City of Carrollton, Texas
Nationwide Permit 27
Pre-Construction Notification

Dudley Branch Pond Removal and Stream Restoration

SWF-2018-00405

Denton County, Texas

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Prepared for:
The City of Carrollton, Texas
1945 E. Jackson Rd. Carrollton, Texas 75006

Prepared by:
HDR Engineering, Inc.
17111 Preston Rd., Suite 300
Dallas, TX 75248-1232

U.S. Army Corps of Engineers (USACE)
Fort Worth District

Nationwide Permit (NWP) Pre-Construction Notification (PCN) Form

This form integrates requirements of the Nationwide Permit Program within the Fort Worth District, including General and Regional Conditions. Please consult instructions included at the end prior to completing this form.

Contents

- **Description of NWP 27**
- **Part I:** NWP Conditions and Requirements Checklist
  - General Conditions Checklist
  - NWP 27-Specific Requirements Checklist
  - Regional Conditions Checklist
- **Part II:** Project Information Form
- **Part III:** Project Impacts and Mitigation Form
- **Part IV:** Attachments Form
- **Instructions**

DESCRIPTION OF NWP 27 – AQUATIC HABITAT RESTORATION, ESTABLISHMENT, AND ENHANCEMENT ACTIVITIES

Activities in waters of the United States associated with the restoration, enhancement, and establishment of tidal and non-tidal wetlands and riparian areas, the restoration and enhancement of non-tidal streams and other non-tidal open waters, and the rehabilitation or enhancement of tidal streams, tidal wetlands, and tidal open waters, provided those activities result in net increases in aquatic resource functions and services.

To the extent that a Corps permit is required, activities authorized by this NWP include, but are not limited to: the removal of accumulated sediments; the installation, removal, and maintenance of small water control structures, dikes, and berms, as well as discharges of dredged or fill material to restore appropriate stream channel configurations after small water control structures, dikes, and berms, are removed; the installation of current deflectors; the enhancement, restoration, or establishment of riffle and pool stream structure; the placement of in-stream habitat structures; modifications of the stream bed and/or banks to restore or establish stream meanders; the backfilling of artificial channels; the removal of existing drainage structures, such as drain tiles, and the filling, blocking, or reshaping of drainage ditches to restore wetland hydrology; the installation of structures or fills necessary to establish or re-establish wetland or stream hydrology; the construction of small nesting islands; the construction of open water areas; the construction of oyster habitat over unvegetated bottom in tidal waters; shellfish seeding; activities needed to reestablish vegetation, including plowing or discing for seed bed preparation and the planting of appropriate wetland species; re-establishment of submerged aquatic vegetation in areas where those plant communities previously existed; re-establishment of tidal wetlands in tidal waters where those wetlands previously existed; mechanized land clearing to remove non-native invasive, exotic, or nuisance vegetation; and other related activities. Only native plant species should be planted at the site.

This NWP authorizes the relocation of non-tidal waters, including non-tidal wetlands and streams, on the project site provided there are net increases in aquatic resource functions and services.

Except for the relocation of non-tidal waters on the project site, this NWP does not authorize the conversion of a stream or natural wetlands to another aquatic habitat type (e.g., stream to wetland or vice versa) or uplands. Changes in wetland plant communities that occur when wetland hydrology is more fully restored during wetland rehabilitation activities are not considered a conversion to another

aquatic habitat type. This NWP does not authorize stream channelization. This NWP does not authorize the relocation of tidal waters or the conversion of tidal waters, including tidal wetlands, to other aquatic uses, such as the conversion of tidal wetlands into open water impoundments.

Compensatory mitigation is not required for activities authorized by this NWP since these activities must result in net increases in aquatic resource functions and services.

Reversion. For enhancement, restoration, and establishment activities conducted: (1) In accordance with the terms and conditions of a binding stream or wetland enhancement or restoration agreement, or a wetland establishment agreement, between the landowner and the U.S. Fish and Wildlife Service (FWS), the Natural Resources Conservation Service (NRCS), the Farm Service Agency (FSA), the National Marine Fisheries Service (NMFS), the National Ocean Service (NOS), U.S. Forest Service (USFS), or their designated state cooperating agencies; (2) as voluntary wetland restoration, enhancement, and establishment actions documented by the NRCS or USDA Technical Service Provider pursuant to NRCS Field Office Technical Guide standards; or (3) on reclaimed surface coal mine lands, in accordance with a Surface Mining Control and Reclamation Act permit issued by the Office of Surface Mining Reclamation and Enforcement (OSMRE) or the applicable state agency, this NWP also authorizes any future discharge of dredged or fill material associated with the reversion of the area to its documented prior condition and use (i.e., prior to the restoration, enhancement, or establishment activities). The reversion must occur within five years after expiration of a limited term wetland restoration or establishment agreement or permit, and is authorized in these circumstances even if the discharge occurs after this NWP expires. The five-year reversion limit does not apply to agreements without time limits reached between the landowner and the FWS, NRCS, FSA, NMFS, NOS, USFS, or an appropriate state cooperating agency. This NWP also authorizes discharges of dredged or fill material in waters of the United States for the reversion of wetlands that were restored, enhanced, or established on prior-converted cropland or on uplands, in accordance with a binding agreement between the landowner and NRCS, FSA, FWS, or their designated state cooperating agencies (even though the restoration, enhancement, or establishment activity did not require a section 404 permit). The prior condition will be documented in the original agreement or permit, and the determination of return to prior conditions will be made by the Federal agency or appropriate state agency executing the agreement or permit. Before conducting any reversion activity the permittee or the appropriate Federal or state agency must notify the district engineer and include the documentation of the prior condition. Once an area has reverted to its prior physical condition, it will be subject to whatever the Corps Regulatory requirements are applicable to that type of land at the time. The requirement that the activity results in a net increase in aquatic resource functions and services does not apply to reversion activities meeting the above conditions. Except for the activities described above, this NWP does not authorize any future discharge of dredged or fill material associated with the reversion of the area to its prior condition. In such cases a separate permit would be required for any reversion.

Reporting. For those activities that do not require pre-construction notification, the permittee must submit to the district engineer a copy of: (1) The binding stream enhancement or restoration agreement or wetland enhancement, restoration, or establishment agreement, or a project description, including project plans and location map; (2) the NRCS or USDA Technical Service Provider documentation for the voluntary stream enhancement or restoration action or wetland restoration, enhancement, or establishment action; or (3) the SMCRA permit issued by OSMRE or the applicable state agency. The report must also include information on baseline ecological conditions on the project site, such as a delineation of wetlands, streams, and/or other aquatic habitats. These documents must be submitted to the district engineer at least 30 days prior to commencing activities in waters of the United States authorized by this NWP.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing any activity (see general condition 32), **except** for the following activities:

(1) Activities conducted on non-Federal public lands and private lands, in accordance with the terms and conditions of a binding stream enhancement or restoration agreement or wetland

enhancement, restoration, or establishment agreement between the landowner and the U.S. FWS, NRCS, FSA, NMFS, NOS, USFS or their designated state cooperating agencies;

(2) Voluntary stream or wetland restoration or enhancement action, or wetland establishment action, documented by the NRCS or USDA Technical Service Provider pursuant to NRCS Field Office Technical Guide standards; or

(3) The reclamation of surface coal mine lands, in accordance with an SMCRA permit issued by the OSMRE or the applicable state agency.

However, the permittee must submit a copy of the appropriate documentation to the district engineer to fulfill the reporting requirement. (Sections 10 and 404)

Note: This NWP can be used to authorize compensatory mitigation projects, including mitigation banks and in-lieu fee projects. However, this NWP does not authorize the reversion of an area used for a compensatory mitigation project to its prior condition, since compensatory mitigation is generally intended to be permanent.

Part I: NWP Conditions and Requirements Checklist

To ensure compliance with the General Conditions (GC), in order for an authorization by a NWP to be valid, please answer the following questions:

1. Navigation (Applies to Section 10 waters [i.e. navigable waters of the U.S.], see instruction 4 for link to list):

a. Does the project cause more than a minimal adverse effect on navigation?
☐ Yes ☒ No ☐ N/A

b. Does the project require the installation and maintenance of any safety lights and signals prescribed by the U.S. Coast Guard on authorized facilities in navigable waters of the U.S.? ☐ Yes ☒ No ☐ N/A

c. Does the Applicant understand and agree that if future operations by the U.S. require the removal, relocation, or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the Applicant will be required, upon due notice from the USACE, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S.; and no claim shall be made against the U.S. on account of any such removal or alteration?
☒ Yes ☐ No ☐ N/A

If you answered yes to question a. or b. above, or if you answered no to question c. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

2. Aquatic Life Movements:

a. Does the project substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area? ☐ Yes ☒ No

b. Is the project's primary purpose to impound water? ☐ Yes ☒ No

c. Will culverts placed in streams be installed to maintain low flow conditions to sustain the movement of those aquatic species? ☐ Yes ☐ No ☒ N/A

If you answered yes to question a. or b. above, or if you answered no to question c. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

3. Spawning Areas:

a. Does the project avoid spawning areas during the spawning season to the maximum extent practicable? ☒ Yes ☐ No ☐ N/A

b. Does the project result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area?
☐ Yes ☒ No ☐ N/A

If you answered no to question a. above, or if you answered yes to question b. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

4. Migratory Bird Breeding Areas:

a. Does the project avoid waters of the U.S. that serve as breeding areas for migratory birds to the maximum extent practicable? ☒ Yes ☐ No ☐ N/A

If you answered no to question a. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

5. Shellfish Beds:

a. Does the project occur in areas of concentrated shellfish populations? ☐ Yes ☒ No

If you answered yes to question a. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

6. Suitable Material:

a. Does the project use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.)?
☐ Yes ☒ No

b. Is the material used for construction or discharged in a water of the U.S. free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act)? ☒ Yes ☐ No

If you answered yes to question a. above, or if you answered no to question b. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

7. Water Supply Intakes:

a. Does the project occur in the proximity of a public water supply intake? ☐ Yes ☒ No

If you answered yes to question a. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

8. Adverse Effects From Impoundments:

a. Does the project create an impoundment of water? ☐ Yes ☒ No

b. If you answered yes to question a. above, are the adverse effects (to the aquatic system due to accelerating the passage of water, and/or restricting its flow) minimized to the maximum extent practicable? ☐ Yes ☐ No ☒ N/A

If you answered no to question b. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

9. Management of Water Flows:

a. Does the project maintain the pre-construction course, condition, capacity, and location of open waters to the maximum extent practicable, for each activity, including stream channelization and storm water management activities? ☒ Yes ☐ No

b. Will the project be constructed to withstand expected high flows? ☒ Yes ☐ No

c. Will the project restrict or impede the passage of normal or high flows? ☐ Yes ☒ No

If you answered no to question a. or b. above, or if you answered yes to question c. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application: **The nature of the projected is restoring a stream channel where there is currently an impoundment. See Attachement H for more information regarding expected flows and condition of the restored stream channel.**

10. Fills Within 100-Year Floodplains:

a. Does the project comply with applicable FEMA-approved state or local floodplain management requirements? ☒ Yes ☐ No ☐ N/A

If you answered no to question a. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

11. Equipment:

a. Will heavy equipment working in wetlands or mudflats be placed on mats, or other measures be taken to minimize soil disturbance? ☒ Yes ☐ No ☐ N/A

If you answered no to question a. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

12. Soil Erosion and Sediment Controls:

a. Will the project use appropriate soil erosion and sediment controls and maintain them in effective operating condition throughout construction? ☒ Yes ☐ No

b. Will all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, be permanently stabilized at the earliest practicable date?
☒ Yes ☐ No

c. Be aware that if work will be conducted within waters of the U.S., Applicants are encouraged to perform that work during periods of low-flow or no-flow.

If you answered no to question a. or b. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

13. Removal of Temporary Fills:

a. Will temporary fills be removed in their entirety and the affected areas returned to pre-construction elevations? ☒ Yes ☐ No ☐ N/A

b. Will the affected areas be revegetated, as appropriate? ☒ Yes ☐ No ☐ N/A

If you answered no to question a. or b. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

14. Proper Maintenance:

a. Will any authorized structure or fill be properly maintained, including maintenance to ensure public safety? ☒ Yes ☐ No

If you answered no to question a. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

15. Single and Complete Project:

a. Does the Applicant certify that the project is a "single and complete project" as defined below?
☒ Yes ☐ No

Single and complete project:
Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.
Single and complete non-linear project: For non-linear projects, the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of "independent utility"). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in an NWP authorization.

Independent utility: Defined as a test to determine what constitutes a single and complete non-linear project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

16. Wild and Scenic River:

There are no Wild and Scenic Rivers within the geographic boundaries of the Fort Worth District. Therefore, this GC does not apply.

17. Tribal Rights:

a. Will the project or its operation impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights? ☐ Yes ☒ No ☐ N/A

If you answered yes to question a. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

18. Endangered Species (see also Box 8 in Part III):

a. Is the project likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or will the project directly or indirectly destroy or adversely modify the critical habitat of such species? ☐ Yes ☒ No

b. Might the project affect any listed species or designated critical habitat? ☐ Yes ☒ No

c. Is any listed species or designated critical habitat in the vicinity of the project?
☐ Yes ☒ No

d. If the project "may affect" a listed species or critical habitat, has Section 7 consultation addressing the effects of the proposed activity been completed? ☐ Yes ☐ No ☒ N/A

If you answered yes to question a. or b. or c. above, or if you answered no to question d. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

19. Migratory Birds and Bald and Golden Eagles:

Does the project have the potential to impact nests, nesting sites, or rookeries of migratory birds, bald or golden eagles? ☐ Yes ☒ No ☐ N/A

If you answered yes to the question above, you are responsible for contacting the appropriate local office of the U.S. Fish and Wildlife Service to obtain any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act.

20. Historic Properties (see also Box 9 in Part III):

a. Does the project have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties?
☐ Yes ☒ No ☐ N/A

If you answered yes to question a. above, please explain how the project would be in compliance with this GC or be aware that the project would require an individual permit application:

21. Discovery of Previously Unknown Remains and Artifacts:

If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, *you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed*. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters:

a. Will the project impact critical resource waters, which include NOAA-designated marine sanctuaries, National Estuarine Research Reserves, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment? ☐ Yes ☒ No

If you answered yes to question a. above, be aware that discharges of dredged or fill material into waters of the U.S. are not authorized by NWP 27 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

23. Mitigation (see also Box 10 in Part III):

a. Will the project include appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal? ☒ Yes ☐ No

If you answered no to question a. above, please include an explanation in Box 10 of why no mitigation would be necessary in order to be in compliance with this GC or be aware that the project would require an individual permit application.

24. Safety of Impoundment Structures:

a. Has the impoundment structure been safely designed to comply with established state dam safety criteria or has it been designed by qualified persons? ☐ Yes ☐ No ☒ N/A

If you answered yes to question a above, non-federal applicants may be required to provide documentation that the design has been independently reviewed by similarly qualified persons with appropriate modifications to ensure safety. If you answered no, please include an explanation in Box 10 of why the structure is exempt from state dam safety criteria or be aware that the project may require an individual permit application.

25. Water Quality (see also Box 11 in Part III):

a. If in Texas, does the project comply with the conditions of the TCEQ water quality certification for NWP 27? ☒ Yes ☐ No ☐ N/A

b. If in "Indian Country," does the project comply with the conditions of the EPA water quality certification for NWPs? ☐ Yes ☐ No ☒ N/A

c. If in Louisiana, does the project comply with the conditions of the LADEQ water quality certification for NWP 27? ☐ Yes ☐ No ☒ N/A

If you answered no to question a. or b. above, please be aware that the project would require an individual permit application.

26. Coastal Zone Management:

The Fort Worth District does not cover any Coastal Zone; therefore, this GC does not apply.

27. Regional and Case-By-Case Conditions:

See the Regional Conditions checklist below to ensure compliance with this GC.

28. Use of Multiple Nationwide Permits:

a. Does the project use more than one NWP for a single and complete project? ☐ Yes ☒ No

b. If you answered yes to question a. above, be aware that unless the project's acreage loss of waters of the U.S. authorized by the NWPs is below the acreage limit of the NWP with the highest specified acreage limit, no NWP can be issued and the project would require an individual permit application.

If you answered yes to question a. above, please explain how the project would be in compliance with this GC and what additional NWP number you intend to use:

29. Transfer of Nationwide Permit Verifications:

a. Does the Applicant agree that if he or she sells the property associated with the nationwide permit verification, the Applicant may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate USACE district office to validate the transfer?
☒ Yes ☐ No

30. Compliance Certification:

a. Does the Applicant agree that if he or she receives the NWP verification from the USACE, they must submit a signed certification regarding the completed work and any required mitigation (the certification form will be sent by the USACE with the NWP verification letter)?
☒ Yes ☐ No

31. Activities Affecting Structure or Works Built by the United States

a. Does the project temporarily or permanently alter and/or occupy a USACE federally authorized Civil Works project? ☐ Yes ☒ No

If you answered yes to question a. above, notification is required in accordance with general condition 32, for any activity that requires permission from the Corps. The district engineer may authorize activities under these NWPs only after a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project.

32. Pre-Construction Notification:

a. Does the Applicant agree that he or she will not begin the project until either:
1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or
2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. ☒ Yes ☐ No

b. Does the Applicant agree that if the district or division engineer notifies the Applicant in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the Applicant cannot begin the activity until an individual permit has been obtained?
☒ Yes ☐ No

To ensure compliance with the NWP 27-specific requirements please answer the following questions:

1. Does the project involve the conversion of a stream or natural wetlands to another aquatic habitat type (e.g., stream to wetland or vice versa) or uplands? Changes in wetland plant communities that occur when wetland hydrology is more fully restored during wetland rehabilitation activities are not considered a conversion to another aquatic habitat type**.**
☐ Yes ☒ No

If you answered yes to question 1. above, be aware that conversion of aquatic habitat type other than those associated when wetland hydrology is more fully restored (i.e., forested wetland to emergent/scrub-shrub, stream to impounded waters) is not authorized by NWP 27 and would require an individual permit application.

2. Does the project result in stream channelization? ☐ Yes ☒ No

If you answered yes to question 2. above, be aware that stream channelization is not authorized by NWP 27 and would require an individual permit application.

3. Does the project result in the relocation of tidal waters or the conversion of tidal waters, including tidal wetlands, to other aquatic uses, such as the conversion of tidal wetlands into open water impoundments? ☐ Yes ☒ No

If you answered yes to question 3. above, be aware that discharges of dredged or fill material into waters of the U.S. are not authorized by NWP 27 and would require an individual permit application.

REGIONAL CONDITIONS CHECKLIST

To ensure compliance with the Regional Conditions within the Fort Worth District, in the State of Texas, in order for an authorization by a NWP to be valid, please answer the following questions (for projects in Texas only):

1. Does the project involve a discharge into habitat types that are wetlands (typically referred to as pitcher plant bogs) that are characterized by an organic surface soil layer and include vegetation such as pitcher plants (*Sarracenia* sp.), sundews (*Drosera* sp.), and sphagnum moss (*Sphagnum* sp.) or wetlands (typically referred to as bald cypress-tupelo swamps) comprised predominantly of bald cypress trees (*Taxodium distichum*), and water tupelo (*Nyssa aquatica*), that are occasionally or regularly flooded by fresh water with common associates including red maple (*Acer rubrum*), swamp privet (*Forestiera acuminata*), green ash (*Fraxinus pennsylvanica*), water elm (*Planera aquatica*), lizard's tail (*Saururus cernuus*), water mermaid weed (*Proserpinaca* spp.), buttonbush (*Cephalanthus occidentalis*), and smartweed (*Polygonum* spp.)? ☐ Yes ☒ No

If you answered yes to question 1. above, notification of the District Engineer is required in accordance with NWP GC 32, and the USACE will coordinate with other resource agencies as specified in NWP GC 32(d).

2. Is the project in the area of Caddo Lake within Texas that is designated as a "Wetland of International Importance" under the Ramsar Convention? ☐ Yes ☒ No

If you answered yes to question 2. above, notification of the District Engineer is required in accordance with NWP GC 32, and the USACE will coordinate with other resource agencies as specified in NWP GC 32(d).

3. **a.** Is the project in an area of Dallas, Denton, or Tarrant counties that is within the study area of the "Final Regional Environmental Impact Statement (EIS), Trinity River and Tributaries" (May 1986)? ☒ Yes ☐ No

b. If Yes, does the project meet the criteria and follow the guidelines specified in Section III of the Record of Decision for the Regional EIS, including the hydraulic impact requirements?
☒ Yes ☐ No ☐ N/A

If you answered no to question 3b. above, be aware that the project would not be authorized by a NWP and would require an individual permit application.

4. Would the proposed work result in the modification or alteration of any completed Corps of Engineers projects that are either locally or federally maintained or if work would occur within the conservation pool or flowage easement of any Corps of Engineers lake project? ☐ Yes ☒ No

If you answered yes to question 4 above, the applicant shall notify the Fort Worth District Engineer in accordance with NWP GC 32. PCNs are not deemed complete until such a time as the Corps has made a determination relative to 33 USC Section 408, 33 CFR Part 208, Section 208.10, 33 CFR Part 320, Section 320.4. If you answered yes to question 3. above, notification of the District Engineer is required in accordance with NWP GC 32, and the USACE will coordinate with other resource agencies as specified in NWP GC 32(d).

5. Is there is the risk of transferring invasive plants to or from your project site? ☐ Yes ☒ No

If you answered yes to the question above, information concerning state specific lists of invasive species and threats can be found at: http://www.invasivespeciesinfo.gov/unitedstates/tx.shtml.

Best management practices can be found at Information concerning state specific lists and threats can be found at: http://www.invasivespeciesinfo.gov/unitedstates/tx.shtml. Known zebra mussel waters within can be found at: http://nas.er.usgs.gov/queries/zmbyst.asp.

6. Would your project meet the scope of work and conditions of NWPs 51 or 52? ☐ Yes ☐ No

If you answered yes, the Corps will provide the PCN to the US Fish and Wildlife Service as specified in NWP General Condition 32(d)(2) for its review and comments.

To ensure compliance with the Regional Conditions within the Fort Worth District, in the State of Louisiana, in order for an authorization by a NWP to be valid, please answer the following questions (for projects in Louisiana only):

1. Does the activity cause the permanent loss of greater than 1/2 acre of seasonally inundated cypress swamp and/or cypress-tupelo swamp? ☐ Yes ☐ No

If you answered yes to question 1. above, be aware that the project would not be authorized by a NWP and would require an individual permit application.

2. Does the activity cause the permanent loss of greater than 1/2 acre of pine savanna, pine flatwoods, and/or pitcher plant bogs? ☐ Yes ☐ No

If you answered yes to question 2. above, be aware that the project would not be authorized by a NWP and would require an individual permit application.

3. Has the activity been determined to have an adverse impact upon a federal or state designated rookery and/or bird sanctuary? ☐ Yes ☐ No

If you answered yes to question 3. above, be aware that the project would not be authorized by a NWP 27 and would require an individual permit application.

4. Does the activity fell or impact by soil compaction any existing den or candidate den trees within areas known to be occupied by the threatened Louisiana black bear? (Existing den trees are those known to be used or have evidence of being used by a denning Louisiana black bear, regardless of size, species, or proximity to water. Candidate den trees are defined as bald cypress and/or tupelo gum with visible cavities, having a minimum diameter-at-breast-height of 36 inches, and associated with rivers, lakes, streams, bayous, sloughs, or other waterbodies.) Additionally, does the activity involve clearing within Louisiana black bear critical habitat? ☐ Yes ☐ No

If you answered yes to question 4. above, be aware that the project would not be authorized by a NWP and would require an individual permit application.

5. Does the project involve instream activities in the following waterways: Abita River and tributaries; Abita River and tributaries; Amite River (LA Highway 37 at Grangeville to Port Vincent); Bayou Bartholomew in Morehouse Parish; Bayou Boeuf and Bayou Rapides Tributaries in Rapides Parish: (Bayou Clear, Brown Creek, Burney Branch, Castor Creek, Clear Creek, Haikey's Creek, Little Bayou Clear, Little Brushy Creek, Loving Creek, Little Loving Creek, Long Branch, Mack Branch, Patterson Branch, Valentine Creek, and Williamson Branch), Bayou Rigolette tributaries in Grant Parish (Beaver Creek, Black Creek, Chandler Creek, Clear Branch, Coleman Branch, Cress Creek, Cypress Creek, Glady Hollow, Gray Creek, Hudson Creek, James Branch, Jordon Creek, Moccasin Branch, and Swafford Creek); Bogue Falaya River and Tributaries, Bogue Chitto River and Tributaries, Lake Borgne, Lake Ponchartrain and its tributaries, Lake Saint Catherine, Little Lake, Tchefuncta River, Little Tchefuncta River, the Rigolets and West Pearl River? ☐ Yes ☐ No

If you answered yes to question 5. above, notification of the District Engineer is required in accordance with NWP GC 32 due to the occurrence of threatened or endangered species.

6. To the best of the applicant's knowledge, is any excavated and/or fill material to be placed within wetlands free of contaminants? ☐ Yes ☐ No ☐ N/A

If you answered no to question 6. above, be aware that the project would not be authorized by a NWP 27 and would require an individual permit application.

7. Regional Condition 7 applies to work within the Louisiana Coastal Zone and/or the Outer Continental Shelf off Louisiana, and therefore does not apply in the USACE Fort Worth District. Work in these areas may require coordination with the USACE Galveston or New Orleans districts.

8. Does the activity adversely affect greater than 1/10 acre of wetlands, and/or adversely impact a designated Natural and Scenic River, a state or federal wildlife management area, and/or refuge? ☐ Yes ☐ No

If you answered yes to question 8. above, notification of the District Engineer is required in accordance with NWP GC 32.

9. For activities involving the installation of a culvert, is twenty percent (20%) of the culvert diameter (20 percent of the height of elliptical culverts) installed below the natural grade of the stream. ☐ Yes ☐ No

If you answered no to question 9 above, be aware that the project would not be authorized by a NWP and would require an individual permit application.

10. Does the activity convert tidal wetlands to any other aquatic habitat type? ☐ Yes ☐ No

If you answered yes to question 10 above, be aware that the project would not be authorized by a NWP 27.

Additional Discussion:

Part II: Project Information (*Project No. SWF-* **2018-00405**)

Box 1 Project Name: Dudley Branch Pond Removal and Stream Restoration		**Applicant Name** Matt Brennan	
Applicant Title Civil Engineering Division Manager		**Applicant Company, Agency, etc.** City of Carrollton, Texas	
Mailing Address 1945 E. Jackson Rd. Carrollton, Texas 75006		Applicant's internal tracking number (if any)	
Work Phone with area code 972-466-3183	Home Phone with area code	Fax #	E-mail Address Matthew.Brennan@cityofcarrollton.com
Relationship of applicant to property: ☒ Owner ☐ Purchaser ☐ Lessee ☐ Other:			
Application is hereby made for verification that subject regulated activities associated with subject project qualify for authorization under a USACE nationwide permit or permits as described herein. I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief, such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities. I hereby grant to the agency to which this application is made the right to enter the above-described location to inspect the proposed, in-progress, or completed work. I agree to start work only after all necessary permits have been received.			
Signature of applicant		Date (mm/dd/yyyy)	

Box 2 Authorized Agent/Operator Name and Signature: *(If an agent is acting for the applicant during the permit process)* John Wooten			
Agent/Operator Title Environmental Scientist		**Agent/Operator Company, Agency, etc.** HDR Inc.	
Mailing Address 17111 Preston Road Suite 300 Dallas, TX 75248			
E-mail Address john.wooten@hdrinc.com			
Work Phone with area code (972) 960-4450	Home Phone with area code	Fax #	Cell Phone #
I hereby authorize the above-named agent to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application. I understand that I am bound by the actions of my agent, and I understand that if a federal or state permit is issued, I, or my agent, must sign the permit.			
Signature of applicant			Date (mm/dd/yyyy)
I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief, such information is true, complete, and accurate.			

Signature of authorized agent	Date (mm/dd/yyyy)

Box 3 Name of property owner, if other than applicant: N/A ☐ Multiple Current Owners *(If multiple current property owners, check here and include a list as an attachment)*	
Owner Title	**Owner Company, Agency, etc.**
Mailing Address	
Work Phone with area code	Home Phone with area code

Box 4 Project location, including street address, city, county, state, and zip code where proposed activity will occur:
1650 W Frankford Rd Carrollton, TX 75007

Nature of Activity (Description of project; include all features; see instructions)**:**
The City of Carrollton operates the existing Taos Pond (OCP-2) in Denton County, Texas. The City proposes to restore and enhance aquatic function to the area through the re-establishment of this segment of Dudley Branch by removing the on-channel pond and relocating the wetlands. The restored channel will mimic the natural hydrology of the existing reaches of the stream. Additionally, native vegetation, including hard mast-producing trees, will be planted along the buffer of the new stream segment to maximize the function of the riparian area.

Project Purpose (Description of the reason or purpose of the project; see instructions)**:**
The purpose of this project is the aquatic habitat restoration of what is currently an open water impoundment on Dudley Branch. Removal of this pond will restore Dudley Branch to the function of a stream and riverine wetland system. Restoration of the stream and wetland will take place within the footprint of the existing impoundment and have a net increase in aquatic resource functions.

Has a delineation of waters of the U.S., including wetlands, been completed? (see instructions)
☒ Yes, Attached ☐ No
If a delineation has been completed, has it been verified in writing by the USACE?
☐ Yes, Date of approved or preliminary jurisdictional determination (mm/dd/yyyy): USACE project:
☒ No

Are color photographs of the existing conditions available? ☐ Yes, Attached ☐ No
Are aerial photographs available? ☐ Yes, Attached ☐ No

☒ **Multiple Waters of the U.S.** *(If multiple waters of the U.S., check here and complete the table in Attachment D)*

Waterbody(ies) (if known; otherwise enter "an unnamed tributary to")**:** Dudley Branch and associated unnamed tributaries

Tributary(ies) to what known, downstream waterbody(ies): Elm Fork Trinity River

Latitude & longitude (Decimal Degrees):
32.998657, -96.928758

USGS Quad map name(s):
USGS US Topo 7.5-minute map for Carrollton, TX 2019 and USGS US Topo 7.5-minute map for Lewisville East, TX 2019

Watershed(s) and other location descriptions, if known:
HUC 12: 120301031003

Directions to the project location:
Exit I-35 N at W Frankfort Rd, turn left onto Indian Creek Rd toward Indian Creek Golf Course, turn right into the electrical substation.

Part III: Project Impacts and Mitigation

Box 5 Reason(s) for Discharge into waters of the U.S.:
Stream and wetland restoration

Type(s) of material being discharged and the amount of each type in cubic yards:
Approximately 53,840 cubic yards of native soil, 2,660 cubic yards of boulders, and 10 cubic yards of concrete (weir).

Total surface area (in acres) of wetlands or other waters of the U.S. to be filled:
8.93 acres

Indicate the proposed impacts to **waters of the U.S.** in ACRES (for wetlands and impoundments) and LINEAR FEET (for rivers and streams), and identify the impact(s) as permanent and/or temporary for each waterbody type listed below. The table below is intended as a tool to summarize impacts by resource type for planning compensatory mitigation and does not replace the table of waters of the U.S. in Attachment D for those projects with impacts to multiple waters of the U.S.

	Permanent		Temporary	
Waterbody Type	**Acres**	**Linear feet**	**Acres**	**Linear feet**
Emergent wetland			2.11	
Scrub-shrub wetland				
Forested wetland				
Perennial stream			0.18	561
Intermittent stream				
Ephemeral stream				
Impoundment	6.59			
Other: Scrub/shrub wetland			0.05	
Total:	6.59	0	2.34	561

Potential indirect and/or cumulative impacts of proposed discharge (if any):
N/A

Required drawings (see instructions):
Vicinity map: ☒ Attached
To-scale plan view drawing(s): ☒ Attached
To-scale elevation and/or cross section drawing(s): ☒ Attached

Is any portion of the work already complete? ☐ Yes ☒ No
If yes, describe the work:

Box 6 Authority: (see instructions)
Is Section 10 of the Rivers and Harbors Act for projects affecting navigable waters applicable?
☐ Yes ☒ No *(see Fort Worth District Navigable Waters list)*

Is Section 404 of the Clean Water Act applicable? ☒ Yes ☐ No

Box 7 Larger Plan of Development:
Is the discharge of fill or dredged material for which Section 10/404 authorization is sought intended for a project which is part of a larger plan of development?
☐ Yes ☒ No *(If yes, please provide the information in the remainder of Box 7)*

Does the project have independent utility in addition to the larger plan of development? ☐ Yes ☒ No
If yes, explain:

If discharge of fill or dredged material is part of development, name and proposed schedule for that larger development (start-up, duration, and completion dates):
N/A

Location of larger development (If discharge of fill or dredged material is part of a plan of development, a map of suitable quality and detail for the entire project site should be included):
N/A

Total area in acres of entire project area (including larger plan of development, where applicable):
N/A

Box 8 Federally Threatened or Endangered Species (see instructions)
Please list any federally-listed (or proposed) threatened or endangered species or critical habitat potentially affected by the project (use scientific names (i.e., genus species), if known):
An IPaC was obtained from the USFWS on February 20, 2020. This IPaC is located in Attachment F. No listed critical habitat is located in the study area. Additionally, the T&E species were reviewed, and it was determined that no suitable habitat exists in the study area.

Have surveys, using U.S. Fish and Wildlife Service (USFWS) protocols, been conducted?
☐ Yes, Report attached ☒ No (explain): No listed critical habitat is located in the study area. Additionally, the T&E species were reviewed, and it was determined that no suitable habitat exists in the study area.

