S-2	1:00				8	X		X	X	X	X	X	X	X	X	
3	S-3	1:30				9	X	X	X	X	X	X	X	X	X	X	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Paul Wild

Shipment Method:

Required Turnaround Time: (Check Box) ☐ STD 10 Wk Days ☒ 5 Wk Days ☐ 2 Wk Days ☐ 24 Hour ☐ Other

Results Due Date:

Relinquished by: Paul Wild Date: 8/4/21 Time: 16:32 Received by:

Relinquished by: Date: Time: Received by (Laboratory): 8/4/2021 16:32

Logged by (Laboratory): Date: Time: Checked by (Laboratory):

Notes: Brenham Family Park

Cooler ID	Cooler Temp.
4365	4.0°C
	4.3
	Client

QC Package: (Check One Box Below)
☒ Level II Std QC
☐ Level III Std QC/Raw Data
☐ Level IV SW846/CLP
☐ Other
☐ TRRP Checklist
☐ TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note:
1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

Envirodyne Laboratories, Inc
11011 Brooklet Dr., # 230
Houston, TX 77099
281.568.7880 Phone
www.envirodyne.com

11 August 2021

ALS Group USA, Corp.
Ragen Giga
10450 Stancliff Rd. Suite #210
Houston, TX 77099

ALS

Enclosed are the results of analyses for samples received by the laboratory on 04-Aug-21 16:45. The analytical data provided relates only to the samples as received in this laboratory report.

ELI certifies that all results are NELAP compliant and performed in accordance with the referenced method except as noted in the Case Narrative or as noted with a qualifier. Any reproductions of this laboratory report should be in full and only with the written authorization from the client.

The total number of pages in this report is 7

Thank you for selecting ELI for your analytical needs. If you have any questions regarding this report, please contact us.

Sincerely,

Stephanie Calvino
Customer Service Representative

Certificate No: T104704265-20-18

Envirodyne Laboratories, Inc
11011 Brooklet Dr., # 230
Houston, TX 77099
281.568.7880 Phone
www.envirodyne.com

Client:	ALS Group USA, Corp.
Project:	ALS
Work Order:	21H1365

Reported:
11-Aug-21 10:31

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
HS21080147-01 S-1	21H1365-01	Water	04-Aug-21 11:40	04-Aug-21 16:45
HS21080147-02 S-2	21H1365-02	Water	04-Aug-21 13:00	04-Aug-21 16:45
HS21080147-03 S-3	21H1365-03	Water	04-Aug-21 13:30	04-Aug-21 16:45

Envirodyne Laboratories, Inc
11011 Brooklet Dr., # 230
Houston, TX 77099
281.568.7880 Phone
www.envirodyne.com

Client:	ALS Group USA, Corp.
Project:	ALS
Work Order:	21H1365

Reported:
11-Aug-21 10:31

HS21080147-01 S-1

21H1365-01 (Water) Sampled: 04-Aug-21 11:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	Notes
Envirodyne Laboratories, Inc.										
Microbiology										
Fecal Coliform	**89**	14	CFU/100 mL	1	B1H1134	04-Aug-21	04-Aug-21 17:00	SM9222 D	HBB	
Total Coliform	> 2420	1	MPN/100 mL	1	B1H0683	04-Aug-21	04-Aug-21 17:36	SM9223 B	HBB	

Envirodyne Laboratories, Inc
11011 Brooklet Dr., # 230
Houston, TX 77099
281.568.7880 Phone
www.envirodyne.com

Client:	ALS Group USA, Corp.
Project:	ALS
Work Order:	21H1365

Reported:
11-Aug-21 10:31

HS21080147-02 S-2

21H1365-02 (Water) Sampled: 04-Aug-21 13:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	Notes
Envirodyne Laboratories, Inc.										
Microbiology										
Fecal Coliform	**74**	14	CFU/100 mL	1	B1H1134	04-Aug-21	04-Aug-21 17:00	SM9222 D	HBB	
Total Coliform	> 2420	1	MPN/100 mL	1	B1H0683	04-Aug-21	04-Aug-21 17:36	SM9223 B	HBB	

Envirodyne Laboratories, Inc
11011 Brooklet Dr., # 230
Houston, TX 77099
281.568.7880 Phone
www.envirodyne.com

Client:	ALS Group USA, Corp.
Project:	ALS
Work Order:	21H1365

Reported:
11-Aug-21 10:31

HS21080147-03 S-3

21H1365-03 (Water) Sampled: 04-Aug-21 13:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	Notes
Envirodyne Laboratories, Inc.										
Microbiology										
Fecal Coliform	**71**	14	CFU/100 mL	1	B1H1134	04-Aug-21	04-Aug-21 17:00	SM9222 D	HBB	
Total Coliform	> 2420	1	MPN/100 mL	1	B1H0683	04-Aug-21	04-Aug-21 17:36	SM9223 B	HBB	

Envirodyne Laboratories, Inc
11011 Brooklet Dr., # 230
Houston, TX 77099
281.568.7880 Phone
www.envirodyne.com

Client:	ALS Group USA, Corp.
Project:	ALS
Work Order:	21H1365

Reported:
11-Aug-21 10:31

Microbiology - Quality Control

Envirodyne Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B1H0683 - Microbiology										
Blank (B1H0683-BLK1)				Prepared & Analyzed: 04-Aug-21						
Total Coliform	<1	1	MPN/100 mL							
Duplicate (B1H0683-DUP1)		**Source: 21H0358-02**		Prepared & Analyzed: 04-Aug-21						
Total Coliform	<1	1	MPN/100 mL		<1			0	20	
Batch B1H1134 - Microbiology										
Blank (B1H1134-BLK1)				Prepared & Analyzed: 04-Aug-21						
Fecal Coliform	<1	1	CFU/100 mL							
Duplicate (B1H1134-DUP1)		**Source: 21H1362-01**		Prepared & Analyzed: 04-Aug-21						
Fecal Coliform	<14	14	CFU/100 mL		<14			0	0.3028	

Envirodyne Laboratories, Inc
11011 Brooklet Dr., # 230
Houston, TX 77099
281.568.7880 Phone
www.envirodyne.com

Client:	ALS Group USA, Corp.
Project:	ALS
Work Order:	21H1365

Reported:
11-Aug-21 10:31

Notes and Definitions

>	> 2420
ND	Analyte NOT DETECTED at or above the reporting limit
<	Result is less than the RL
a	Analyte not available for TNI/NELAP accreditation
n	Not accredited

21H1365

10450 Stancliff Rd, Ste 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887
www.alsglobal.com

Subcontract Chain of Custody

SAMPLING STATE: **Texas** **COC ID:** **16625**

SUBCONTRACT TO:

Envirodyne Laboratories, Inc.
11011 Brooklet, Ste 230
Houston, TX 77099 **Phone:** +1 281 568 7880

CUSTOMER INFORMATION:

Company:	ALS Houston
Contact:	Ragen Giga
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Email:	RagenP.Giga@ALSGlobal.com
Alternate Contact:	
Email:	

INVOICE INFORMATION:

Company:	ALS Houston
Contact:	Accounts Payable
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Reference:	HS21080147
TSR:	Sonia West

	LAB SAMPLE ID / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / DUE DATE
1.	**HS21080147-01**	**S-1**	**Water**	**04 Aug 2021 11:40**
	SUB_Fecal Coliform			11 Aug 2021
	SUB_Total Coliform			11 Aug 2021
2.	**HS21080147-02**	**S-2**	**Water**	**04 Aug 2021 13:00**
	SUB_Fecal Coliform			11 Aug 2021
	SUB_Total Coliform			11 Aug 2021
3.	**HS21080147-03**	**S-3**	**Water**	**04 Aug 2021 13:30**
	SUB_Fecal Coliform			11 Aug 2021
	SUB_Total Coliform			11 Aug 2021

Comments: Please analyze for the analysis listed above.
Send report to the emails shown above.

QC Level: STD (Laboratory Standard QC: method blank and LCS required)

Relinquished By: _____ Date/Time: 8.4.21 1645

Received By: _____ Date/Time: 8/4/21 1645

Cooler ID(s): _____ Temperature(s): 2.5/2.5 -2-HA

APPENDIX H – TRANSECT PHOTOGRAPHS

Photo 1: Transect 1 east-facing view from the western Site boundary.

Photo 2: Transect 1 forested area west of the creek.

Photo 3: Transect 2 east-facing view from the western Site boundary.

Photo 4: Transect 2 forested area west of the creek.

Photo 5: Transect 2 west-facing view from the eastern Site boundary.

Photo 6: Transect 2 forested area east of the creek.

TRANSECT PHOTOGRAPHS

City of Brenham

Brenham Family Park

Brenham, Washington County, Texas

WILD ASSOCIATES
Engineering & Environmental Consulting

Photo 7: Transect 3 east-facing view from the western Site boundary.

Photo 8: Transect 3 forested area west of the creek.

Photo 9: Transect 3 west-facing view from the eastern Site boundary.

Photo 10: Transect 3 forested area east of the creek.

Photo 11: Transect 4 east-facing view from the fence line crossing the western pasture.

Photo 12: Transect 4 forested area west of the creek.

TRANSECT PHOTOGRAPHS

City of Brenham

Brenham Family Park

Brenham, Washington County, Texas

WILD ASSOCIATES
Engineering & Environmental Consulting

Photo 13: Transect 4 west-facing view from the eastern Site boundary.

Photo 14: Transect 4 forested area east of the creek.

Photo 15: Transect 5 east-facing view from the western Site boundary.

Photo 16: Transect 5 forested area west of the creek.

Photo 17: Transect 5 west-facing view from the eastern Site boundary.

Photo 18: Transect 5 forested area east of the creek.

Photo 19: Transect 6 east-facing view from the western Site boundary.

Photo 20: Transect 6 forested area west of the creek.

Photo 21: Transect 6 west-facing view from the eastern Site boundary.

Photo 22: Transect 6 forested area east of the creek.

Photo 23: Transect 7 east-facing view from west of an old fence line crossing the transect.

Photo 24: Transect 7 forested area east of the creek.

Photo 25: Transect 7 west-facing view from the eastern Site boundary.