If a federally-listed species would potentially be affected, please provide a description and a biological evaluation.
☐ Yes, Report attached ☒ Not attached

Has Section 7 consultation been initiated by another federal agency?
☐ Yes, Initiation letter attached ☒ No

Has Section 10 consultation been initiated for the proposed project?
☐ Yes, Initiation letter attached ☒ No

Has the USFWS issued a Biological Opinion?
☐ Yes, Report attached ☒ No
If yes, list date Opinion was issued (mm/dd/yyyy):

Box 9 Historic properties and cultural resources
Please list any historic properties listed (or eligible to be listed) on the National Register of Historic Places which the project has the potential to affect:
N/A

Has an archaeological records search been conducted?
☒ Yes, Report attached ☐ No (explain):

Are any cultural resources of any type known to exist on-site?
☐ Yes ☒ No

Has an archaeological pedestrian survey been conducted for the site? ☒ Yes, Report attached ☐ No (explain):
Has Section 106 or SHPO consultation been initiated by another federal or state agency? ☐ Yes, Initiation letter attached ☒ No
Has a Section 106 MOA been signed by another federal agency and the SHPO? ☐ Yes, Attached ☒ No If yes, list date MOA was signed (mm/dd/yyyy):

Box 10 Proposed Conceptual Restoration Plan Summary (see instructions)
Measures taken to avoid and minimize impacts to waters of the U.S. (if any): The design as well as the purpose and need for the proposed project do not allow for complete avoidance of impacts to waters of the U.S. However, to the maximum extent practicable, impacts to waters of the U.S. were avoided in the design and location of the re-established stream channel. Only features abutting the existing pond will be altered (See Attachment H Appendix B), adjacent wetlands and streams will be avoided (W-1, W-2, W-3, W-7, S-1, OCP-1, OCP-3, and OCP-2 above the restored portion of Dudley Branch). The three forested wetlands (W-4, W-5, and W-6) within the study area that are abutting the pond will also be avoided. Additionally, hydraulic models indicate that the hydrology of the avoided streams and wetlands above the restoration site will remain unaffected. Wetlands that cannot be avoided will be relocated to the stream banks and benches. Impacts to S-4 are unavoidable due to necessary modifications required to restore Dudley Branch. Impacts to S-4 were minimized by isolating fill and grading to only where required to remove old pond outlets and to connect the restored Dudley Branch to existing S-1 (see Attachment H Appendix D). The Applicant has developed appropriate and practicable on-site measures in the design and operational plans for the proposed project in order to minimize adverse impacts to waters of the U.S. that cannot be reasonably avoided. These measures include, but are not limited to, water quality protection through best management practices (BMPs), bioengineering of the restored stream channel by using mostly native and natural materials and absence of hard armoring, protection of downstream features with a sinusoidal pattern to provide a natural and stable downstream flow. BMPs will be used to control erosion and sedimentation during construction of the proposed project and to control total suspended solids following construction. Construction will be conducted using a phased approach to reroute water to avoid flows through active construction areas to the extent practicable. Areas temporarily disturbed by construction will be re-contoured and re-vegetated as appropriate to minimize adverse impacts to water quality.
Applicant proposes combination of one or more of the following mitigation types: ☐ Mitigation Bank ☒ On-site ☐ Off-site (Number of sites:) ☐ None
Applicant proposes to purchase mitigation bank credits: ☐ Yes ☒ No Mitigation Bank Name: Number of Credits:

Indicate in ACRES (for wetlands and impoundments) and LINEAR FEET (for rivers and streams) the total quantity of waters of the U.S. proposed to be created, restored, enhanced, and/or preserved for purposes of providing compensatory mitigation. Indicate mitigation site type (on- or off-site) and number. Indicate waterbody type (non-forested wetland, forested wetland, perennial stream, intermittent stream, ephemeral stream, impoundment, other) or non-jurisdictional (uplands[1]).

Mitigation Site Type and Number	Waterbody Type	Created	Restored	Enhanced	Preserved
e.g., On-site 1	*Non-forested wetland*	*0.5 acre*			
e.g.; Off-site 1	*Intermittent stream*		*500 LF*	*1000 LF*	
On-site	Perennial Stream		1,586 LF		
On-site	Forested Wetland		2.99 ac		
	Totals:		1,586 LF and 2.99 ac		

[1] **For uplands, please indicate if designed as an upland buffer.**

Summary of Restoration Work Plan (Describe the mitigation activities listed in the table above): See Attachment H Section 4

If no mitigation is proposed, provide a detailed explanation of why no mitigation would be necessary to ensure that adverse effects on the aquatic environment are minimal:
N/A

Has a conceptual restoration plan been prepared in accordance with the USACE regulations and guidelines?
☒ Yes, Attached ☐ No (explain):

Mitigation site(s) latitude & longitude (Decimal Degrees): 32.998657, -96.928758	USGS Quad map name(s): Carrollton, TX (2019) and Lewisville East, TX (2019)

Other location descriptions, if known:
N/A

Directions to the mitigation location(s):
N/A

Box 11 Water Quality Certification (see instructions)**:**

For Texas:

Does the project meet the conditions of the Texas Commission on Environmental Quality (TCEQ) Clean Water Act Section 401 certification for NWP 27? ☒ Yes ☐ No

Does the project include soil erosion control and sediment control Best Management Practices (BMPs)? ☒ Yes ☐ No

Does the project include BMPs for post-construction total suspended solids control?
☒ Yes ☐ No

For Louisiana:
Individual water quality certification issued by LDEQ? ☐ Yes, Attached ☐ No

Water quality certification waiver or other approval by LDEQ? ☐ Yes, Attached ☐ No
Explain:

For Tribal Lands ("Indian Country"):
Does the project meet the conditions of the EPA water quality certification for NWPs?
☐ Yes ☐ No

Box 12 List of other certifications or approvals/denials received from other federal, state, or local agencies for work described in this application:

Agency	Approval Type[2]	Identification No.	Date Applied	Date Approved	Date Denied
THC	Section 106	8426	5/7/2018	9/13/2018	

[2] Would include but is not restricted to zoning, building, and floodplain permits

Part IV: Attachments

	Included
A. List of Property Owners	☐
B. Delineation of Waters of the U.S., Including Wetlands	☒
C. Color Photographs	☒
D. Table of Waters of the U.S. Impacted by the Proposed Project	☒
E. Required Drawings/Figures	☒
F. Threatened or Endangered Species Reports and/or Letters	☒
G. Historic Properties and Cultural Resources Reports and/or Letters	☒
H. Conceptual Restoration Plan	☒
I. Other:	☐

End of Form

Attachment B

Delineation of Waters of the U.S., Including Wetlands

Delineation and Proposed Jurisdictional Determination of Waters of the U.S.

Dudley Branch Pond Removal and Stream Restoration
Denton County, Texas

Prepared for:

CARROLLTON
TEXAS

City of Carrollton, Texas

Prepared by:

HDR Inc.
17111 Preston Road, Suite 300
Dallas, Texas 75248

April 2020

Table of Contents

1.0 INTRODUCTION 1
1.1 Background 1
2.0 STUDY AREA DESCRIPTION 1
2.1 Hydrology of the Study Area 1
2.2 Vegetation in the Study Area 2
2.3 Soils in the Study Area 2
3.0 REGULATORY BACKGROUND 3
3.1 Regulatory Agencies 3
3.2 Definitions 3
3.3 Guidance Based on Supreme Court Rulings 4
4.0 WATERS OF THE U.S. DELINEATION 5
4.1 Methods 5
4.2 Results 6
5.0 SUMMARY AND RECOMMENDATIONS 10
5.1 Regulatory and Permitting Discussion 10
6.0 REFERENCES 11

List of Appendices

Appendix A: Figures
Appendix B: Representative Photographs
Appendix C: Wetland Determination Data Forms

List of Acronyms and Abbreviations

ac ..... acre(s)
CWA ..... Clean Water Act
EPA ..... U.S. Environmental Protection Agency
ft ..... foot/feet
GIS ..... Geographic Information System
HDR ..... HDR Engineering, Inc.
in ..... inch(es)
LF ..... linear feet
IP ..... Individual Permit
NRCS ..... Natural Resources Conservation Service
OHWM ..... ordinary high water mark
ROW ..... right-of-way
RPW ..... relatively permanent water
SWANCC ..... Solid Waste Agency of Northern Cook County
TCEQ ..... Texas Commission on Environmental Quality
TNRIS ..... Texas Natural Resource Information System
TNW ..... traditional navigable water
TXRAM ..... Texas Rapid Assessment Method
U.S. ..... United States
USACE ..... U.S. Army Corps of Engineers

1.0 INTRODUCTION

1.1 Background

This report presents the findings of a delineation and proposed jurisdictional determination for potential waters of the United States (U.S.), including wetlands, performed on an approximately 37.3-acre (ac) study area along the proposed Dudley Branch Pond Removal and Stream Restoration project located within the Elm Fork Trinity Watershed (HUC: 12030103) in Denton County, Texas. The study area and surrounding areas are a mix of residential and industrial developments, golf course facilities, and paved roads in the City of Carrollton, TX (**Appendix A, Figure 1**).

The proposed jurisdictional determination was conducted by Mike Keenan and Brandon Tate of HDR Engineering, Inc. (HDR). The objective of the evaluation was to determine whether potential waters of the U.S. occur in the study area, and if so, to assist the project team in compliance with the requirements of Section 404 of the Clean Water Act (CWA). A field survey for the following determination was conducted in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (U.S. Army Corps of Engineers, 2010).

Due to the current uncertainty regarding the definitions of waters to be regulated by the CWA, HDR evaluated the potential for federal jurisdiction under Section 404 of the CWA in the study area based on the most recently approved guidance for jurisdictional determinations from the U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (EPA) published December 2, 2008 (USACE, 2008). The guidance was issued pursuant to the U.S. Supreme Court findings in the Rapanos and Carabell cases and is referred to as the Rapanos Guidance. Furthermore, an approved jurisdictional determination is within the regulatory authority of the USACE and EPA and would be subject to the rules in effect at the time of review by the agencies. Generally, the proposed jurisdictional determination in this report that follows Rapanos Guidance is not anticipated to change based on the proposed changes in the Navigable Waters Protection Rule, if it becomes applicable. However, further evaluation of potential jurisdiction may be necessary when additional guidance is available from the USACE.

2.0 STUDY AREA DESCRIPTION

The 37.3-acre study area is located in Denton County, Texas within the Elm Fork Trinity Watershed (HUC: 12030103). The study area is approximately 0.57 mile long and runs along the east-southeast boundary of the Indian Creek Golf Club (**Appendix A, Figure 1**). The predominant land uses in the vicinity of the study area are golf course facilities and residential housing.

2.1 Hydrology of the Study Area

The study area receives water from ponded area OCP-1 and a wetland complex that extends outside of the study area within the power line right-of-way (ROW) to the north. OCP-2, a man-made impoundment with a backwater canal, is surrounded by wetland fringe. Water exits the pond via a pipe that flows to a location outside of the study area and via two outfalls that flow into perennial stream S-4 (Dudley Branch). S-4 flows west into Elm Fork Trinity River about 0.6

mile west of the study area boundary, and 13.8 miles north of that confluence, the Elm Fork Trinity River flows into the Trinity River, the closest traditional navigable water (TNW).

2.2 Vegetation in the Study Area

The study area is located within the Northern Blackland Prairie in the Texas Blackland Prairies Ecoregion (Griffith et al., 2004). The Northern Blackland Prairie Ecoregion was historically a tallgrass prairie and dominated by little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardi*), yellow Indiangrass (*Sorghastrum nutans*), and tall dropseed (*Sporobolus compositus*) with non-prairie areas containing switchgrass (*Panicum virgatum*), eastern gamagrass (*Tripsacum dactyloides*), sugar hackberry (*Celtis laevigata*), oak (*Quercus* spp.), elm (*Ulmus* spp.), ash (*Fraxinus* spp.), eastern cottonwood (*Populus deltoides*), and pecan (*Carya illinoinensis*) (Griffith et al., 2004). The region is now primarily urban and suburban development and cropland.

The study area consists of a stream riparian corridor winding through a disturbed power line ROW and adjacent to manicured golf course and urban sod and residential housing. The riparian areas and wetlands are dominated by elm (*Ulmus* spp.), curly dock (*Rumex crispus*), black willow (*Salix nigra*), switchgrass, narrowleaf cattail (*Typha angustifolia*), giant ragweed (*Ambrosia trifida*), Pennsylvania smartweed (*Persicaria pensylvanica*), common persimmon (*Diospyros virginiana*), box elder (*Acer negundo*), and willow baccharis (*Baccharis salicina*). Uplands were dominated by bermudagrass (*Cynodon dactylon*), curly dock, Texas bindweed (*Convolvulus equitans*), southern dewberry (*Rubus trivialis*), and perennial ryegrass (*Lolium perenne*).

2.3 Soils in the Study Area

The study area lies in the Blackland Pairies Physiographic province, which includes portions of North Texas (Wermund, 1996). The Geologic Atlas of Texas (Bureau of Economic Geology, 1991) indicates the surface consists primarily of Holocene Alluvium and Quaternary deposits undivided and Pleistocene Fluviatile terrace deposits. Surface soils had a texture of clay in the study area.

The study area contains only one soil map unit.

Ovan clay, occasionally flooded occurs throughout the entirety of the study area. It is derived from clayey alluvium of quaternary age derived from mixed sources and has a texture of clay throughout the soil profile. The soil map unit is moderately well drained with a very low to moderately low water transmission capacity and high available water storage (Natural Resources Conservation Service [NRCS], 2020a).

2.3.1 Hydric Soils in the Study Area

No soils in the study area are listed on the National Hydric Soil List for Texas (NRCS, 2020b).

3.0 REGULATORY BACKGROUND

3.1 Regulatory Agencies

Agencies that regulate impacts to the nation's surface water resources within Texas include the USACE, EPA, and Texas Commission on Environmental Quality (TCEQ). Waters of the U.S. are protected under Sections 401 and 404 of the CWA, and Executive Order 11990 (Protection of Wetlands). The USACE has the primary regulatory authority for enforcing Section 404 requirements for waters of the U.S., including wetlands.

The stated objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Section 404 of the Act requires the issuance of a permit by the USACE for the discharge of dredged or fill material into waters of the U.S.

3.2 Definitions

The Code of Federal Regulations (33 CFR 328.3), prior to the Navigable Waters Protection Rule (not applicable at the time of this report), defines waters of the U.S. as:

- All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- All interstate waters including interstate wetlands;
- All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
    - Which are, or could be, used by interstate or foreign travelers for recreational or other purposes; or
    - From which fish or shellfish are, or could be, taken and sold in interstate or foreign commerce; or
    - Which are used, or could be used, for industrial purposes by industries in interstate commerce;
- All impoundments of waters otherwise defined as waters of the U.S. under the definition;
- Tributaries of waters of the U.S. identified above;
- The territorial seas;
- Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in the paragraphs above. The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other waters of the U.S. by manmade dikes or barriers, natural river berms, beach dunes, and the like are "adjacent wetlands."

3.2.1 Streams

The jurisdictional extent of streams is generally delineated by the ordinary high water mark (OHWM) which is defined as the line on the shore/bank established by flowing and/or standing water, marked by characteristics such as a clear, natural line impressed on the bank, erosion shelving, changes in the character of soil, destruction of terrestrial vegetation, presence of litter

and debris, or other appropriate means that consider the characteristics of the surrounding areas.

3.2.2 Wetlands

Wetlands are a category of waters of the U.S. and are defined by 33 CFR part 328.3 as areas that are "inundated or saturated by surface or ground water at a frequency and duration sufficient to support—and that under normal circumstances do support—a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." However, temporarily or seasonally flooded depressions that receive overland storm runoff or overbank floodwaters can meet the three criteria to be considered wetlands. This is often due to the slowly permeable soils and relatively long growing season resulting in anaerobic, hydric soils after just 12 to 13 consecutive days in the north-central Texas region.

3.2.3 Constructed Ponds

The jurisdictional status of constructed ponds depends on whether they were constructed as an impoundment of a jurisdictional stream, or if they were constructed in uplands, away from waters of the U.S. However, the jurisdictional status of constructed ponds also depends on whether they have a surface hydrological connection to a water of the U.S. under present normal conditions. If a constructed pond lacks a drainage pipe (or other means) that provides flow sufficient to establish an OHWM directly downstream to a water of the U.S., then this pond may be considered a non-jurisdictional aquatic feature.

3.2.4 Non-Jurisdictional Aquatic or Drainage Features

In general, ponds constructed in uplands and remnant channels (e.g., erosional features) are not considered to be waters of the U.S. when they: 1) do not have a surface hydrologic connection to a water of the U.S.; 2) are not adjacent to a water of the U.S.; 3) are not used for, never were in the past, and likely never would be used for interstate commerce; or 4) are not interstate waters. These non-jurisdictional aquatic and drainage features are common in areas with low to moderate rainfall and historically altered land uses (e.g., crops to rangeland), and are referred to in this report as features that are not waters of the U.S. The acreages associated with non-jurisdictional features are not included in total acreages for a proposed jurisdictional determination.

3.3 Guidance Based on Supreme Court Rulings

In January 2003 the USACE issued guidance in response to the U.S. Supreme Court's findings in the case of the Solid Waste Agency of Northern Cook County (SWANCC) v. USACE (531 U.S. 159 [2001]) that limited the jurisdiction over non-tidal isolated waters, including wetlands and open water areas excavated in uplands. In general, only wetlands that have a direct hydrological connection to waters of the U.S., or are within their floodplains, are considered potentially jurisdictional under Section 404.

On December 2, 2008, the USACE and the EPA issued the Rapanos Guidance (USACE, 2008), a revision to the joint guidance for Jurisdictional Determinations implementing the U.S. Supreme Court's findings in the Rapanos and Carabell cases (126 S. Ct. 2208 [2006]). The guidance generally does not allow for the agencies to assert jurisdiction over ephemeral features, including erosional features, swales, small washes characterized by low volume, infrequent, or short duration flow; and ditches excavated wholly in, and draining only, uplands and that do not carry a relatively permanent flow of water. Jurisdiction over water resources that are not

traditional navigable waters (TNWs) or wetlands adjacent to a TNW is generally based on meeting one of the following two standards: 1) if a water body is relatively permanent, or if the water body is a wetland that "directly abuts" a relatively permanent water (RPW); or 2) if a water body, in combination with all wetlands adjacent to that water body, has a "significant nexus" to a TNW.

For non-navigable waters that are not relatively permanent and wetlands not directly abutting a RPW to be considered waters of the U.S., a significant nexus must exist with a measurable hydrologic, biological, or chemical connection to a TNW. Factors used in determining a significant nexus would include: 1) hydrologic conditions, such as volume, duration, and frequency of flow; 2) ecological factors, such as aquatic habitat that supports the biological functions of a TNW; and 3) chemical factors, such as maintenance of water quality in the TNW.

As noted previously, the Rapanos Guidance is the most recently approved and published guidance for jurisdictional determinations, but some differences may occur from the Navigable Waters Protection Rule, for which guidance is not yet available.

4.0 WATERS OF THE U.S. DELINEATION

4.1 Methods

A recent topographic map of the study area and high resolution digital natural color aerial photography were used to identify potential locations for waters of the U.S. Waters of the U.S., including wetlands, were delineated and evaluated based on a combination of aerial photograph interpretation and routine on-site delineation methods used during field work on May 2 and September 19, 2018, by HDR Environmental Scientists Mike Keenan and Brandon Tate. The surveys were conducted in accordance with the USACE 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual Great Plains Region* (USACE, 2010). The delineation was also performed to reflect guidance from the USACE in accordance with the U.S. Supreme Court rulings in the SWANCC and Rapanos cases.

Based on the review of topographic and aerial maps, areas potentially containing waters of the U.S. (e.g., stream corridors, impoundments, etc.) and wetlands (areas adjacent to streams or with little slope and depressional areas) were evaluated using aerial photograph interpretation and routine on-site delineation methods. The on-site delineation included collecting data on stream characteristics (e.g., OHWM, flow type) and wetland vegetation, soils, and hydrology. On-site delineations were recorded using a sub-meter GeoXT Global Positioning System (GPS) unit and mapped as a data layer using ArcGIS 10.7.1.

4.1.1 Waters of the U.S. (Streams and Open Water)

Jurisdictional boundaries for streams and open waters were delineated at the OHWM (as described in section 3.2.1) in the field. Methods used to determine the category of each stream (e.g., perennial, intermittent, or ephemeral) include characterizing the type of substrate, evidence of groundwater seepage, percentage of reaches with gain and loss, type of vegetation, and evidence of flow volume. Data was also collected on the apparent condition of each stream reach such as channel condition, riparian buffer vegetation, in-stream habitat, and hydrologic setting. Streams are classified based on potential navigability and flow regime, and include: TNWs, RPWs (perennial or seasonal), and non-RPWs (i.e., ephemeral streams).

The jurisdictional status of constructed ponds depends on whether they were constructed as an impoundment of a jurisdictional stream or if they were constructed in uplands, away from waters of the U.S. However, the jurisdictional status of constructed ponds also depends on whether they have a surface hydrological connection to a water of the U.S. under normal conditions. If a pond lacks a drainage pipe (or other means) that provides flow sufficient to establish an OHWM directly downstream to a water of the U.S., then it may be considered a non-jurisdictional aquatic feature.

4.1.2 Wetlands

Wetland determinations were performed on-site using the methodology of the *USACE 1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (U.S. Army Corps of Engineers, 2010). The presence of wetlands is determined by the positive indication of three criteria: hydrophytic vegetation, hydrology, and hydric soils. Data collected on the evidence of the three criteria is recorded on a Wetland Determination Data Form for the site.

Recorded information includes the dominant plant species in each vegetation stratum (i.e., tree, sapling/shrub, herbaceous, and vine). The indicator status of each recorded plant species is determined from the National Wetland Plant List (Lichvar, 2016). To meet the dominance test for hydrophytic vegetation, greater than 50% of the dominant plant species must have an indicator status of facultative (FAC, 34–66% probability of occurring in wetlands), facultative wetland (FACW, 67–99% probability), or obligate wetland (OBL, greater than 99% probability).

The determination of wetland hydrology is based on the presence of at least one primary or two secondary indicators of a prolonged hydroperiod (i.e., period of inundation/saturation). Primary indicators include surface water, high water table, saturation, water marks, sediment deposits, drift deposits, algal mat or crust, iron deposits, inundation visible on aerial imagery, water-stained leaves, salt crust, aquatic invertebrates, hydrogen sulfide odor, dry-season water table, oxidized rhizospheres on living roots (where not tilled), presence of reduced iron and thin muck surface. Secondary indicators include surface soil cracks, sparsely vegetated concave surface, drainage patterns, oxidized rhizospheres on living roots (where tilled), crayfish burrows, saturation visible on aerial imagery, geomorphic position, and FAC-neutral test.

Hydric soils are defined as soils which are flooded, ponded, or saturated long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile. The determination of hydric soils is generally based on the presence of indicators of an aquic moisture regime and hydric conditions. Aquic moisture regimes occur under anaerobic conditions and could develop from continuous saturation for at least 5% of the growing season. At least one positive hydric soil indicator at each site is required to classify the soil as hydric. For example, soils in prolonged anaerobic conditions undergo chemical reduction of iron and manganese, thereby producing low-chroma soil colors. Additionally, if reduced iron and manganese in inundated or saturated soil is exposed to oxygen in other areas of the soil ped (e.g., root pores and ped faces), areas of concentrated high-chroma mottles develop that are referred to as redoximorphic features. During the field survey, colors of the soil profile matrix and mottles are identified using Munsell® soil color charts. Additional characteristics including soil profile, texture, color, topography, and field indicators of hydrology are also considered in determining the presence of hydric soil.

4.2 Results

4.2.1 Waters of the U.S.

Waters of the U.S., including wetlands, within the study area are summarized in subsequent sections. Delineation maps for waters of the U.S. within the study area are provided in **Appendix A**. Representative photographs are provided in **Appendix B**. Wetland Determination Data Forms are provided in **Appendix C**.

Waters of the U.S., including wetlands, within the study area consist of three on-channel ponds (OCPs), four streams, and eleven wetlands (**Table 1**).

Table 1. Summary of Areal Extent of Waters of the U.S. within the Study Area

Categories of Waters of the U.S.	Study Area Acreage
Streams	0.51 (2,224 LF)
Scrub-shrub Wetlands	0.05
Forested Wetlands	1.13
Emergent Wetlands	2.64
On-channel Pond	8.25
Total	**12.58**

Note: May vary from project impact totals in permit application based on project design

4.2.1.1 Streams

The study area has a total of 2,224 linear feet (LF) (0.51 ac) of perennial stream (**Table 2**).

Table 2. Streams within the Study Area

Resource ID	Description	OHWM (feet)	Classification	Linear Feet Within Study Area	Acreage Within Study Area
S-1	Perennial	8.5	RPW	196	0.04
S-2	Perennial	4	RPW	85	0.01
S-3	Perennial	11	RPW	26	0.01
S-4	Perennial	10.5	RPW	1,917	0.45
	Total			**2,224**	**0.51**

Perennial stream S-1 (8.5-foot average OHWM width) flows from OCP-1 to OCP-2. This stream has a 20-foot portion, midway between OCP-1 and OCP-2, which narrows down to approximately one foot. Riverine, emergent wetland W-2 receives hydrology from S-1.

Perennial streams S-2 (4-foot average OHWM width) and S-3 (11-foot average OHWM width) are both small streams that flow out of OCP-2 into perennial stream S-4. These streams serve as two of three outlets for OCP-2. S-2 is moderately incised, while S-3 is not, but both have a wooded riparian buffer associated with the forested riparian area of S-4.

Perennial stream S-4 is Dudley Branch and has an 11-foot average OHWM width. This stream flows west, perpendicular and downstream of OCP-2 in the middle portion of the study area to

the southwestern boundary. The upstream reaches of this stream have a forested primary buffer, but a low-quality, intensively manipulated secondary buffer. The downstream (southern) portion of the stream has either a scrub-shrub or power line ROW primary buffer with a similar low-quality secondary buffer. This stream's channel is more incised than perennial stream S-2.

4.2.1.2 Wetlands

The study area has a total of 3.82 ac of wetlands that include 0.05 ac of scrub-shrub, 1.13 ac of forested, and 2.64 ac of emergent wetlands (**Table 3**).

Table 3. Wetlands within the Study Area

Resource ID	Description	Type	Classification	Acreage Within Study Area
W-1	Palustrine Emergent Wetland	Lacustrine Fringe	Abutting	0.15
W-2	Palustrine Emergent Wetland	Riverine	Abutting	0.06
W-3	Palustrine Emergent Wetland	Lacustrine Fringe	Abutting	0.01
W-4	Palustrine Forested Wetland	Lacustrine Fringe	Abutting	0.14
W-5	Palustrine Forested Wetland	Lacustrine Fringe	Abutting	0.09
W-6	Palustrine Forested Wetland	Lacustrine Fringe/ Depressional	Abutting	0.90
W-7	Palustrine Emergent Wetland	Depressional	Adjacent	0.17
W-8	Palustrine Emergent Wetland	Lacustrine Fringe	Abutting	1.18
W-9	Palustrine Emergent Wetland	Lacustrine Fringe	Abutting	0.33
W-10	Palustrine Emergent Wetland	Lacustrine Fringe	Abutting	0.74
W-11	Palustrine Scrub-Shrub Wetland	Lacustrine Fringe	Abutting	0.05
			Total	**3.82**

4.2.1.2.1 Emergent Wetlands

The study area consists of seven emergent wetlands totaling 2.64 ac (W-1, W-2, W-3, W-7, W-8, W-9, and W-10). W-1 is a lacustrine fringe wetland associated with OCP-1, and W-8, W-9, and W-10 are emergent fringes of OCP-2. Dominant plant species in these lacustrine fringe wetlands are switchgrass, narrowleaf cattail, curly dock, Pennsylvania smartweed, giant ragweed, and Chinese tallow (*Triadica sebifera*).

W-2 is a riverine wetland associated with S-1. It is dominated by swamp smartweed. W-3 is a small emergent area within forested wetland W-4. It is dominated by giant ragweed.

4.2.1.2.2 Scrub-shrub Wetlands

The study area contains one 0.05-ac scrub-shrub wetland (W-11). This wetland is also lacustrine fringe, but it is at a higher elevation than the emergent fringe wetlands. Dominant species are box elder, Chinese tallow, black willow, Pennsylvania smartweed, narrowleaf cattail, giant ragweed, and curly dock.

4.2.1.2.3 Forested Wetlands

The study area contains three forested wetlands totaling 1.13 ac (W-4, W-5, and W-6). W-4 and W-5 are on the outside bend where OCP-2's backwater canal makes a 90° turn to the east. Additionally, these two wetlands are split by S-1. Hydrology for these wetlands comes primarily from OCP-2 but also from S-1, to a lesser degree. Dominant species are American elm (*Ulmus Americana*), black willow, and giant ragweed.

The largest of the forested wetlands is W-6. This wetland is a depressional, alluvial fan created where OCP-2's backwater canal makes a 90° turn to the east. This wetland is characterized by its lack of herbaceous vegetation. Black willow is the dominant species, however, the wetland also contains small percentages of Chinese tallow, silverleaf maple (*Acer saccharinum*), and giant ragweed.

4.2.1.3 On-channel Ponds

The study area has a total of 8.25 ac of on-channel ponds (**Table 4**).

Table 4. On-channel Ponds within the Study Area

Resource ID	Type	Classification	Acreage Within Study Area
OCP-1	On-channel Pond	RPW	0.07
OCP-2	On-channel Pond	RPW	8.17
OCP-3	On-channel Pond	RPW	0.01
		Total	**8.25**

OCP-1 is a large open water feature only partially within the study area and situated between the golf course and a residential area. It is crossed aerially by a transmission line. The fringes of the pond are emergent wetland dominated by cattail.

OCP-2 is a large open water feature that backs up into a flood control canal to the north. This pond is surrounded on most of its perimeter by wetland habitats. Perennial streams S-2 and S-3 serve as two of the three outlets for this pond. The third outlet is a water control structure that siphons water into an underground pipe. The depth of this pond was not measured for the purposes of this report, however, the maximum depth is likely over 10 feet.

OCP-3 is a small backwater area that receives water from OCP-2's backwater canal. This feature is considered open water habitat rather than wetland due to its depth and lack of emergent vegetation.

4.2.1.4 Potentially Non-Jurisdictional Aquatic or Drainage Features

One non-jurisdictional vegetated swale (NJD-1) without a defined OHWM was found within the study area. This feature is considered non-jurisdictional based on the most recently approved guidance from the USACE and EPA (USACE, 2008).

5.0 SUMMARY AND RECOMMENDATIONS

The approximately 37.3-ac study area contains three OCPs totaling 8.25 ac, four streams totaling 2,224 LF (0.51 ac), and 11 wetlands totaling 3.82 ac that are considered waters of the U.S. based on this study and on-site delineation.

5.1 Regulatory and Permitting Discussion

This delineation and proposed jurisdictional determination of waters of the U.S., including wetlands, for the proposed project is based on the best professional judgment of HDR's team of environmental scientists, with extensive experience with delineation of similar resources in the south-central U.S. region. However, it does not constitute an Approved Jurisdictional Determination or significant nexus determination, which can only be officially rendered by the USACE Regulatory Division through the formal review process. HDR recommends that the City of Carrollton coordinate with the USACE, Fort Worth District, Regulatory Division if an Approved Jurisdictional Determination is desired.

Under Section 404 of the CWA, the USACE regulates the discharge of excavated or fill material into water of the U.S., including wetlands. Based on the proposed design, it would require a Section 404 permit for authorization.

6.0 REFERENCES

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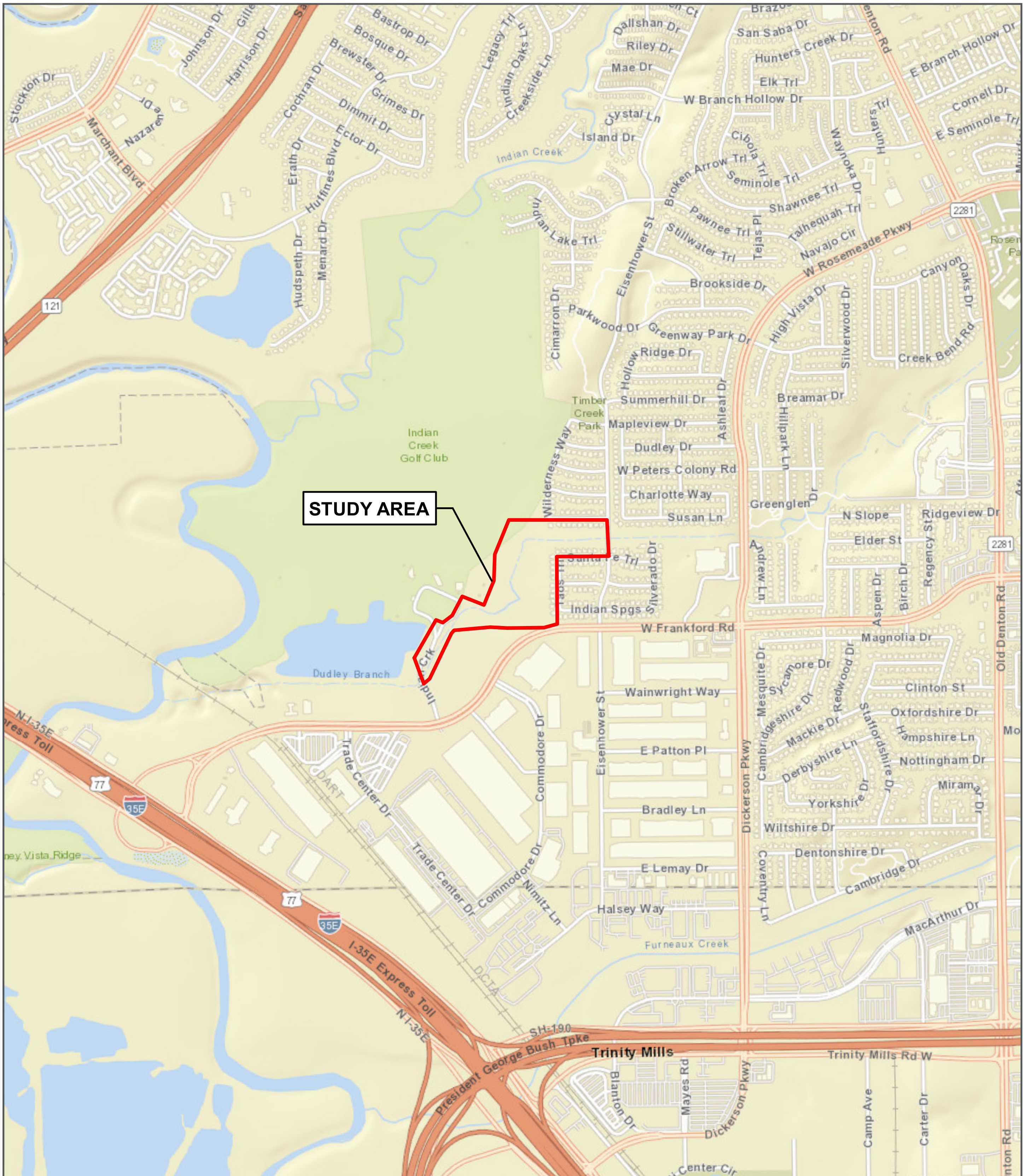
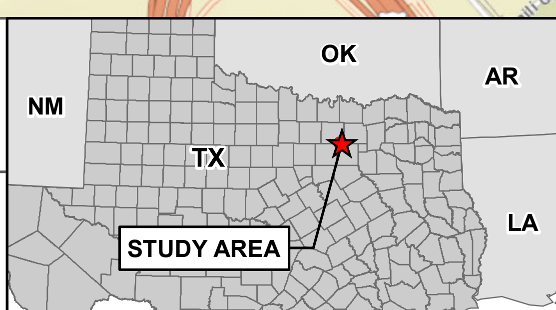
Appendix A:
Maps





N

0 1,000 2,000
FEET

CARROLLTON
TEXAS

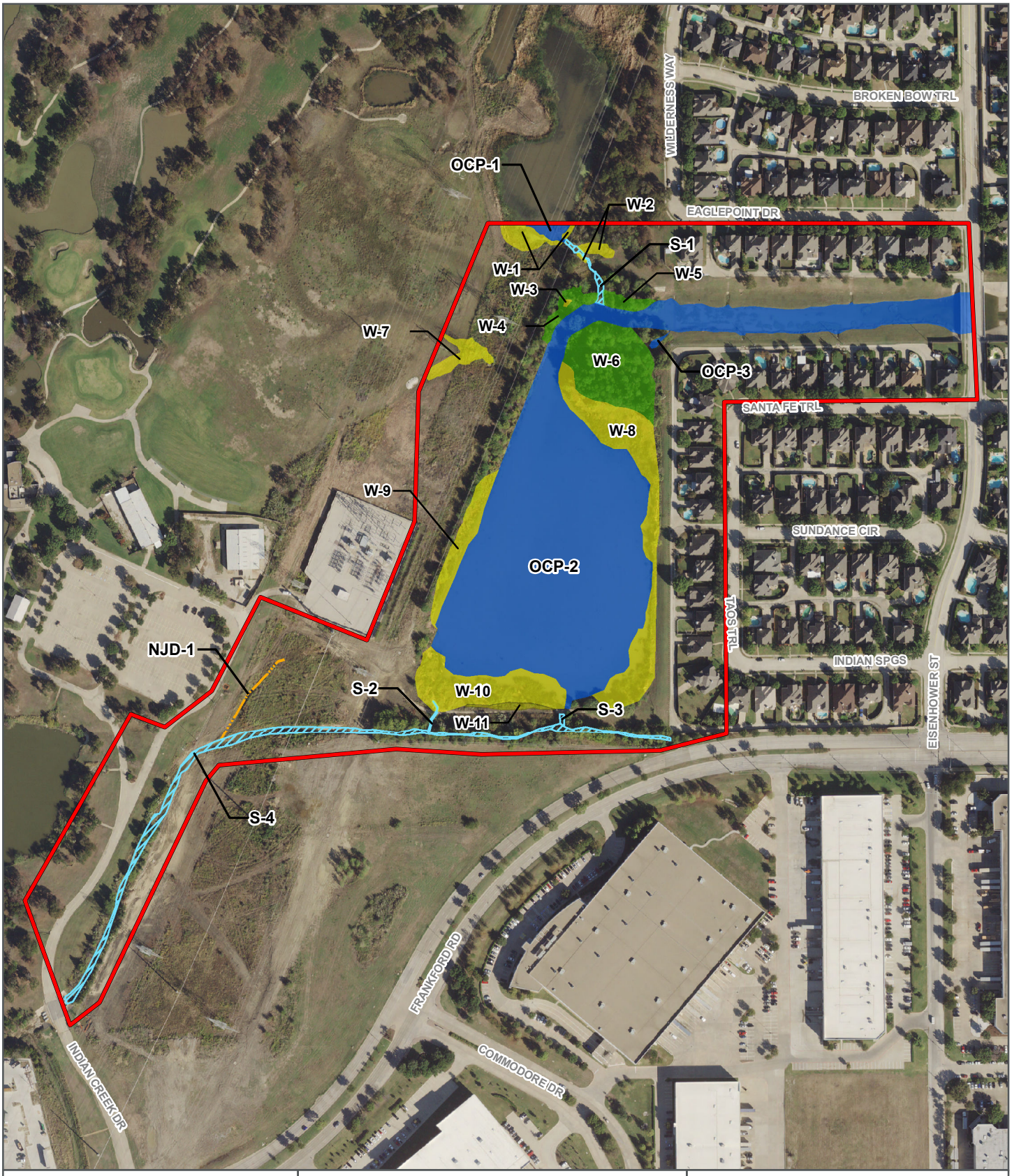
HDR

GENERAL LOCATION

DUDLEY BRANCH IMPROVEMENTS
DELINEATION AND PROPOSED
JURISDICTIONAL DETERMINATION

FIGURE 1

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\DELINEATION\DUDLEYBRANCH_FIG1_GENLOC_8X11.MXD - USER: KNAGY - DATE: 3/19/2020



N

0 250 500
FEET

WATERS OF THE U.S.

- PERENNIAL STREAM
- EMERGENT WETLAND
- FORESTED WETLAND
- SCRUB-SHRUB WETLAND
- ON-CHANNEL POND

NOT WATERS OF THE U.S.

- STUDY AREA
- NON-JURISDICTIONAL DRAINAGE

CARROLLTON TEXAS

HDR

WATERS OF THE U.S.

DUDLEY BRANCH IMPROVEMENTS
DELINEATION AND PROPOSED
JURISDICTIONAL DETERMINATION

FIGURE 2

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\DELINEATION\DUDLEYBRANCH_FIG2_WOTUS_8X11.MXD - USER: KNAGY - DATE: 3/19/2020

Appendix B:
Representative Photographs

Representative Study Area Photographs
Delineation and Proposed Jurisdictional Determination
Dudley Branch Pond Removal and Stream Restoration
Photographs Taken May 2, 2018 and September 19, 2018

	Photo 1. Facing east along the backwater canal portion of OCP-2. Note the ponded nature of the canal.
	Photo 2. Facing north at perennial stream at the confluence of S-1 and OCP-2. Forested wetlands W-4 and W-5 are on the left and right respectively. Notice the ponded, backwater nature of OCP-2 and this portion of S-1.

	Photo 3. Looking north at OCP-2 toward the confluence with S-1. Note the narrow emergent fringe wetland W-9 on the left side of the picture.
	Photo 4. Facing west at emergent fringe wetland W-8. Emergent wetlands W-9 (background right) and W-10 (background left) can also be seen in the picture.

	Photo 5. Facing southwest at OCP-3 with forested wetland W-6 in the background. Note the lack of emergent vegetation.
	Photo 6. Facing northwest in forested wetland W-6. Note the large black willow trees and lack of herbaceous vegetation.

	Photo 7. Facing west in the upstream portion of perennial stream S-4. Note the dense canopy cover and forested riparian buffer.
	Photo 8. Facing southwest at the downstream portion of perennial stream S-4. Note the transition of the riparian corridor from power line ROW to unmaintained scrub-shrub.

	Photo 9. Facing southwest at perennial stream S-4. Note the scrub-shrub riparian buffer.
	Photo 10. Facing north at emergent wetland W-1 around OCP-1. Note the transmission and distribution lines overhead.

	Photo 11. Facing east at emergent wetland W-2. Note the thick growth of smartweed.
	Photo 12. Facing south at perennial stream S-1. Note the backwater nature of this portion of the stream.

	Photo 13. Showing emergent wetland W-3 (giant ragweed) and forested wetland W-4 (wooded area). Drift deposits typical of W-4, W-5, and W-6.
	Photo 14. View of emergent wetland W-7. Note the transmission line overhead.

Photo 15. Facing east at S-3. Note how the stream starts at the base of the concrete low water crossing.

Appendix C:
Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 5/2/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: UP-1

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): hilltop Local relief (concave, convex, none): convex Slope (%): 1

Subregion (LRR): LRRJ Lat: 32.998316 Long: -96.930151 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: UPL

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

On a high point of the berm around the man-made impoundment.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Rumex crispus	45	yes	FAC
2. Convolvulus equitans	30	yes	FACU
3. Helianthus annuus	5	no	FACU
4. Eupatorium capillifolium	15	no	FACU
5. Cirsium altissimum	5	no	UPL
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	45	x 3 =	135
FACU species	50	x 4 =	200
UPL species	5	x 5 =	25
Column Totals:	100 (A)		360 (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]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: UP-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 %	Type[1]	Loc[2]	Texture	Remarks
1-12	7.5 YR 6/8	70					Sandy clay	red fill dirt
1-12	10 YR 3/1	30					clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 5/2/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: UP-2

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 25

Subregion (LRR): LRRJ Lat: 32.998049 Long: -96.928070 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: UPL

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Manicured sod hillside.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Cynodon dactylon	75	yes	FACU
2. Lolium perenne	10	no	FACU
3. Paspalum dilatatum	10	no	FAC
4. Ambrosia psilostachya	5	no	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	20	x 3 =	60
FACU species	80	x 4 =	320
UPL species		x 5 =	
Column Totals:	100 (A)		380 (B)

Prevalence Index = B/A = 3.8

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: UP-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 %	Type[1]	Loc[2]	Texture	Remarks
1-16	10 YR 3/2	100					clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 9/19/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: W-1

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): lacustrine fringe Local relief (concave, convex, none): convex Slope (%): 1-3

Subregion (LRR): LRRJ Lat: 33.000928 Long: -96.928720 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: PEM

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Fringe around OCP-1.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Persicaria hydropiperoides	50	yes	OBL
2. Lemna minor	25	yes	OBL
3. Panicum virgatum	15	no	FAC
4. Iva annua	10	no	FAC
5. Echinochloa crus-galli	5	no	FAC
6. Sagittaria lancifolia	5	no	OBL
7.			
8.			
9.			
10.			
	110.0 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0.0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	80	x 1 = 80
FACW species	0	x 2 = 0
FAC species	30	x 3 = 90
FACU species		x 4 = 0
UPL species		x 5 = 0
Column Totals:	110 (A)	170 (B)

Prevalence Index = B/A = 1.5

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W-1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/2	98	5YR 3/4	2	C	M/PL	clay	roots
6-12	10YR 3/1	30	5YR 3/4	5	C	M/PL	sandy clay	
6-12	10YR 4/6	65					sandy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 6

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 9/19/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: W-2

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): riverine Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): LRRJ Lat: 33.000742 Long: -96.928414 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: PEM

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil ✓, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Abutting S-1.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Persicaria hydropiperoides	90	yes	OBL
2. Ludwigia peploides	5	no	OBL
3. Lemna minor	5	no	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100.0 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0.0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		100 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W-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 %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Too wet to color.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 12

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 9/19/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: W-3

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): lacustrine fringe/riverine Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR): LRRJ Lat: 33.000425 Long: -96.928765 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: PEM

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Entire wetland covered with drift deposits.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Ambrosia trifida	40	yes	FAC
2. Cardiospermum halicacabum	5	no	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	45.0 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 55.0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	45	x 3 = 135
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	45 (A)	135 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W-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 %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					clay	
6-12	10YR 4/2	98	2.5YR 4/8	2	C	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 9/19/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: W-4

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): lacustrine fringe Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR): LRRJ Lat: 33.000477 Long: -96.928697 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: PFO

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Abutting OCP-2.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Ulmus americana	40	yes	FAC
2. Salix nigra	40	yes	OBL
3.			
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. Fraxinus pennsylvanica	5	yes	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Ambrosia trifida	60	yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	60.0	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 40.0

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	40	x 1 = 40
FACW species	0	x 2 = 0
FAC species	105	x 3 = 315
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	145 (A)	355 (B)

Prevalence Index = B/A = 2.4

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W-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 %	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 4/2	98	2.5YR 4/8	2	C	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
✓ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 9/19/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: W-5

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): lacustrine fringe Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR): LRRJ Lat: 33.000426 Long: -96.928372 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: PFO

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Abutting OCP-2.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	50	yes	OBL
2. Acer negundo	10	no	FAC
3.			
4.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Ambrosia trifida	50	yes	FAC
2. Persicaria hydropiperoides	15	yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	65.0	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 35.0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	0	x 2 =	0
FAC species	60	x 3 =	180
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	125 (A)		245 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W-5

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 %	Type[1]	Loc[2]	Texture	Remarks
0-3	10 YR 4/2	100					clay	
3-12	2.5YR 5/2	95	2.5YR 4/8	5	C	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 5/2/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: W-6 (DP-1)

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): lacustrine fringe/depressional Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): LRRJ Lat: 32.999826 Long: -96.928271 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: PFO

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Alluvial fan/depression adjacent to the bend in the OCP-2 backwater canal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	60	yes	FACW
2. Triadica sebifera	5	no	FAC
3.			
4.			
	65	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	5	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 100

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

Lots of detritus and very little herbaceous vegetation.

SOIL

Sampling Point: W-6 (DP-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 %	Type[1]	Loc[2]	Texture	Remarks
0-2								organic matter
2-6	7.5 YR 3/1	95	7.5 YR 5/8	5	C	M	clay	
6-12	7.5 YR 4/1	50	7.5 YR 5/8	10	C	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
✓ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 5/2/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: W-6 (DP-2)

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): lacustrine fringe/depressional Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): LRRJ Lat: 32.999967 Long: -96.928523 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: PFO

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Alluvial fan/depression adjacent to the bend in the OCP-2 backwater canal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	60	yes	FACW
2. Triadica sebifera	5	no	FAC
3. Acer saccharinum	5	no	FAC
4.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. Acer negundo	5	yes	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Ambrosia trifida	5	yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	5	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 95

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

Lots of detritus and very little herbaceous vegetation.

SOIL

Sampling Point: W-6 (DP-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 %	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 2/1	100					clay	organic matter and roots
4-12	10 YR 4/3	70	5 YR 4/6	30	C	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 9/19/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: W-7

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR): LRRJ Lat: 33.000096 Long: -96.929506 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: PEM

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Adjacent to OCP-2 and in transmission line ROW.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Sesbania drummondii	5	yes	FACW
2.			
3.			
4.			
5.			
	5 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Typha angustifolia	95	yes	OBL
2. Persicaria hydropiperoides	15	no	OBL
3. Cardiospermum halicacabum	5	no	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	115.0 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0.0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	110	x 1 =	110
FACW species	5	x 2 =	10
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	120 (A)		135 (B)

Prevalence Index = B/A = 1.1

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W-7

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 %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2	95	7.5YR 5/8	5	C	M		
7-12								water table

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Water table at 7+ inches.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ✓	No ___	Depth (inches): 7
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 5/2/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: W-8

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): lacustrine fringe Local relief (concave, convex, none): convex Slope (%): 1-3

Subregion (LRR): LRRJ Lat: 32.998104 Long: -96.928228 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: PEM

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Wide shelf/fan within a man-made impoundment.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	5	yes	FAC
2.			
3.			
4.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Salix nigra	5	yes	FACW
2. Triadica sebifera	5	yes	FAC
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Panicum virgatum	15	no	FAC
2. Typha angustifolia	85	yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W-8

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 %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Too inundated to color.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0-12

Water Table Present? Yes ✓ No ___ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 5/2/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: W-9

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): lacustrine fringe Local relief (concave, convex, none): convex Slope (%): 1-2

Subregion (LRR): LRRJ Lat: 32.999250 Long: -96.929409 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: PEM

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Fringe around a man-made impoundment.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	5	yes	FACW
2. Diospyros virginiana	10	yes	FAC
3. Ulmus crassifolia	5	yes	FAC
4.			
	20	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. Triadica sebifera	5	yes	FAC
2. Diospyros virginiana	5	yes	FAC
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Typha angustifolia	40	yes	OBL
2. Ambrosia trifida	25	yes	FAC
3. Persicaria pensylvanica	25	yes	FACW
4. Rumex crispus	5	no	FAC
5.			
6.			
7.			
8.			
9.			
10.			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W-9

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 %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5 Y 3/1	45	2.5 YR 4/6	10	C	M	Clay	
0-6	2.5 Y 5/2	45					Clay	
6-12							Clay	Too wet to color.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ✓	No ___	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 5/2/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: W-10

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): lacustrine fringe Local relief (concave, convex, none): convex Slope (%): 1-3

Subregion (LRR): LRRJ Lat: 32.997693 Long: -96.929772 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: PEM

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Emergent fringe extending out into a shallow shelf in the man-made impoundment.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Typha angustifolia	100	yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W-10

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Too inundated to color.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 6"

Water Table Present? Yes ✓ No ___ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Dudley Branch City/County: Carrollton/ Denton County Sampling Date: 5/2/18

Applicant/Owner: City of Carrollton State: TX Sampling Point: W-11

Investigator(s): Mike Keenan and Brandon Tate Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): lacustrine fringe Local relief (concave, convex, none): convex Slope (%): 1-2

Subregion (LRR): LRRJ Lat: 32.997656 Long: -96.929135 Datum: NAD 83

Soil Map Unit Name: Ovan clay, occasionally flooded NWI classification: PSS

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Scrub-shrub fringe of an emergent fringe around a man-made impoundment.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	5	no	FAC
2. Acer negundo	20	yes	FAC
3. Diospyros virginiana	5	no	FAC
4. Populus deltoides	5	no	FAC
	35	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. Triadica sebifera	25	yes	FAC
2. Acer negundo	40	yes	FAC
3. Salix nigra	15	no	FACW
4.			
5.			
	80	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Typha angustifolia	15	yes	OBL
2. Panicum virgatum	10	no	FAC
3. Persicaria pensylvanica	45	yes	FACW
4. Ambrosia trifida	15	yes	FAC
5. Rumex crispus	15	yes	FAC
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 7 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W-11

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 %	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 3/2	100					Clay	Roots present
4-10	10 YR 3/2	80	5 YR 4/6	20	C	M	Clay	
10+							Clay	too wet to color

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ✓	No ___	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ___

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

Remarks:

Attachment C

Color Photographs

Photographs from the Delineation of waters of the U.S. and TXRAM evaluation performed by HDR can be found in Attachment B and Attachment H, Appendix E.

Attachment D

Table of Waters of the U.S. Impacted by the Proposed Project

Attachment D: Table of Waters of the U.S. Impacted by the Proposed Project

Waterbody ID[1]	Latitude and Longitude (Decimal Degrees)	Resource Type[2]	Linear Feet in Project Area	Acres in Project Area	Impact Type[3]	Linear Feet of Impact	Acres of Impact	Cubic Yards of Material to be Discharged
OCP-2	-96.928854, 32.998639	I	-	8.17	D/P	-	6.59	46,104
S-2	-96.929882, 32.997620	PS	85	0.01	D/T	52	0.004	11
S-3	-96.928856, 32.997558	PS	26	0.01	D/T	26	0.007	16
S-4	-96.930950, 32.997504	PS	1,917	0.45	D/T	483	0.17	630
W-8	-96.928094, 32.998829	NFW	-	1.18	D/T	-	0.69	3,426
W-9	-96.929656, 32.998799	NFW	-	0.33	D/T	-	0.22	1,055
W-10	-96.929558, 32.997759	NFW	-	0.74	D/T	-	0.49	5,184
W-11	-96.929275, 32.997649	FW (PS/S)	-	0.05	D/T	-	0.03	86

[1] Waterbody ID may be the name of a feature or an assigned label such as “W-1” for a wetland.

[2] Resource Types: NFW – Non-forested wetland, FW – Forested wetland, PS – Perennial Stream, IS – Intermittent Stream, ES – Ephemeral Stream, I – Impoundment

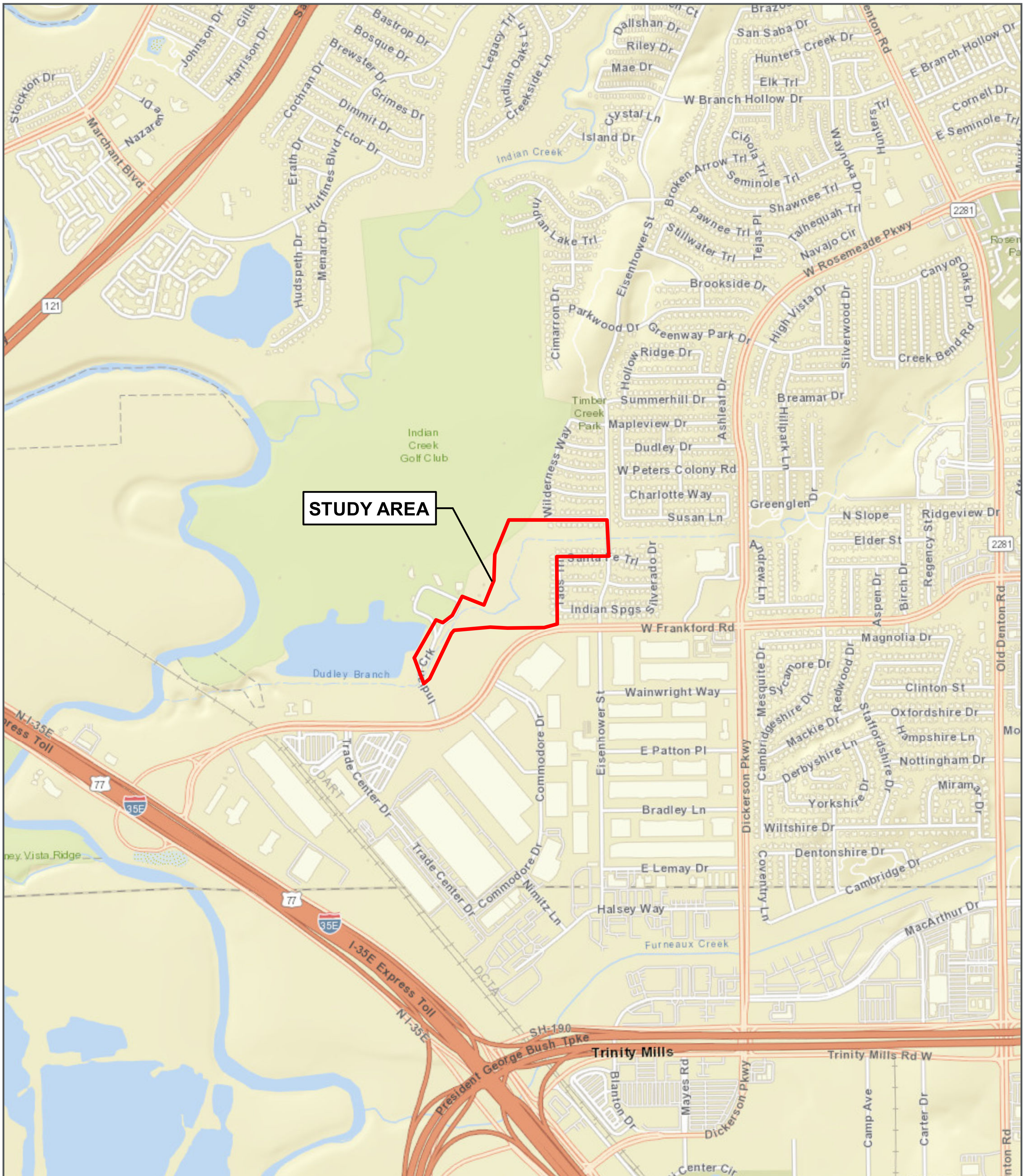
[3] Impact Types: D/P – Direct* and Permanent, D/T – Direct and Temporary, I/P – Indirect** and Permanent, I/T – Indirect and Temporary

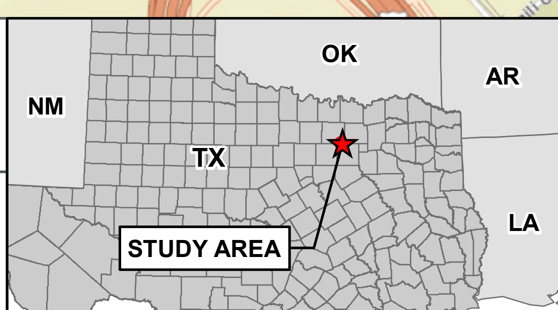
* Direct impacts are here defined as those adverse affects caused by the proposed activity, such as discharge or excavation.

** Indirect impacts are here defined as those adverse affects caused subsequent to the proposed activity, such as flooding or effects of drainage on adjacent waters of the U.S.

Attachment E

Required Figures / Drawings
(For additional figures see Attachments B and H)





N

0 1,000 2,000
FEET

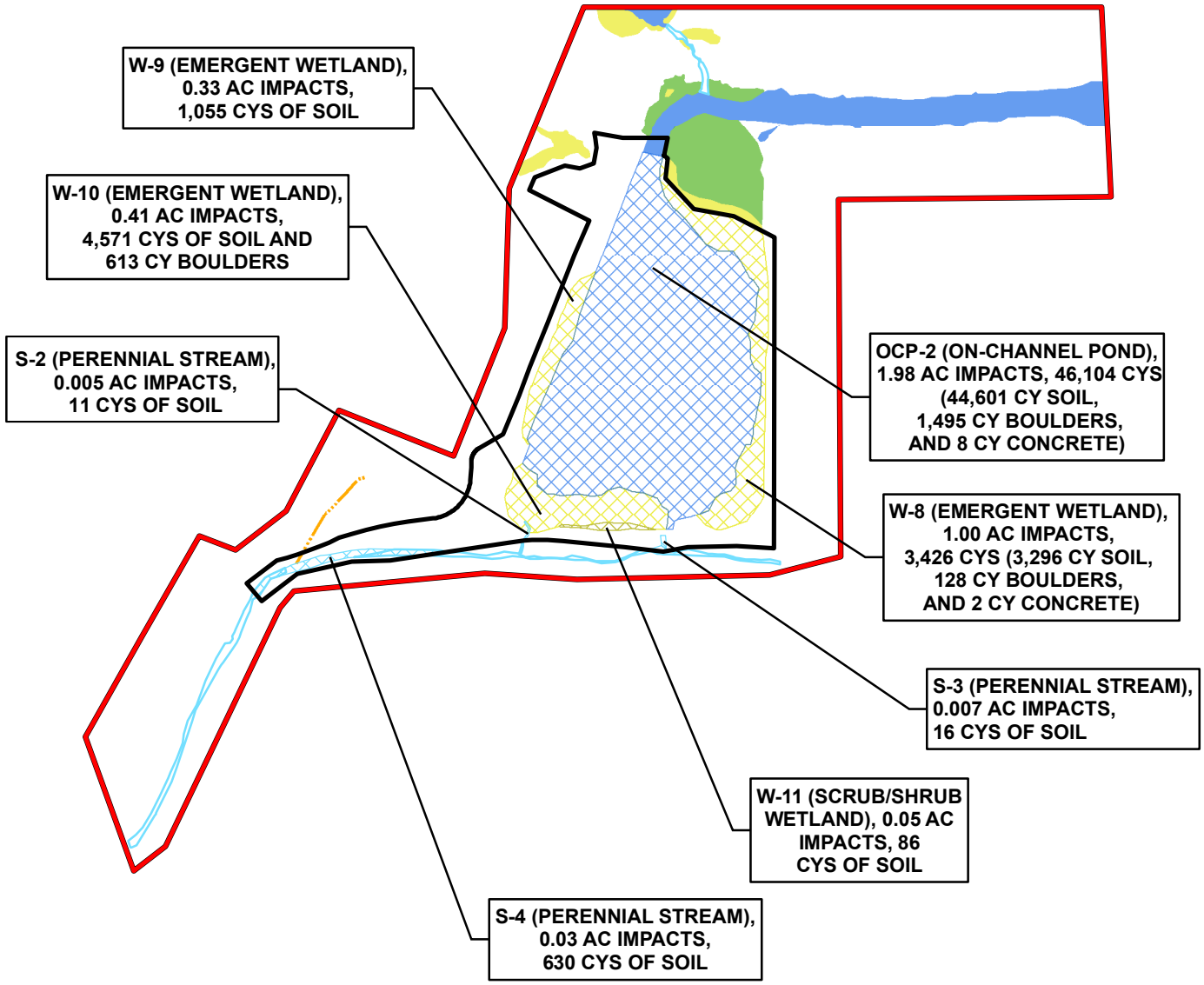
CARROLLTON
TEXAS

GENERAL LOCATION

DUDLEY BRANCH POND
REMOVAL & STREAM RESTORATION

FIGURE 1

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\PCN\DUDLEYBRANCH_FIG1_GENLOC_8X11.MXD - USER: KNAGY - DATE: 4/7/2020



N

0 250 500
FEET

CARROLLTON TEXAS

HDR

WATERS OF THE U.S.

- EMERGENT WETLAND - IMPACT
- SHRUB SCRUB WETLAND - IMPACT
- PERENNIAL STREAM - IMPACT
- ON-CHANNEL POND - IMPACT
- EMERGENT WETLAND
- FORESTED WETLAND
- PERENNIAL STREAM
- ON-CHANNEL POND

NOT WATERS OF THE U.S.

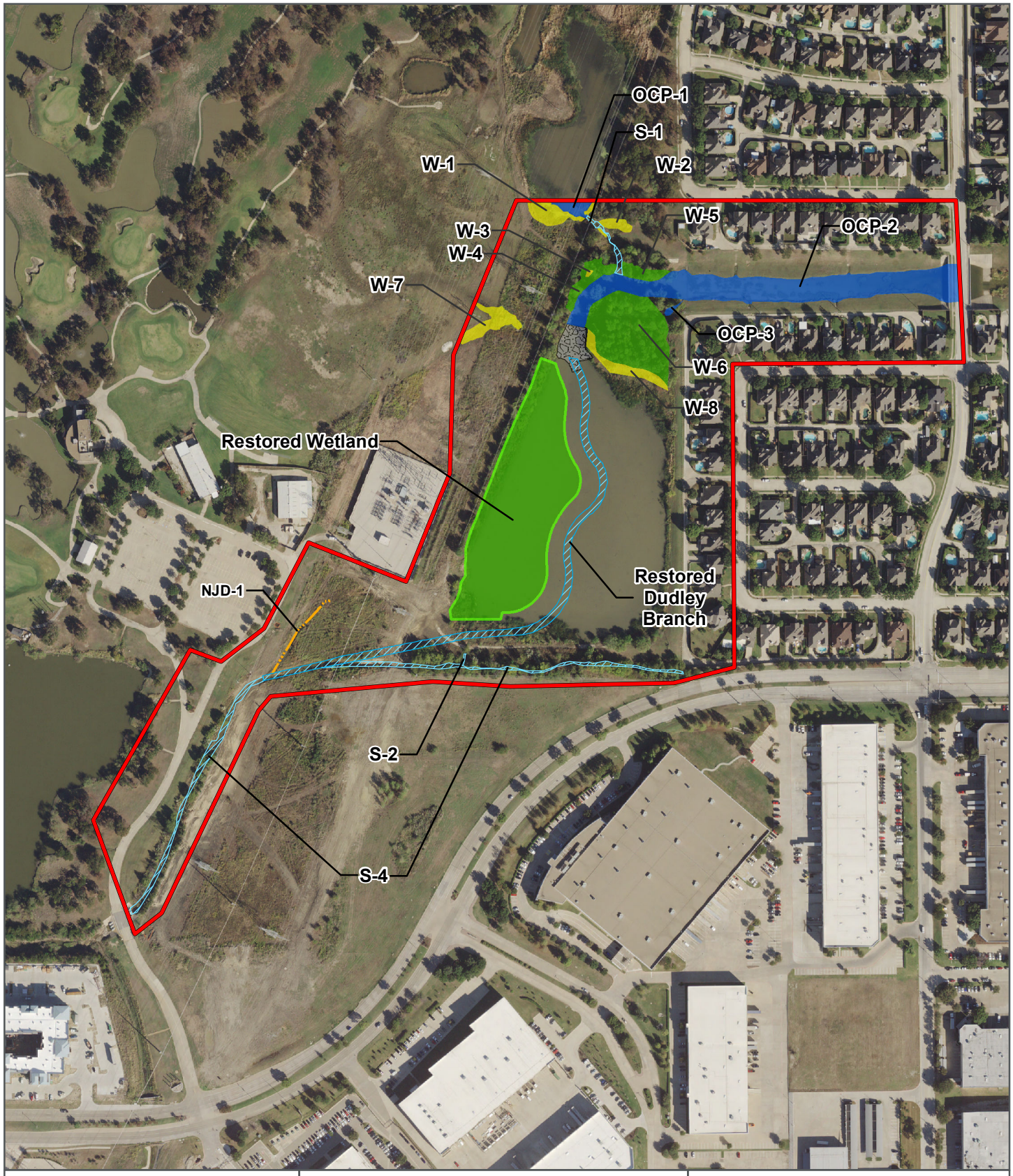
- STUDY AREA
- NON-JURISDICTIONAL DRAINAGE

IMPACTS TO WATERS OF THE U.S.

DUDLEY BRANCH POND
REMOVAL & STREAM RESTORATION

FIGURE 2

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\PCN\DUDLEYBRANCH_FIG2_IMPACTS_8X11.MXD - USER: KNAGY - DATE: 4/7/2020



N

0 250 500
FEET

WATERS OF THE U.S.

- PERENNIAL STREAM
- EMERGENT WETLAND
- FORESTED WETLAND
- ON-CHANNEL POND

FEATURES NOT WATERS OF THE U.S.

- NON-JURISDICTIONAL DRAINAGE
- BOULDERS
- STUDY AREA

CARROLLTON TEXAS

HDR

POST-RESTORATION WATERS OF THE U.S.