Photo 26: Transect 7 forested area east of the creek.

Photo 27: Transect 8 east-facing view from the forested area looking towards the road.

Photo 28: Transect 8 forested area east of the creek.

Photo 29: Transect 9 east-facing view from the western Site boundary.

Photo 30: Transect 9 forested area west of the creek.

Photo 31: Transect 9 west-facing view from the eastern Site boundary.

Photo 32: Transect 9 forested area east of the creek.

Photo 33: Transect 10 east-facing view from the western Site boundary.

Photo 34: Transect 10 forested area west of the creek.

Photo 35: Transect 10 west-facing view from the eastern Site boundary.

Photo 36: Transect 10 forested area east of the creek.

APPENDIX I – USFWS WILDLIFE SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758-4460
Phone: (512) 490-0057 Fax: (512) 490-0974
http://www.fws.gov/southwest/es/AustinTexas/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

In Reply Refer To: June 30, 2021
Consultation Code: 02ETAU00-2021-SLI-1637
Event Code: 02ETAU00-2021-E-03337
Project Name: Brenham Family Park

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that *may* occur within the county of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

Please note that new information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Also note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of federally listed as threatened or endangered species and to determine whether projects may affect these species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

While a Federal agency may designate a non-Federal representative to conduct informal consultation or prepare a biological assessment, the Federal Agency must notify the Service in writing of any such designation. The Federal agency shall also independently review and evaluate the scope and content of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by a federally funded, permitted or authorized activity, the agency is required to consult with the Service pursuant to 50 CFR 402. The following definitions are provided to assist you in reaching a determination:

- *No effect* - the proposed action will not affect federally listed species or critical habitat. A “no effect” determination does not require section 7 consultation and no coordination or contact with the Service is necessary. However, if the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.
- *May affect, but is not likely to adversely affect* - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effect. The Federal agency or the designated non-Federal representative should consult with the Service to seek written concurrence that adverse effects are not likely. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.
- *Is likely to adversely affect* - adverse effects to listed species may occur as a direct or indirect result of the proposed action. For this determination, the effect of the action is neither discountable nor insignificant. If the overall effect of the proposed action is beneficial to the listed species but the action is also likely to cause some adverse effects to individuals of that species, then the proposed action “is likely to adversely affect” the listed species. The analysis should consider all interrelated and interdependent actions. An “is likely to adversely affect” determination requires the Federal action agency to initiate formal section 7 consultation with our office.

Regardless of the determination, the Service recommends that the Federal agency maintain a complete record of the evaluation, including steps leading to the determination of effect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related information. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered

Species Consultation Handbook" at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF.

Migratory Birds

For projects that may affect migratory birds, the Migratory Bird Treaty Act (MBTA) implements various treaties and conventions for the protection of these species. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Migratory birds may nest in trees, brushy areas, or other areas of suitable habitat. The Service recommends activities requiring vegetation removal or disturbance avoid the peak nesting period of March through August to avoid destruction of individuals, nests, or eggs. If project activities must be conducted during this time, we recommend surveying for nests prior to conducting work. If a nest is found, and if possible, the Service recommends a buffer of vegetation remain around the nest until the young have fledged or the nest is abandoned.

For additional information concerning the MBTA and recommendations to reduce impacts to migratory birds please contact the U.S. Fish and Wildlife Service Migratory Birds Office, 500 Gold Ave. SW, Albuquerque, NM 87102. A list of migratory birds may be viewed at https://www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-species.php. Guidance for minimizing impacts to migratory birds for projects including communications towers can be found at: https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/communication-towers.php. Additionally, wind energy projects should follow the wind energy guidelines

https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/wind-energy.php) for minimizing impacts to migratory birds and bats.

Finally, please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/eagles.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758-4460
(512) 490-0057

Project Summary

Consultation Code: 02ETAU00-2021-SLI-1637
Event Code: 02ETAU00-2021-E-03337
Project Name: Brenham Family Park
Project Type: RECREATION CONSTRUCTION / MAINTENANCE
Project Description: 32 acre park in Brenham
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@30.1352873,-96.38145696611662,14z

Counties: Washington County, Texas

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. The location of the critical habitat is not available. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot *Calidris canutus rufa* No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane *Grus americana* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

Clams

NAME	STATUS
Texas Fawnsfoot *Truncilla macrodon* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8965	Candidate

Flowering Plants

NAME	STATUS
Navasota Ladies-tresses *Spiranthes parksii*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/1570

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

APPENDIX J – USFWS CONSULTATION DOCUMENTATION

From: Best, Chris
To: Paul Wild
Cc: Christy Wild
Subject: RE: [EXTERNAL] Brenham Family Park EA
Date: Tuesday, May 17, 2022 9:59:35 AM
Attachments: image001.png

Paul and Christy –

I agree with your assessment: It is very unlikely that Navasota ladies'-tresses occurs within the construction footprint of the Brenham Family Park development, but it cannot be categorically ruled out. Surveys for this species are usually conducted from mid-October to mid-November, when it typically flowers, because positive identification is based on the morphology of the flowers and inflorescence. However, the species typically does not flower in years when rainfall is not well distributed throughout the growing season. I recall that last September was unusually dry, so it may not have been an adequate year to survey. This year is shaping up to be even worse. Another approach that has been taken by some consultants is to survey the project sites for the vegetative basal rosettes during the early summer. Later in the summer the leaves wither and can no longer be detected. Although these basal leaves cannot be identified to species, only to the genus Spiranthes, if no rosettes are found than we can say S. parksii is not present. It may be challenging to adequately search for the basal leaves amid dense grasses and forbs, given the relatively small construction footprint of this project, that might be a feasible approach.

Chris Best, State Botanist
U.S. Fish and Wildlife Service
10711 Burnet Rd., Suite 200
Austin, TX 78758
~~512-490-0057 x 225~~ (Out of office during pandemic)
chris_best@fws.gov

If a cluttered desk is a sign of a cluttered mind, of what, then, is an empty desk a sign? — Albert Einstein

---

From: Paul Wild <Paul.Wild@wildassociates.net>
Sent: Tuesday, May 17, 2022 7:53 AM
To: Best, Chris <chris_best@fws.gov>
Cc: Christy Wild <Christy.Wild@wildassociates.net>
Subject: RE: [EXTERNAL] Brenham Family Park EA

Chris, I assume your travels went well and you're back in the saddle. Have you had an opportunity to look at the material I sent you? Although we believe the conditions at the site are such that they would not entirely preclude the orchid from being there, we also believe the probability of it being there is low. We have found that orchids are very picky about their habitat, and we don't believe the habitat at the site is ideal. In any case, let me know if you want to discuss it with a call. Thanks.

From: Best, Chris <chris_best@fws.gov>
Sent: Tuesday, April 26, 2022 4:05 PM
To: Paul Wild <Paul.Wild@wildassociates.net>
Cc: Christy Wild <Christy.Wild@wildassociates.net>

APPENDIX K – TPWD SPECIES LIST

Last Update: 6/22/2021

WASHINGTON COUNTY

AMPHIBIANS

Houston toad *Anaxyrus houstonensis*

Terrestrial and aquatic: Primary terrestrial habitat is forests with deep sandy soils. Juveniles and adults are presumed to move through areas of less suitable soils using riparian corridors. Aquatic habitats can include any water body from a tire rut to a large lake.

Federal Status: LE	State Status: E	SGCN: Y
Endemic: Y	Global Rank: G1	State Rank: S1

southern crawfish frog *Lithobates areolatus areolatus*

Terrestrial and aquatic: The terrestial habitat is primarily grassland and can vary from pasture to intact prairie; it can also include small prairies in the middle of large forested areas. Aquatic habitat is any body of water but preferred habitat is ephemeral wetlands.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S3

Strecker's chorus frog *Pseudacris streckeri*

Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Woodhouse's toad *Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: SU

BIRDS

bald eagle *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3B,S3N

black rail *Laterallus jamaicensis*

Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

WASHINGTON COUNTY

BIRDS

chestnut-collared longspur *Calcarius ornatus*

According to Partners in Flight's Landbird Conservation Plan (2016), this species has a continental decline of 85%. Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Eskimo curlew *Numenius borealis*

Historically, shortgrass plains and prairies, but more recently (1960s) in old fields, closely grazed pastures, burned prairies, and marshes; beaches and sand flats. Nonbreeding: grasslands, pastures, plowed fields, and less frequently, marshes and mudflats

Federal Status: LE	State Status: E	SGCN: N
Endemic: N	Global Rank: GH	State Rank: SHN

Franklin's gull *Leucophaeus pipixcan*

This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2N

interior least tern *Sternula antillarum athalassos*

Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Federal Status: DL: Delisted	State Status: E	SGCN: N
Endemic: N	Global Rank: G4T3Q	State Rank: S1B

piping plover *Charadrius melodus*

Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2N

WASHINGTON COUNTY

BIRDS

reddish egret *Egretta rufescens*

Resident of the Texas Gulf Coast; brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S2B

rufa red knot *Calidris canutus rufa*

Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4T2	State Rank: S2N

swallow-tailed kite *Elanoides forficatus*

Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2B

western burrowing owl *Athene cunicularia hypugaea*

Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S2

white-faced ibis *Plegadis chihi*

Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4B

whooping crane *Grus americana*

Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G1	State Rank: S1N

WASHINGTON COUNTY

BIRDS

wood stork *Mycteria americana*

Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: SHB,S2N

FISH

american eel *Anguilla rostrata*

Originally found in all river systems from the Red River to the Rio Grande. Aquatic habtiats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

chub shiner *Notropis potteri*

Brazos, Colorado, San Jacinto, and Trinity river basins. Flowing water with silt or sand substrate

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S2

Mississippi silvery minnow *Hybognathus nuchalis*

Found in eastern Texas streams, from the Brazos River eastward and northward to the Red River; found in moderate current; silty, muddy, or rocky substrate. In Texas, adults likely to inhabit smaller tributary streams.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G5	State Rank: S4

sharpnose shiner *Notropis oxyrhynchus*

Range is now restricted to upper Brazos River upstream of Possum Kingdom Lake. May be native to Red River and Colorado River basins. Typically found in turbid water over mostly silt and shifting sand substrates.