DUDLEY BRANCH POND
REMOVAL & STREAM RESTORATION

FIGURE 3

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\PCN\DUDLEYBRANCH_FIG3_POSTRESTORATION_8X11.MXD - USER: KNAGY - DATE: 4/7/2020

N

0 250 500
FEET

WATERS OF THE U.S.
- PERENNIAL STREAM
- EMERGENT WETLAND
- FORESTED WETLAND
- ON-CHANNEL POND

FEATURES NOT WATERS OF THE U.S.
- STUDY AREA
- BOULDERS
- FORESTED WETLAND TREES AND SHRUBS
- HARDWOOD TREES (FREQUENTLY FLOODED)
- NATIVE GRASSES
- UPLAND HARDWOOD TREES

CARROLLTON TEXAS

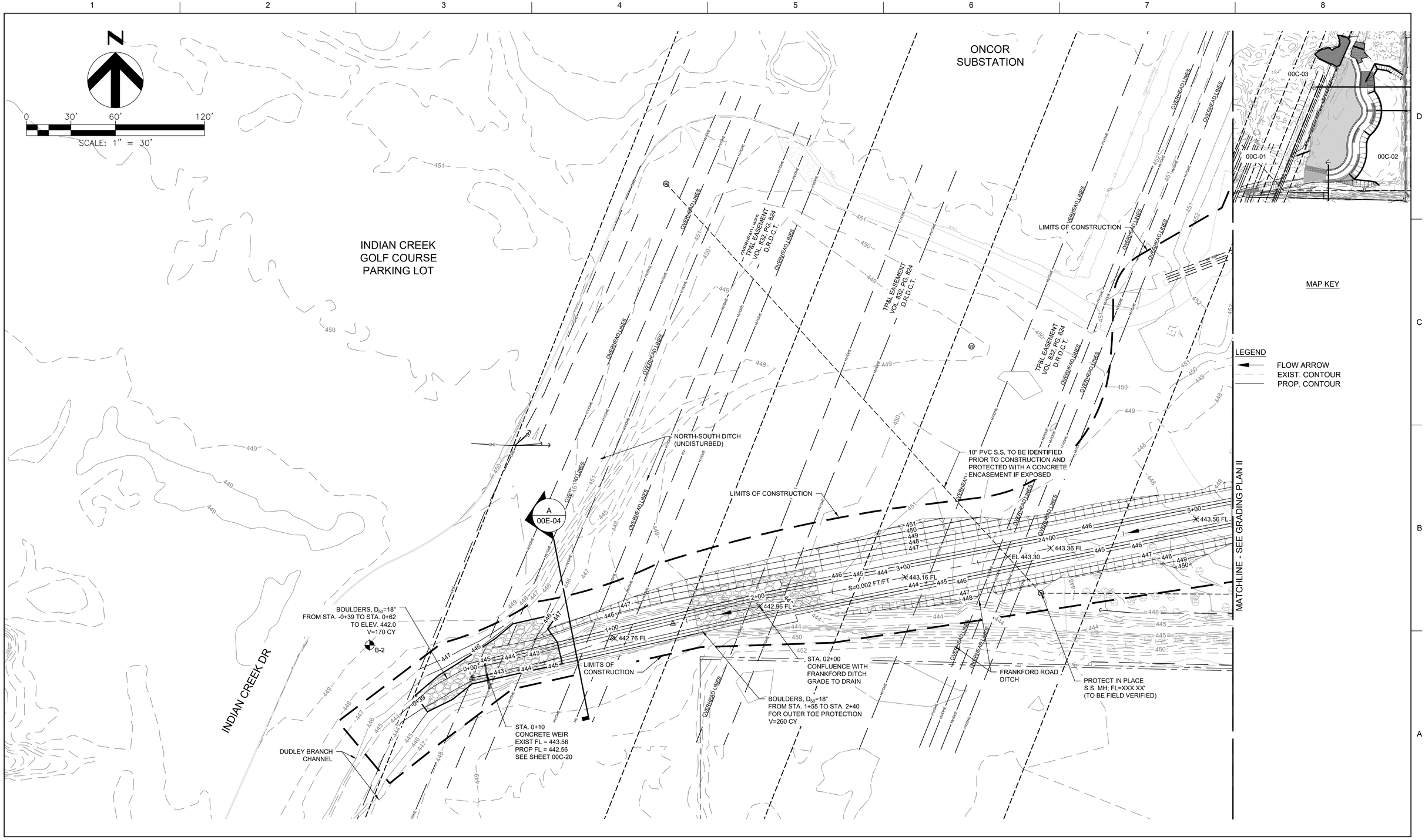
HDR

REVEGETATION PLAN

DUDLEY BRANCH POND
REMOVAL & STREAM RESTORATION

FIGURE 4

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\PCN\DUDLEYBRANCH_FIG4_REVEGETATION_8X11.MXD - USER: KNAGY - DATE: 4/7/2020



Texas P.E. Firm Registration No. F-754

ISSUE	DATE	DESCRIPTION
2	02/07/2020	INTERNAL 70% REVIEW
1	06/18/2019	INTERNAL 30% REVIEW

PROJECT MANAGER	Rodrigo Vizcaino
DESIGNED BY	
DESIGNED BY	
DRAWN BY	
CHECKED BY	
PROJECT NUMBER	10110387

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF REVIEW UNDER THE AUTHORITY OF RODRIGO VIZCAINO TEXAS P.E. NO. 95939 DATE: FEBRUARY 14, 2020

IT IS NOT TO BE USED FOR CONSTRUCTION OR ANY OTHER PURPOSE.

CARROLLTON TEXAS

Design and Permitting of Channel Improvements for Dudley Branch

GRADING PLAN I

0 1" 2"

FILENAME

SCALE 1" = 30'

SHEET **00E-01**

MATCHLINE - SEE GRADING PLAN III

MATCHLINE - SEE GRADING PLAN I

PROPOSED WETLAND

TP&L EASEMENT VOL. 82, PG. 824 D.R.D.C.T.

EL 447.50

PILOT CHANNEL B=VARIES, SS=2:1

BOULDERS, D_{50}=18" FROM STA. 10+00 TO STA. 10+85 FOR OUTER TOE PROTECTION TO ELEV. 448.5 V=170 CY

BOULDER MAT 6'x6' D_{50}=12" V=3 CY

S=0.002 FT/FT

444.76 FL

444.57 FL

444.37 FL

444.16 FL

443.96 FL

443.76 FL

FLOODPLAIN BENCHES, WIDTH VARIES

DIVIDING EARTHEN BERM H=12", SS=4:1 FILL WITH COHESIVE MATERIAL

ROCK RIFFLE WITH BOULDERS, D_{50}=12" V=300 CY

STA 6+60.64 START EARTHEN 452' LT OF CL

B 00E-04

R100.00

R250.00

BOULDERS, D_{50}=18" FROM STA. 06+50 TO STA. 09+30 FOR OUTER TOE PROTECTION TO ELEV. 448.0 V=530 CY

COIR MAT LINED SWALE OR APPROVED EQUAL

OVERBANK FILL GRADE TO DRAIN TO CHANNEL S = 0.7% MIN, 1.0% MAX

GRADE TO ELEV 453.0

LIMITS OF CONSTRUCTION

EL 452.50

ARMOR WITH COIR MATTING A=925 SY

ARMOR WITH COIR MATTING A=610 SY

FRANKFORD ROAD DITCH (UNDISTURBED)

FRANKFORD DRIVE

ALLEY

TAOS TRAIL

LOT 12

LOT 11

LOT 10

LOT 9

LOT 8

LOT 7

0 30' 60' 120'

SCALE: 1" = 30'

MAP KEY

00C-01 00C-02 00C-03

LEGEND

FLOW ARROW

EXIST. CONTOUR

PROP. CONTOUR

ISSUE	DATE	DESCRIPTION
2	02/07/2020	INTERNAL 70% REVIEW
1	06/18/2019	INTERNAL 30% REVIEW

PROJECT MANAGER	Rodrigo Vizcaino
DESIGNED BY	
DESIGNED BY	
DRAWN BY	
CHECKED BY	
PROJECT NUMBER	10110387

Texas P.E. Firm Registration No. F-754

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF REVIEW UNDER THE AUTHORITY OF RODRIGO VIZCAINO TEXAS P.E. NO. 95939 DATE: FEBRUARY 14, 2020

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CARROLLTON TEXAS

Design and Permitting of Channel Improvements for Dudley Branch

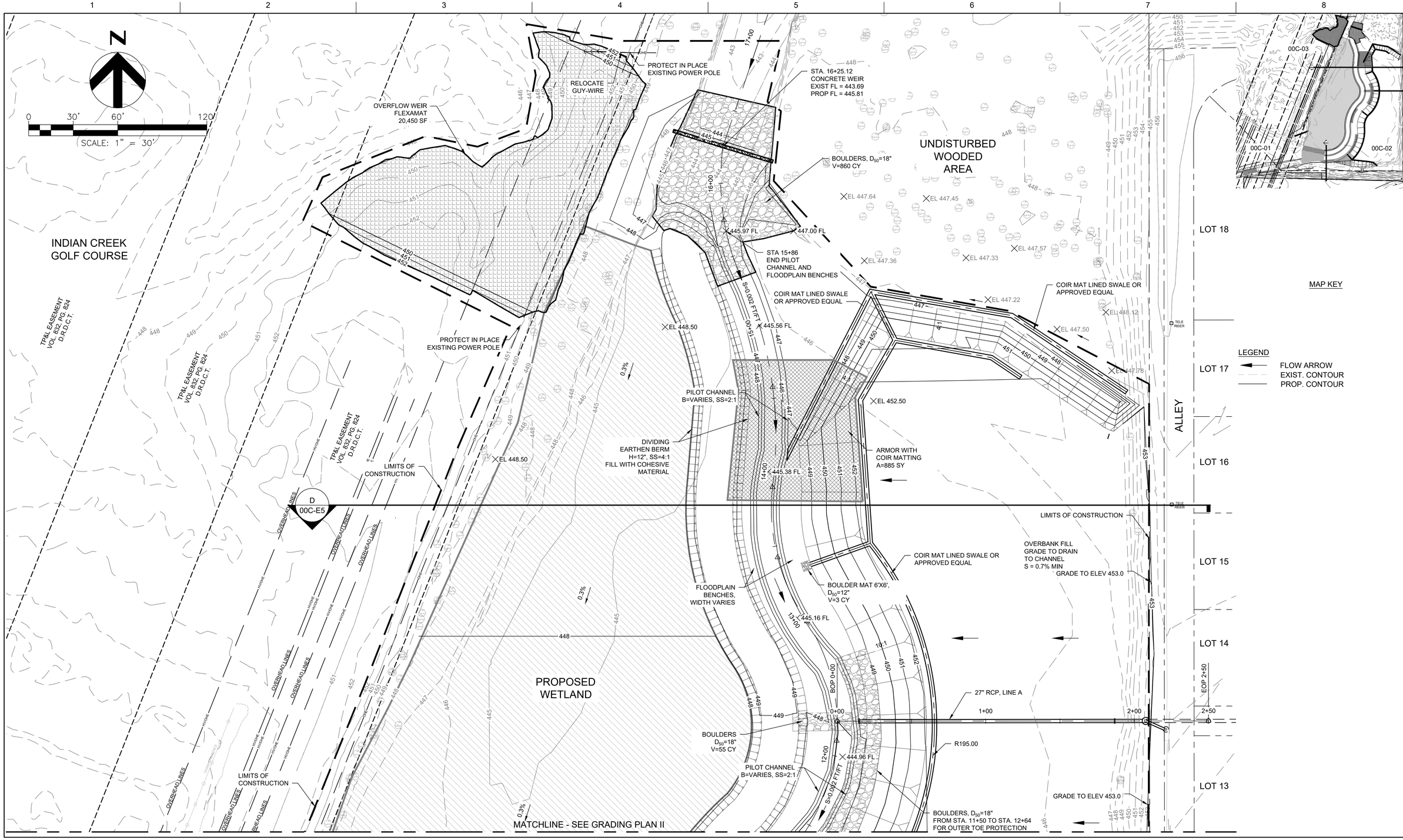
GRADING PLAN II

0 1" 2"

FILENAME

SCALE 1" = 30'

SHEET 00E-02



HDR
Texas P.E. Firm Registration No. F-754

ISSUE	DATE	DESCRIPTION
2	02/07/2020	INTERNAL 70% REVIEW
1	06/18/2019	INTERNAL 30% REVIEW

PROJECT MANAGER	Rodrigo Vizcaino
DESIGNED BY	
DESIGNED BY	
DRAWN BY	
CHECKED BY	
PROJECT NUMBER	10110387

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CARROLLTON TEXAS

Design and Permitting of Channel Improvements for Dudley Branch

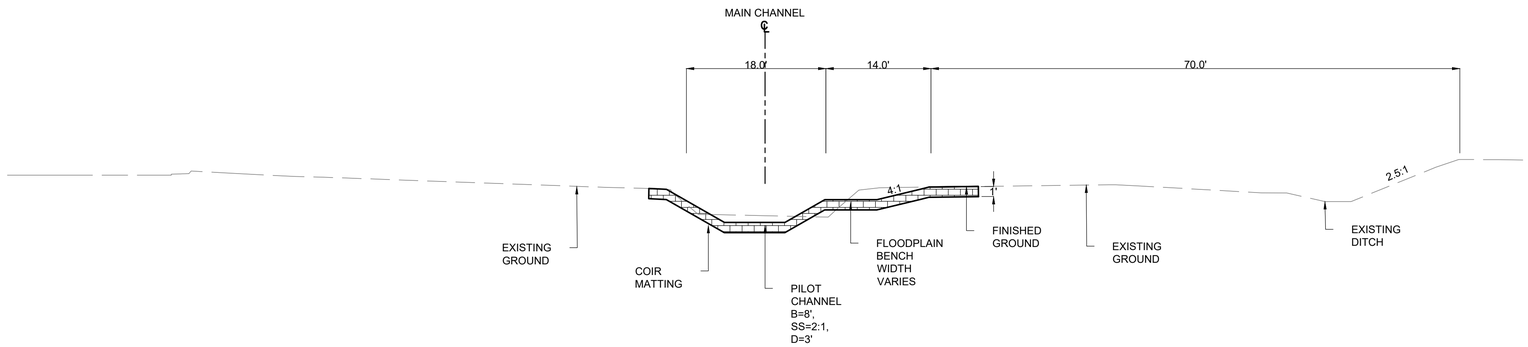
GRADING PLAN III

0 1" 2"

FILENAME

SCALE 1" = 30'

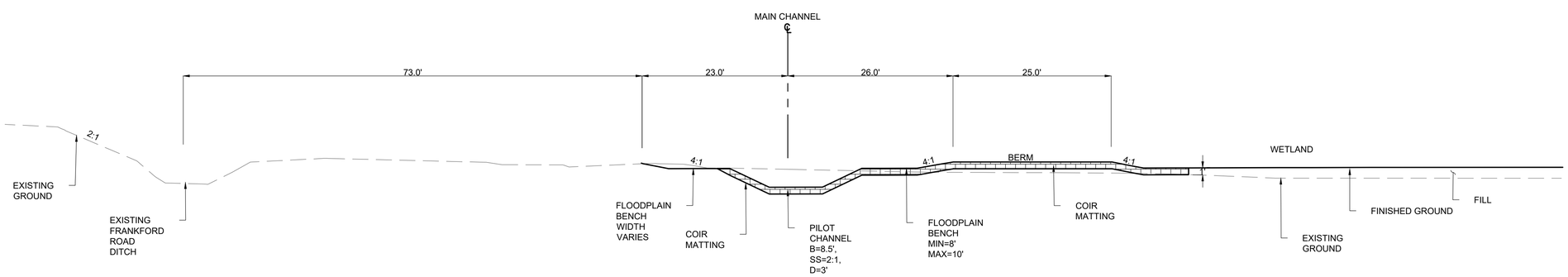
SHEET 00E-03



SECTION A-A
LOOKING DOWNSTREAM
H: 1"=10'
V: 1"=10'

NOTES:

1. SECTION VIEW IS LOOKING DOWNSTREAM.



SECTION B-B
LOOKING DOWNSTREAM
H: 1"=10'
V: 1"=10'

Texas P.E. Firm
Registration No. F-754

ISSUE	DATE	DESCRIPTION
2	02/07/2020	INTERNAL 70% REVIEW
1	06/18/2019	INTERNAL 30% REVIEW

PROJECT MANAGER	Rodrigo Vizcaino
DESIGNED BY	
DESIGNED BY	
DRAWN BY	
CHECKED BY	
PROJECT NUMBER	10110387

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CARROLLTON TEXAS

Design and Permitting of Channel Improvements for Dudley Branch

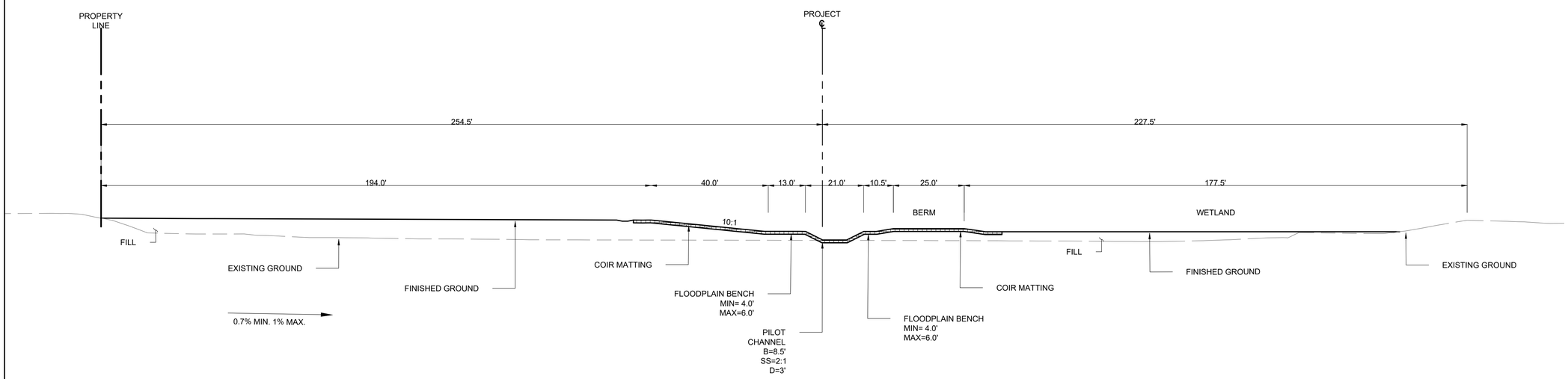
SECTION DETAILS I

0 1" 2"

FILENAME

SCALE AS NOTED

SHEET 00E-04



SECTION D-D
LOOKING DOWNSTREAM
H: 1"=20'
V: 1"=20'

NOTES:

1. SECTION VIEW IS LOOKING DOWNSTREAM.

Texas P.E. Firm
Registration No. F-754

ISSUE	DATE	DESCRIPTION
2	02/07/2020	INTERNAL 70% REVIEW
1	06/18/2019	INTERNAL 30% REVIEW

PROJECT MANAGER	Rodrigo Vizcaino
DESIGNED BY	
DESIGNED BY	
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PROJECT NUMBER	10110387

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CARROLLTON TEXAS

Design and Permitting of Channel Improvements for Dudley Branch

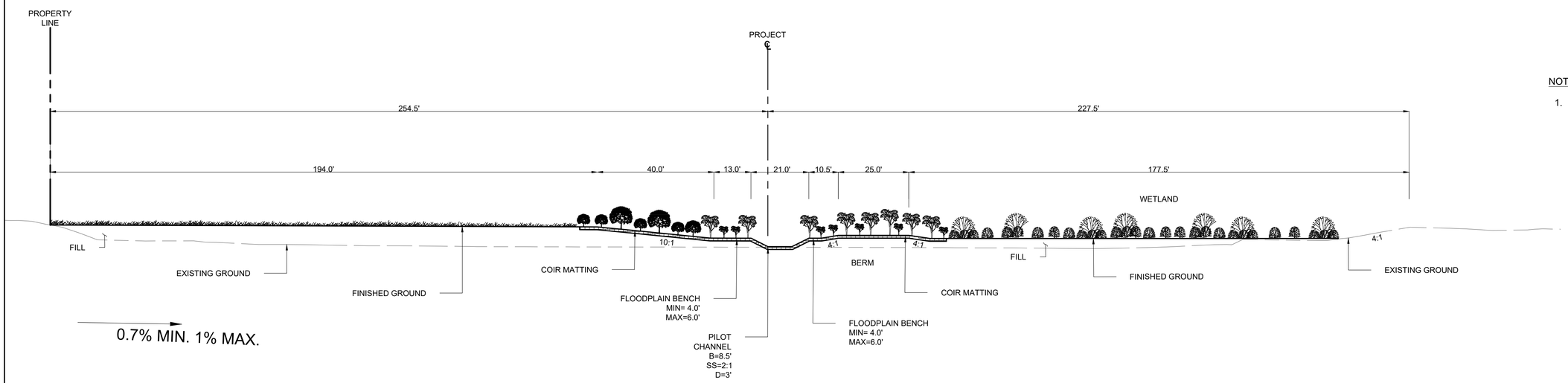
SECTION DETAILS II

0 1" 2"

FILENAME

SCALE AS NOTED

SHEET 00E-05



SECTION D-D
LOOKING DOWNSTREAM
H: 1"=20'
V: 1"=20'

NOTES:

1. SECTION CUT IS LOOKING DOWNSTREAM.

MAP KEY

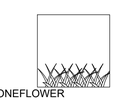
LEGEND

FORESTED WETLAND TREES AND SHRUBS
- BUTTONBUSH
- SOUTHERN WAX MYRTLE
- GREEN ASH
- WATER HICKORY
- OVERCUP OAK
- RIVER BIRCH
- SWAMP CHESTNUT OAK
- SWAMP WHITE OAK
- WILLOW OAK

HARWOOD TREES (FREQUENTLY FLOODED)
- AMERICAN ELM
- BALD CYPRESS*
- GREEN ASH*
- SHUMARD OAK
- SWAMP CHESTNUT OAK
- RIVER BIRCH
- SWAMP WHITE OAK

UPLAND HARWOOD TREES
- BUR OAK
- CEDAR ELM
- CHINQUAPIN OAK
- COMMON PERSIMMON
- PECAN
- SHUMARD OAK
- WATER OAK

NATIVE GRASSES
- BUFFALOGRASS
- VINE MESQUITE
- VIRGINIA WILDRYE
- BLUE GRAMA
- CURLY MESQUITE
- BLUEBONNET
- UPRIGHT PRAIRIE CONEFLOWER
- INDIAN BLANKET



Texas P.E. Firm
Registration No. F-754

ISSUE	DATE	DESCRIPTION
2	02/07/2020	INTERNAL 70% REVIEW
1	06/18/2019	INTERNAL 30% REVIEW

PROJECT MANAGER	Rodrigo Vizcaino
DESIGNED BY	
DESIGNED BY	
DRAWN BY	
CHECKED BY	
PROJECT NUMBER	10110387

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF REVIEW UNDER THE AUTHORITY OF RODRIGO VIZCAINO TEXAS P.E. NO. 95939 DATE: FEBRUARY 14, 2020

IT IS NOT TO BE USED FOR CONSTRUCTION OR ANY OTHER PURPOSE.

CARROLLTON TEXAS

Design and Permitting of Channel Improvements for Dudley Branch

SECTION DETAILS III

0 1" 2"

FILENAME

SCALE AS NOTED

SHEET **00E-06**

Attachment F

Threatened or Endangered Species Reports and/or Letters

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arlington Ecological Services Field Office
2005 Ne Green Oaks Blvd
Suite 140
Arlington, TX 76006-6247
Phone: (817) 277-1100 Fax: (817) 277-1129
http://www.fws.gov/southwest/es/arlingtontexas/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

In Reply Refer To: March 27, 2020
Consultation Code: 02ETAR00-2019-SLI-1458
Event Code: 02ETAR00-2020-E-03011
Project Name: Dudley Branch Pond Removal and Stream Restoration

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/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, which may occur within the boundary of 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.).

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 section 7(a)(1) of the Act, Federal agencies are directed to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Under and 7(a)(2) and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether their actions may affect threatened and endangered species and/or designated critical habitat. A Federal action is an activity or program authorized, funded, or carried out, in whole or in part, by a Federal agency (50 CFR 402.02).

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 Federal actions 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.

After evaluating the potential effects of a proposed action on federally listed species, one of the following determinations should be made by the Federal agency:

1. *No effect* - the appropriate determination when a project, as proposed, is anticipated to have no effects to 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, the action agency should maintain a complete record of their evaluation, including the steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related information.
2. *May affect, but is not likely to adversely affect* - the appropriate determination when a proposed action's anticipated effects are insignificant, discountable, or completely beneficial. Insignificant effects relate to the size of the impact and should never reach the scale where "take" of a listed species occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects, or expect discountable effects to occur. This determination requires written concurrence from the Service. A biological evaluation or other supporting information justifying this determination should be submitted with a request for written concurrence.
3. *May affect, is likely to adversely affect* - the appropriate determination if any adverse effect to listed species or critical habitat may occur as a direct or indirect result of the proposed action, and the effect is not discountable or insignificant. This determination requires formal section 7 consultation.

The Service recommends that candidate species, proposed species, and proposed critical habitat be addressed should consultation be necessary. 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

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please 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. Please 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.

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 (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy

guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

For additional information concerning migratory birds and eagle conservation plans, please contact the Service's Migratory Bird Office at 505-248-7882.

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:

Arlington Ecological Services Field Office
2005 Ne Green Oaks Blvd
Suite 140
Arlington, TX 76006-6247
(817) 277-1100

Project Summary

Consultation Code: 02ETAR00-2019-SLI-1458

Event Code: 02ETAR00-2020-E-03011

Project Name: Dudley Branch Pond Removal and Stream Restoration

Project Type: STREAM / WATERBODY / CANALS / LEVEES / DIKES

Project Description: Stream restoration project involving the removal of an on-channel impoundment.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/32.99763502335892N96.92994612559335W

Counties: Denton, TX

Endangered Species Act Species

There is a total of 4 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
Least Tern *Sterna antillarum* Population: interior pop. No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8505	Endangered
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. Your location is outside the critical habitat. 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. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

Critical habitats

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

Attachment G

Historic Properties and Cultural Resources Reports and/or Letters

Intensive Archaeological Survey of the Proposed Dudley Branch Improvements Project

Denton County, Texas

June 2018

By: Amy Leuchtmann

Principal Investigator: Amy Leuchtmann

Texas Antiquities Permit Number: 8426

DRAFT

Intensive Archaeological Survey of the Proposed Dudley Branch Improvements Project

Denton County, Texas

By
Amy Leuchtmann

Principal Investigator
Amy Leuchtmann

Texas Antiquities Permit Number: 8426

Prepared For:

1945 E. Jackson Road
P.O. Box 110535
Carrollton, TX 75011-0535

Prepared By:

17111 Preston Road, Suite 300
Dallas, TX 75248

June 2018

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Management Summary

The City of Carrollton has contracted HDR, Inc. (HDR) to conduct an intensive archaeological survey in advance of permanent elimination of an existing in-line pond and stabilization of Dudley Branch in Carrollton, Texas. The proposed project will be located north of the intersection of W. Frankford Road and Indian Creek Road on the northwest side of the City of Carrollton in Denton County, Texas (Figure 1-1). The improvements start at the upstream end at the Eisenhower Street culvert crossing where Dudley Branch flows under Eisenhower Street and extends to the culverts beneath Indian Creek Road. Since the project area is located on city property, and the city is a sub-entity of the State, the proposed developments are required to be in compliance with Chapter 191 of the Texas Natural Resources Code, also known as the Antiquities Code of Texas (13 *Texas Administrative Code* [TAC] 26.12).

The improvement area results in an Area of Potential Effects (APE) that is 32.3 acres (13.1 hectares), with the Taos Pond making up 8.2 acres (3.3 hectares) of the total acreage. While still in the design phase, it is estimated that the depth of impact will not exceed 3 feet. The proposed improvements will stabilize Dudley Branch, involving the possibility of channel realignment and the complete removal of Taos Pond. Currently, engineers are working on two alternative plans to present to the city, who will decide on the final course of action. Both alternatives will be located within the current APE.

The purpose of the archaeological investigation is to determine the presence/absence of archaeological resources within the APE as per the Antiquities Code of Texas (13 TAC 26.12) and to evaluate identified resources for their eligibility for inclusion in the National Register of Historic Places (NRHP) or as a designated State Antiquities Landmark (SAL). The archaeological investigation conducted by HDR consisted of an intensive survey of the APE to determine the presence/absence of archaeological resources by employing shovel testing, pedestrian survey, and photo documentation. Fieldwork was completed by Principle Investigator Amy Leuchtmann and project archaeologist Megan Koszarek on May 21–22, 2018.

The survey consisted of shovel testing, pedestrian walkover, and photo documentation of the entire APE. A majority of the area has been heavily impacted by modern developments. No cultural resources were encountered during the intensive survey of the 32.3-acre APE.

All records and materials generated by this project will be permanently curated at the Center for Archaeological Studies at Texas State University in San Marcos, Texas.

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Contents

Management Summary i

Abbreviations and Acronyms v

1 Introduction 1

2 Background 3

2.1 Geology and Soils 3

2.2 Cultural History 3

2.2.1 Paleo-Indian Period 3

2.2.2 Archaic Period 3

2.2.3 Late Prehistoric Period 4

2.2.4 Protohistoric 4

2.2.5 Historic European and Euro-American Cultural Period 4

3 Methods 7

3.1 Previous Investigations 7

3.2 Survey Methods 11

4 Results 13

5 Summary and Recommendations 23

5.1 National Register Eligibility 23

5.1.1 Criteria for Evaluation of Eligibility 23

5.1.2 State Antiquities Landmark 25

5.2 Conclusion and Recommendation Summary 26

6 References 27

Appendix

Appendix A: Shovel Test Table

Tables

Table 2-1. General Cultural Chronology for the Southern High Plains. 3
Table 3-1. Previous Cultural Resources Surveys Located within One Mile of the Project Area. 7
Table 3-2. Previously Recorded Archaeological Sites Located within One Mile of the APE. 8

Figures

Figure 1-1. Topographic Map of the Project Area. 2
Figure 3-1. Previous Cultural Resources within One Mile of the APE. 9
Figure 4-1. Results of the Archaeological Survey. 15
Figure 4-2. Grassy field in center of APE, facing southwest. 17
Figure 4-3. Grassy field in center of APE, facing south. 17
Figure 4-4. Photograph of ST002 within grassy field, showing previous disturbance. 18
Figure 4-5. Overview of Area of Potential Effects along the transmission line from the south end, facing north. 18
Figure 4-6. Photograph of ST006 within transmission corridor. 19
Figure 4-7. Overview of Area of Potential Effects along banks of Dudley Branch at Eisenhower Street, facing east. 19
Figure 4-8. Overview of Area of Potential Effects along banks of Dudley Branch at Eisenhower Street, facing west. 20
Figure 4-9. Overview of Area of Potential Effects at Taos Pond, facing southwest. 20
Figure 4-10. Overview of Area of Potential Effects at Taos Pond, facing northwest. 21

Abbreviations and Acronyms

APE	Area of Potential Effects
Atlas	Texas Archeological Sites Atlas
CFR	Code of Federal Regulations
cm	centimeter(s)
cmbs	centimeters below surface
ft	feet
GPS	Global Positioning System
in	inch/inches
km	kilometer(s)
m	meter(s)
mi	mile(s)
NRHP	National Register of Historic Places
OTHM	Official Texas Historical Markers
ROW	right-of-way
RTHL	Recorded Texas Historic Landmarks
SAL	State Antiquities Landmark
TAC	Texas Administrative Code
TARL	Texas Archeological Research Laboratory
THC	Texas Historical Commission
USGS	US Geological Survey

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1 Introduction

The City of Carrollton has contracted HDR, Inc. (HDR) to conduct an intensive archaeological survey in advance of permanent elimination of an existing in-line pond and stabilization of Dudley Branch in Carrollton, Texas. The proposed project will be located north of the intersection of W. Frankford Road and Indian Creek Road on the northwest side of the City of Carrollton in Denton County, Texas (Figure 1-1). The improvements start at the upstream end at the Eisenhower Street culvert crossing where Dudley Branch flows under Eisenhower Street and extends to the culverts beneath Indian Creek Road. Since the project area is located on city property, and the city is a sub-entity of the State, the proposed developments are required to be in compliance with Chapter 191 of the Texas Natural Resources Code, also known as the Antiquities Code of Texas (13 *Texas Administrative Code* [TAC] 26.12).

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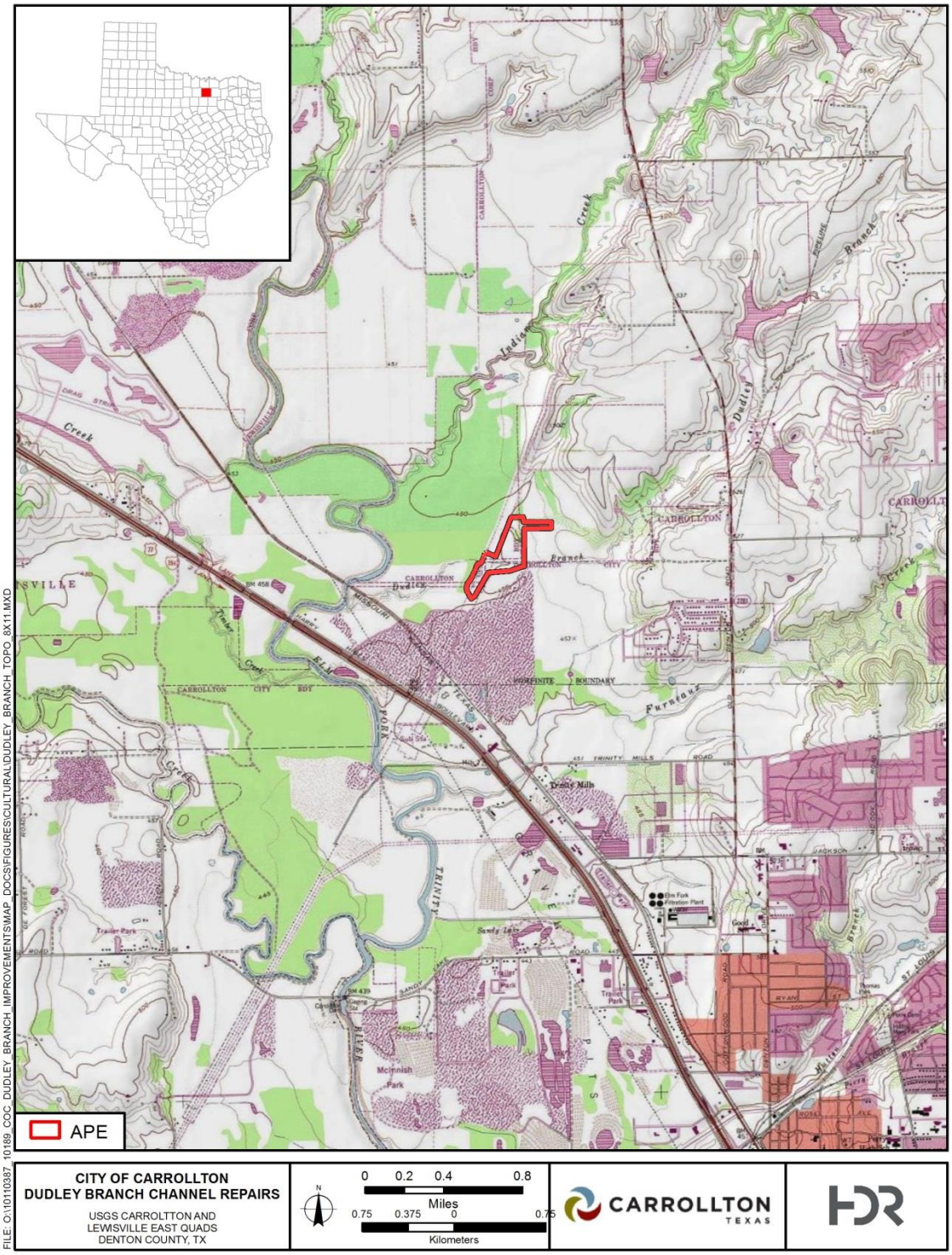
The purpose of the archaeological investigation is to determine the presence/absence of archaeological resources within the APE as per the Antiquities Code of Texas (13 TAC 26.12) and to evaluate identified resources for their eligibility for inclusion in the National Register of Historic Places (NRHP) or as a designated State Antiquities Landmark (SAL). The archaeological investigation conducted by HDR consisted of an intensive survey of the APE to determine the presence/absence of archaeological resources by employing shovel testing, pedestrian survey, and photo documentation. Fieldwork was completed by Principle Investigator Amy Leuchtmann and project archaeologist Megan Koszarek on May 21–22, 2018. A total of 32 person-hours were invested in the field portion of the project.