Federal Status: LE	State Status: E	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S1S2

silver chub *Macrhybopsis storeriana*

Red River and Brazos River basins. Mainly restricted to large, often silty rivers. Ranges over gravel to silt substrates but found more commonly over silt or mud bottom.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

WASHINGTON COUNTY

FISH

silverband shiner *Notropis shumardi*

In Texas, found from Red River to Lavaca River; Main channel with moderate to swift current velocities and moderate to deep depths; associated with turbid water over silt, sand, and gravel.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

smalleye shiner *Notropis buccula*

Endemic to the Brazos River drainage; presumed to have been introduced into the Colorado River. Historically found in lower Brazos River as far south as Hempstead, Texas but appears to now be restricted to upper Brazos River system upstream of Possum Kingdom Lake. Typically found in turbid waters of broad, sandy channels of main stream, over substrate consisting mostly of shifting sand.

Federal Status: LE	State Status: E	SGCN: Y
Endemic: Y	Global Rank: G2	State Rank: S1S2

INSECTS

American bumblebee *Bombus pensylvanicus*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G3G4	State Rank: SNR

MAMMALS

big brown bat *Eptesicus fuscus*

Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

big free-tailed bat *Nyctinomops macrotis*

Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

eastern red bat *Lasiurus borealis*

Red bats are migratory bats that are common across Texas. They are most common in the eastern and central parts of the state, due to their requirement of forests for foliage roosting. West Texas specimens are associated with forested areas (cottonwoods). Also common along the coastline. These bats are highly mobile, seasonally migratory, and practice a type of "wandering migration". Associations with specific habitat is difficult unless specific migratory stopover sites or wintering grounds are found. Likely associated with any forested area in East, Central, and North Texas but can occur statewide.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S4

WASHINGTON COUNTY

MAMMALS

eastern spotted skunk *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G4 State Rank: S1S3

hoary bat *Lasiurus cinereus*

Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G3G4 State Rank: S4

long-tailed weasel *Mustela frenata*

Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5 State Rank: S5

mountain lion *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5 State Rank: S2S3

northern yellow bat *Lasiurus intermedius*

Occurs mainly along the Gulf Coast but inland specimens are not uncommon. Prefers roosting in spanish moss and in the hanging fronds of palm trees. Common where this vegtation occurs. Found near water and forages over grassy, open areas. Males usually roost solitarily, whereas females roost in groups of several individuals.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5 State Rank: S4

swamp rabbit *Sylvilagus aquaticus*

Primarily found in lowland areas near water including: cypress bogs and marshes, floodplains, creeks and rivers.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5 State Rank: S5

tricolored bat *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G2G3 State Rank: S3S4

WASHINGTON COUNTY

MOLLUSKS

Brazos Heelsplitter *Potamilus streckersoni*

Reported from streams, but not far into the headwaters, to large rivers, and some reservoirs. In riverine systems occurs most often in nearshore habitats such as banks and backwater pools but occasionally in mainchannel habitats such as riffles. Typically found in standing to slow-flowing water in soft substrates consisting of silt, mud or sand but occasionally in moderate flows with gravel and cobble substrates (Randklev et al. 2014b,c; Tsakiris and Randklev 2016b; Smith et al. 2019) [Mussels of Texas 2020]

Federal Status:	State Status: T	SGCN: Y
Endemic: Y	Global Rank: GNR	State Rank: SNR

Texas Fawnsfoot *Truncilla macrodon*

Occurs in large rivers but may also be found in medium-sized streams. Is found in protected near shore areas such as banks and backwaters but also riffles and point bar habitats with low to moderate water velocities. Typically occurs in substrates of mud, sandy mud, gravel and cobble. Considered intolerant of reservoirs (Randklev et al. 2010; Howells 2010o; Randklev et al. 2014b,c; Randklev et al. 2017a,b). [Mussels of Texas 2019]

Federal Status: C	State Status: T	SGCN: Y
Endemic: Y	Global Rank: G1	State Rank: S2

REPTILES

common garter snake *Thamnophis sirtalis*

Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.

Federal Status:	State Status:	SGCN: N
Endemic:	Global Rank: G5	State Rank: S2

eastern box turtle *Terrapene carolina*

Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

slender glass lizard *Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

WASHINGTON COUNTY

REPTILES

smooth softshell *Apalone mutica*

Aquatic: Large rivers and streams; in some areas also found in lakes and impoundments (Ernst and Barbour 1972). Usually in water with sandy or mud bottom and few aquatic plants. Often basks on sand bars and mudflats at edge of water. Eggs are laid in nests dug in high open sandbars and banks close to water, usually within 90 m of water (Fitch and Plummer 1975).

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Texas horned lizard *Phrynosoma cornutum*

Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4G5	State Rank: S3

timber (canebrake) rattlesnake *Crotalus horridus*

Terrestrial: Swamps, floodplains, upland pine and deciduous woodland, riparian zones, abandoned farmland. Limestone bluffs, sandy soil or black clay. Prefers dense ground cover, i.e. grapevines, palmetto.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

western box turtle *Terrapene ornata*

Terrestrial: Ornate or western box trutles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

western chicken turtle *Deirochelys reticularia miaria*

Aquatic and terrestrial: This species uses aquatic habitats in the late winter, spring and early summer and then terrestrial habitats the remainder of the year. Preferred aquatic habitats seem to be highly vegetated shallow wetlands with gentle slopes. Specific terrestrial habitats are not well known.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5T5	State Rank: S2S3

PLANTS

branched gay-feather *Liatris cymosa*

Somewhat barren grassland openings in post oak woodlands on tight clayey, chalky, or gravelly soils, often over Catahoula Formation; flowering July-October

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G2	State Rank: S2

WASHINGTON COUNTY

PLANTS

Navasota ladies'-tresses *Spiranthes parksii*

Openings in post oak woodlands in sandy loams along upland drainages or intermittent streams, often in areas with suitable hydrologic factors, such as a perched water table associated with the underlying claypan; flowering populations fluctuate widely from year to year, an individual plant does not flower every year; flowering late October-early November (-early December)

Federal Status: LE | State Status: E | SGCN: Y
Endemic: Y | Global Rank: G3 | State Rank: S3

Sayersville blue eyes *Nemophila sayersensis*

Open fields and woodland margins on deep loose nutrient-poor sand (Simpson, Helfgott and Neff 2001). Mar-May.

Federal Status: | State Status: | SGCN: Y
Endemic: Y | Global Rank: G2 | State Rank: S2

Shinner's sunflower *Helianthus occidentalis ssp. plantagineus*

Mostly in prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country.

Federal Status: | State Status: | SGCN: Y
Endemic: N | Global Rank: G5T2T3 | State Rank: S4

Texas beebalm *Monarda viridissima*

Endemic perennial herb of the Carrizo Sands; deep, well-drained sandy soils in openings of post oak woodlands; flowers white.

Federal Status: | State Status: | SGCN: Y
Endemic: Y | Global Rank: G3 | State Rank: S3

Texas meadow-rue *Thalictrum texanum*

Mostly found in woodlands and woodland margins on soils with a surface layer of sandy loam, but it also occurs on prairie pimple mounds; both on uplands and creek terraces, but perhaps most common on claypan savannas; soils are very moist during its active growing season; flowering/fruiting (January-)February-May, withering by midsummer, foliage reappears in late fall(November) and may persist through the winter

Federal Status: | State Status: | SGCN: Y
Endemic: Y | Global Rank: G2Q | State Rank: S2

Texas pinkroot *Spigelia texana*

Woodlands on loamy soils; Perennial; Flowering March-Nov; Fruiting April-Nov

Federal Status: | State Status: | SGCN: Y
Endemic: Y | Global Rank: G3 | State Rank: S3

Texas tauschia *Tauschia texana*

Occurs in loamy soils in deciduous forests or woodlands on river and stream terraces; Perennial; Flowering/Fruiting Feb-April

Federal Status: | State Status: | SGCN: Y
Endemic: Y | Global Rank: G3 | State Rank: S3

WASHINGTON COUNTY

PLANTS

Topeka purple-coneflower *Echinacea atrorubens*

Occurring mostly in tallgrass prairie of the southern Great Plains, in blackland prairies but also in a variety of other sites like limestone hillsides; Perennial; Flowering Jan-June; Fruiting Jan-May

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

APPENDIX L – RESUMES

WILD ASSOCIATES
Engineering & Environmental Consulting

PAUL R. WILD
PRESIDENT

EXPERIENCE

Thirty-nine years of experience in environmental and health and safety consulting, human health risk assessment, geotechnical and construction materials testing programs, contractor quality assurance, and business management applied to the oil and gas, petrochemicals, power, waste management, and manufacturing industries. Technical experience with field exploration programs, contractor construction monitoring, CE/EA/EIA documentation, bid spec and bid tab development, constructability analysis, remedial construction management, drilling operations, data analysis, regulatory analysis and auditing, permitting, ISO 9001, and technical document preparation. International experience in Latin America, West Africa, Asia, Middle East, and Asia Pacific. Experienced with domestic and international EH&S regulations and standards.

EDUCATION

B.S. Chemistry (Zoology minor): Marshall University, 1983

CERTIFICATIONS/REGISTRATIONS

TCEQ Corrective Action Project Manager Reg. #CAPM00385
OSHA Certified for Hazardous Waste Site Work and Supervisor Training (OSHA 29 CFR 1910.120)
AHERA building inspector and management planner; Illinois Licensed Asbestos Inspector #100-7145 (lapsed)

REPRESENTATIVE PROJECTS

GLO/FEMA/CITY OF PORT ARTHUR
Port Arthur, TX
Disaster Recovery HUD Environmental Reviews, HazMat Debris Management, Wetlands Delineations, Hist/Cult Surveys, Corps Permitting, Marsh Degradation Survey, Phase I ESA

Directed development of NEPA Environmental Review Records under GLO funding and various resource surveys for Corps of Engineers permitting and FEMA disaster recovery operations.

CITY OF PORT ARTHUR
Port Arthur, Texas
Granger Ditch Rehabilitation Wetlands Delineation and Corps Permitting

Directed the threatened and endangered species and historical/cultural surveys and the wetlands delineation for a ditch rehabilitation project.