The survey consisted of shovel testing, pedestrian walkover, and photo documentation of the entire APE. A majority of the area has been heavily impacted by modern developments. No cultural resources were encountered during the intensive survey of the 32.3-acre APE.

All records and materials generated by this project will be permanently curated at the Center for Archaeological Studies at Texas State University in San Marcos, Texas.

Figure 1-1. Topographic Map of the Project Area.



2 Background

2.1 Geology and Soils

The underlying geology of the APE consists of Woodbine Formation of Gulfian age and Alluvium of the Holocene age (USGS 2018). According to data from the Natural Resources Conservation Service (NRCS), the APE contains a single soil map unit: Ovan clay, occasionally flooded (Soil Survey Staff 2018). The Ovan clay within the APE consists of very deep, moderately well drained soil, reaching a B-horizon at approximately 64 cm (cm; 25 inches [in]) below surface.

2.2 Cultural History

Current conceptions of the prehistoric cultural chronology of north central Texas (especially for the upper Trinity River Basin) are largely based on four major reports by Peter and McGregor (1988), Prikryl (1987, 1990), and Yates and Ferring (1986) (Table 2-1).

Table 2-1. General Cultural Chronology for the Southern High Plains.

Period	Age (B.C. / A.D.)
Paleo-Indian	9500–7000 B.C.
Archaic	7000 B.C.–A.D. 700
Late Prehistoric	A.D. 700–1600
Protohistoric	A.D. 1600–1800

After Peter and McGregor [1988], Prikryl [1987, 1990], and Yates and Ferring (1986)

2.2.1 Paleo-Indian Period

Point types found in north central Texas that are associated with the early to late part of the Paleo-Indian period include Clovis, Folsom, Dalton, Plainview, San Patrice, and Scottsbluff. Based on a sample of projectile points from surface sites, Prikryl (1990) has concluded that among the most common Paleo-Indian point types in this area are Plainview and Dalton. Ferring and Yates (1997) suggest that these types date to about 10,000 to 9,500 years ago, based on cross-dating with other regions. The suggested age for these types may correspond with the onset of early Holocene alluviation in the local river valleys, including the Trinity and Sabine. The majority of the recorded Paleo-Indian sites cluster in the upper Trinity drainage, where the most intensive archaeological investigations have taken place, though often these sites consist of no more than one or two projectile points. The generally low density of Paleo-Indian artifacts and sites, and the tendency for projectile points to be made from nonlocal lithics have led investigators to characterize these populations as highly mobile, with low regional densities (Lynott 1981:100–101).

2.2.2 Archaic Period

For north central Texas, the Archaic is tentatively dated between ca. 7000 B.C. and A.D. 700, with segments of approximately 2,500 years often considered as early, middle, and late divisions of the period (Prikryl 1993:199). Thus, the Early Archaic has been dated from 7000 to 4000 B.C., the Middle Archaic from 4000 to 2000 B.C., and the Late Archaic from 2000 B.C. to A.D. 700. Relatively recent overviews that cover the Archaic period in this portion of Texas include Hofman (1989), Prikryl (1990), and Story (1985, 1990). Diagnostic artifacts for the period are similar to those of adjacent regions, although developing a sound chronological sequence of diagnostic tool types has proven difficult because many of the investigations have focused on surface manifestations. Prikryl

(1990) suggests Early Archaic projectile points include early split stemmed varieties and possibly Angostura, and Middle Archaic points include basal-notched forms such as Andice, Bell, and Calf Creek along with Bulverde, Carrollton, Dawson, and Wells. Late Archaic point types reportedly include Castroville, Dallas, Edgewood, Elam, Ellis, Gary, Godley, Marshall, Pamillas, Trinity, and Yarbrough (Prikryl 1990). At one time, the Carrollton and Elam foci were used to define the Middle and Late Archaic, respectively (Crook and Harris 1952, 1954). Reevaluation of the type-site artifacts, however, showed that the materials were so mixed that perpetuation of these foci provided little interpretive value (Hofman et al. 1989; Prikryl 1990). Some of this mixing and the generally low numbers of Early and Middle Archaic sites may be due to extensive erosion of mid-Holocene deposits, as has been documented for the Brazos River drainage west of the Dallas area in Young, Stephens, and Throckmorton counties (Ensor et al. 1992).

2.2.3 Late Prehistoric Period

The Late Prehistoric period (ca. A.D. 700–1600) is marked by the initial appearance of arrow points. The A.D. 700 date for the start of this period is based upon dated contexts for similar material in the Brazos River drainage to the west. Group aggregation and large-scale manipulation of subsistence resources, as represented by the Wylie pits and the human burials they contain, may indicate societal changes that continued through the Late Prehistoric period. Habitation structures indicating increased sedentism, at least in certain places and at certain times, have been found in some Late Prehistoric sites along with cultigens, such as corn, and arrow points and ceramic artifacts indicating important technological changes. Also, there may be evidence (e.g., the distinction between burials placed inside and outside Wylie pits) of differential mortuary practices that could reflect a shift toward hierarchical social structure, although this evidence is nowhere near as strong as that for the Caddo area of northeast Texas. Both Lynott (1977) and Prikryl (1990) have proposed that the Late Prehistoric period be divided into an early and late phase, with the early phase reflecting a continuation of the foraging subsistence system of the preceding Late Archaic period and the late phase reflecting Southern Plains influences. Evidence of horticulture and bison procurement also appears in sites of this period (Harris and Harris 1970; Morris and Morris 1970).

2.2.4 Protohistoric

The cultural divergences between north central and northeast Texas that began in the Archaic period continued into the Protohistoric and Historic periods. Various sociological factors, not the least of which was the colonization of New Mexico by the Spanish, caused drastic changes in the cultural makeup of north central Texas, as groups from elsewhere migrated into the area and existing groups were forced to adapt to their presence. Meanwhile, Caddoan groups continued to dominate the northeastern portion of the state, although significant changes were occurring there also.

2.2.5 Historic European and Euro-American Cultural Period

The original Anglo-American settlers in Texas were largely subsistence farmers residing on small holdings, with an economy based on grain and livestock production (Peter and Cliff 1990:36). The commercial production of cotton apparently was not introduced until the 1830s (Fehrenbac 1968), a shift that was accompanied by increasing numbers of slaves in the region. The town of Jefferson, on Cypress Creek, was a major cotton market, and the antebellum planters throughout the region undoubtedly sent their cotton there for sale (Peter and Cliff 1990:39). Other major industries established about the same time included tan yards and syrup mills; after 1857, railroad construction also progressed westward (Webb and Carroll 1952:1:198, 2:59).

Rural populations began to decline during the 1930s under the impetus of poor climatic conditions, hard times, the decreased importance of cotton as a cash crop, and the increasing level of mechanization in agriculture (Lebo 1995). After a mid-century decline, however, light industry, retail, and service opportunities reconfigured local economies. The Dallas-Fort Worth metroplex has undergone astronomical growth, particularly in its northern suburbs; the current population of Garland, for example, is over 140 times the city's 1970 population (North Central Texas Council of Governments 2009).

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3 Methods

3.1 Previous Investigations

A review of the Texas Historical Commission's (THC) Archeological Sites Atlas (Atlas) indicates that 15 previous surveys have been conducted, and 7 archaeological sites have been recorded within 1 mile (1.6 km) of the APE (Figure 3-1). No Official Texas Historical Markers (OTHMs), Recorded Texas Historic Landmarks (RHTLs), cemeteries, or National Register of Historic Places (NRHP) listed properties or districts are located within the 1-mile search area.

None of the 15 previous cultural resources surveys within the 1-mile buffer crosses the APE (Table 3-1**Error! Reference source not found.**; see Figure 3-1).

Table 3-1. Previous Cultural Resources Surveys Located within One Mile of the Project Area.

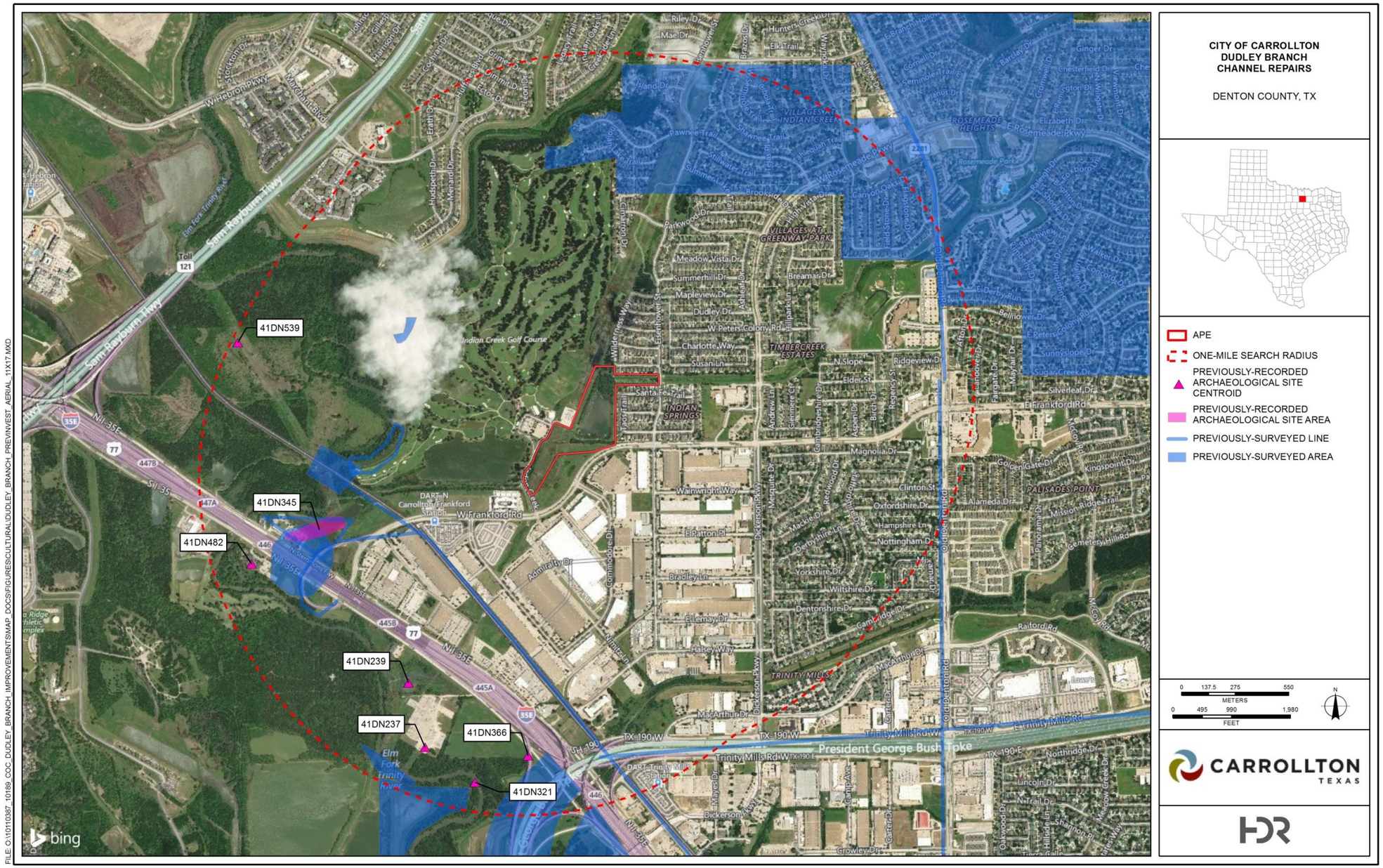
ID	Agency	Report Title	Contractor	Year	Comments / Recommendations
8500008717	COE– Fort Worth District	—	—	1988	—
8400004346	FWCE	—	—	1988	—
8500012389	TX DOT	Archaeological Evaluation for a Road Widening Project on Interstate Highway 35 from Interstate Highway 635 to US 380, Dallas and Denton Counties, Texas	GMI, Inc.	2004	TAC Permit #3329
8400010755	—	Cultural Resources Survey of the Carrollton Northwest Corridor, Dallas Area Rapid Transit Light Rail System, Dallas County, Texas	Geo-Marine, Inc	2002	TAC Permit #2552
8400004345	FHWA	—	—	1991	—
8400004347	FHWA	—	—	1992	—
8500004914	FHA	—	—	1991	—
8400004339	TDHPT	—	—	1981	—
8500012101	City of Dallas Water Utilities	Geoarchaeological Investigations at the Elm Fork Water Treatment Plant Pre-Sedimentation Basin, Dallas County, Texas	GMI, Inc.	2004	TAC Permit #3516
8500000220	—	—	—	1998	Sponsored by Trans Texas Authority
8500000091	—	—	—	1994	Sponsored by Trans Texas Authority
8500000219	—	—	—	1998	Sponsored by Trans Texas Authority
8500008731	—	—	—	1980	Sponsored by Housing and Urban Development
8400004343	FHWA TXDOT	—	—	1994	—
8400007335	TXDOT	—	—	1994	—

Seven archaeological sites are located within one mile of the APE (Table 3-2; see Figure 3-1). Four of those sites have been determined ineligible for inclusion in the NRHP. There is no information concerning a determination, or even site description for Site 41DN237. Site 41DN539 is recommended as potentially eligible by the recorder, who suggests further investigation upon further impacts to the site. Finally, Site 41DN239, a well, has been determined eligible for inclusion in the NRHP. However, during a return visit to the site, researchers were unable to locate the site.

Table 3-2. Previously Recorded Archaeological Sites Located within One Mile of the APE.

ID	Affiliation	Features/Function	NRHP Eligibility	Comments/ Recommendations
41DN345	Prehistoric	Sparse Scatter of Lithics, Mussel Shell, and Bone	Ineligible	Archaeological testing was undertaken; no diagnostic material was recovered, nor features identified
41DN482	Prehistoric	Chert and Quartzite Flakes, Mussel Shell, and Burned Rock	Ineligible	
41DN239	Prehistoric / Historic	—	Eligible	The National Registration Eligibility Review determined it eligible, but according to the site form, it could not be relocated.
41DN237		—	—	—
41DN321	Historic	Bridge	Ineligible	No cultural deposits associated with site; structurally, too little remains
41DN366	Historic	Occupation	Ineligible	—
41DN539	Prehistoric	Burned Clay and Charcoal	Potentially Eligible	Recommended potentially eligible; identified in an auger hole; further archaeological investigation recommended if further impacts are expected

Figure 3-1. Previous Cultural Resources within One Mile of the APE.



FILE: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\CULTURAL\DUDLEY_BRANCH_PREVINVEST_AERIAL_11X17.MXD

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3.2 Survey Methods

HDR conducted an intensive archaeological survey consisting of a combination of shovel testing and pedestrian survey throughout the entire 32.3-acre (13.1-hectare) APE, with the exception of the 8.2 acres (3.3 hectares) making up the Taos Pond. The northern portion of the APE is made up of Dudley Branch and its sloping banks. The APE south of Taos Pond is made up of a grassy field and an Oncor transmission line corridor. Both portions of the APE were considered to have low probability of encountering cultural deposits due to the heavy levels of previous disturbance. According to the Council of Texas Archeologists (CTA) guidelines, a project with an APE of between 11 and 100 acres requires 1 shovel test for every two acres. The survey resulted in a total of twelve shovel tests. There was no historic-age architecture within the APE to document and evaluate.

Each shovel test was approximately 30 cm (12 inches [in]) in diameter and was excavated in 20 cm (8 in) arbitrary levels to a depth of 80 cm (32 in) below surface or until sterile subsoil was encountered. Shovel test excavation depths met or exceeded the maximum depth of impacts proposed for the current project. The soil removed was screened through 0.635 cm (0.25 in) mesh screen, and soil descriptions followed the guidelines and terminology established by the National Soil Survey Center (Schoeneberger et al. 2002). Soil colors were recorded using a Munsell Soil Color Chart. All excavated shovel tests were recorded on shovel test forms which note depth, soil matrix descriptions, and cultural materials recovered. Digital photographs were used to document the survey conditions, disturbances, and any cultural features observed; and details of each photograph were recorded on standardized forms.

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4 Results

The project APE includes approximately 21.38 acres (8.65 hectares) of disturbed ground, including the existing Dudley Branch canal and Oncor transmission corridor, approximately 8.2 acres (3.32 hectares) that make up Taos Pond, and approximately 2.72 acres (1.1 hectares) of grassy field (Figure 4-1). The survey crew began on the afternoon of May 21st at the grassy field, south of Taos Pond and Dudley Branch canal (Figure 4-2 and Figure 4-3). Four shovel tests were excavated within the field. Survey of the grassy field continued on May 22nd. Eight shovel tests were excavated within the field, and all showed levels of previous ground disturbance (Figure 4-4).

Field personnel conducted four shovel tests within the transmission corridor (Figure 4-1). Here the typical shovel test profile consisted of black (10YR 2/1) clay, with cracking, from 0 to 60 cm below surface (cmbs) underlain from 60 to 80 cmbs by very dark grey (10YR 3/1) clay, with slickensides, which is consistent with the NRCS soil profile (Figure 4-6).

Following shovel testing, photo documentation of the remaining APE commenced. The northern extent begins at the upstream end at the Eisenhower Street culvert crossing where Dudley Branch flows under Eisenhower Street. At this location the banks of the canal have been built up and groomed to such an extent that shovel testing was unwarranted (Figure 4-7 and Figure 4-8).

Taos Pond is just north of the grassy field that was surveyed and tested (Figure 4-9 and Figure 4-10). According to preliminary plans, this pond will be removed as part of the Dudley Branch Improvements project. Any modifications to the area, besides the draining of it, will likely include fill, as opposed to any further excavation.

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Figure 4-1. Results of the Archaeological Survey.

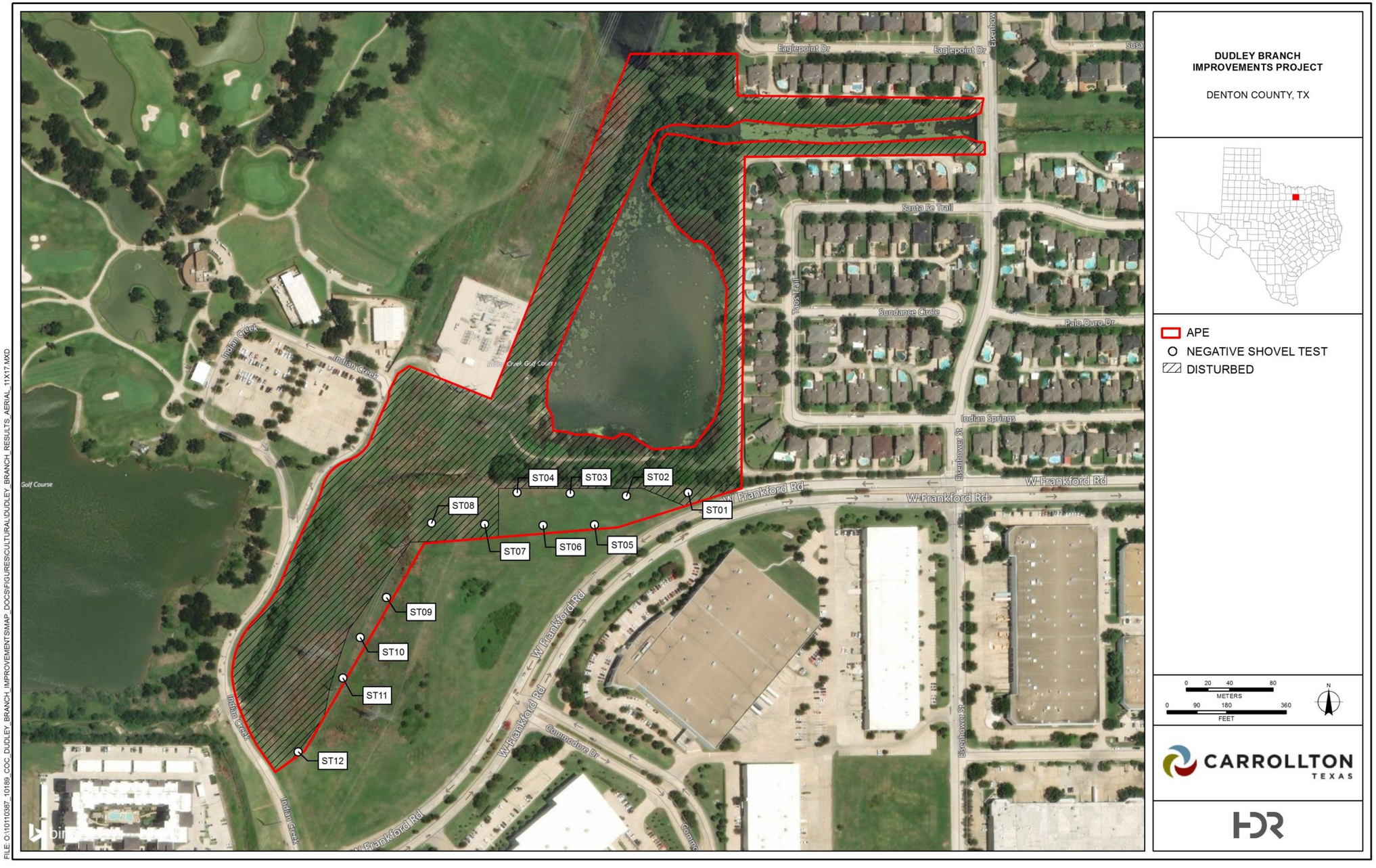

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Figure 4-2. Grassy field in center of APE, facing southwest.

Figure 4-3. Grassy field in center of APE, facing south.

Figure 4-4. Photograph of ST002 within grassy field; previous disturbance demonstrated by existence of brick fragments.

Figure 4-5. Overview of Area of Potential Effects along the transmission line from the south end, facing north.

Figure 4-6. Photograph of ST006 within transmission corridor.

Figure 4-7. Overview of Area of Potential Effects along banks of Dudley Branch at Eisenhower Street, facing east.

Figure 4-8. Overview of Area of Potential Effects along banks of Dudley Branch at Eisenhower Street, facing west.

Figure 4-9. Overview of Area of Potential Effects at Taos Pond, facing southwest.

Figure 4-10. Overview of Area of Potential Effects at Taos Pond, facing northwest.

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5 Summary and Recommendations

5.1 National Register Eligibility

5.1.1 Criteria for Evaluation of Eligibility

As part of this review process, cultural resources investigations are undertaken with the purpose of identifying resources listed in, or eligible for listing in, the NRHP. The assessment of cultural resources' significance is based on federal guidelines and regulations. Any cultural resource listed in or eligible for inclusion in the NRHP is known as a "historic property," and the term "eligible for inclusion in the NRHP" includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet NRHP-listing criteria (36 CFR 800.2). The criteria for evaluating properties for inclusion in the NRHP (36 CFR 60.4 [A–D]) are codified under the authority of the National Historic Preservation Act of 1966, as amended, and the Advisory Council on Historic Preservation has set forth guidelines to use in determining site eligibility. Subsequent to the identification of relevant historical themes and related research questions, these four criteria of eligibility are applied:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, material, workmanship, feeling, and association and

A. that are *associated with events* that have made a significant contribution to the broad patterns of our history; or

B. that are *associated with the lives of persons* significant in our past; or

C. that *embody the distinctive characteristics* of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. that have *yielded, or may be likely to yield, information important in prehistory or history*. Note that the application of Criterion D presupposes that the information imparted by the site is significant in history or prehistory [36 CFR 60.4, emphasis added].

The physical characteristics and historic significance of the overall property are examined when conducting NRHP evaluations. Although a property in its entirety may be considered eligible based on Criteria A, B, C, and/or D, specific data are also required for individual components therein based on date, function, history, physical characteristics, and other information. Resources that do not relate in a significant way to the overall property may contribute if they independently meet the NRHP criteria.

For a historic resource, district, or landscape to be determined eligible for the NRHP, it must retain enough of its historic integrity to convey its significance. For the NRHP, there are seven aspects of integrity:

1. Location
2. Design

3. Setting
4. Materials
5. Workmanship
6. Feeling
7. Association

Occasionally, certain resources fall into categories in which they must be evaluated further using one or more of the following Criterion Considerations. If a resource identified during the reconnaissance-level survey falls into one of these categories, the following Criterion Considerations will be applied in conjunction with one or more of the four National Register criteria:

A. A religious property deriving primary significance from architectural or artistic distinction or historical importance, or
B. A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event, or
C. A birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his or her productive life, or
D. A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events, or
E. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived, or
F. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historical significance, or
G. A property achieving significance within the past 50 years if it is of exceptional importance (36 CFR 60.4).

The scientific value of archaeological sites is often assessed under Criterion D. With regard specifically to this criterion, the goal of prehistoric archaeological research and management is to fill gaps in the knowledge about specific research domains. Scientific importance is driven, in part, by the research paradigms of the time and in part by the amount of information available about a particular research topic in a specific geographic area. The most robust forms of scientific importance should honor diverse and occasionally competing schools of research interests and their attendant approaches. In order to fulfill Criterion D, a site must possess certain attributes (e.g., intact buried cultural strata with functionally and temporally diagnostic materials, datable cultural features), such that further intensive research at the site could be expected to add additional information to relevant research questions.

5.1.2 State Antiquities Landmark

At the state level, archaeological sites may be considered significant and be recognized or designated as an SAL, provided that at least one of the following conditions is met:

1. The archaeological site is situated on lands owned or controlled by the State of Texas or one of its political subdivisions; or
2. The archaeological site is situated on private land which has been specifically designated as an SAL and fits at least one of the following criteria:
    A. Preservation of materials must be sufficient to allow application of standard archaeological techniques to advantage;
    B. The majority of artifacts are in place so that a significant portion of the site's original characteristics can be defined through investigation;
    C. The site has the potential to contribute to cumulative cultural history by the addition of new information;
    D. The site offers evidence of unique or rare attributes; and/or
    E. The site offers a unique and rare opportunity to test techniques, theories, or methods of preservation, thereby contributing to scientific knowledge [Texas Natural Resources Code 1977; Title 9, Chapter 191, Texas Antiquities Committee, Section 191.094 and Chapter 41.7, Antiquities Code of Texas].

Buildings, structures, cultural landscapes, and non-archaeological sites, objects, and districts may be designated as an SAL, provided that the following conditions are met:

1. The property fits within at least one of the following criteria:
    A. The property is associated with events that have made a significant contribution to the broad patterns of our history, including importance to a particular cultural or ethnic group;
    B. The property is associated with the lives of persons significant in our past;
    C. The property embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction;
    D. The property has yielded, or may be likely to yield, information important in Texas culture or history;
2. The property retains integrity at the time of the nomination, as determined by the executive director of the commission; and
3. For buildings and structures only, the property must be listed in the NRHP, either individually, or as a contributing property within a historic district. Contributing status may be determined by the Keeper of the National Register of the executive director of the commission.

5.2 Conclusion and Recommendation Summary

HDR conducted an intensive cultural resources survey for an area of approximately 21.38 acres (8.65 hectares) in advance of the Dudley Branch Improvements project. The entire APE was subjected to systematic shovel testing, pedestrian survey, and photo-documentation. Much of the APE has been previously disturbed from past drainage projects and the construction within the transmission corridor.

There are no standing structures within the APE. No new historic or archaeological sites were observed during the survey.

In accordance with 36 CFR 800 and 13 TAC 26, no further cultural resource investigations are recommended for the presently-defined APE. HDR recommends that the proposed Dudley Branch improvements be allowed to proceed. However, in the event that any archaeological deposits are encountered during construction, work should cease, and the THC should be notified.

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Appendix A.
Shovel Test Table

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NOTE: Although the below table is arranged by natural levels in order to show stratigraphy, all shovel tests were excavated in 20-cm arbitrary levels.

Shovel Test (ST) Number	Matrix Description	Contents
1	0–20 cmbs: dark gray (10YR 4/1) silty clay *modern brick at 10 cmbs	No cultural materials
2	0–10 cmbs: dark gray (10YR 4/1) silty clay 10–20 cmbs: brownish yellow (10YR 6/6) clay with 50 percent $CaCO_3$	No cultural materials
3	0–50 cmbs: dark gray (10YR 4/1) clay loam *$CaCO_3$ at 20 cmbs, increasing in concentration with depth **Manganese present at 40 cmbs	No cultural materials
4	0–20 cmbs: very dark gray (10YR 3/1) clay with brown (10YR 4/3) silty clay with gravel and $CaCO_3$ pockets	No cultural materials
5	0–20 cmbs: disturbed *50 percent gravels, concrete, and modern brick present	No cultural materials
6	0–15 cmbs: very dark grayish brown (10YR 3/2) clay loam 15–70 cmbs: grayish brown (10YR 5/2) silty loam *terminated at limestone	No cultural materials
7	0–20 cmbs: very dark grayish brown (10YR 3/2) clay loam *disturbed – large gravels, plastic, and other modern trash	No cultural materials
8	0–25 cmbs: very dark gray (10YR 3/1) clay loam with brown (10YR 4/3) clay and pockets of strong brown (7.5YR 4/6) clay *modern trash present	No cultural materials
9	0–60 cmbs: black (10YR 2/1) clay 60–80 cmbs: very dark gray (10YR 3/1) clay (slicken sides)	No cultural materials
10	0–70 cmbs: black (10YR 2/1) clay 70–80 cmbs: very dark gray (10YR 3/1) clay (slicken sides)	No cultural materials
11	0–70 cmbs: black (10YR 2/1) clay 70–80 cmbs: very dark gray (10YR 3/1) clay (slicken sides)	No cultural materials
12	0–10 cmbs: dark gray (10YR 4/1) silty clay 10–20 cmbs: brownish yellow (10YR 6/6) clay with 50 percent $CaCO_3$	No cultural materials

TEXAS HISTORICAL COMMISSION

ANTIQUITIES PERMIT APPLICATION FORM
ARCHEOLOGY

GENERAL INFORMATION

I. PROPERTY TYPE AND LOCATION

Project Name (and/or Site Trinomial) Dudley Branch Improvements
County (ies) Denton
USGS Quadrangle Name and Number Lewisville East (33096) and Carrollton (32096)
UTM Coordinates Zone 14 (NAD 83) E 693470 N 3652948
Location North of W. Frankford Road and Indian Creek intersection
Federal Involvement ☒ Yes No
Name of Federal Agency USACE- Fort Worth District
Agency Representative Jimmy Barrera

II. OWNER (OR CONTROLLING AGENCY)

Owner City of Carrollton
Representative Mike McKay, P.E., Civil Engineer Manager
Address 1945 E. Jackson Road, P.O. Box 110535
City/State/Zip Carrollton, TX 75011-0535
Telephone (include area code) (972) 466-3183 Email Address mike.mcakay@cityofcarrollton.com

III. PROJECT SPONSOR (IF DIFFERENT FROM OWNER)

Sponsor
Representative
Address
City/State/Zip
Telephone (include area code) Email Address

PROJECT INFORMATION

I. PRINCIPAL INVESTIGATOR (ARCHEOLOGIST)

Name Amy Leuchtmann
Affiliation HDR, Inc.
Address 17111 Preston Road, Suite 300
City/State/Zip Dallas, Texas 75248
Telephone (include area code) (972) 732-2010 Email Address amy.leuchtmann@hdrinc.com

(OVER)

ANTIQUITIES PERMIT APPLICATION FORM (CONTINUED)

II. PROJECT DESCRIPTION

Proposed Starting Date of Fieldwork 05/01/2017
Requested Permit Duration 5 Years _____ Months (1 year minimum)
Scope of Work (Provide an Outline of Proposed Work) pedestrian survey and shovel testing

III. CURATION & REPORT

Temporary Curatorial or Laboratory Facility HDR, Inc.
Permanent Curatorial Facility Center for Archaeological Studies (Texas State University)

IV. LAND OWNER'S CERTIFICATION

I, Mike McKay, as legal representative of the Land Owner, _____, do certify that I have reviewed the plans and research design, and that no investigations will be performed prior to the issuance of a permit by the Texas Historical Commission. Furthermore, I understand that the Owner, Sponsor, and Principal Investigator are responsible for completing the terms of the permit.
Signature _____ Date 5/4/2018

V. SPONSOR'S CERTIFICATION

I, _____, as legal representative of the Sponsor, _____, do certify that I have reviewed the plans and research design, and that no investigations will be performed prior to the issuance of a permit by the Texas Historical Commission. Furthermore, I understand that the Sponsor, Owner, and Principal Investigator are responsible for completing the terms of this permit.
Signature _____ Date _____

VI. INVESTIGATOR'S CERTIFICATION

I, Amy Leuchtmann, as Principal Investigator employed by HDR, Inc. (Investigative Firm), do certify that I will execute this project according to the submitted plans and research design, and will not conduct any work prior to the issuance of a permit by the Texas Historical Commission. Furthermore, I understand that the Principal Investigator (and the Investigative Firm), as well as the Owner and Sponsor, are responsible for completing the terms of this permit.

Signature _____ Date 4/27/18

Principal Investigator must attach a research design, a copy of the USGS quadrangle showing project boundaries, and any additional pertinent information. Curriculum vita must be on file with the Archeology Division.