PORT ARTHUR EDC
Port Arthur, Texas
Pipeline Location Survey, Post-Harvey Contamination Assessment, Phase I ESA

Conducted various projects to assist PAEDC with post-Harvey clean-up and property transactions.

PORT ARTHUR ISD
Port Arthur, Texas
Memorial HS and Adams Elementary Wetlands Delineations

Conducted wetlands delineations at two schools to assist PAISD with their clearing and development programs.

COTE D'IVOIRE PEACE REFINERY
Abidjan, Cote D'Ivoire
Environmental Impact Assessment and Geotechnical/Geologic Studies

Directed the Environmental Impact Assessment of a grassroots, 200,000 bpd refinery. Negotiated with the lead governmental agency for environmental compliance, Agence Nationale De l'Environnement (ANDE), for project scoping and contract negotiations with local consultants and suppliers for project execution. The EIA was conducted in accordance with World Bank and International Finance Corporation guidelines, with considerartion of the IFC's Equator Principles. Conducted baseline site reconnaissance and developed report for the refinery management team and President of Cote D'Ivoire.

TRANSREDES S.A. (ENRON/SHELL JV)
Bolivia, South America
Mechanical/Environmental Risk Assessment and Baseline Environmental Impact Study

Managed the assessment of an oil and gas pipeline system in Bolivia for mechanical risks from corrosion, erosion, maximum allowable operating pressure excursions, seismic influence, operational procedures, engineering design, etc. Managed an ASTM Risk-Based Corrective Action Assessment and a baseline Environmental Impact Study, including analysis of noise emissions and stack emissions calculations. The

RBCA assessment data were used by Transredes to develop estimated costs for environmental restoration of their facilities and surrounding properties. The baseline EIS was used as the basis of comprehensive operating permit granted by the Bolivian government.

EXXONMOBIL DEVELOPMENT COMPANY **Sakhalin Island, Russia Project Environmental**
Houston, Texas; Russia **Compliance and Hazards Analysis**

Directed nine senior specialists to conduct regulatory analysis, development of environmental documents, and hazards analysis for the Sakhalin 1 Project. Specialists directed development of Environmental Impact Assessments; functioned as liaisons between EPC contractor design staff and EMDC to ensure incorporation of Russian environmental and health and safety standards; assisted in design of fire suppression systems and emergency alarm systems; reviewed translated documents for accuracy; and conducted detailed analysis of Russian regulations. The facilities included onshore and offshore production, processing, and storage for the Chayvo and Odoptu fields, including extended reach drilling from onshore platforms to marine production zones; the Orlan offshore production platform; the De-Kastri terminal; and associated pipelines and pump/compressor stations.

WORLD BANK/PEPE ENGINEERS **QA Review – Odaw Drainage Basin Routine**
Washington, D.C.; Houston, Texas **Maintenance Dredging Feasibility Study**

Conducted the quality assurance review of a study evaluating the feasibility of major dredging operations to minimize or preclude seasonal flooding in the city of Accra.

KISTLER AEROSPACE **Nevada Test Site Commercial Launch Facility EIA**
Las Vegas, Nevada **Hazardous Materials Assessment**

As part of a team conducting the EIA, preliminary engineering, and permitting, conducted an assessment of the proposed launch site for hazardous materials. Developed the regulatory agency and permits matrix.

HUNT OIL **Pipeline EIA Feasibility and Cost Estimation**
Yemen

Evaluated logistical and technical issues for development of a study of the feasibility of conducting an Environmental Impact Assessment of pipeline route through various physiographic regions of Yemen.

ENAP **EIA Technical Terms of Reference for Upstream,**
Chile, South America **Midstream, and Downstream Facilities**

Developed Technical Terms of Reference for bidding on Environmental Impact Assessments for both onshore and offshore exploration facilities, pipelines, production facilities, and gas processing facilities.

EMPRESA GENERADORA **Compliance and Contamination Assessments**
DE ELECTRICIDAD HAINA **of Power Generation Facilities**
Dominican Republic

Provided management logistical support for the evaluation of power plants for environmental regulatory compliance and contamination of soil and groundwater for Enron's pre-acquisition due diligence program.

DEPARTMENT OF ENERGY/CHEVRON **Elk Hills Naval Petroleum Reserve**
Kern County, California **Asset Valuation**

Directed the activities of environmental staff conducting environmental O&M and restoration net present value cost analysis for a 30-year projection as part of the asset valuation before sale to Occidental Petroleum.

TEXAS DOT **Baytown Tunnel Removal Project**
Baytown, Texas **Environmental Assessment**

Managed the Environmental Assessment for the Baytown Tunnel Removal Project to be submitted for Corps of Engineers approval under the National Environmental Policy Act. The project involved conducting the feasibility of various alternatives to demolish and close in-place the tunnel or demolish and remove it from its current location. Tasks included evaluation of sediment hazardous constituents content, dredge disposal permitting, disposal of hazardous waste, underground storage tank closure, asbestos-containing materials and lead paint abatement, and water well plugging and abandonment.

LOUISIANA DOTD **Perkins Road Expansion Project**
Baton Rouge, Louisiana **Environmental Assessment**
Directed the Environmental Assessment to be submitted for LADOTD and DOT approval under the National Environmental Policy Act. The project involved conducting the feasibility of various alternatives to expand a congested, mixed-use (residential and commercial) thoroughfare. The environmental tasks involved evaluation of impacts to threatened and endangered species, wetlands, noise, and socioeconomics.

KEYSPAN **Hydroelectric Power Plant Pre-Acquisition Due**
New York, New York **Diligence Assessments**
Evaluated the environmental risks of Niagara Mohawk's and Connecticut Power and Light's hydroelectric plants in NY, MA, and CT as part of a team conducting comprehensive assessments before acquisition by KeySpan.

PUBLICATIONS

"A Contaminant-Resistant Slurry Trench," W. R. Tobin, co-author, presented at the First Annual Southern Regional Ground Water Conference, San Antonio, Texas, September 1985, pp. 193-208.
"Attapulgite: A Clay Liner Solution?" W. R. Tobin, co-author, Civil Engineering, Vol. 56, No. 2, February 1986, pp. 56-58.
"The Environmental Site Assessment as a Pre-Investment Security," presented at the Texas Section American Society of Civil Engineers Spring Meeting, Dallas, Texas, April 1987.

OTHER LANGUAGES

Functionally conversive and literate in Spanish

WILD ASSOCIATES
Engineering & Environmental Consulting

CHRISTY WILD
CEO

SPECIALIZATION

Horticulturist with 18 years of experience in greenhouse management and plant propagation including regulations for pesticide use and application issues under Texas Department of Agriculture; plant propagation using Integrated Pest Management (IPM) for pest and disease control and plant nutrition; plant compatibilities in landscape design and selection of suitable plants based on site-specific criteria for irrigation, soil types, and erosion control; wetland delineations; stream condition assessments; Phase I Environmental Site Assessments;Threatened and Endangered Species Surveys; Historical and Cultural Resource Surveys; and oilfield remediation monitoring. Develops Corps of Engineers Nationwide and Individual Permits for drainage improvement and bank stabilization projects.

EDUCATION, REGISTRATIONS AND CERTIFICATIONS

Houston Community College, 1998-1999
University of Texas Austin, 1993-1996
Army Corps of Engineers Wetland Delineation Training, Richard Chinn Environmental Training, Inc., 2013
Advanced Hydric Soils, Wetland Training Institute, 2014
Keying Grasses, Sedges, and Rushes, Wetland Training Institute, 2014
Permaculture Design Certification, Oregon State University, 2019

REPRESENTATIVE PROJECTS

MONTGOMERY COUNTY DD6
Montgomery County, Texas
Level 2 Stream Condition Assessment, Wetlands Delineation, Hist/Cult Survey, T&ES Survey

Conducted the stream condition assessment and related tasks for a 9.5-mile major flood control ditch rehabilitation project to support DD6 in obtaining a FEMA grant for ditch rehabilitation. Assisted DD6 with Corps of Engineers regulatory compliance and permitting requirements.

GENERAL LAND OFFICE
Galveston, TX
Galveston Island Development Areas 3, 4, and 5 Phase I Environmental Site Assessments

Conducted Phase I ESAs for select areas on Galveston Island to evaluate the potential for environmental impacts from recognized environmental conditions, such as gas stations, dry cleaners, landfills, etc.

GENERAL LAND OFFICE/CITY OF ORANGE
Orange, TX
Disaster Recovery Coopers Gully Stream Condition Assessment, Corps Individual Permit

Conducted a Tier 1 Stream Condition Assessment (SCA) and Individual Permit for Coopers Gully to support the City and GLO in their efforts to conduct post-Hurricane Ike Disaster recovery projects funded by federal grants from HUD. Developed the plantings plan to offset impacts as part of the design package.

CITY OF LEAGUE CITY
League City, TX
Wetlands and Water Bodies Mitigation Monitoring, Corps Permit Compliance

Conducted Wetlands Mitigation Monitoring for 2,600 linear feet bank stabilization project along tidally-influenced Robinson Bayou. Provided reports to the Corps to document compliance with the mitigation plan.

HARRIS COUNTY PUBLIC INFRASTRUCTURE DEPARTMENT
Harris County, TX
Wetlands and Water Bodies Delineations, Phase I ESAs, Hist/Cult & T&ES Surveys, Corps Regional General Permits

As part of HCPID's environmental due diligence efforts before roadway construction, conducted wetlands and water bodies delineations, Regional General Permits, Phase I ESAs, hist/cult surveys, and T&ES surveys on Grant Road, Choate Road, Mueschke Road, Walters Road, Crosby-Lynchburg Road, Gosling Road, and Mason Creek Trail connection.

GENERAL ELECTRIC — **Wetlands and Water Bodies Delineation, Corps Verification**
Channelview, TX
Conducted the wetlands and water bodies delineation of a tract along Carpenter's Bayou to assist GE with selection of the footprint of their proposed parking lot expansion project. Met with the Corps to verify findings.