FOR OFFICIAL USE ONLY

Reviewer _____ Date Permit Issues _____
Permit Number _____ Permit Expiration Date _____
Type of Permit _____ Date Received for Data Entry _____

Texas Historical Commission
Archeology Division
P.O. Box 12276, Austin, TX 78711-2276
Phone 512/463-6096
www.thc.state.tx.us
3/3/09

TEXAS HISTORICAL COMMISSION
The State Agency for Historic Preservation

ARCHAEOLOGICAL INTENSIVE SURVEY SCOPE

Intensive Archaeological Survey for the Proposed City of Carrollton 2018 Dudley Branch Improvements Project, Denton County, Texas

Introduction

The City of Carrollton has contracted HDR, Inc. (HDR) to conduct an intensive archaeological survey in advance of permanent elimination of an existing in-line pond and stabilization of Dudley Branch in Carrollton, Texas. The proposed project will be located north of the intersection of W. Frankford Road and Indian Creek (road) on the northwest side of Carrollton (Figure 1). The improvements start at the upstream end at the Eisenhower Street culvert crossing where Dudley Branch flows under Eisenhower Street and extends to the culverts beneath Indian Creek (road). Since the project area is located on city property and the city is a sub-entity of the State, the proposed developments are required to be in compliance with Chapter 191 of the Texas Natural Resources Code, also known as the Antiquities Code of Texas (13 *Texas Administrative Code* [TAC] 26.12).

The improvement area results in an Area of Potential Effects (APE) that is 32.3 acres (13.1 hectare), with the Taos Pond making up 8.2 acres (3.3 hectare) of the total acreage. While still in the design phase, it is estimated that the depth of impact will not exceed 3 feet.

The proposed improvements will stabilize Dudley Branch, involving the possibility of channel realignment and the complete removal of Taos Pond. Currently, engineers are working on two alternative plans to present to the city, who will decide on the final course of action.

The purpose of the archaeological investigation is to determine the presence/absence of archaeological resources within the APE as per the Antiquities Code of Texas (13 TAC 26.12) and to evaluate identified resources for their eligibility for inclusion in the National Register of Historic Places (NRHP) or as a designated State Antiquities Landmark (SAL).

Environmental Background

The underlying geology of the APE consists of Woodbine Formation of Gulfian age and Alluvium of the Holocene age (USGS 2018). According to data from the Natural Resources Conservation Service (NRCS), the APE contains a single soil map unit: Ovan clay, occasionally flooded (Soil Survey Staff 2018). The Ovan clay within the APE consist of very deep, moderately well drained soil, reaching a B-horizon at approximately 64 cm (cm; 25 inches [in]) below surface.

Previous Investigations

A review of the Texas Historical Commission's (THC) Archeological Sites Atlas (Atlas) indicates that 15 previous surveys have been conducted, and 7 archaeological sites have been recorded within one mile (1.6 km) of the APE (Figure 2). No Official Texas Historical Markers (OTHMs), Recorded Texas Historic Landmarks (RHTLs), cemeteries, or National Register of Historic Places (NRHP) listed properties or districts are located within the one mile search area.

None of the 15 previous cultural resources surveys within the one-mile buffer crosses the APE.

Seven archaeological sites are located within one mile of the APE. Four of those sites have been determined ineligible for inclusion in the NRHP. There is no information concerning a determination, or even site description for Site 41DN237. Sites 41DN539 and 41DN539 are recommended as potentially eligible by the recorder, who suggests further investigation upon further impacts to the site. Finally, Site 41DN239, a well, has been determined eligible for inclusion in the NRHP. However, during a return visit to the site, researchers were unable to locate the site.

Table 1. Previous Cultural Resources Surveys Located within One Mile of the Project Area.

ID	Agency	Report Title	Contractor	Year	Comments / Recommendations
8500008717	COE–Fort Worth District	—	—	1988	—

8400004346	FWCE	—	—	1988	—
8500012389	TX DOT	Archaeological Evaluation for a Road Widening Project on Interstate Highway 35 from Interstate Highway 635 to US 380, Dallas and Denton Counties, Texas	GMI, Inc.	2004	TAC Permit- 3329
8400010755	—	Cultural Resources Survey of the Carrollton Northwest Corridor, Dallas Area Rapid Transit Light Rail System, Dallas County, Texas	Geo-Marine, Inc	2002	TAC Permit- 2552
8400004345	FHWA	—	—	1991	—
8400004347	FHWA	—	—	1992	—
8500004914	FHA	—	—	1991	—
8400004339	TDHPT	—	—	1981	—
8500012101	City of Dallas Water Utilities	Geoarchaeological Investigations at the Elm Fork Water Treatment Plant Pre-Sedimentation Basin, Dallas County, Texas	GMI, Inc.	2004	TAC Permit- 3516
8500000220	—	—	—	1998	Sponsored by Trans Texas Authority
8500000091	—	—	—	1994	Sponsored by Trans Texas Authority
8500000219	—	—	—	1998	Sponsored by Trans Texas Authority
8500008731	—	—	—	1980	Sponsored by Housing and Urban Development
8400004343	FHWA TXDOT	—	—	1994	—
8400007335	TXDOT	—	—	1994	—

Table 2. Previously Recorded Archaeological Sites Located within One Mile of the APE.

ID	Affiliation	Features/Function	NRHP Eligibility	Comments/ Recommendations
41DN345	Prehistoric	Sparse Scatter of Lithics, Mussel Shell, and Bone	Ineligible	Archaeological testing was undertaken- no diagnostic material was recovered, nor features identified
41DN482	Prehistoric	Chert and Quartzite Flakes, Mussel Shell, and Burned Rock	Ineligible	

ID	Affiliation	Features/Function	NRHP Eligibility	Comments/ Recommendations
41DN239	Prehistoric/Historic	—	Eligible	The National Registration Eligibility Review determined it eligible, but according to the site form, it could not be relocated.
41DN237		—	—	—
41DN321	Historic	Bridge	Ineligible	No cultural deposits associated with site; structurally, too little remains
41DN366	Historic	Occupation	Ineligible	—
41DN539	Prehistoric	Burned Clay and Charcoal	Potentially Eligible	Recommended potentially eligible; identified in an auger hole; further archaeological investigation recommended if further impacts are expected

Survey Methods

HDR will conduct an intensive archaeological survey consisting of a combination of shovel testing and pedestrian survey throughout the entire 32.3 acre (13.1 hectare) APE, with the exception of the 8.2 acres (3.3 hectare) making up the Taos Pond. The northern portion of the APE is made up of Dudley Branch and its sloping banks. The APE south of Taos Pond is made up of a grassy field and an Oncor transmission line corridor. Both portions of the APE are considered to have low probability of encountering cultural deposits due to the heavy levels of previous disturbance. According to the Council of Texas Archeologists (CTA) guidelines, a project with an APE of between 11 and 100 acres requires 1 shovel test for every two acres. The survey will result in a total of no fewer than twelve shovel tests. There is no historic-age architecture within the APE to document and evaluate.

Each shovel test will be approximately 30 cm (12 in) in diameter and will be excavated in 20-cm (8-in) arbitrary levels to a depth of 80 cm (32 in) below surface. The soil removed will be screened through 0.635-cm (0.25-in) mesh screen, and soil descriptions will follow the guidelines and terminology established by the National Soil Survey Center (Schoeneberger et al. 2002). Soil colors will be recorded using a Munsell Soil Color Chart. All excavated shovel tests will be recorded on shovel test forms that note depth, soil matrix descriptions, and cultural materials recovered. Digital photographs will be used to document the survey conditions, disturbances, and any cultural features observed. Details of each photograph will be recorded on standardized forms. All shovel test locations will be recorded using a Global Positioning System (GPS) unit. Should construction plans change and require ground disturbance below a meter, archaeological monitoring is recommended.

Should any archaeological sites be located, photographs and notes will be taken to identify the deposits, and a site form recording location information, vegetation cover, contextual integrity, estimated temporal period, and artifactual material noted will be completed for each site. All site forms will be submitted to the Texas Archeological Research Laboratory (TARL) for official recordation, and site trinomials will be obtained for all sites discovered prior to project completion.

Each site located will be identified by a temporary marker placed on the site. The marker will have an identifying number in the form of “HDR-XXX”. This number is a temporary field number only, though formal site trinomials will be obtained. Site designations will be applied only to clusters of artifacts (whether surface or subsurface) that represent occupation or activity areas. Field notes concerning sites will be maintained by the project archaeologist. These field notes will document survey conditions, vegetative cover, and initial interpretations of the cultural properties.

Generally, surface collections of both historic and prehistoric materials would involve only temporally diagnostic artifacts or tools. For prehistoric material, this includes decorated body sherds or rims, projectile points, biface preforms, finished tools, or well-made cores. For historic artifacts, material to be collected includes decorated ceramics, decorated or

embossed glass, and pieces with maker's marks or indications of manufacturing technology. In addition, samples may be collected of any undecorated earthenwares, stonewares, window glass, colored glass, and nails that may be present on the surface and would aid in site age determination.

Reporting Requirements

The data analysis for the project shall describe and evaluate all recorded cultural resources sites, plus analyze and present all data relative to any artifacts collected during the cultural resources survey. Official site trinomials will be obtained for all new sites discovered. A cost-effective analysis will be performed, and the report will present results in a clear and concise manner. This data will be used to formulate a recommendation for or against the need for archaeological testing to determine the eligibility of any sites identified during the survey for inclusion in the NRHP and/or designated as an SAL using the appropriate criteria under which eligibility of identified or revisited sites is evaluated.

A final report will be prepared in compliance with the guidelines published by the Council of Texas Archeologists, the THC, and the Secretary of the Interior's Guidelines. The report will include an introductory chapter discussing the conditions of the survey; a chapter treating the environmental and geological setting of the project area; a chapter discussing the prehistoric and historic cultural contexts of the project area, including previous research in the area; a chapter regarding survey methodology; a chapter explaining the results of this survey—including a list of all sites identified, the ownership of the land on which the sites lie, and their eligibility; and finally, a chapter summarizing HDR's recommendations. Each chapter will contain all pertinent data collected and recorded (i.e., numbers and listing of sites, their NRHP or SAL eligibility recommendations, whether on private or state land, where excavation units were excavated, where artifacts were collected, and what future recommendations are being made per requirements of 13 TAC 26.5(35), 13 TAC 26.20(1), and 13 TAC 26.20(1)) for the specific project.

One print copy of this report and two tagged PDF copies of the final report (one with site location information and one without) will be submitted to THC per the requirements of the Antiquities Permit. On completion of the fieldwork, all artifacts, field forms, photographs, and results will be curated at the CAS at Texas State University in San Marcos.

References

Schoeneberger, P.J., D.A. Wysocki, E.C. Benham, and W.D. Broderson (editors)
2002 *Field Book for Describing and Sampling Soils, Version 2.0.* Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture
2018 Web Soil Survey. Available online at: http://websoilsurvey.nrcs.usda.gov/, accessed April 26, 2018.

USGS
2018 Texas Geology Web Map Viewer. Available online at https://txpub.usgs.gov/dss/texasgeology/, accessed April 26, 2018

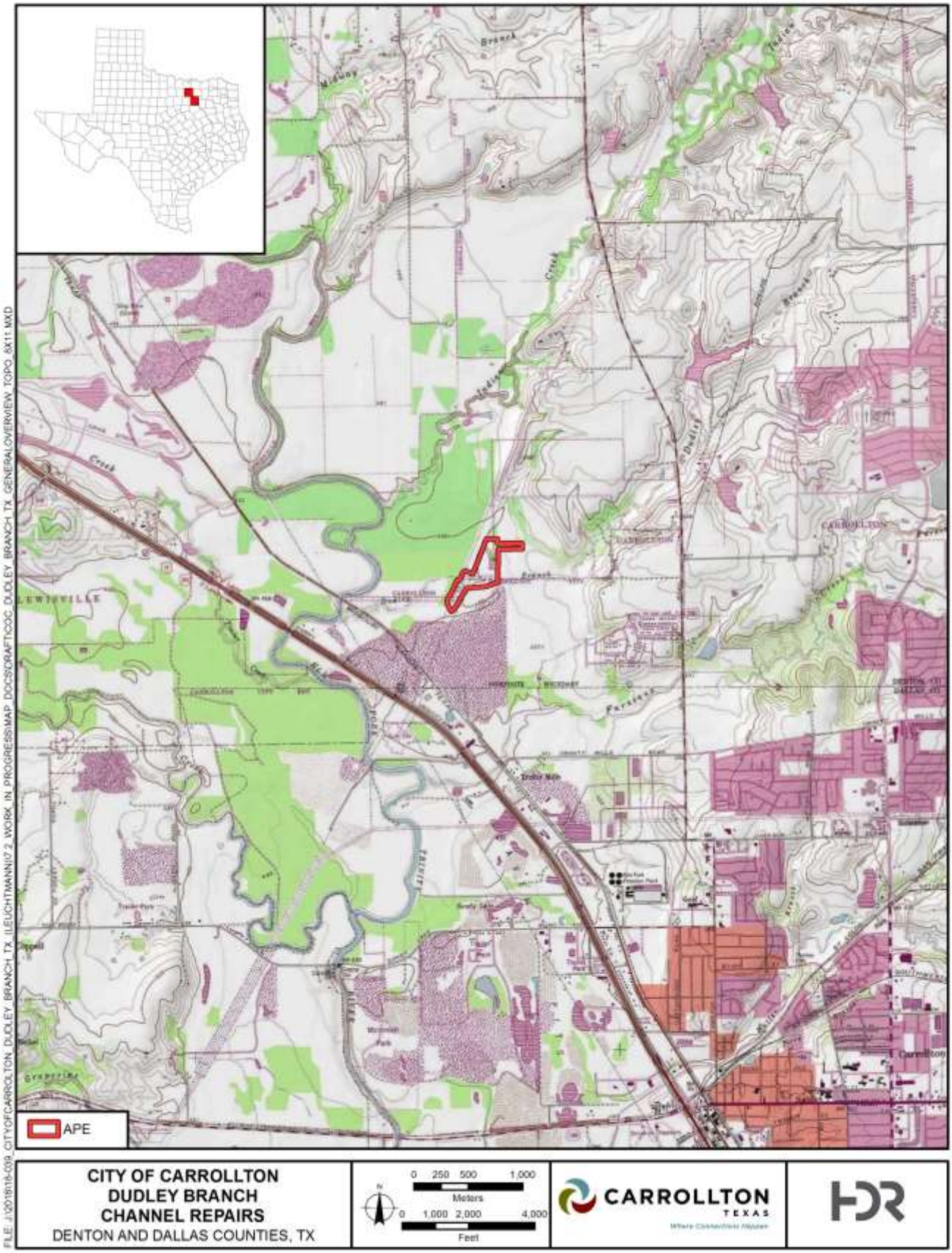


Figure 1. Topographic Map Showing the Project Location.

Figure 2. Aerial Photographic Map Showing Previous Cultural Resources within One Mile of the APE.

From:	noreply@thc.state.tx.us
To:	Leuchtmann, Amy; reviews@thc.state.tx.us
Subject:	Project Review: 201812572
Date:	Thursday, September 13, 2018 3:33:59 PM

Re: Project Review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas
Permit 8426
201812572
Dudley Branch Improvements
W. Frankford Rd and Indian Creek intersection
Carrollton,TX

Dear Amy Leuchtmann:
Thank you for your submittal regarding the above-referenced project. This response represents the comments of the Executive Director of the Texas Historical Commission (THC), pursuant to review under the Antiquities Code of Texas.

The review staff led by Arlo McKee and Caitlin Brashear has completed its review and has made the following determinations based on the information submitted for review:

Above-Ground Resources

- No historic properties are present or affected by the project as proposed. However, if historic properties are discovered or unanticipated effects on historic properties are found, work should cease in the immediate area; work can continue where no historic properties are present. Please contact the THC's History Programs Division at 512-463-5853 to consult on further actions that may be necessary to protect historic properties.

Archeology Comments

- No effect on archeological sites. However, if buried cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains.
- No sites recorded .
- Draft report acceptable. Please submit another copy as a final report along with shapefiles showing the area where the archeological work was conducted. Shapefiles should be submitted electronically to Archeological_projects@thc.texas.gov.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas. If you have any

questions concerning our review or if we can be of further assistance, please email the following reviewers: Arlo.McKee@thc.texas.gov, caitlin.brashear@thc.texas.gov.

Sincerely,

For Mark Wolfe, State Historic Preservation Officer
Executive Director, Texas Historical Commission

Please do not respond to this email.

Attachment H

Conceptual Restoration Plan

City of Carrollton

CARROLLTON
TEXAS

RESTORATION PLAN

APPLICATION FOR DEPARTMENT OF THE ARMY
Nationwide Permit 27

City of Carrollton
Proposed Dudley Branch Pond Removal and Stream Restoration

USACE Project No. SWF-2018-00405

April 2020

Prepared for:
The City of Carrollton, Texas
1945 E. Jackson Rd. Carrollton,
Texas 75006

Prepared by:
HDR Engineering, Inc.
17111 Preston Rd., Suite 300
Dallas, TX 75248-1232

Conceptual Restoration Plan

Part I: Project Information

Project Name: **Dudley Branch Pond Removal and Stream Restoration**
SWF Permit No.: **SWF-2018-00405**
Project Location: **Carrollton, Texas (32.998657, -96.928758)**
Restoration Site Location(s) (if different): **Not Applicable**
Watershed(s): **HUC 12: 120301031003**
County or Counties: **Denton County, Texas**

Note to Reader: The restoration plan that follows is prepared in accordance with and follows the Fort Worth District recommended format posted on the District's webpage (as of October 27, 2016).

1. Project Description

The City of Carrollton (hereinafter referred to as the City or Applicant) operates the existing Taos Pond (OCP-2) in Denton County, Texas. The Applicant proposes to re-establish a segment of Dudley Branch by removing the on-channel pond and relocating the wetlands (herein referred to as proposed project or new stream). This Conceptual Restoration Plan (CRP) is submitted as **Attachment H** and is part of an Application for Department of the Army Nationwide Permit 27 (NWP) provided to the Fort Worth District of the U.S. Army Corps of Engineers (USACE) to initiate the process for approval to impact waters of the U.S., including wetlands (WOTUS), under Section 404 of the Clean Water Act (CWA).

2. Purpose and Need

The purpose of this project is the aquatic habitat restoration of what is currently an open water impoundment on Dudley Branch. Removal of this pond will restore Dudley Branch to the function of a stream and riverine wetland system. Restoration of the stream and wetland will take place within the footprint of the existing impoundment and have a net increase in aquatic resource functions.

Part II: Avoidance and Minimization

1. Avoidance

The design as well as the purpose and need for the proposed project does not allow for complete avoidance of impacts to waters of the U.S. However, to the maximum extent practicable, impacts to waters of the U.S. were avoided in the design and location of the re-established stream channel. Only features abutting the existing pond will be altered (See **Appendix B**)—adjacent wetlands and streams will be avoided (W-1, W-2, W-3, W-7, S-1, OCP-1, OCP-3, and OCP-2 above the restored portion of Dudley Branch). The three forested wetlands (W-4, W-5, and W-6) within the

study area that are abutting the pond will also be avoided. Additionally, hydraulic models indicate that the hydrology of the avoided streams and wetlands above the restoration site will remain unaffected. Wetlands that cannot be avoided will be relocated to the stream banks and benches.

2. Minimization

Impacts to S-4 are unavoidable due to necessary modifications required to restore Dudley Branch. Impacts to S-4 were minimized by isolating fill and grading to only where required to remove old pond outlets and to connect the restored Dudley Branch to existing S-1 (see **Appendix D**).

The Applicant has developed appropriate and practicable on-site measures in the design and operational plans for the proposed project in order to minimize adverse impacts to waters of the U.S. that cannot be reasonably avoided. These measures include, but are not limited to, water quality protection through best management practices (BMPs), bioengineering of the restored stream channel by using mostly native and natural materials and absence of hard armoring, and protection of downstream features with a sinusoidal pattern to establish a natural and stable downstream flow.

BMPs will be used to control erosion and sedimentation during construction of the proposed project and to control total suspended solids following construction. Construction will be conducted using a phased approach to reroute water to avoid flows through active construction areas to the extent practicable. Areas temporarily disturbed by construction will be re-contoured and re-vegetated as appropriate to minimize adverse impacts to water quality.

Part III: Restoration Plan

1. Goals and Objectives

The goals of the proposed restoration plan include:

1. Provide for the replacement and net increase of the chemical, physical, and biological functions of the WOTUS that will be temporarily impacted due to aquatic habitat restoration activities.
2. Provide for the restoration of the ecological function and aesthetic value of riparian or aquatic communities affected by the proposed aquatic habitat restoration activities.

The proposed restoration plan includes the following objectives:

1. The restoration of 2.99 acres of forested wetland;
2. The restoration of 1,586 linear feet (LF) of stream channel with associated riparian corridors;

3. The restoration of the ecological functions of stream corridors such as water quality improvement, floodwater storage, sediment transfer, nutrient cycling, and wildlife habitat; and
4. The development of restoration activities that achieve sustainability and limit the amount of maintenance required by repairing and mimicking natural processes of energy transfer, nutrient cycling, and the hydrologic regime.

The following definitions from NWP 27 are used and described below for their applicability and use in this Restoration Plan:

Enhancement means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Restoration means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource.

For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Re-establishment means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

This Restoration Plan for Dudley Branch defines restoration types for various activities as follows:

The stream that is proposed for restoration is a stream that currently does not exist due to an impoundment/pond at the site that will be restored and rebuilt through removal of the dam and pond to result in a gain in stream length and function. This will be considered Re-establishment.

Impacted lacustrine fringe wetlands that will be impacted by the removal of the impoundment will be relocated as riverine forested wetlands to the floodplain of the new stream. This will result in no net loss of wetland and an increase in function and will be considered Re-establishment.

2. Site Selection

Based on the nature of the proposed project and the purpose of NWP 27, the Applicant plans to provide on-site restoration at the current location of the impoundment on Dudley Branch. This project area's footprint provides sufficient area to practicably re-establish waters of the U.S. associated with the proposed aquatic restoration activities. Additionally, the use of the Restoration Work Plan of this document, along with an Adaptive Management Plan, will maximize the likelihood of re-establishing ecologically self-sustaining aquatic resources.

Pertinent sources were reviewed to determine if there are any current or future activities within the watershed that may affect the long-term condition of the hydrology on the restoration site. The Texas Water Development Board 2016 Region C Water Plan was reviewed, and it was concluded that there are no proposed reservoirs that may influence the hydrology of the proposed restoration projects. Additionally, proposed residential, commercial, and industrial developments; recent USACE 404 permit actions and any actions currently under review; urban expansion; and water rights were all reviewed for the proposed restoration area and in the general vicinity of the project. None of these factors are expected to influence the hydrology or viability of the proposed restoration of Dudley Branch.

3. Liens, Easements, or Encumbrances

Some grading associated with stream restoration will be conducted within an existing Oncor transmission line easement on City of Carrollton property. However, no liens, easements, or encumbrances exist within the core portion of the mitigation area containing stream and wetland features. Additionally, no such land restriction impact mitigation activities because the land is owned, managed, and maintained by the City of Carrollton. No tree plantings are proposed in this maintained transmission line right-of-way (ROW).

4. Baseline Information

Ecological Conditions for the Impact Site

Historical Condition

In the early 1980s, when the site and the surrounding area was still largely rural agricultural lands, the pond was constructed on Dudley Branch. At this time, Dudley Branch flowed east to west, and the pond was constructed so that the southern portion of the pond was adjacent to the stream. Years later, Dudley Branch was rerouted to its current path, flowing into the pond from the northwest.

Current Condition

A summary of ecological conditions for the proposed project is provided below. Extensive site-specific baseline information is not detailed in the CMP. Details related to specific baseline information and adverse impacts are located in **Attachment B** of the Nationwide Permit application. This delineation report provides detailed descriptions of the aquatic resources, existing vegetation, surrounding land uses, and geology and soils within the project area, which is the site of impacts and restoration (i.e., on-site). Ecological condition for streams and wetlands at the impact site were determined by using the Texas Rapid Assessment Method (TXRAM) Version 2.0 and can be found in **Appendix E** of this restoration plan.

Endangered Species

According to the endangered species list from the U.S. Fish and Wildlife Service's (USFWS) Information, Planning, and Conservation (IPaC) System, four federally listed threatened and endangered species could potentially occur in the study area. No suitable habitat was identified in the study area for any federally listed threatened or endangered species potentially occurring in the study area. While whooping cranes could utilize the study area as a stopover location along their migration route, the shoreline habitat at the study area is not considered preferred habitat. Additionally, the study area is not within the identified critical habitat for this species. Similarly, interior least terns could potentially utilize the aquatic habitat within the study area. However, least terns prefer barren to sparsely vegetated sandbars, gravel pits, and shorelines. The margin of the impoundment on the study area is densely vegetated by emergent, herbaceous or woody vegetation, thus, making it unsuitable for interior least terns. Since this is not a wind energy project, piping plovers and red knots are excluded from consideration. Therefore, the proposed project would have no effect on federally listed species.

Cultural Resources

An intensive cultural resources survey was conducted on the 21.38-acre Area of Potential Effects (APE) at the Dudley Branch site. The survey consisted of shovel testing, pedestrian walkover, and photo documentation of the entire APE. A majority of the area has been heavily impacted by modern developments. No cultural resources were encountered during the intensive survey of the APE. The results of this survey are detailed in **Attachment G** of the permit application.

The proposed re-establishment project is located in an urban area that has been disturbed by construction of ponds, roads, and utility infrastructure. No cultural resources were identified within the proposed grading limits of this project; therefore, no adverse effects to prehistoric or historic resources are anticipated.

5. Restoration Work Plan

The following restoration work plan describes the proposed restoration activities during the initial active development and management phase of the restoration plan. These activities include stream and wetland restoration (i.e., re-establishment). Figures and design plans illustrating the proposed restoration plan are in the permit application **Attachment E**. It is anticipated that the proposed restoration work plan described below will achieve the goals and objectives of this restoration plan by providing the restoration of historic stream channel and the relocation and enhancement of associated wetland.

Summary of Restoration Plan Objectives and Approach

Stream and Wetland Restoration Engineering Design and Management Approach

A summary of stream and wetland restoration practices to be used during restoration actions at the on-site restoration area is provided below. The proposed actions are based on principles of fluvial geomorphology adapted to fit the geology and hydrologic conditions of the project and restoration areas. The proposed stream and wetland restoration measures associated with the proposed on-site restoration actions for the Dudley Branch project include dam removal, grading of sediment, pilot channel development, grade control structure installation, channel restoration, and native seeding and tree planting.

- Re-grading and re-vegetation of previously constructed earthen embankments will be performed to re-establish the stream channel, reduce retention, restore flow/natural stream processes, relocate lacustrine fringe wetlands to be adjacent to the stream channel, and minimize erosion and sedimentation.
- Riparian restoration area activities will be initiated as soon as practicable following construction through supplemental plantings of native tree, shrub, and herbaceous vegetation for erosion and sediment control as well as the improvement of the diversity, structure, and canopy of the native riparian plant community (see permit application **Attachment E**). Containerized trees will be planted within the stream benches, adjacent to the channel, in highly-erodible areas to provide natural armoring and in-stream habitat.
- Stream re-establishment design plans considered the general sinusoidal pattern of the existing portions of the stream so that the connection of upstream and downstream stable channel reaches would result in natural and stable flow patterns. Appropriate channel width to depth ratios, low floodplain benches, slopes, and grade control measures were implemented (see design plans in the permit application **Attachment E**).

- Construction of stream restoration will be conducted under the oversight of an engineer and/or ecologist with fluvial geomorphology and stream restoration experience utilizing slopes appropriate to soil conditions, grade control, and temporary erosion protection as necessary to reduce erosion and manage risk of failure. As-built plans, including any changes based on field conditions as approved by the stream restoration field engineer, would be provided to the USACE following construction.
- Stream banks will be graded to create in-stream benches appropriate for the stream type for development of streamside vegetation and riparian systems.
- Rock clusters and riffles will be constructed using native material and located to provide energy dissipation, grade control, increase microhabitats, and increase substrate diversity.
- During and post construction, the public will be excluded to reduce impact to slope soil stability and vegetation in order to avoid adverse impacts that may occur close to or adjacent to streams. Following initial stabilization, revegetation, and the verification that success criteria are achieved, public use of the area may resume.

Specific design plans and specifications for each restoration location are provided below and in **Attachment E** of the permit application.

Native Vegetation Restoration & Management

The restoration of herbaceous and woody plant communities will be conducted within the proposed on-site restoration area. Only native species will be planted per the NWP 27 requirement. The proposed actions will vary depending on the intended function of the landform. Therefore, the Applicant has developed the following general approaches to vegetation restoration in each habitat type.

<u>Native Forested Wetland:</u>

Designed wetland areas will be planted with native woody species suitable for establishment in this region under the hydrologic conditions. This mix of trees and shrubs, dominated by hard mast-producing hardwood trees, shall be planted at a density of 315 stem/acre as soon as practicably possible. A diversity of species will be planted to maximize the ecological function of the forested wetland.

Forested Wetland Woody Species List:

- Buttonbush (*Cephalanthus occidentalis*)

- Southern wax myrtle (*Myrica cerifera*)
- Green ash (*Fraxinus pennsylvanica*)
- Water hickory (*Carya aquatic*)
- Overcup oak (*Quercus lyrata*)
- River birch (*Betula nigra*)
- Swamp chestnut oak (*Quercus michauxii*)
- Swamp white oak (*Quercus bicolor*)
- Willow oak (*Quercus phellos*)

Native Hardwood Frequently Flooded Riparian Zone and In-stream Benches:

The right bank of the stream and the in-stream benches will be planted with native hardwood species suitable for establishment in this region under the hydrologic conditions. This mix of trees, dominated by hard mast-producing hardwood trees, shall be planted at a density of 315 stem/acre as soon as practicably possible. Depending on the time between construction and feasible tree planting, geotextile and natural fiber mats, in conjunction with native grasses, may be used, when necessary, to protect slopes from overland flow and surface erosion. Containerized bald cypress (*Taxodium distichum*) and green ash (*Fraxinus pennsylvanica*) are to be used for channel protection in highly erodible portions of the stream. Bald cypress is to only be planted in such areas. A diversity of tree species will be planted to establish a riparian buffer of at least 150 feet to maximize the ecological function of the perennial stream.

Frequently Flooded Riparian and In-stream Bench Tree List:

- American Elm (*Ulmus Americana*)
- Bald cypress (*Taxodium distichum*)
- Green ash (*Fraxinus pennsylvanica*)
- Shumard oak (*Quercus shumardii*)
- Swamp chestnut oak (*Quercus michauxii*)
- River birch (*Betula nigra*)
- Swamp white oak (*Quercus bicolor*)

Native Hardwood Upland Riparian Zone:

The left bank of the stream, which will exhibit higher landscape position than the right bank, will be planted with native hardwood species suitable for establishment in this region under the hydrologic conditions. This mix of trees, dominated by hard mast-producing hardwood trees, shall be planted at a density of 315 stem/acre as soon as practicably possible. Depending on the time

between construction and feasible tree planting, geotextile and natural fiber mats, in conjunction with native grasses, may be used, when necessary, to protect slopes from overland flow and surface erosion. A diversity of tree species will be planted to establish a riparian buffer of at least 150 feet to maximize the ecological function of the perennial stream.

Upland Riparian Tree List:

- Bur oak (*Quercus macrocarpa*)
- Cedar elm (*Ulmus crassifolia*)
- Chinquapin oak (*Quercus muehlenbergii*)
- Common persimmon (*Diospyros virginiana*)
- Pecan (*Carya illinoinensis*)
- Shumard oak (*Quercus shumardii*)
- Water oak (*Quercus nigra*)

Native Upland Grassland:

The eastern portion of the restoration area shall be established as a native grassland. This upland area shall be seeded with native sod-forming grasses after construction as soon as practicably possible. Best management practices will be implemented to minimize soil erosion to the greatest extent practicable until the grasses are established and stabilize the soil.

Native Grass Seed List:

- Buffalograss (*Buchloe dactyloides*)
- Vine mesquite *(Panicum obtusum*)
- Virginia wildrye (*Elymus virginicus*)
- Blue grama (*Bouteloua gracilis*)
- Curly mesquite (*Hilaria belangeri*)
- Bluebonnet (*Lupinus texensis*)
- Upright prairie coneflower (*Ratibida columnifera*)
- Indian blanket (*Gaillardia pulchella*)

Desirable Characteristics of Native Plants for Erosion Control and Wildlife Use

Native plants considered for erosion control and wildlife use should possess as many of the following characteristics as possible.

- Thrive under specific climatic and soil conditions.
- Compete with other plant species occurring in these conditions.

- Cover as much area as possible. Desirable characteristics include spreading by stolons, runners, or rhizomes; forming thickets, mats, or coppices; rooting from decumbent or declining branches, or forming root shoots (suckers).
- Produce fertility-enriching litter with high water holding capacity.
- Inexpensive, readily available from local sites or nurseries, and easy to propagate and maintain. Use local seed or propagules.
- Rapid growing and long-lived.
- Possess hardy characteristics such as resistance or adaptability to drought, shade, insect damage, and diseases; and growrapidly on soils with a wide range of fertility and chemical characteristics.
- Produce dense foliage (deciduous and evergreen), stems, or thorns, preferably close to the ground.
- Produce seasonally abundant shoots, leaves, buds, and fruits that have high nutritive value for many species of animal life.
- Produce annual, persistent fruits that have high seed germination ratios.
- For tall-growing plants, they should not produce inhibitors that prevent other plant species from growing beneath them.
- Preferably, non-poisonous to man and pets.

Desirable Characteristics of Native Plant Associations for Erosion Control and Wildlife Use

- Selected plants should be of the same local climatic and ecological region, topography, and soil conditions.
- Selected plants should be noncompetitive (i.e., compatible).
- The association should cover as much area as possible (overlapping canopies).
- The association should form at least two canopy layers above the soil surface.
- Selected plants should include a mixture of physical and habit forms (e.g., deciduous, evergreen, tree, shrub, vine, forb, grass).
- The association should provide annual, all-season fruits.
- The association should provide areas of adequate cover.
- Some components of the association should establish quickly and provide rapid growth.

- Planting should be arranged in irregular groups rather than uniform rows so that the association will produce a more natural form.

Monitoring and control of non-native/invasive species would be performed as necessary. The stream and wetland restoration activities will promote ecological functions of the riparian buffer, in-stream habitat, and wetland habitat restoration by replacing the chemical, physical, and biological functions of the pond and associated wetlands impacted on-site by the stream restoration activities.

Vegetation Restoration

In the locations where soil disturbance occurs due to dam removal and grading to re-establish a bankfull channel and relocated wetlands, the native grass/forb species list and temporary non-invasive cover crop will be used in the first year following ground disturbance activities. During the first late cool season following grass/forb seed application, native trees/shrubs from the riparian buffer and upland buffer species lists as appropriate for soil and slope conditions will be planted. Within the alluvial areas of the bankfull benches, native grasses, shrubs (e.g., buttonbush), and trees (e.g., water oak) adapted for early colonization will be planted on 12-foot center spacing to aid in stabilizing soil along the newly graded channel (see **Attachment E** of the permit application). For riparian and forested wetland areas, seedlings of at least four species from the list in the section above will be planted to result in a total stem count of at least 250 stems per acre (250 stems assumes an approximate mortality of 20% of the 315 stems planted per acre) with no one species comprising more than 35% and no less than 5% of the total.

Implementation Schedule

The Applicant will initiate the pond removal and grading for stream re-establishment work subsequent to permit authorization and concurrent to construction in waters of the U.S. for the proposed project. Restoration construction and components must be completed and operational (e.g., flows) when project construction is completed as determined by the Corps.

Activity	Anticipated Start*	Anticipated Completion
On-site Pond Removal/Grading/ Construction for Stream Restoration and wetland Relocation	Concurrent with construction in waters of the U.S.	Within one year of initiation for construction and two years for stabilization

Activity	Anticipated Start*	Anticipated Completion
Monitoring	Following restoration activities and concurrent with construction in waters of the U.S.	Five years following last seedling planting (see **Appendix G**) and three years following completion of construction in waters of the U.S. (for flow releases), until success criteria are met

* Approximate timing of start based on current understanding of project schedule.

6. Determination of Net Increase

The Applicant shall implement on-site restoration for adverse impacts to waters of the U.S. by restoring waters of the U.S. as described in **Part III, Section 5**. The determination of net increase is described in more detail in **Appendix F**, and is based on the net increase in ecological conditions of the new stream and forested wetland as demonstrated using TXRAM Version 2.0. An explanation of how the proposed restoration will compensate for unavoidable impacts to aquatic resources resulting from the proposed project is provided in **Appendix F**.

The rationale for the determination of net increase includes: (1) assessment of the quantity and quality of impacted WOTUS, and (2) the types of restoration measures described in this plan and the anticipated functional "lift."

Restoration net increase in aquatic resources as shown in **Appendix F** are appropriate for the proposed restoration measures based on the following:

- Restoration net increase is based on an evaluation to determine the ecological lift and functional replacement of the proposed restoration measures when compared to the quality of the impacted resources. Additional information is provided in **Appendix F**.
- Restoration will be performed on-site. Thus, the credits do not require any decrease for location in a different watershed or ecoregion.
- Restoration measures include in-kind stream and wetland restoration.
- Restoration has a high likelihood of success due to site characteristics and the restoration work plan. The potential risk of failure for the proposed restoration is diminished due to the presence and replication of existing, reliable hydrology, as well as the implementation of the proposed success criteria and management plan.
- The restoration plan minimizes local threats which could affect the proposed restoration measures. No activities will occur in the areas used as restoration which could be detrimental or restrict the proposed restoration from providing the anticipated ecological functions.

Restoration Credit Summary

Based on the proposed restoration activities described above, the impacts to 561 LF of perennial stream and 2.16 acre of wetland (2.11 ac of emergent and 0.05 acre of scrub/shrub wetland) will be offset by re-establishment (restoration) of approximately 1,586 LF of perennial stream and 2.99 acre of forested wetland. This results in a net increase of streams and wetlands in addition to a boost in overall aquatic function.

Texas Rapid Assessment Method

Impacts to aquatic ecosystem functions are considered in the restoration planning process to allow (1) adequate replacement of functions and (2) restoration of the required stream and wetland linear feet and acreages, in accordance with USACE requirements.

The Texas Rapid Assessment Method, Version 2.0 was published by the U.S. Army Corps of Engineers, Fort Worth District in September 2015 (final draft version), as the preferred method to provide an evaluation of ecological condition of waters of the U.S. (i.e., wetlands and streams) within the Fort Worth District's jurisdiction. The TXRAM scores, in addition to acreages and linear feet, were used to determine pre- and post-restoration functional and conditional values.

TXRAM was performed for all impacted waters of the U.S. in the project area, and an overall score for each feature was calculated using the TXRAM scoring sheet (see **Appendix E**). TXRAM scores were also projected for the restored stream and wetland following restoration activities to determine the ecological lift demonstrated by the change in TXRAM score (see **Appendix E**). Furthermore, a suitable reference stream reach was evaluated with TXRAM to document the proposed achievable condition of restoration and justification for the proposed lift (see **Appendix E**).

In summary, the TXRAM evaluation assesses the conditional impacts to waters of the U.S. at the project area as well as the projected ecological lift to streams proposed for restoration. The results of the TXRAM evaluation were used in the determination of restoration efficacy as discussed in **Appendix F**.

7. Maintenance Plan

Maintenance practices conducted by the Applicant following initial restoration and re-establishment of WOTUS may include activities such as:

General Maintenance and Monitoring Activities:

1. Annual monitoring of ecological conditions.
2. Annual visual monitoring for any impacts from unauthorized activities (e.g., off-road vehicles, tree cutting, trespassing).
3. Annual maintenance or repair of necessary restoration activities (e.g., fencing) to control unauthorized access of the area.
4. Annual monitoring for growth of non-native/invasive species with control practices as necessary.
5. When applicable, erosion control measures and re-planting approved native vegetation to meet performance criteria.
6. Replacement of trees/shrubs will be performed if needed to meet the success criteria. Different native species may be sourced based on an evaluation of site conditions in an effort to improve survivability of replacement specimens.
7. Irrigation, if required, will only be used for the first growing season following the initial plantings and one additional year for supplemental plantings.
8. Areas of excessive erosion (i.e., greater than 10% bare ground with the exception of stream beds and aggrading point bars) in the locations where dams are modified or removed, and soil grading areas will be repaired using temporary erosion control measures and native vegetation.

On-site Restoration Area:

1. Native herbaceous vegetation cover will be monitored for a period of 5 years, or until success criteria are achieved. Monitoring shall include tree stem counts within designated planting areas. Supplemental tree/shrub plantings will occur as necessary, and the monitoring period for those specific portions of the restoration area will be extended until tree seedlings survive for five years or until native volunteer recruitment is documented to contribute to meeting minimum stem count requirements in the management reach or buffer unit.
2. The Applicant will conduct TXRAM (Version 2.0) monitoring of the re-established stream and relocated and restored wetlands to track progress toward the target scores shown in **Appendix E** for the end of the construction and monitoring periods.
3. Bank stability, bank height/width ratio, channel dimensions, floodplain bench condition, and lateral migration will be monitored at established survey benchmark locations annually for a minimum period of 5 years following construction and until two bankfull discharges have occurred at least one year apart. Areas of excessive erosion (i.e., greater than 10%

bare ground with the exception of stream beds and aggrading point bars) in the locations where dams are removed and soil grading work were conducted will be repaired using temporary erosion control measures and native vegetation.

8. Perpetual Site Protection Instrument

The Applicant will provide site protection for the restoration area in accordance with regulatory requirements and the 2008 Mitigation Rule. As the owner in fee of the site, the City will provide site protection in the form of perpetual ownership of the land. Site protection restrictions shall not be removed or modified from any established instruments without written approval of the USACE, and conveyance of any interest in the property must be subject to the established instruments.

9. Performance Standards

Performance standards for the restoration area will ensure the features are functioning as the intended type of WOTUS and meeting the goals and objectives described in this restoration plan. The City will be responsible for maintaining restoration areas to comply with performance standards until such time as the City provides documentation to, and receives verification from, the USACE that aquatic resources in the restoration areas are meeting the performance standards. A planned benchmark schedule is provided in **Attachment G**.

Key performance standards include:

1. Completion of adequate restoration to satisfy the Objectives (see **Part III, Section 1**).
2. Completion of restoration work plan elements located in **Part III, Section 5**.
3. Restoration area will meet specific success criteria as outlined below.
4. Stream and wetlands will be monitored using an appropriate assessment method (**Appendix G**).
5. TXRAM 2.0 scores for the stream and wetlands shall meet the proposed scores for the end of monitoring as shown in **Appendix E** and **Appendix F** to meet their success criteria.

<u>Success Criteria</u>

The success criteria proposed in this document support the requirements of the 2008 Mitigation Rule.

1. Stream Dimension: General maintenance of a stable cross-section and hydrologic access to floodplain features over the course of the monitoring period will generally represent success in dimensional stability. Minor changes in dimension may be expected. Key

parameters such as cross-sectional area and the channel's width-to-depth ratio may experience natural adjustment over time.

2. Stream Pattern and Profile: The profile should not demonstrate significant, prolonged trends toward degradation or aggradation over a significant portion of a reach. Functional standards such as channel depth, width and width-to-depth ratios will be measured and compared to each monitoring year. While some minor variability is expected, trends of instability (degradation or aggradation) over a five year monitoring period will be apparent. Pattern features (e.g., radius of curvature, belt width, wave length) should show little adjustment over the standard 5-year monitoring period and will be monitored to ensure adjustment is minor and general stable conditions are achieved.
3. Riparian buffer along the stream shall measure a minimum of 150 feet on either side of the channel.
4. Five years after initiation of restoration, a minimum ground cover of 75% with native grasses and forbs for areas with canopy cover less than 60%, and a minimum ground cover of 50% with native grasses and forbs for areas with canopy cover 60% and greater. Bare ground, with the exception of normal aggradation and point bar development in streams, shall not exceed 10% of the surface.
5. The riparian buffer along the stream will exhibit stem counts of a minimum of 250 stems per acre (target 80% survival of the 315 stems planted per acre) of planted or volunteer native trees or shrubs that have survived in the ground for a minimum of five years. Non-native, invasive species will not be allowed to remain untreated in the canopy/mid-story, and shall not comprise more than 0% of the woody vegetation and more than 1% of the herbaceous cover. Non-native stems will not be counted toward the minimum stems per acre. Stems will consist of at least four native species with one species not comprising more than 30%.
6. The forested wetland will exhibit stem counts of a minimum of 250 stems per acre (target 80% survival of the 315 stems planted per acre) of planted or volunteer native trees or shrubs that have survived in the ground for a minimum of five years. Non-native, invasive species will not be allowed to remain untreated in the canopy/mid-story, and shall not comprise more than 0% of the woody vegetation. Due to the urban setting of the site and the immediately adjacent residential lawns, complete exclusion of non-native herbaceous vegetation is not possible. Considering this unique challenge, non-native, invasive species shall not comprise more than 10% of the herbaceous cover. Non-native stems will not be

counted toward the minimum stems per acre. Stems will consist of at least four native species with one species not comprising more than 30%.

General Success Criteria

1. Restoration areas will have no excessive erosion or bare soils (i.e., greater than 10 percent bare ground).
2. Sediment aggradation in the stream channel will not accumulate to levels that would impair water quality or aquatic life movements (as demonstrated with TXRAM 2.0 for proposed conditions and reference reaches).
3. Vegetation will be healthy and contribute to nutrient cycling, water quality, and wildlife habitat.
4. The re-establishment (restoration) of approximately 1,586 LF of stream with associated riparian buffers within the project area.
5. Re-location and re-establishment of 2.99 acres of riverine forested wetland within the project area.
6. The stream will be required to meet or exceed the proposed score at release of monitoring shown in **Appendix E** and **Appendix F** to demonstrate ecological lift based on TXRAM 2.0.

Note: Target scores used in success criteria reflect the results of a TXRAM 2.0 evaluation of existing and proposed conditions of the aquatic features on the site, as well as a reference site (see **Appendix E** and **Appendix F** in this restoration plan for additional information on the evaluations).

10. Monitoring Requirements

The City will ensure sufficient financial resources are allocated to perform monitoring activities. The City, or their designees, will be responsible for monitoring and reporting annually following permit issuance until the success criteria are met. A planned benchmark schedule is provided in Appendix **G**.

<u>Self-Monitoring and Reporting</u>

The City will establish and implement a self-monitoring program that includes the following actions.

1. Designation, in writing, of a responsible party or position, who shall coordinate with the USACE on-site inspections and compliance with permit conditions; and
2. Implementation of a reporting program that includes submittal of written compliance reports to the USACE, due October 1 each year. These reports will outline compliance with the special conditions, summarize all activities that occurred during the reporting period, and provide notification of completion of all authorized work. These reports will document the activities that have occurred from Sept 1 of the preceding year to Aug 31 of the reporting year.

   Compliance reports shall include at a minimum:

   a. The approximate acreage, location, type, and description of waters of the U.S. impacted during the reporting year;
   b. the approximate acreage, location, type, status, and completion date (actual or projected) of the ongoing restoration that occurred during the reporting period;
   c. a description of the completed restoration activities, including a map showing the location of waters of the U.S. re-established, rehabilitated, or enhanced and supporting documentation including vegetative species and planting rates;
   d. for the stream, the monitoring report shall include information on fluvial geomorphological metrics (see **Part III, Section 9**) and site photographs collected at permanent survey locations and comparison to as-built drawings;
   e. for forested wetlands, the monitoring report shall include a tree stem count;
   f. representative photographs of the progress and success of restoration work accomplished under this permit;
   g. an evaluation of progress toward meeting restoration performance standards described above; and
   h. a cumulative summary of restored and enhanced waters of the U.S., categorized by type (including hydrologic regime).

Vegetation density/stem count surveys will be conducted annually to evaluate progress of restoration activities. The City would also conduct an appropriate assessment (e.g., TXRAM 2.0 and fluvial geomorphology metrics) of the restoration area annually for a period of five years after implementation (i.e., construction and vegetation management activities) of the restoration plan and will update annually thereafter, if needed, until success criteria are achieved. Results would be included in the annual reporting discussed above.

Compliance reports are required even if no work is conducted during the reporting period. The City will submit compliance reports until the USACE has verified that the restoration area has met the standards of applicable special conditions.

11. Long-term Management Plan

The City will own the restoration area and will manage it in accordance with the protection and management plan described in **Part III, Section 7** and **Section 8**.

General provisions for long-term management of City-owned restoration area include:

1. The restoration area will be retained and maintained in perpetuity predominantly in the vegetative and hydrologic condition described in the performance standards of this restoration plan, and any activities (other than those specified in this restoration plan) which may affect these conditions must be approved in writing by the USACE, Fort Worth District.
2. There shall be no filling, excavation, or alteration of the restoration site that will affect the success criteria outlined in this restoration plan unless approved in writing in advance by the USACE, Fort Worth District.
3. There shall be no mowing, shredding, clearing, or other vegetation disturbance activities within the forested portions of the restoration area except for control of non-native and invasive species as described in this plan and vegetation management plans referenced herein.
4. There shall be no motor vehicles operated within the restoration area except for those required to perform permitted restoration efforts (e.g., planting and erosion control) and only when soils are not at or near saturation. (Emergency fire control vehicles and equipment, when operating to control an active fire, are included in this exception.)
5. There shall be no horseback riding, recreational ATV operation, or biking within the restoration area.
6. There shall be no development within the restoration area which alters the natural vegetative and hydrologic conditions of the restoration area except as described herein.
7. Any activities related to wildlife habitat management which do not jeopardize the restoration performance standards are permitted.
8. Access is permitted to the USACE for the purpose of inspection, and to take actions including but not limited to scientific or educational observations and studies, and collection of samples.

12. Adaptive Management Plan

The Applicant shall be responsible for developing, operating, and maintaining the restoration area in a manner that meets the goals and objectives of this plan. In general, the restoration alternatives and proposed measures were developed to minimize the risk of failure and facilitate adaptive management of the wetlands and the streams and buffers. For example, the proposed use of locally sourced propagules and encouraging native volunteer species regeneration are examples of adaptive management that will increase the chance of success, reduce long term maintenance costs, and improve long-term self-sustainability of the activities to adapt to climate fluctuations common in the region.

The restoration area that results from this plan is vulnerable to acts of nature such as climatic instability and disease as well as unauthorized human activities that may cause the site to become non-compliant with the success criteria in the restoration plan. Occurrence of such acts of nature during the monitoring period or following attainment of performance standards may require changes to the restoration plan to allow for maintenance activities to offset and counteract negative impacts. Depending upon the circumstances, however, it may be appropriate to allow natural processes to continue, particularly when vegetation is expected to re-establish due to continued existence of seed sources, hydrology, and restrictions on incompatible land uses. As appropriate, the Applicant will discuss the potential causes, effects to function, options, and management decisions on such issues with the USACE.

Part IV: Appendices

	Included
A. General Location Map	☒
B. Delineation of Waters of the U.S., Including Wetlands	☒
C. Site Photos	☒
D. Plan Figures, Design, and Specification Sheets	☒
E. TXRAM Report	☒
F. Net Ecological Condition Evaluation	☒
G. Schedule for Benchmarks	☒

Proposed Conceptual Restoration Plan

Appendix A

General Location Map–Not Included as a Separate Appendix (See Application Attachment E)

Proposed Conceptual Restoration Plan

Appendix B

Delineation of Waters of the U.S., Including Wetlands Site– Not Included as a Separate Appendix (See Application Attachment B)

Proposed Conceptual Restoration Plan

Appendix C

Site Photos–Not Included as a Separate Appendix (See Photos in Application Attachments B and H Appendix E)

Proposed Conceptual Restoration Plan

Appendix D

Design/Plan Figures–Not Included as a Separate Appendix (See Application Attachment E)

Proposed Conceptual Restoration Plan

Appendix E

TXRAM Report

City of Carrollton, Texas

CARROLLTON
TEXAS

Report on the Texas Rapid Assessment Method (TXRAM) for Wetlands and Streams

City of Carrollton, Texas

Dudley Branch Pond Removal and Stream Restoration

Denton County, Texas

April 2020

Prepared for:
City of Carrollton, Texas
1945 E. Jackson Rd
Carrollton, TX 75006

Prepared by:
HDR Engineering, Inc.
17111 Preston Rd., Suite 300
Dallas, TX 75248-1232

Table of Contents

1.0 INTRODUCTION 1
2.0 METHODS 1
2.1 Restoration Design Development 1
2.2 Post-Restoration Score Development 2
3.0 RESULTS 4
3.1 Streams 4
3.2 Wetlands 5
4.0 CONCLUSIONS 6
5.0 REFERENCES 6

Attachments

Attachment 1: Wetland and Stream Data Sheets and Final Scoring Sheets
Attachment 2: Figures

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Fort Worth District, Regulatory Branch has published the Texas Rapid Assessment Method Version 2.0 (TXRAM) for use in evaluating the ecological condition of wetlands and streams in order to calculate adverse impacts and mitigation compensation under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 (USACE, 2015). The City of Carrollton, Texas (Carrollton or Applicant) proposes the use of TXRAM to perform a conditional assessment of the waters of the U.S. for the Dudley Branch Pond Removal and Stream Restoration (project) in Denton County, Texas.

TXRAM is a rapid, repeatable, field-based method that generates a single overall score of wetland or stream integrity and health. TXRAM can be used to assess potential wetlands and stream impacts, as well as to assess the ecological condition of wetlands and streams restored for mitigation. The data from the TXRAM evaluation of impacted waters of the U.S. and the potential restoration features can be used to evaluate the restoration by the project. The purpose of this report is to describe the circumstances and results of the TXRAM evaluation for the Dudley Branch Pond Removal and Stream Restoration project application for a Nationwide Permit (NWP) 27 (study area).

2.0 METHODS

A delineation and proposed jurisdictional determination (JD) of waters of the U.S. within the study area was performed concurrently with a TXRAM assessment on May 2 and September 19, 2018. HDR used available delineation data and aerial photographs to identify preliminary wetland assessment areas (WAAs) and stream assessment reaches (SARs) using the TXRAM assessment extent guidelines.

HDR used the following methods to perform the TXRAM assessment.

- Using the Geographic Information System (GIS), ArcGIS 10.7.1, HDR identified proposed WAAs and SARs within the study area using the TXRAM assessment extent guidelines.
- TXRAM field assessment using Version 2.0 was performed for all WAAs and SARs on May 2 and September 19, 2018, by HDR environmental scientists Mike Keenan and Brandon Tate. Each WAA was visited in the field in accordance with the TXRAM methodology, including the collection of quantitative vegetation data. Each SAR was visited in the field in accordance with the TXRAM methodology.

2.1 Restoration Design Development

A delineation and proposed jurisdictional determination (JD) of waters of the U.S. within the Dudley Branch Pond Removal and Stream Restoration study area (Study Area) was performed concurrently with a TXRAM assessment on May 2, 2018, and September 19, 2018. Additionally, TXRAM was conducted on a reference stream (Cottonwood Branch) in Frisco, Texas on April 4, 2019. This stream was recommended by USACE and the Texas Parks and Wildlife Department (TPWD) as a comparable stream to the proposed, restored segment of Dudley Branch because it has the same hydrologic regime (perennial), is in the same watershed (Hydrologic Unit Code [HUC] 8: 12030103), is in the same Environmental Protection Agency (EPA) Level III ecoregion (Texas Blackland Prairies), has the same soil type (Ovan clay, frequently flooded), is within a similar landscape position, and has similar surrounding development patterns.

Characteristics of the reference reach were utilized for the design of the restored Dudley Branch. The Dudley Branch Pond Removal and Stream Restoration design calls for a pilot channel bottom width of 8 feet to convey base flows and a bank-to-bank width of 21 feet. The channel is anticipated to have a 19-foot wide ordinary high water mark (OHWM) with a depth of approximately 3 feet. Above the pilot channel, and within the top of bank, are floodplain benches. Similar to the reference stream, these benches will be wooded. Overall, the basic stream geometry (see Attachment 2 Figure 1) of the two streams (Dudley Branch and Cottonwood Branch) will be complementary except that Dudley Branch will have a wider channel and an adjacent forested wetland. The width of the restored Dudley Branch is necessary to provide adequate flow conveyance of the 1-year storm event based on hydrologic and hydraulic models of Dudley Branch and local, urbanized watershed. The width also closely resembles the width of Dudley Branch downstream, near the confluence with the Elm Fork Trinity River.

In addition to incorporating elements of the reference stream into the Dudley Branch design, the existing, downstream reaches of Dudley Branch were evaluated as part of the initial Study Area delineation. The general sinusoidal pattern of these reaches was imitated in the design to ensure that the restored segment of Dudley Branch provides a natural and stable flow pattern.

2.2 Post-Restoration Score Development

2.2.1 Stream

The post-restoration stream score was calculated with HDR Environmental Scientists' best professional judgment according to the anticipated assessment metric scores of the post-restoration condition. Metric scores were estimated based on the proposed channel design, the reference reach, and downstream reaches of the existing Dudley Branch. While all three of these resources were considered when developing each metric, the most applicable and representative resource carried the most weight in the decision. See Attachment 1 for final data and scoring sheets.

Channel Condition

Floodplain connectivity was based off of the dimensions of the channel and floodplain bench design. Bank condition is expected to be similar to the condition of the reference reach and the downstream reaches of Dudley Branch because the soils and flow patterns should be roughly equivalent. Sediment deposition is expected to be the same in the restored stream as it is in the downstream reaches of Dudley Branch.

Buffer Condition

Riparian buffer condition was evaluated based on the proposed restoration activities, namely the forested wetland and riparian area that are to be planted along all portions of the stream that are not within the transmission line easement.

In-stream Condition

Considering the existing soils and in-stream substrate in the area, the substrate composition is expected to be similar to the downstream reaches of Dudley Branch. However, the design calls for the addition of cobble riffles that will provide an enhancement to the current, local substrate and in-stream habitat. The in-stream habitat metric was given the same score as the reference reach (four) which is one point higher than the typical score of downstream reaches of Dudley

Branch (S-4-1, S-4-3, S-4-4). Cobble riffles within the channel and container trees planted along the channel are expected to enhance the in-stream habitat compared to that found in the downstream reaches of Dudley Branch, and be more similar to that of the reference reach.

Hydrologic Condition

The intent of the stream design is to functionally imitate the flow regime and channel flow status of the reference reach and the downstream reaches of Dudley Branch, so commensurate metric scores were given.

Limited Habitat

The re-vegetation plan for the site calls for a mix of trees that are dominated by oak and hickories. Thus, the restored stream is expected to receive additional points for exhibiting banks dominated by hard mast producing tree species.

2.2.2 Wetland

The post-restoration wetland score was calculated with HDR Environmental Scientists' best professional judgment according to the anticipated assessment metric scores of the post-restoration condition. Metric scores were estimated based on the proposed wetland design and existing, on-site wetlands. Since the post-restoration wetland will be a forested, riverine wetland, WAAs exhibiting a riverine system (W-2-1) and WAAs including forested wetland (W-4-1) were considered the most suitable for development of the post-restoration score. See Attachment 1 for final data and scoring sheets.

Landscape

Aquatic context is not expected to vary significantly from the existing conditions on the site except for the proposed restoration activities. The buffer was evaluated based on the proposed restoration activities, namely the riparian habitat that is to be planted along all portions of the stream and surrounding the wetland that are not within the transmission line easement. Given that this is only a portion of the overall wetland buffer, this metric is not expected to change significantly.

Hydrology

The designed wetland is expected to have similar but slightly improved hydrology as compared to the existing, riverine wetland on-site (W-2-1). The water source will be more natural than W-2-1 because it will not have any artificial control. Similarly, the hydroperiod is expected to be seasonal with high variation but no artificial control. The hydrologic flow will be very similar to the conditions observed in W-2-1.

Soils

Organic matter in the soil is expected to be consistent within W-2-1 and W-4-1 considering the soil type will be the same and the conditions of the wetland will be similar. Sedimentation within the restored wetland will be comparable to the conditions in the existing riverine wetland on-site (W-2-1). The soil modification metric will score lower in the restored wetland by virtue of the restoration activities themselves. Past modification will be 100% of the wetland, but the recovery within the monitoring period should achieve at least moderate recovery.

Physical Structure

While the topographic complexity of the restored wetland will be slightly better than the riverine wetland on-site (W-2-1), the metric score will likely be the same at a value of one (1). No specific micro-topography is planned in the wetland design. The edge complex will be similar to the on-site wetlands, horizontal variability will not be high, but the wetland will be in the seasonal floodplain, and the edge vertical structure variation will be moderate. The wetland design does not call for any specific habitat features, thus the physical habitat richness is expected to be relatively low at the end of the monitoring period. However, as the wetland matures, habitat features can be expected to develop naturally from the presence of woody and herbaceous vegetation.

Biotic Structure

Plant strata is expected to contain herbaceous, saplings/shrubs, and trees. While planting within the wetland will be limited to tree and shrub species, herbaceous plants are likely to volunteer naturally. Per the re-vegetation plan, the wetland must contain at least four dominant tree and shrub species, though the recommended planting list contains many other species. While the species richness metric could likely be estimated at a higher number for the restored wetland, a conservative number was selected based on the minimum requirements of the restoration plan's success criteria (see Part III Section 9 of Attachment H [CRP]). Non-native/invasive infestation will be minimal due to the maintenance requirements of the restoration plan (see Part III Section 9 of Attachment H [CRP]). The wetland is planned to be planted uniformly and generally have low interspersion, which is similar to the natural condition observed in the on-site wetlands. Strata overlap is expected to be similar to the forested wetlands on site (W-4-1), low. As succession takes place in the future, this metric may improve. For the purposes of this exercise, a five year estimate (the length of monitoring) was utilized. The herbaceous cover of the wetland will likely be similar to the forested wetlands on-site (W-4-1). This low herbaceous cover score is reasonable because the wetland will mature to a forested system with a canopy cover that prevents herbaceous grow. Additionally, no herbaceous vegetation will be planted in the wetland. Thus, the only herbaceous vegetation in the wetland will be volunteers. The vegetation modification metric will be determined by the fact that 100% of the wetland will experience high severity of vegetation alteration. However, this alteration was done to improve the wetland and will exhibit at least moderate recovery.

Limited Habitat

The re-vegetation plan for the wetland calls for a mix of trees that are dominated by oak and hickories, Thus the restored wetland is expected to receive additional points for exhibiting a tree strata dominated by hard mast producing species.

3.0 RESULTS

3.1 Streams

The results of the TXRAM evaluation for streams in the study area are reported below. The TXRAM data sheets and final scoring sheets for the representative SARs can be found in **Attachment 1**, and maps are located in **Attachment 2**.

The TXRAM scores for the existing SARs in the study area ranged from a high of 72 to a low of 55. **Table 1** below depicts the score for each TXRAM core element as well as the overall TXRAM

score for the SARs in the study area, in addition to the reference stream (RS-1-1) and the projected post-restoration score for Dudley Branch.

Table 1. TXRAM Scores for SARs in the Study Area, Reference Reach, and Restored Stream (Projected)

SAR ID	Type	Channel Condition	Riparian Buffer Condition	In-Stream Condition	Hydrologic Condition	Additional Points (Limited Habitat)	TXRAM Score
S-1-1	Perennial	28.0	9.9	12.5	21.9	-	72
S-2-1	Perennial	24.0	14.2	10.0	21.9	-	70
S-3-1	Perennial	26.0	12.0	12.5	18.8	-	69
S-4-1	Perennial	22.0	5.9	10.0	21.9	-	60
S-4-2	Perennial	22.0	3.4	7.5	21.9	-	55
S-4-3	Perennial	22.0	9.6	10.0	21.9	-	64
S-4-4	Perennial	24.0	8.1	12.5	21.9	-	67
RS-1-1	Perennial	28.0	10.4	22.5	25.0	-	86
Restored Dudley Branch	Perennial	30.0	14.9	17.5	25.0	4.4	92

3.2 Wetlands

The results of the TXRAM evaluation for wetland waters of the U.S. at the Dudley Branch Pond Removal and Stream Restoration study area are reported below. The TXRAM data sheets and final scoring sheets for the representative WAAs can be found in **Attachment 1**, and maps are located in **Attachment 2**.

The TXRAM scores for the existing WAAs at the study area ranged from a high of 68 to a low of 60. **Table 2** below depicts the score for each TXRAM core element as well as the overall TXRAM score for the WAAs for each wetland in the study area in addition to the projected post-restoration score for the relocated wetland.

Table 2. TXRAM Scores for WAAs in the Study Area and Restored Wetland (Projected)

WAA ID	Type	Landscape	Hydrology	Soils	Physical Structure	Biotic Structure	Additional Points (Limited Habitat)	TXRAM Score
W-1-1	Lacustrine Fringe	10.0	15.0	12.5	10.0	12.1	-	60
W-2-1	Riverine	10.4	25.0	12.5	8.3	10.7	-	67
W-3-1	Depressional	10.3	20.0	12.5	11.7	9.3	-	64
W-4-1	Depressional	9.6	20.0	12.5	13.3	12.1	-	68

Table 2. TXRAM Scores for WAAs in the Study Area and Restored Wetland (Projected)

WAA ID	Type	Landscape	Hydrology	Soils	Physical Structure	Biotic Structure	Additional Points (Limited Habitat)	TXRAM Score
W-5-1	Lacustrine Fringe	9.2	17.5	12.5	11.7	15.0	-	66
Restored Wetland	Riverine	10.2	30.0	10.0	8.3	10.7	3.5	73

4.0 CONCLUSIONS

In summary, the results of the TXRAM evaluation provide an evaluation of the existing ecological condition of waters of the U.S. (i.e., wetlands and streams) at the Dudley Branch Pond Removal and Stream Restoration study area in addition to the reference stream and the projected post-restoration condition of Dudley Branch and its associated riverine, forested wetland. The scores for each of these wetland and stream types, combined with the acreage or linear feet of impact can be used to evaluate the efficacy of the proposed aquatic resource restoration activities.

5.0 REFERENCES

U.S. Army Corps of Engineers. 2015. The Texas Rapid Assessment Method (TXRAM). Wetlands and Streams Modules, Version 2.0. Final.

Attachment 1: Wetland and Stream Data Sheets and Final Scoring Sheets

Wetland Final Scoring Sheets and Data Sheets

TXRAM WETLAND FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Wetland ID/Name: W-1 WAA No.: W-1-1 Size: 0.15 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Wetland Type: Lacustrine Fringe Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☒ Yes ☐ No

Notes: Emergent fringe W-1 around OCP-1.

Core Element	*Metric*	*Metric Score*	*Core Element Score Calculation*	*Core Element Score*
Landscape	Aquatic Context	4	Sum of metric scores / 8 x 15	10.0
	Buffer	1.35		
Hydrology	Water source	2	Sum of metric scores / 12 x 30	15.0
	Hydroperiod	2		
	Hydrologic flow	2		
Soils	Organic matter	2	Sum of metric scores / 12 x 15	12.5
	Sedimentation	4		
	Soil modification	4		
Physical Structure	Topographic complexity	2	Sum of metric scores / 12 x 20	10.0
	Edge complexity	3		
	Physical habitat richness	1		
Biotic Structure	Plant strata	1	Sum of metric scores / 28 x 20	12.1
	Species richness	2		
	Non-native/invasive infestation	3		
	Interspersion	2		
	Strata overlap	1		
	Herbaceous cover	4		
	Vegetation alterations	4		
Sum of core element scores = overall TXRAM wetland score				59.6
Additional points for unique resources = overall TXRAM wetland score x 0.10 if: ☐ Area of Caddo Lake designated a "Wetland of International Importance" under the Ramsar Convention ☐ Bald cypress – water tupelo swamp ☐ Pitcher plant bog ☐ Spring				-
Additional points for limited habitats = overall TXRAM wetland score x 0.05 if: ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM wetland score and additional points = **total overall TXRAM wetland score**				60

Representative Site Photograph:

Facing north at W-1-1 (emergent wetland W-1) around OCP-1.

TXRAM WETLAND DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Wetland ID/Name: W-1 WAA No.: W-1-1 Size: 0.15 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Wetland Type: Lacustrine Fringe Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☐ Yes ☐ No

Notes: Emergent fringe W-1 around OCP-1.

LANDSCAPE

Aquatic Context – Confirm in office review. See figures in section 2.3.1.1 for examples.

Notes on any barriers or alterations that prevent connection: None.

Aquatic resources within 1,000 feet of WAA to which wetland connects (including number for other considerations): 9 **Score:** 4

Buffer – Evaluate to 500 feet from WAA boundary. Confirm in office review. See figures in section 2.3.1.2 for examples.

Buffer Type/Description	*Score (See Narratives)*	*Percentage*	*Subtotal*
1. Residential	0	15	0
2. Emergent Wetland/Forested Upland	3	20	0.6
3. Forested Wetland	4	10	0.4
4. Maintained ROW	1	15	0.15
5. Golf Course	0.5	40	0.2

Score: 1.35

HYDROLOGY

Water Source – Degree of natural or unnatural/artificial influence. Confirm in office review for watershed.

Natural: ☐ Precipitation ☐ Groundwater ☐ Overbank flow/stream discharge ☐ Overland flow ☐ Beaver activity ☐ Other: _____

Unnatural/Manipulated: ☒ Impoundment ☐ Outfall ☐ Irrigation/pumping ☐ Other artificial influence or control: _____

Watershed: ☐ Development ☐ Irrigated agriculture ☐ Wastewater treatment plant ☐ Impoundment ☐ Other: _____

Degree of artificial influence/control: ☐ Complete ☒ High ☐ Low ☐ None

Wetland created/restored/enhanced: ☐ Sustainable/replicates natural ☐ Controlled **Score:** 2

Hydroperiod – Variability and recent alteration of the duration, frequency, and magnitude of inundation/saturation.