POINTE LAND DEVELOPMENT — **Wetlands Determinations, Stream Condition Assessment, Corps Nationwide Permit**
Conroe, TX
Conducted wetlands determinations and SCA on two tracts to assist in developing the land plan to avoid Corps-jurisdictional waters of the U.S. and to minimize Corps permitting efforts. Developed the Pre-Construction Notification for the Corps Nationwide Permit for the outfall structure.

CROSBY ISD — **Wetlands Preliminary Jurisdictional Determination**
Crosby, TX
Conducted an analysis of aerial photography and NWI, USGS topo, and FEMA maps to provide an opinion on whether or not the wetlands at the site were likely under the jurisdiction of the Corps of Engineers.

NUCOR STEEL — **Stream Condition Assessment and Ecological Risk Assessment**
Jewett, TX
Conducted a Stream Condition Assessment of Brushy Creek to support Nucor Steel and TCEQ in their Ecological Risk Assessment of the area surrounding the plant.

MISCHER INVESTMENTS — **Oil & Gas Flowline Mapping and Removal Monitoring**
Houston, TX
Located abandoned flowlines, mapped locations, monitored the removal of flowlines, soil testing, monitored the compaction and re-grading of soils.

HUITT-ZOLLARS/TEXAS PARKS AND WILDLIFE DEPARTMENT — **Disaster Recovery Wetlands and Water Bodies Delineations, Hist/Cult & T&ES Surveys**
Cedar HIll, TX
Conducted wetlands and water bodies delineations, hist/cult survey, and T&ES survey at Cedar Hill State Park as a part of TPWD's Flood Repair Program.

HOUSTON INDEPENDENT SCHOOL DISTRICT — **Phase I ESAs, HazMat Surveys**
Houston, TX
Conducted Phase I ESAs and provided subcontractor quality assurance review for hazmat surveys involving ACM/LBP/Mold, mercury-containing light bulbs and thermometers, and PCB light ballasts.

CDM/CITY OF LEAGUE CITY — **Phase I ESA Water Line and Booster Station Improvements**
League City, TX
Conducted a Phase I ESA of a 5-mile water line corridor and the associated booster station.

COSTELLO/NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY — **Phase I ESA, Wetlands Delineation, Threatened and Endangered Species Survey**
Harris County, TX
Conducted a Phase I ESA, wetlands delineation, and threatened and endangered species survey for a 2-mile water line.

PDG ARCHITECTS/COPTIC CHURCH — **Modified Wetlands Determination and Jurisdictional Determination**
Houston, TX
Conducted a modified wetlands determination and submitted documentation to the Corps for a formal request for a jurisdictional determination.

WILD ASSOCIATES
Engineering & Environmental Consulting

CALEB WILD
STAFF PROFESSIONAL

SPECIALIZATION

Mr. Wild has 18 years of experience in environmental and geotechnical consulting applied to the oil and gas, petrochemicals, power, waste management, and manufacturing industries. Technical experience with field exploration programs, drilling operations, data analysis, and technical document preparation. Specific technical expertise with geotechnical and environmental soils borings, installation and sampling of groundwater monitoring wells, quality control of dredging operations, installation of impact/geo piers and auger cast piles, wetlands delineations, and hazardous materials testing. Assists with field health and safety (H&S) plan development and implements field H&S programs. Develops reports consisting of text, maps, diagrams, aerial photo displays, water well search maps, data summary tables, boring logs, and similar documents using Microsoft Office software, gINT, and GEOSYSTEM Software.

PROFESSIONAL HISTORY

Tolunay-Wong Engineers, Houston, Texas, 2005 – 2018, Staff Professional
Wild Associates LLC, Houston, Texas, 2018 - Current, Staff Professional

EDUCATION

B.S. Political Science, with a Minor in Energy and Sustainability – University of Houston

CERTIFICATIONS

Troxler Nuclear Density Gauge Training
Transportation Worker Identification Credentials (TWIC)
Defense Information Systems Agency (DISA)
OSHA HAZWOPPER
PEC Premier Safety Courses
TDSHS Asbestos Inspector Course

REPRESENTATIVE PROJECTS

MONTGOMERY COUNTY DD6 — **Level 2 Stream Condition Assessment, Wetlands Delineation, Hist/Cult Survey, T&ES Survey**
Montgomery County, Texas

Conducted benthic and fin fish sampling for a stream condition assessment and related tasks for a 9.5-mile major flood control ditch rehabilitation project to support DD6 in obtaining a FEMA grant for ditch rehabilitation.

HOUSTON ISD — **Bellaire High School Hazmat Survey**
Houston, TX

Conducted inventorying of hazardous materials of the school in preparation for demolition.

CITY OF ORANGE — **Coopers Gully Stream Condition Assessment**
Orange, TX

Supported field data gathering for stream conditions for a Corp of Engineers permit for stream improvements.

GB BIOSCIENCES — **Greens Bayou Sediment Management**
Houston, TX — **Project Dredging and Debris Removal Monitoring**

Conducted Kingfisher dredge contractor monitoring for the chlorinated pesticides-contaminated sediments remediation of Greens Bayou. Worked 12-hr shifts on dredge monitoring removal of debris; sediment sampling; decant water discharge monitoring and sampling; backfill sand thin layer placement; and documentation.

WILLIAMS MIDSTREAM — **Pipeline Mercury Monitoring in TX, LA, SC, MS**
Houston, TX

Conducted mercury monitoring activities on Williams midstream pipelines and stations. Pipelines were affected

with mercury from an offshore Shell oil platform originating with the Markham facility in South Texas. Tested for mercury with Mercury Tracker, Jerome, and handheld x-ray devices. Performed duties in Texas, Louisiana, South Carolina, and Mississippi.

VARIOUS CLIENTS **Pipeline and Pump/Compressor Station Release Texas Investigations and Remediation Monitoring**

Conducted numerous pipeline and pump and compressor station release investigations to evaluate potential releases and extent of impacts to soil and groundwater from confirmed releases. Monitored remediation contractors conducting wellhead, pipeline, buried debris, and contaminated soil removal.

HOUSTON COMMUNITY COLLEGE **Indoor Air Quality Monitoring**
Houston, TX

Conducted IAQ monitoring of a new classroom and administration building to provide data to indicate building construction and air handling units were consistent with LEED requirements in order to get certification.

BUCKEYE HUB **Dredge Materials Sampling and Testing**
Corpus Christi, TX

Interacted with Client principals to address project specific hazards and concerns. Sampled sediments during active ingress and egress of large oil tankers in a dock area that was to be dredged for dock expansion. Developed the report presenting the analytical results for the sampled sediments.

STOLTHAVEN **Dredge Materials Sampling and Testing**
Houston, TX

Worked closely with the Client and field crews on project specific issues to have both onshore and offshore soil/sediment sampling locations for a new boat dock sampled in a timely manner. Directed simultaneous operations of the onshore buggy mounted rigs and offshore barge platform crews in the Houston Ship Channel. Developed the report presenting the analytical results for the sampled sediments.

VOPAKMODA **Proposed Dock Dredge and Contaminated**
Houston, TX **Sediments Sampling and Testing**

Conducted the sampling and testing activities for the pre-dredge sampling and testing of contaminated sediment and soil for a new dredging and channel deepening project, and assisted with Corps permitting.

HOUSTON FUEL OIL TERMINAL **Proposed Dock Dredge Sampling and Testing**
Houston, TX

Conducted the sampling and testing activities for the pre-dredge sampling and testing of sediment and soil for a new dredging and channel deepening project.

NUCOR STEEL **EPA Consent Decree Closure and Groundwater**
Jewett, TX **Monitoring**

In response to EPA Consent Decree, conducted the field activities at a steel smelting facility for the contaminated area investigations and closure under TRRP, including groundwater monitoring, surface water monitoring, and open trench soil and waste profiling. Specific activities involved sampling of possible contaminated soils and debris, minor surveying work to locate sampling locations, and the installation and quarterly monitoring of groundwater monitoring wells.

FORT BEND COUNTY ENGINEERING DEPARTMENT **Chlorinated Hydrocarbon Plume Delineation, MNA,**
Fort Bend County, TX **APAR, RAP**

Field Technician for a long-term groundwater monitoring program involving plume mapping and documentation of natural attenuation. A landfill gas assessment indicated methane and CO2 laden gas was bypassing the liner after the landfill was capped. Investigation results identified that the landfill gas plume was relatively hot, above or near the boiling points of several volatile organic compounds, primarily chlorinated solvents. The landfill gas plume migrated from the landfill into the cooler surrounding soils and then downward under a density gradient to the top of the water table. An APAR and RAP were approved by TCEQ.

WILD ASSOCIATES
Engineering & Environmental Consulting

Ronald J. Arceneaux, PE, PLS

PRINCIPAL ENGINEER

RELEVANT PROJECT EXPERIENCE

PROJECT MANAGER FOR LARGE WATERSHED PLANNING PROJECTS SUCH AS:

- Alligator Bayou Watershed Study, JCDD7
- City of Port Arthur Drainage Master Plan
- Tiger Creek Watershed Study, Orange County DD
- Anderson Gully Watershed Study, Orange County DD
- Heatherbrook Trail Relief Sewer, Park Central MUD

PARK CENTRAL AREA/ NEW TOWN IN TOWN, FOR THE PARK CENTRAL MUNICIPAL UTILITY DISTRICT:

PORT ARTHUR, TX

Was the Project Manager and District Engineer on this project for:

- Planning, design, construction management and grant/ loan administration for the 1,200-acre master planned mixed use community.
- Also, as the District Engineer, he administered a $15.5 million bond issue program for water, sewer, paving and drainage projects.
- Management duties included close coordination with, and reporting to, State and Federal agencies.

AIRPORT BUSINESS PARK

PORT ARTHUR, TX

Performed project management for planning, design and construction management services for:

- Creation of a 100-acre business park adjacent to Jefferson County Airport.
- Scope of responsibilities included:
  - Preparation of preliminary and final subdivision plat
  - Preparation of detailed plans
  - Contract Documents and technical Specifications
  - Coordination for all reviews by agencies having jurisdiction.

EDUCATION

Bachelor of Science, in Civil Engineering at Lamar University 1977.

CERTIFICATIONS

Registered Professional Engineer
Texas #50052
Exp. 9/30/2018
Professional Land Surveyor
Texas #4572
Exp. 12/31/2018

ACHIEVEMENTS

1980 Young Engineer of the year, TSPE
1996 Engineer of the year, TSPE
1990 Small Business of the year, Chamber of Commerce

CREDENTIALS

40+ years of supervising, planning, and designing of water transmission, utility systems, drainage, maritime and transportation projects for public and private concerns. More so, he is cultivated in the administration of privately funded projects, and public works projects funded by state and federal agencies. Through networking with regional leaders, elected officials and businesses, he has established the necessary contacts to aid in data collection, identification of policy and decision makers, and familiarity with agency interaction.

INFORMATION

Email: Ron.Arceneaux@wildassociates.net

Phone: 409.284.6517

Address: 7419 Sheffield Bend Court
Houston, TX 77095

Elizabeth Helen Silvy, Ph.D.

10400 Maple Falls, Port Arthur, TX, 77640
Phone: (979) 219-1724; E-mail: BSilvy88@yahoo.com

Education

Ph.D. Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas (August 2019)
Dissertation title: Exploring Novel Spawning and Larviculture Methodologies to Enhance Production of Warmwater Marine Fish

M.S. Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas (December 2015)
Thesis title: Determining Factors Affecting Dermo Disease (*Perkinsus marinus*) in populations of Eastern Oysters (*Crassostrea viginica*) in Galveston Bay, Texas.

B.S. Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas (August 2014)
Focus on fisheries and ecology related course work
NAUI certified open water diver, May 2007

Research Interests

My research interests are broad and encompass restoration of marine and coastal ecosystems with a focus on fisheries related enhancement through finfish and molluscan aquaculture, investigation of novel species production in aquaculture, pond and water body management, fisheries management, impacts of invasive species on trophic dynamics of marine ecosystems and human dimensions of conservation in coastal ecology and marine fisheries.

Professional Experience

Adjunct Instructor, Lamar University, Department of Biology, Beaumont, Texas. 2020–Present

Course Taught: Ichthyology (Graduate/Undergraduate), Anatomy and Physiology Lab and General Biology 2 Lab

Developed Ichthyology graduate and undergraduate lecture and lab courses. Developed and formatted Anatomy and Physiology Lab online lab manual in TopHat. Conducted lectures, graded lecture assignments and lecture exams, supervised lab assignments, planned field trips, graded lab assigned reports and lab tests. Facilitated publication of extension publications through Texas A&M AgriLife Extension Service for ichthyology graduate students. Mentorship of both undergraduate and graduate students regarding job searches and resume and cover letter preparation

Permits Obtained:
Texas Parks and Wildlife State Park Scientific Study Permit #: 05-21
Texas Parks and Wildlife Scientific Collection Permit #: SPR-0221-019

Environmental Consultant, Wild Associates, Houston, Texas. 2020–Present

Benthic macroinvertebrate sampling, identification, and Hilsenhoff Biotic Index assessment. Fishes (freshwater/marine) sampling, identification and Aquatic Life Score assessment. Malacology sampling, identification, and assessment. Formal report preparation for USACE Interim Level 2- Stream Conditional Assessment Procedure for Intermittent Streams with Perennial Pools, Perennial Streams, and Wadable Rivers with Impacts Greater than 500 Linear Feet

Post Doctoral Associate, Dr. Cortney Ohs, Indian River Research and Education Center, Fisheries and Aquatic Sciences, School of Forest Resources and Conservation, University of Florida, Ft. Pierce Florida. 2019-2020

Florida hogfish broodstock husbandry, Florida hogfish reproduction, Florida hogfish larviculture and grow out, ornamental fish culture, spawning, and larval rearing, graduate student development, mentoring, and management, grant and publication writing and editing, and general lab management and monitoring. Worked closely with visiting scholars to develop and execute research projects involving tropical fish egg production and spawning viability as well as optimizing copepod nutrition and grow out techniques.

Served as a teaching assistant for FAS 6165: Fish and Crustacean Nutrition

Graduate Research Assistant, Dr. Todd Sink, Texas A&M AgriLife Extension Service, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas. 2015–2019

Grant writing and project development, Southern flounder gender manipulation through gynogenesis, development and establishment of protocols regarding broodstock acquisition and larval cobia production, development of a live foods harvesting system to enhance rearing of larval spotted sea trout, testing novel hormone injections to enhance spawning of red drum, and general lab and facility maintenance and monitoring

Served as a teaching assistant for:
WFSC 491 530 Research: Manipulation of gender in Southern flounder culture. Spring semester, 2017
WFSC 491 902 Research: Examination of pellet-trained largemouth bass continuance of artificial diet utilization in the presence of natural forage. Writing intensive course. Spring and Fall semesters, 2017

Lab Coordinator, Dr. Todd Sink, Texas A&M AgriLife Extension Service, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas. 2015–2019

Coordinate weekly lab meetings of undergraduate students, evaluate student performance, develop and oversee facility set up and maintenance plans, develop and edit publications, websites, and apps.

Graduate Teaching Assistant, Dr. Frances Gelwick, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas. 2014–2016

Animal Ecology (WFSC 403) and Fisheries Management (WFSC 410).

Conducted lectures, supervised lab assignments, planned field trips to streams and rivers located in the Bryan/College Station area and the Texas coast which included fish collection (seining and electroshocking) and identification, arranged for guest speakers, graded lab assigned reports and lab tests

Research Assistant, Dr. Nils Peterson and Dr. Brian Langerhans, Human Dimensions in Conservation Biology, FORFAR Research Station, Andros, Bahamas. 2014

Developed questions and conducted interviews with commercial fisherman regarding the drivers and impacts of illegal marine harvest. Worked with R to transcribe interviews and analyze resulting data. Conducted fish assemblage survey regarding invasive lionfish impacts. Worked closely with coauthors to produce publications resulting from research undertaken in both lionfish effects on fish assemblage surveys as well as impacts of neocolonialism on native fisherman

Undergraduate Research Assistant, Dr. Frances Gelwick, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas. 2014

Designed and implemented a field project, collected oyster samples in the Galveston Bay area. Worked in conjunction with Dr. Tom Soniat of Louisiana State University to update *DermoWatch*, a comprehensive webpage detailing Dermo prevalence in the Gulf of Mexico.

Undergraduate Publication Assistant, Dr. Todd Sink, Texas A&M AgriLife Extension Service, Texas A&M University, College Station, Texas. 2014

Develop, write, and edit publications, Maintain AgriLife Extension Aquaculture, Fisheries, and Pond Management website. Design and prepare applications for Android and iOS operating systems.

Laboratory Technician, Dr. Sammy Ray, Department of Marine Biology, Texas A&M Galveston, Galveston, Texas. 2011

Conducted Dermo (*Perkinsus marinus*) research. Cured samples, prepared slides, read slides using histological methodologies, data entry and analysis, maintained and updated *DermoWatch* website, worked closely with researchers at Louisiana State University

Field Technician, Dr. Sammy Ray, Department of Marine Biology, Texas A&M Galveston, Galveston, Texas. 2011

Conducted Dermo (*Perkinsus marinus*) research. Collected samples, processed samples using histological methodologies, prepared spat bags, collected spat bags from the field lab.

Undergraduate Laboratory Assistant, Department of Marine Biology, Texas A&M Galveston, Galveston, Texas. 2010

Graduate student research on juvenile dolphin fish (*Coryphaena hippurus*), Image Plus Pro, larval fish calibration measurements, larval fish sorting.

Undergraduate Research Assistant, Department of Marine Biology, Texas A&M Galveston, Galveston, Texas. 2009

Graduate student research on larval Snook (*Centropomus undecimalis*). Field research, trawl seine nets, data collection, larval fish identification

---

Teaching

Adjunct Instructor, Lamar University, Department of Biology, Beaumont, Texas (2020-2021)
Course Taught:

BIOL 1407: General Biology II Lab: Plant and vertebrate structure and function, development, reproduction, and ecology.
BIOL 2401: Anatomy and Physiology Lab: Structure and function of cells, tissues, and muscle, skeletal and nervous systems.
BIOL 4431: Ichthyology Lecture and Lab: Natural history, taxonomy and ecology of freshwater and marine fishes.
BIOL 5431: Graduate Ichthyology Lecture and Lab: Natural history, taxonomy and ecology of freshwater and marine fishes.

Teaching Assistant, University of Florida Indian River Research and Education Center, Fisheries and Aquatic Sciences, School of Forest Resources and Conservation, Fort Pierce, Florida. (2019–2020)
Course Taught:

FAS 6165: Fish and Crab Nutrition: Basic principles of nutrition and formulation of diets for fish and crustaceans in aquaculture. Digestive physiology, nutrients, feed formulation, and specific nutritional requirements for numerous aquatic organisms.

Graduate Teaching Assistant, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas (2016–2019)
Courses taught:

WFSC 491 530 Research: Manipulation of gender in Southern flounder culture. Spring semester
WFSC 491 902 Research: Examination of pellet-trained largemouth bass continuance of artificial diet utilization in the presence of natural forage. Writing intensive course. Spring and Fall semesters

Responsible for overseeing undergraduate research proposals, project planning, and projects undertaking. Responsible for overseeing development, construction, and completion of undergraduate research project involving largemouth bass diet studies. Provided aid and editing for reports. Served as mentor for undergraduate students within the lab.

Graduate Teaching Assistant, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas (2015–2016)
Courses Taught:

WFSC 403: Animal Ecology: Concepts of animal ecology which emerge at various levels of organization; the ecosystem, the community, the population and the individual; laboratories emphasis on the quantitative analysis of field data and the simulation of population dynamics.
WFSC 410: Fisheries Management: Basic knowledge from ichthyology, biology of fishes and limnology related to applied aspects of freshwater and marine fishery science. Management techniques applicable to streams, ponds, reservoirs, estuaries, and the oceans.

Responsible for 2 (3 hour) labs in WFSC 403 (Animal Ecology) and WFSC 410 (Fisheries Management)Conducted lectures, supervised lab assignments, planned field trips to streams and rivers located in the Bryan/College Station area and the Texas coast which included fish collection (seining and electroshocking) and identification, arranged for guest speakers, graded lab assigned reports and lab tests

Teaching Assistant, GO Science Club, Texas A&M Galveston (2009–2010)

Responsible for daily records and maintenance
Participated in and designed functional science lessons to encourage young women to enter STEM fields
Mentor in basic science for children ages 5–15

Scholarships/Grants/Awards
Grant Totals: ($525,000)

2020 NOAA-NMFS Saltonstall-Kennedy Competitive Grants Program ($300,000)

Grant Title: Refining Culture Methods to Improve Aquaculture Production of Hogfish (*Lachnolaimus maximus*)

2016 Agriculture and Food Research Initiative (AFRI) Critical Agricultural Research and Extension ($225,000)

Grant Title: Advancement of Extensive Larval Culture and Earthen Pond Grow-Out Protocols for Commercial Cobia (*Rachycentron canadum*) Production.

2016 Winner, Weirdest Job on Campus Texas A&M University

University Wide Competition for strangest job on campus. Detailed reporting on South Flounder gynogenetic cloning

2015 Texas Sea Grant's Grant-in-Aid of Graduate Research Award ($1,500) To aid in Master's degree research funding

Proposal Title: Determining factors affecting Dermo disease (*Perkinsus marinus*) in populations of eastern oysters (*Crassostrea viginica*) in Galveston Bay, Texas.

Publications

E.H. Silvy, F. Shopnitz, and C. Ohs. 2021. Broodstock Formation, Spawning, And Larval Culture of Hogfish (*Lachnolaimus maximus*). World Aquaculture Magazine. (In press)

E.H. Silvy and T.D. Sink. 2020. The Use of Maturation Peptides to Induce and Synchronize Ovulation in Captive, Sexually Mature, Female Cobia. Journal of Biology and Life Sciences. 1(5) 2020. SJBLS.MS.ID.000522.

E.H. Silvy, F.P. Gelwick and N. J. Silvy. 2020. Factors Affecting Dermo Disease (*Perkinsus marinus*) in Eastern Oysters (*Crassostrea virginica*) in Galveston Bay, Texas. Journal of Environmental Science and Engineering. A9 (2020):227-245.

Ohs, C.L., A.H. Beany, and **E.H. Silvy**. 2020. Evaluation of retail markets and the perception and potential of marketing cultured bait shrimp. Journal of Shellfish Research. 39(2):471

E. H. Silvy and T.D. Sink. 2020. Evaluation of the Safety and Gross Pathology of a Sucrose Based Excipient Intended to Deliver Time-Released Spawning Peptides in Warmwater Marine Fish. Journal of Aquatic Resources and Marine Sciences. 2020:218–225

E.H. Silvy and T.D. Sink. 2020. Evaluating temperature and pressure shock to create gynogenic cloned progeny in southern flounder (*Paralichthys lethostigma*). North American Journal of Aquaculture. 82(4):369-420.

Sink, T.D., and **E.H. Silvy**. 2019. Farming and all-female flounder population. Scientia. Scientia.global. 12 Nov 2019. https://www.scientia.global/dr-todd-sink-farming-an-all-female-flounder-population/.

Silvy, E.H., E. Johnson, C. Story, M. N. Peterson, J. Heinen-Kay, and R. B. Langerhans. 2018. Illegal harvest of marine resources on Andros Island and the legacy of colonialism. British Journal of Criminology. 58(2):332–350.

Silvy, E.H., B. Peachey, D. Gatlin and T. Sink. 2017. Project Title: Development of New Reproductive and Larval Rearing Methods to Eliminate Major Constraints During Production of Southern Flounder (*Paralichthys lethostigma*) for Stock Enhancement: FINAL REPORT. Texas Parks and Wildlife Department contract number: 487654

Sink, T.D. and **E.H. Silvy**. 2017. Black Gill Syndrome in Brown Shrimp from Galveston Bay. Texas A&M AgriLife Extension Service No. WFSC-016

Sink, T., **E.H. Silvy**, and W. Walton. 2015. Eastern oysters. Southern Regional Aquaculture Center fact sheet 7305, AgriLife Extension, Texas A&M University, College Station, Texas, USA.

Sink, T., **E.H. Silvy**, and H. Gerke. 2015. Adding value to oyster crops–branding, marketing, and production strategies. AgriLife Extension Solutions publication EWF-016, AgriLife Extension, Texas A&M University, College Station, Texas, USA.

Sink, T.D., J.K. Gwinn, H. Gerke, and **E.H. Silvy**. 2014. Crawfish Production Manual for Texas. Texas A&M AgriLife Extension Service Publication No. EWF-018

Professional Societies

Society	**Years Active**
World Aquaculture Association	2016–Present
American Aquaculture Association	2016–Present
Texas Aquaculture Association	2014– Present
American Fisheries Society	2014– Present
Texas Chapter of the American Fisheries Society	2014–Present
Global Aquaculture Alliance	2019–Present
Global Aquaculture Alliance	2014–2018

Professional Service

2021 External Reviewer for North Carolina Sea Grant Biennial Research Competition. Invited Review.
Grant Title: "The Impacts of Black Gill Disease in North Carolina Shrimp: Prevalence, Environmental Drivers, and Physiological Effects."

2017 Served as Treasurer of the Texas A&M Chapter of the American Fisheries Society
2017 Member of Discussion Panel, "Restoring Coastal Ecosystems through Aquaculture", World Aquaculture Society Annual Meeting, San Antonio, Texas

Discussed current issues in public perception of aquaculture and the meaning and basis of science to the current perceptions, as well as the future of aquaculture in acceptance with those perceptions

2016 Organized and participated in Dermo identification methods workshop, University of Houston at Clear Lake

Coordinated with researchers at the University of Houston at Clear Lake, The Environmental Institute of Houston, Louisiana State University, and Texas A&M University to better understand and identify Dermo (*Perkinsus marinus)* in oyster tissue samples collected in the Gulf of Mexico

2016 Planned and coordinated Annual Fish Fry for TAMU Chapter of the American Fisheries Society
2015 Planned and coordinated Annual Fish Fry for TAMU Chapter of the American Fisheries Society
2014 Planned and coordinated Annual Fish Fry for TAMU Chapter of the American Fisheries Society

---

Invited Presentations

Silvy, E., F. Gelwick, G. Guillen, and R. Lopez. 2015. Determining factors affecting Dermo disease (*Perkinsus marinus*) in populations of eastern oysters (*Crassostrea viginica*) in Galveston Bay, Texas. Galveston Bay Estuary Program: State of the Bay Conference, Galveston, Texas.

Presentations

Silvy, E., C. Ohs, F. Shopnitz, M. DiMaggio, A. Collins, and J. Patterson. 2020. Hogfish (*Lachnolaimus maximus*) Broodstock Husbandry, Harem Formation, Volitional Spawning, and Larval Rearing. World Aquaculture Society annual meeting, Honolulu, Hawaii.

Silvy, E., R. Vega, and T. Sink. 2018. Production of greater quantities of female southern flounder for foodfish culture and stock enhancement. World Aquaculture Society annual meeting, Las Vegas, Nevada.

Silvy, E., R. Vega, and T. Sink. 2018. Production of greater quantities of female southern flounder for stock enhancement. Texas Chapter of The American Fisheries Society annual meeting, College Station, Texas.

Silvy, E., R. Vega, and T. Sink. 2017. Manipulation of gender in southern flounder to improve both stock enhancement and food production. World Aquaculture Society annual meeting, San Antonio, Texas.

Silvy, E., F. Gelwick, G. Guillen, and R. Lopez. 2015. Determining factors affecting Dermo disease (*Perkinsus marinus*) in populations of eastern oysters (*Crassostrea viginica*) in Galveston Bay, Texas. Texas Chapter of The American Fisheries Society annual meeting, Kerrville, Texas.

Silvy, E., E. Johnson, C. Story, M. N. Peterson, J. L. Heinen, and R. B. Langerhans. 2014. Drivers and deviants of illegal harvest of marine resources on Andros Island and the legacy of colonialism in a soil deprived nation. American Fisheries Society annual meeting, Quebec, Canada. Poster

Silvy, E., E. Johnson, C. Story, M. N. Peterson, J. L. Heinen, and R. B. Langerhans. 2014. Drivers and deviants of illegal harvest of marine resources on Andros Island and the legacy of colonialism in a soil deprived nation. American Fisheries Society annual meeting, Portland, Oregon.

Skills

Enhanced proficiency with BlackBoard Learn and TopHat
Aquaculture system design, construction and completion
Boat and engine maintenance and handling
SCUBA certified (NAUI)
U.S.C.G. Boater Safety Course (Florida and Texas certification)
Control burn experience
Proficient in Microsoft Word, Excel, PowerPoint, Scientific Calculator, and Internet
Basic construction (drywall, plumping, cement, ceilings)
Radiotelemetry

Ryan E. Nelson

717 Tamarack Drive *713-818-5035*
McAllen, TX 778501 *ryannelson95@hotmail.com*

Education

Bachelor of Science, Texas A&M University, Zoology, May 1996

Master of Science, Texas A&M University, Wildlife and Fisheries Science, December 1999

Summary of Technical Skills

- Experienced in environmental regulatory issues from regulatory and industry perspectives.
- Proficient in the use of a wide variety of tools and disciplines used in environmental resource management. Examples include:
  - Use of GPS and GIS technology
  - Wetland delineations
  - Biological surveys
  - Water quality assessments
  - Wetland restorations
  - Emergency response
  - Environmental sampling
  - Environmental permit acquisition
  - Project management
  - Preparation of proposals
- Experienced in the production of technical reports detailing environmental projects. Prepared numerous reports such as Phase I Environmental Site Assessments, Wetland Delineation Reports, and biological sections of Environmental Impact Statements. Also have written governmental publications such as reports detailing environmental inspections and water quality in the Rio Grande.

Job Experience

2010-Present - Biological Consultant

- Performed biological surveys in Texas
- Performed endangered species surveys in Texas

2008- Present – Science Teacher McAllen ISD, Sharyland ISD

- Taught physics, biology, and environmental science.

2006-2008 - Project Manager, Crouch Environmental Services, Houston, Texas

- Conducted Phase I Environmental Site Assessments, Phase II Environmental Site Assessments, and Biological Surveys for various projects.
- Managed crews of scientists and technicians delineating wetlands on more than 20,000 acres at various project sites in Texas.
- Prepared work scopes and cost proposals for various projects.
- Interacted with clients and regulatory agencies to insure expectations were met.

2005-2006 – Biologist, Tolunay-Wong Engineers, Houston, Texas

- Conducted all biological surveys and wetland delineations as the sole company biologist.
- Conducted Phase I Environmental Site Assessments and Phase II Environmental Site Assessments.
- Prepared USACE Wetlands Permits for various projects.

2003-2005 - Environmental Management Division, US International Boundary and Water Commission, Texas Clean Rivers Program, El Paso, Texas

- Tracked program budget expenditures and prepare budget and progress reports.
- Collected monthly field and laboratory water quality parameters at sampling stations.
- Coordinated data collection with various other state and federal agencies, universities, and other nongovernmental organizations.
- Compiled data collected by the Clean Rivers Program and other entities into databases accessible to the public.
- Prepared annual reports detailing water quality in the Rio Grande using a variety of tools including GIS applications.
- Assisted in the organization, preparation, and coordination of CRP public meetings.
- Assisted in a variety of public outreach programs dealing with water quality issues.

2000- 2003 - Environmental Investigator, Texas Commission on Environmental Quality, El Paso, Texas

- Duties included monitoring surface waters of the state and investigating public water supplies, wastewater treatment facilities, on-site sewage facilities, sludge land application sites, and animal feeding operations.
- Prepared monitoring plans for the region using previously analyzed data, collected water quality samples and field data, analyzed data for quality assurance purposes, and input data into state water quality databases.
- Reviewed regulated entity permit files, provided technical assistance to the public, conducted investigations of facilities to insure compliance with state and federal laws, conducted complaint investigations, and wrote technical reports outlining those investigations.
- Responded to accidental pollutant discharges as a representative of the TCEQ. 40 hour HAZWOPER certified.
- Additional duties included regional office GPS trainer (trained all office personnel in the use of GPS technology), and Chemical Hygiene Officer (responsible for insuring all lab safety procedures were followed).

1996 – 1999 - Research Assistant, Texas A&M University, College Station, Texas

- Contracted by Texas Parks and Wildlife to conduct a survey of East Texas water bodies for the threatened Alligator Snapping Turtle.
- Participated in numerous biological surveys though out Texas and New Mexico.
- Obtained funding for, designed, and implemented a research project studying the thermal ecology of the alligator snapping turtle.

APPENDIX M – WETLAND DATA SHEETS

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Brenham Family Park City/County: Brenham, Washington Sampling Date: 8-5-2021

Applicant/Owner: City of Brenham State: Texas Sampling Point: TP-1 Transect 6

Investigator(s): P. Wild, C. Wild Section, Township, Range: _____

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

Subregion (LRR or MLRA): LRR J Lat: 30.135596° Long: -96.380472° Datum: WGS 84

Soil Map Unit Name: 20 Carbengle clay loam, 5 to 8 percent slopes NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ 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)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

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

Wetland Hydrology Present? **Yes** _____ **No** X

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

Remarks:

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

Sampling Point: TP-1

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 40')			
1. Rubus arvensis	30	Y	FAC
2. Ambrosia psilostachya	30	Y	FAC
3. Croton capitatus	20	Y	NI
4. Smilax bona-nox	5	N	FAC
5. Sorghum halepense	2	N	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	87 = Total Cover		
50% of total cover: 43.5	20% of total cover: 17.4		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (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]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: TP-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
0-20	10yr3/2	100					sandy clay	sand partings 10yr4/6

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked 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)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Brenham Family Park City/County: Brenham, Washington Sampling Date: 8-5-2021

Applicant/Owner: City of Brenham State: Texas Sampling Point: TP-2 Transect 6

Investigator(s): P. Wild, C. Wild Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): 0.5

Subregion (LRR or MLRA): LRR J Lat: 30.135333° Long: -96.381172° Datum: WGS 84

Soil Map Unit Name: 20 Carbengle clay loam, 5 to 8 percent slopes NWI classification: PFO1A

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

Sampling point maps on top of the NWI feature for the creek which is actually 25 ft to the SW.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ 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)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

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

Wetland Hydrology Present? **Yes** _____ **No** X

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

Remarks:

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

Sampling Point: TP-2

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus nigra	90	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	90 = Total Cover		
50% of total cover: 45	20% of total cover: 18		
Sapling/Shrub Stratum (Plot size: 30')			
1. Carya illinoinensis	30	Y	FACU
2. Ilex vomitoria	30	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	60 = Total Cover		
50% of total cover: 30	20% of total cover: 12		
Herb Stratum (Plot size: 30')			
1. Toxicodendron radicans	5	Y	FAC
2. Smilax bona-nox	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (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]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: TP-2

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
0-20	10yr2/1	100					clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked 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)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Brenham Family Park City/County: Brenham, Washington Sampling Date: 9-7-2021

Applicant/Owner: City of Brenham State: Texas Sampling Point: TP-3

Investigator(s): P. Wild Section, Township, Range: _____

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

Subregion (LRR or MLRA): LRR J Lat: 30.137293° Long: -96.383810° Datum: WGS 84

Soil Map Unit Name: 8 Bosque clay loam, frequently flooded NWI classification: _____

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ 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)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

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

Wetland Hydrology Present? **Yes** _____ **No** X

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

Remarks:

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

Sampling Point: TP-3

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size: 30')			
1. Prosopis glandulosa	3	Y	UPL
2. Acer negundo	1	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	4 = Total Cover		

50% of total cover: 2 20% of total cover: 0.8

Herb Stratum (Plot size: 30')			
1. Rubus arvensis	100	Y	FAC
2. Solidago canadensis	10	N	FACU
3. Cynodon dactylon	10	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120 = Total Cover		

50% of total cover: 60 20% of total cover: 24

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	101	x 3 =	303
FACU species	20	x 4 =	80
UPL species	3	x 5 =	15
Column Totals:	124 (A)		398 (B)

Prevalence Index = B/A = 3.2

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: TP-3

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
0-20	10yr2/1	100					clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked 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)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Brenham Family Park City/County: Brenham, Washington Sampling Date: 9-7-2021

Applicant/Owner: City of Brenham State: Texas Sampling Point: TP-4

Investigator(s): P. Wild Section, Township, Range: _____

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

Subregion (LRR or MLRA): LRR J Lat: 30.137586° Long: -96.383430° Datum: WGS 84

Soil Map Unit Name: 41 Klump loamy sand, 5 to 8 percent slopes NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ 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)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

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

Wetland Hydrology Present? **Yes** _____ **No** X

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

Remarks:

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

Sampling Point: TP-4

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Maclura pomifera	80	Y	FACU
2. Platanus occidentalis	5	N	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	85 = Total Cover		

50% of total cover: 42.5 20% of total cover: 17

Sapling/Shrub Stratum (Plot size: 30')			
1. Ilex vomitoria	5	Y	FAC
2. Carya illinoinensis	3	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	8 = Total Cover		

50% of total cover: 4 20% of total cover: 1.6

Herb Stratum (Plot size: 30')			
1. Toxicodendron radicans	20	Y	FAC
2. Smilax rotundifolia	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25 = Total Cover		

50% of total cover: 12.5 20% of total cover: 5

Woody Vine Stratum (Plot size: 30')			
1. Vitis mustangensis	10	Y	NI
2.			
3.			
4.			
5.			
	10 = Total Cover		

50% of total cover: 5 20% of total cover: 2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	5	x 2 =	10
FAC species	30	x 3 =	90
FACU species	83	x 4 =	332
UPL species		x 5 =	
Column Totals:	118 (A)		432 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: TP-4

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
0-20	10yr4/3	100					sl. silty sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked 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)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Brenham Family Park City/County: Brenham, Washington Sampling Date: 9-7-2022

Applicant/Owner: City of Brenham State: Texas Sampling Point: TP-5

Investigator(s): P. Wild Section, Township, Range:

Landform (hillslope, terrace, etc.): swale slope Local relief (concave, convex, none): concave Slope (%): 10

Subregion (LRR or MLRA): LRR J Lat: 30.135243 Long: -96.378864 Datum: NAD83

Soil Map Unit Name: 41 Klump loamy sand, 5 to 8 percent slopes NWI classification: R4SBC

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

The channel shown on the NWI map does not exist, such that the NWI designation of R4SBC is not accurate.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ 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)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 10

Wetland Hydrology Present? Yes X No _____

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: TP-5

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 10 ft)			
1. Cynodon dactylon	50	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	50 = Total Cover		

50% of total cover: 25 20% of total cover: 10

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: TP-5

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR3/1	99	5YR3/4	1	C	M	fine sandy clay	
16 - 20	10YR2/1	100					sandy clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked 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)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

APPENDIX N - TEST PIT PHOTOGRAPHS

Photo 1: Test Pit 1 non-hydric soil.

Photo 2: Test Pit 1 dominant species Cuman Ragweed (*Ambrosia psilostachya*).

Photo 3: Test Pit 2 non-hydric soil.

Photo 4: Test Pit 2 dominant species Pecan (*Carya illinoinensis*).

Photo 5: Test Pit 3 non-hydric soil.

Photo 6: Test Pit 3 dominant species Field Blackberry (*Rubus arvensis*).

WETLAND TEST PIT PHOTOGRAPHS

City of Brenham

Brenham Family Park

Brenham, Washington County, Texas

WILD ASSOCIATES
Engineering & Environmental Consulting

Photo 7: Test Pit 4 non-hydric soil.

Photo 8: Test Pit 4 dominant species Osage-Orange (*Maclura pomifera*).

Photo 9: Test Pit 5 non-hydric soil.

Photo 10: Test Pit 5 dominant species Bermuda grass (*Cynodon dactylon.)*

WETLAND TEST PIT PHOTOGRAPHS

City of Brenham

Brenham Family Park

Brenham, Washington County, Texas

WILD ASSOCIATES
Engineering & Environmental Consulting