Evaluate the hydroperiod including natural variation: Seasonal low variability

Direct evidence of alteration: Natural: ☐ Log-jam ☐ Channel migration ☐ Other: _____

Human: ☐ Diversions ☐ Ditches ☐ Levees ☒ Impoundments ☐ Other: _____

Riverine only: ☐ Recent channel in-stability/dis-equilibrium (☐ Degradation or ☐ Aggradation)

Indirect evidence of alteration: ☐ Wetland plant stress: _____ ☐ Plant morphology: _____

☐ Upland species encroachment: _____ ☐ Plant Community: _____ ☐ Soil: _____

Change/Alteration of hydroperiod: ☐ None ☐ Due to natural events ☐ Human influences (☐ Slight or ☐ High)

Degree hydroperiod of wetland created/restored/enhanced replicates natural patterns: _____

Lacustrine fringe on human impoundment: ☐ High variability ☒ Low variability ☐ Recent changes to hydroperiod **Score:** 2

Hydrologic Flow – Movement of water to or from surrounding area and openness to water moving through the WAA.

Flow: ☒ Inlets: 1 ☒ Outlets: 1 ☐ Signs of water movement to or from WAA: _____

Restrictions: ☐ Levee ☐ Berm/dam ☐ Diversion ☐ Other: _____

High flowthrough: ☐ Floodplain ☐ Drift deposits ☐ Drainage patterns ☐ Sediment deposits ☐ Other: _____

Low flowthrough: ☐ High landscape position ☐ Stagnant water ☒ Closed contours ☐ Other: _____ **Score:** 2

SOILS

Organic Matter – Use data and indicators from wetland determination data form(s) based on applicable regional supplement.

☐ High (organic soil or indicator A1, A2, A3)

☐ Moderate (indicator A9, S1, F1 in AW or A9, S1, S2, F1 in GP or A6, A7, A9, S7, F13 in AGCP)

☒ Low (indicated by thin organic or organic-mineral layer) ☐ None observable in surface layer as described herein **Score:** 2

Sedimentation – Deposition of excess sediment due to human actions. Confirm in office review for landscape.

Landscape with stress that could lead to excess sedimentation? ☐ Yes ☒ No Landscape position: ☐ High ☐ Low

Magnitude of recent runoff/flooding events: ☐ High ☐ Low Percent of WAA with excess sediment deposition: 0

☐ Sand deposits: 0 % of area, _____ average thickness ☐ Silt/Clay deposits: 0 % of area, _____ average thickness

Lacustrine fringe only: ☐ Upper end of impoundment ☐ Degrades wetland ☐ Contributes to wetland processes **Score:** 4

Soil Modification – Physical changes by human activities. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Farming R/P ☐ Logging R/P ☐ Mining R/P ☐ Filling R/P

☐ Grading R/P ☐ Dredging R/P ☐ Off-road vehicles R/P ☐ Other R/P: _____

Percent of WAA with recent soil modification: 0 % Degree of modification: ☐ High ☐ Low

Indicators of past modification: ☐ High bulk density ☐ Low organic matter ☐ Lack of soil structure ☐ Lack of horizons ☐ Hardpan

☐ Dramatic change in texture/color ☐ Heterogeneous mixture ☐ Other: _____

Indicators of recovery: ☐ Organic matter ☐ Structure ☐ Horizons ☐ Mottling ☐ Hydric soil ☐ Other: _____

Percent of WAA with past modification: 100 % Recovery: ☒ Complete ☐ High ☐ Moderate ☐ Low ☐ None **Score:** 4

PHYSICAL STRUCTURE

Topographic Complexity – See figures in section 2.3.4.1. Record % micro-topography and % WAA for each elevation gradient.

Elevation gradients (EG): 2 Evidence: ☒ Plant assemblages ☐ Level of saturation/inundation ☐ Path of water flow ☐ Slope

Micro-topography: 0 % of WAA (By EG: EG 1= 50% WAA, 0% MT; EG 2=50% WAA, 0% MT)

Types: ☐ Depressions ☐ Pools ☐ Burrows ☐ Swales ☐ Wind-thrown tree holes ☐ Mounds ☐ Gilgai ☐ Islands

☐ Variable shorelines ☐ Partially buried debris ☐ Debris jams ☐ Plant hummocks/roots ☐ Other:_____ **Score:** 2

Edge Complexity – Confirm in office review. See figure in section 2.3.4.2 to evaluate wetland boundary.

WAA: ☒ In seasonal floodplain ☐ Contiguous to other wetland ☐ Edge vertical structure variation: _____

Horizontal variability: ☐ High ☐ Moderate ☐ Low ☒ None **Score:** 3

Physical Habitat Richness – See definitions and table in section 2.3.4.3 for habitat types applicable to each wetland type.

Label of habitat types qualifying as present in WAA: K Total: 1 **Score:** 1

BIOTIC STRUCTURE

Plant Strata – Use applicable wetland delineation regional supplement and data from determination data form(s).

Number of plant strata: ☐ ≥ 4 ☐ 3 ☐ 2 ☒ 1 ☐ 0 **Score:** 1

Species Richness – Use data from determination data form(s) to count species with 5% or more relative cover in a stratum.

Number of species across all strata and determination data forms (not counting a species more than once): 4 **Score:** 2

Non-Native/Invasive Infestation – Use data from determination data form(s). See tables in section 2.3.5.3 for examples.

Average total relative cover of non-native/invasive species across all strata and determination data forms: 4.55 % **Score:** 3

Interspersion – Confirm in office review. Use figure in section 2.3.5.4 to determine the degree of interspersion of plant zones.

Degree of horizontal/plan view interspersion: ☐ High ☐ Moderate ☒ Low ☐ None ☐ Bottomland hardwood forest **Score:** 2

Strata Overlap – Use strata defined in plant strata metric using applicable regional supplement. See figures in section 2.3.5.5.

High overlap (≥ 3 strata overlapping): 0 % of WAA Moderate overlap (2 strata overlapping): 0 % of WAA

Herbaceous species/dense litter overlap (only in portion where there are no other strata overlapping): 10 % of WAA

Total percentage of WAA with some form of overlap (if more than one present): 10 % of WAA **Score:** 1

Herbaceous Cover – Estimate for entire WAA. In South Central Plains or East Central Texas Plains: ☐ Bottomland hardwood forest

Total cover of emergent and submergent plants: ☒ > 75% ☐ 51–75% ☐ 26–50% ☐ ≤ 25% **Score:** 4

Vegetation Alterations – Unnatural (human-caused) stressors. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Disking R/P ☐ Mowing/shredding R/P ☐ Logging R/P

☐ Cutting R/P ☐ Trampling R/P ☐ Herbicide treatment R/P ☐ Herbivory R/P ☐ Disease R/P ☐ Chemical spill R/P

☐ Pollution R/P ☐ Feral hog rooting R/P ☐ Woody debris removal R/P ☐ Other R/P: _____

Percent of WAA with recent vegetation alteration: 0 % Severity of alteration: ☐ High ☐ Low

Percent of WAA with past vegetation alteration: 100 % Degree of recovery: ☒ Complete ☐ High ☐ Moderate ☐ Low

☐ Alteration to improve wetland (degree of natural community recovery):_____ **Score:** 4

TXRAM WETLAND FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Wetland ID/Name: W-2 WAA No.: W-2-1 Size: 0.06 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Wetland Type: Riverine Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☐ Yes ☐ No

Notes: Emergent, riverine wetland W-2.

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Landscape	Aquatic Context	4	Sum of metric scores / 8 x 15	10.4
	Buffer	1.55		
Hydrology	Water source	3	Sum of metric scores / 12 x 30	25.0
	Hydroperiod	3		
	Hydrologic flow	4		
Soils	Organic matter	2	Sum of metric scores / 12 x 15	12.5
	Sedimentation	4		
	Soil modification	4		
Physical Structure	Topographic complexity	1	Sum of metric scores / 12 x 20	8.3
	Edge complexity	3		
	Physical habitat richness	1		
Biotic Structure	Plant strata	1	Sum of metric scores / 28 x 20	10.7
	Species richness	1		
	Non-native/invasive infestation	4		
	Interspersion	1		
	Strata overlap	0		
	Herbaceous cover	4		
	Vegetation alterations	4		
Sum of core element scores = overall TXRAM wetland score				66.9
Additional points for unique resources = overall TXRAM wetland score x 0.10 if: ☐ Area of Caddo Lake designated a "Wetland of International Importance" under the Ramsar Convention ☐ Bald cypress – water tupelo swamp ☐ Pitcher plant bog ☐ Spring				-
Additional points for limited habitats = overall TXRAM wetland score x 0.05 if: ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM wetland score and additional points = **total overall TXRAM wetland score**				67

Representative Site Photograph:

Typical view of W-2-1 (emergent wetland W-2). Note that the wetland is dominated by smartweed.

TXRAM WETLAND DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Wetland ID/Name: W-2 WAA No.: W-2-1 Size: 0.06 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Wetland Type: Riverine Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☒ Yes ☐ No

Notes: Emergent, riverine wetland W-2.

LANDSCAPE

Aquatic Context – Confirm in office review. See figures in section 2.3.1.1 for examples.

Notes on any barriers or alterations that prevent connection: None.

Aquatic resources within 1,000 feet of WAA to which wetland connects (including number for other considerations): 10 **Score:** 4

Buffer – Evaluate to 500 feet from WAA boundary. Confirm in office review. See figures in section 2.3.1.2 for examples.

Buffer Type/Description	*Score (See Narratives)*	*Percentage*	*Subtotal*
1. Residential	0	25	0
2. Emergent Wetland/Forested Upland	3	30	0.9
3. Forested Wetland	4	10	0.4
4. Maintained ROW	1	15	0.15
5. Golf Course	0.5	20	0.1

Score: 1.55

HYDROLOGY

Water Source – Degree of natural or unnatural/artificial influence. Confirm in office review for watershed.

Natural: ☒ Precipitation ☐ Groundwater ☒ Overbank flow/stream discharge ☒ Overland flow ☐ Beaver activity ☐ Other: _____

Unnatural/Manipulated: ☐ Impoundment ☐ Outfall ☒ Irrigation/pumping ☐ Other artificial influence or control: _____

Watershed: ☐ Development ☐ Irrigated agriculture ☐ Wastewater treatment plant ☐ Impoundment ☐ Other: _____

Degree of artificial influence/control: ☐ Complete ☐ High ☒ Low ☐ None

Wetland created/restored/enhanced: ☐ Sustainable/replicates natural ☐ Controlled **Score:** 3

Hydroperiod – Variability and recent alteration of the duration, frequency, and magnitude of inundation/saturation.

Evaluate the hydroperiod including natural variation: Seasonal High Variation

Direct evidence of alteration: Natural: ☐ Log-jam ☐ Channel migration ☐ Other: _____

Human: ☐ Diversions ☐ Ditches ☐ Levees ☐ Impoundments ☐ Other: _____

Riverine only: ☐ Recent channel in-stability/dis-equilibrium (☐ Degradation or ☐ Aggradation)

Indirect evidence of alteration: ☐ Wetland plant stress: _____ ☐ Plant morphology: _____

☐ Upland species encroachment: _____ ☐ Plant Community: _____ ☐ Soil: _____

Change/Alteration of hydroperiod: ☐ None ☐ Due to natural events ☒ Human influences (☒ Slight or ☐ High)

Degree hydroperiod of wetland created/restored/enhanced replicates natural patterns: _____

Lacustrine fringe on human impoundment: ☐ High variability ☐ Low variability ☐ Recent changes to hydroperiod **Score:** 3

Hydrologic Flow – Movement of water to or from surrounding area and openness to water moving through the WAA.

Flow: ☒ Inlets: 1 ☒ Outlets: 1 ☐ Signs of water movement to or from WAA: _____

Restrictions: ☐ Levee ☐ Berm/dam ☐ Diversion ☐ Other: _____

High flowthrough: ☒ Floodplain ☐ Drift deposits ☐ Drainage patterns ☐ Sediment deposits ☐ Other: _____

Low flowthrough: ☐ High landscape position ☐ Stagnant water ☐ Closed contours ☐ Other: _____ **Score:** 4

SOILS

Organic Matter – Use data and indicators from wetland determination data form(s) based on applicable regional supplement.

☐ High (organic soil or indicator A1, A2, A3)

☐ Moderate (indicator A9, S1, F1 in AW or A9, S1, S2, F1 in GP or A6, A7, A9, S7, F13 in AGCP)

☒ Low (indicated by thin organic or organic-mineral layer) ☐ None observable in surface layer as described herein **Score:** 2

Sedimentation – Deposition of excess sediment due to human actions. Confirm in office review for landscape.

Landscape with stress that could lead to excess sedimentation? ☐ Yes ☒ No Landscape position: ☐ High ☐ Low

Magnitude of recent runoff/flooding events: ☐ High ☐ Low Percent of WAA with excess sediment deposition: 0

☐ Sand deposits: 0 % of area, _____ average thickness ☐ Silt/Clay deposits: 0 % of area, _____ average thickness

Lacustrine fringe only: ☐ Upper end of impoundment ☐ Degrades wetland ☐ Contributes to wetland processes **Score:** 4

Soil Modification – Physical changes by human activities. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Farming R/P ☐ Logging R/P ☐ Mining R/P ☐ Filling R/P

☐ Grading R/P ☐ Dredging R/P ☐ Off-road vehicles R/P ☐ Other R/P: _____

Percent of WAA with recent soil modification: 0 % Degree of modification: ☐ High ☐ Low

Indicators of past modification: ☐ High bulk density ☐ Low organic matter ☐ Lack of soil structure ☐ Lack of horizons ☐ Hardpan

☐ Dramatic change in texture/color ☐ Heterogeneous mixture ☐ Other: _____

Indicators of recovery: ☐ Organic matter ☐ Structure ☐ Horizons ☐ Mottling ☐ Hydric soil ☐ Other: _____

Percent of WAA with past modification: 0 % Recovery: ☐ Complete ☐ High ☐ Moderate ☐ Low ☐ None **Score:** 4

PHYSICAL STRUCTURE

Topographic Complexity – See figures in section 2.3.4.1. Record % micro-topography and % WAA for each elevation gradient.

Elevation gradients (EG): 1 Evidence: ☒ Plant assemblages ☐ Level of saturation/inundation ☐ Path of water flow ☐ Slope

Micro-topography: 0 % of WAA (By EG: EG 1= 100% WAA, 0% MT)

Types: ☐ Depressions ☐ Pools ☐ Burrows ☐ Swales ☐ Wind-thrown tree holes ☐ Mounds ☐ Gilgai ☐ Islands

☐ Variable shorelines ☐ Partially buried debris ☐ Debris jams ☐ Plant hummocks/roots ☐ Other:_____ **Score:** 1

Edge Complexity – Confirm in office review. See figure in section 2.3.4.2 to evaluate wetland boundary.

WAA: ☒ In seasonal floodplain ☐ Contiguous to other wetland ☐ Edge vertical structure variation: _____

Horizontal variability: ☐ High ☐ Moderate ☐ Low ☒ None **Score:** 3

Physical Habitat Richness – See definitions and table in section 2.3.4.3 for habitat types applicable to each wetland type.

Label of habitat types qualifying as present in WAA: B and K Total: 2 **Score:** 1

BIOTIC STRUCTURE

Plant Strata – Use applicable wetland delineation regional supplement and data from determination data form(s).

Number of plant strata: ☐ ≥ 4 ☐ 3 ☐ 2 ☒ 1 ☐ 0 **Score:** 1

Species Richness – Use data from determination data form(s) to count species with 5% or more relative cover in a stratum.

Number of species across all strata and determination data forms (not counting a species more than once): 3 **Score:** 1

Non-Native/Invasive Infestation – Use data from determination data form(s). See tables in section 2.3.5.3 for examples.

Average total relative cover of non-native/invasive species across all strata and determination data forms: 0 % **Score:** 4

Interspersion – Confirm in office review. Use figure in section 2.3.5.4 to determine the degree of interspersion of plant zones.

Degree of horizontal/plan view interspersion: ☐ High ☐ Moderate ☐ Low ☒ None ☐ Bottomland hardwood forest **Score:** 1

Strata Overlap – Use strata defined in plant strata metric using applicable regional supplement. See figures in section 2.3.5.5.

High overlap (≥ 3 strata overlapping): 0 % of WAA Moderate overlap (2 strata overlapping): 0 % of WAA

Herbaceous species/dense litter overlap (only in portion where there are no other strata overlapping): 0 % of WAA

Total percentage of WAA with some form of overlap (if more than one present): 0 % of WAA **Score:** 0

Herbaceous Cover – Estimate for entire WAA. In South Central Plains or East Central Texas Plains: ☐ Bottomland hardwood forest

Total cover of emergent and submergent plants: ☒ > 75% ☐ 51–75% ☐ 26–50% ☐ ≤ 25% **Score:** 4

Vegetation Alterations – Unnatural (human-caused) stressors. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Disking R/P ☐ Mowing/shredding R/P ☐ Logging R/P

☐ Cutting R/P ☐ Trampling R/P ☐ Herbicide treatment R/P ☐ Herbivory R/P ☐ Disease R/P ☐ Chemical spill R/P

☐ Pollution R/P ☐ Feral hog rooting R/P ☐ Woody debris removal R/P ☐ Other R/P: _____

Percent of WAA with recent vegetation alteration: 0 % Severity of alteration: ☐ High ☐ Low

Percent of WAA with past vegetation alteration: 100 % Degree of recovery: ☒ Complete ☐ High ☐ Moderate ☐ Low

☐ Alteration to improve wetland (degree of natural community recovery):_____ **Score:** 4

TXRAM WETLAND FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Wetland ID/Name: W-7 WAA No.: W-3-1 Size: 0.17 Date: 9/19/18 Evaluator(s): Mike Keenan & Brandon Tate

Wetland Type: Depressional Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☒ Yes ☐ No

Notes: WAA contains W-7. Wetland is located within a maintained transmission-line ROW, adjacent to a golf course.

Core Element	*Metric*	*Metric Score*	*Core Element Score Calculation*	*Core Element Score*
Landscape	Aquatic Context	4	Sum of metric scores / 8 x 15	10.3
	Buffer	1.475		
Hydrology	Water source	2	Sum of metric scores / 12 x 30	20.0
	Hydroperiod	3		
	Hydrologic flow	3		
Soils	Organic matter	2	Sum of metric scores / 12 x 15	12.5
	Sedimentation	4		
	Soil modification	4		
Physical Structure	Topographic complexity	2	Sum of metric scores / 12 x 20	11.7
	Edge complexity	4		
	Physical habitat richness	1		
Biotic Structure	Plant strata	2	Sum of metric scores / 28 x 20	9.3
	Species richness	2		
	Non-native/invasive infestation	1		
	Interspersion	1		
	Strata overlap	1		
	Herbaceous cover	4		
	Vegetation alterations	2		
Sum of core element scores = overall TXRAM wetland score				63.8
Additional points for unique resources = overall TXRAM wetland score x 0.10 if: ☐ Area of Caddo Lake designated a "Wetland of International Importance" under the Ramsar Convention ☐ Bald cypress – water tupelo swamp ☐ Pitcher plant bog ☐ Spring				
Additional points for limited habitats = overall TXRAM wetland score x 0.05 if: ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				
Sum of overall TXRAM wetland score and additional points = **total overall TXRAM wetland score**				64

Representative Site Photograph:

W-3-1 consists of thick herbaceous vegetation growing in a maintained ROW.

TXRAM WETLAND DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Wetland ID/Name: W-7 WAA No.: W-3-1 Size: 0.17 Date: 9/19/18 Evaluator(s): Mike Keenan & Brandon Tate

Wetland Type: Depressional Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☐ Yes ☐ No

Notes: WAA contains W-7. Wetland is located within a maintained transmission-line ROW, adjacent to a golf course.

LANDSCAPE

Aquatic Context – Confirm in office review. See figures in section 2.3.1.1 for examples.

Notes on any barriers or alterations that prevent connection: Berm to east prevents direct flow of water into OCP-1 and W-3, but water is connected to OCP-3 and W-10 via a swale.

Aquatic resources within 1,000 feet of WAA to which wetland connects (including number for other considerations): 12 **Score:** 4

Buffer – Evaluate to 500 feet from WAA boundary. Confirm in office review. See figures in section 2.3.1.2 for examples.

Buffer Type/Description	*Score (See Narratives)*	*Percentage*	*Subtotal*
1. Emergent Wetland/Forested Upland	3	20	0.6
2. Forested Wetland	4	10	0.4
3. Residential/Concrete Pad Site	0	5	0
4. Golf Course	0.5	35	0.175
5. Maintained ROW	1	30	0.3

Score: 1.475

HYDROLOGY

Water Source – Degree of natural or unnatural/artificial influence. Confirm in office review for watershed.

Natural: ☒ Precipitation ☒ Groundwater ☐ Overbank flow/stream discharge ☒ Overland flow ☐ Beaver activity ☐ Other: _____

Unnatural/Manipulated: ☐ Impoundment ☐ Outfall ☐ Irrigation/pumping ☐ Other artificial influence or control: _____

Watershed: ☐ Development ☒ Irrigated agriculture ☐ Wastewater treatment plant ☐ Impoundment ☐ Other: _____

Degree of artificial influence/control: ☐ Complete ☒ High ☐ Low ☐ None

Wetland created/restored/enhanced: ☐ Sustainable/replicates natural ☐ Controlled **Score:** 2

Hydroperiod – Variability and recent alteration of the duration, frequency, and magnitude of inundation/saturation.

Evaluate the hydroperiod including natural variation: Seasonal High Variation

Direct evidence of alteration: Natural: ☐ Log-jam ☐ Channel migration ☐ Other: _____

Human: ☐ Diversions ☐ Ditches ☐ Levees ☒ Impoundments ☐ Other: _____

Riverine only: ☐ Recent channel in-stability/dis-equilibrium (☐ Degradation or ☐ Aggradation)

Indirect evidence of alteration: ☐ Wetland plant stress: _____ ☐ Plant morphology: _____

☐ Upland species encroachment: _____ ☐ Plant Community: _____ ☐ Soil: _____

Change/Alteration of hydroperiod: ☐ None ☐ Due to natural events ☒ Human influences (☒ Slight or ☐ High)

Degree hydroperiod of wetland created/restored/enhanced replicates natural patterns: _____

Lacustrine fringe on human impoundment: ☐ High variability ☐ Low variability ☐ Recent changes to hydroperiod **Score:** 3

Hydrologic Flow – Movement of water to or from surrounding area and openness to water moving through the WAA.

Flow: ☒ Inlets: 2 ☒ Outlets: 1 ☐ Signs of water movement to or from WAA: Storm drain out

Restrictions: ☐ Levee ☐ Berm/dam ☐ Diversion ☐ Other: _____

High flowthrough: ☒ Floodplain ☐ Drift deposits ☐ Drainage patterns ☐ Sediment deposits ☐ Other: _____

Low flowthrough: ☐ High landscape position ☐ Stagnant water ☐ Closed contours ☐ Other: _____ **Score:** 3

SOILS

Organic Matter – Use data and indicators from wetland determination data form(s) based on applicable regional supplement.

☐ High (organic soil or indicator A1, A2, A3)

☐ Moderate (indicator A9, S1, F1 in AW or A9, S1, S2, F1 in GP or A6, A7, A9, S7, F13 in AGCP)

☒ Low (indicated by thin organic or organic-mineral layer) ☐ None observable in surface layer as described herein **Score:** 2

Sedimentation – Deposition of excess sediment due to human actions. Confirm in office review for landscape.

Landscape with stress that could lead to excess sedimentation? ☐ Yes ☒ No Landscape position: ☐ High ☐ Low

Magnitude of recent runoff/flooding events: ☐ High ☐ Low Percent of WAA with excess sediment deposition: 0

☐ Sand deposits: 0 % of area, _____ average thickness ☐ Silt/Clay deposits: 0 % of area, _____ average thickness

Lacustrine fringe only: ☐ Upper end of impoundment ☐ Degrades wetland ☐ Contributes to wetland processes **Score:** 4

Soil Modification – Physical changes by human activities. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Farming R/P ☐ Logging R/P ☐ Mining R/P ☐ Filling R/P

☐ Grading R/P ☐ Dredging R/P ☐ Off-road vehicles R/P ☐ Other R/P: _____

Percent of WAA with recent soil modification: 0 % Degree of modification: ☐ High ☐ Low

Indicators of past modification: ☐ High bulk density ☐ Low organic matter ☐ Lack of soil structure ☐ Lack of horizons ☐ Hardpan

☐ Dramatic change in texture/color ☐ Heterogeneous mixture ☐ Other: _____

Indicators of recovery: ☐ Organic matter ☐ Structure ☐ Horizons ☐ Mottling ☐ Hydric soil ☐ Other: _____

Percent of WAA with past modification: 0 % Recovery: ☐ Complete ☐ High ☐ Moderate ☐ Low ☐ None **Score:** 4

PHYSICAL STRUCTURE

Topographic Complexity – See figures in section 2.3.4.1. Record % micro-topography and % WAA for each elevation gradient.

Elevation gradients (EG): 2 Evidence: ☒ Plant assemblages ☐ Level of saturation/inundation ☐ Path of water flow ☐ Slope

Micro-topography: 0 % of WAA (By EG: EG 1= 50% WAA, 0% MT; EG 2=50% WAA, 0% MT)

Types: ☐ Depressions ☐ Pools ☐ Burrows ☐ Swales ☐ Wind-thrown tree holes ☐ Mounds ☐ Gilgai ☐ Islands

☐ Variable shorelines ☐ Partially buried debris ☐ Debris jams ☐ Plant hummocks/roots ☐ Other:_____ **Score:** 2

Edge Complexity – Confirm in office review. See figure in section 2.3.4.2 to evaluate wetland boundary.

WAA: ☒ In seasonal floodplain ☐ Contiguous to other wetland ☐ Edge vertical structure variation: _____

Horizontal variability: ☐ High ☒ Moderate ☐ Low ☐ None **Score:** 4

Physical Habitat Richness – See definitions and table in section 2.3.4.3 for habitat types applicable to each wetland type.

Label of habitat types qualifying as present in WAA: C and K Total: 2 **Score:** 1

BIOTIC STRUCTURE

Plant Strata – Use applicable wetland delineation regional supplement and data from determination data form(s).

Number of plant strata: ☐ ≥ 4 ☐ 3 ☒ 2 ☐ 1 ☐ 0 **Score:** 2

Species Richness – Use data from determination data form(s) to count species with 5% or more relative cover in a stratum.

Number of species across all strata and determination data forms (not counting a species more than once): 3 **Score:** 2

Non-Native/Invasive Infestation – Use data from determination data form(s). See tables in section 2.3.5.3 for examples.

Average total relative cover of non-native/invasive species across all strata and determination data forms: 41 % **Score:** 1

Interspersion – Confirm in office review. Use figure in section 2.3.5.4 to determine the degree of interspersion of plant zones.

Degree of horizontal/plan view interspersion: ☐ High ☐ Moderate ☐ Low ☒ None ☐ Bottomland hardwood forest **Score:** 1

Strata Overlap – Use strata defined in plant strata metric using applicable regional supplement. See figures in section 2.3.5.5.

High overlap (≥ 3 strata overlapping): 0 % of WAA Moderate overlap (2 strata overlapping): 5 % of WAA

Herbaceous species/dense litter overlap (only in portion where there are no other strata overlapping): 15 % of WAA

Total percentage of WAA with some form of overlap (if more than one present): 20 % of WAA **Score:** 1

Herbaceous Cover – Estimate for entire WAA. In South Central Plains or East Central Texas Plains: ☐ Bottomland hardwood forest

Total cover of emergent and submergent plants: ☒ > 75% ☐ 51–75% ☐ 26–50% ☐ ≤ 25% **Score:** 4

Vegetation Alterations – Unnatural (human-caused) stressors. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Disking R/P ☒ Mowing/shredding R/P ☐ Logging R/P

☐ Cutting R/P ☐ Trampling R/P ☐ Herbicide treatment R/P ☐ Herbivory R/P ☐ Disease R/P ☐ Chemical spill R/P

☐ Pollution R/P ☐ Feral hog rooting R/P ☐ Woody debris removal R/P ☒ Other R/P: Transmission line ROW

Percent of WAA with recent vegetation alteration: 0 % Severity of alteration: ☐ High ☐ Low

Percent of WAA with past vegetation alteration: 100 % Degree of recovery: ☐ Complete ☐ High ☒ Moderate ☐ Low

☐ Alteration to improve wetland (degree of natural community recovery):_____ **Score:** 2

TXRAM WETLAND FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Wetland ID/Name: W-3, W-4, W-5, W-6 WAA No.: W-4-1 Size: 1.14 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Wetland Type: Depressional Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☒ Yes ☐ No

Notes: WAA includes emergent wetland W-3 and forested wetlands W-4, W-5, and W-6.

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Landscape	Aquatic Context	4	Sum of metric scores / 8 x 15	9.6
	Buffer	1.13		
Hydrology	Water source	2	Sum of metric scores / 12 x 30	20.0
	Hydroperiod	3		
	Hydrologic flow	3		
Soils	Organic matter	2	Sum of metric scores / 12 x 15	12.5
	Sedimentation	4		
	Soil modification	4		
Physical Structure	Topographic complexity	4	Sum of metric scores / 12 x 20	13.3
	Edge complexity	3		
	Physical habitat richness	1		
Biotic Structure	Plant strata	2	Sum of metric scores / 28 x 20	12.1
	Species richness	4		
	Non-native/invasive infestation	3		
	Interspersion	2		
	Strata overlap	1		
	Herbaceous cover	1		
	Vegetation alterations	4		
Sum of core element scores = overall TXRAM wetland score				67.5
Additional points for unique resources = overall TXRAM wetland score x 0.10 if: ☐ Area of Caddo Lake designated a "Wetland of International Importance" under the Ramsar Convention ☐ Bald cypress – water tupelo swamp ☐ Pitcher plant bog ☐ Spring				-
Additional points for limited habitats = overall TXRAM wetland score x 0.05 if: ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM wetland score and additional points = **total overall TXRAM wetland score**				68

Representative Site Photograph:

Facing northwest in W-4-1. Note the lack of herbaceous vegetation.

TXRAM WETLAND DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Wetland ID/Name: W-3, W-4, W-5, W-6 WAA No.: W-4-1 Size: 1.14 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Wetland Type: Depressional Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☐ Yes ☐ No

Notes: WAA includes emergent wetland W-3 and forested wetlands W-4, W-5, and W-6.

LANDSCAPE

Aquatic Context – Confirm in office review. See figures in section 2.3.1.1 for examples.

Notes on any barriers or alterations that prevent connection: Roads, residential areas, and berms

Aquatic resources within 1,000 feet of WAA to which wetland connects (including number for other considerations): 11 **Score:** 4

Buffer – Evaluate to 500 feet from WAA boundary. Confirm in office review. See figures in section 2.3.1.2 for examples.

Buffer Type/Description	*Score (See Narratives)*	*Percentage*	*Subtotal*
1. PEM Wetland	3	10	0.3
2. Power line ROW	1	20	0.2
3. Residential Housing	0	40	0
4. Forested Upland	3	20	0.6
5. Golf Course	0.5	5	0.025

Score: 1.13

HYDROLOGY

Water Source – Degree of natural or unnatural/artificial influence. Confirm in office review for watershed.

Natural: ☒ Precipitation ☐ Groundwater ☒ Overbank flow/stream discharge ☐ Overland flow ☐ Beaver activity ☐ Other: _____

Unnatural/Manipulated: ☒ Impoundment ☐ Outfall ☐ Irrigation/pumping ☐ Other artificial influence or control: _____

Watershed: ☒ Development ☐ Irrigated agriculture ☐ Wastewater treatment plant ☐ Impoundment ☐ Other: _____

Degree of artificial influence/control: ☐ Complete ☒ High ☐ Low ☐ None

Wetland created/restored/enhanced: ☐ Sustainable/replicates natural ☐ Controlled **Score:** 2

Hydroperiod – Variability and recent alteration of the duration, frequency, and magnitude of inundation/saturation.

Evaluate the hydroperiod including natural variation: Seasonal inundation with high variation

Direct evidence of alteration: Natural: ☐ Log-jam ☐ Channel migration ☐ Other: _____

Human: ☐ Diversions ☐ Ditches ☐ Levees ☐ Impoundments ☐ Other: _____

Riverine only: ☐ Recent channel in-stability/dis-equilibrium (☐ Degradation or ☐ Aggradation)

Indirect evidence of alteration: ☐ Wetland plant stress: _____ ☐ Plant morphology: _____

☐ Upland species encroachment: _____ ☐ Plant Community: _____ ☐ Soil: _____

Change/Alteration of hydroperiod: ☒ None ☐ Due to natural events ☐ Human influences (☐ Slight or ☐ High)

Degree hydroperiod of wetland created/restored/enhanced replicates natural patterns: _____

Lacustrine fringe on human impoundment: ☐ High variability ☐ Low variability ☐ Recent changes to hydroperiod **Score:** 3

Hydrologic Flow – Movement of water to or from surrounding area and openness to water moving through the WAA.

Flow: ☒ Inlets: 1 ☒ Outlets: 1 ☒ Signs of water movement to or from WAA: Steam outlets

Restrictions: ☐ Levee ☒ Berm/dam ☐ Diversion ☐ Other: _____

High flowthrough: ☐ Floodplain ☒ Drift deposits ☐ Drainage patterns ☐ Sediment deposits ☐ Other: _____

Low flowthrough: ☐ High landscape position ☐ Stagnant water ☐ Closed contours ☐ Other: _____ **Score:** 3

SOILS

Organic Matter – Use data and indicators from wetland determination data form(s) based on applicable regional supplement.

☐ High (organic soil or indicator A1, A2, A3)

☐ Moderate (indicator A9, S1, F1 in AW or A9, S1, S2, F1 in GP or A6, A7, A9, S7, F13 in AGCP)

☒ Low (indicated by thin organic or organic-mineral layer) ☐ None observable in surface layer as described herein **Score:** 2

Sedimentation – Deposition of excess sediment due to human actions. Confirm in office review for landscape.

Landscape with stress that could lead to excess sedimentation? ☐ Yes ☒ No Landscape position: ☐ High ☐ Low

Magnitude of recent runoff/flooding events: ☐ High ☐ Low Percent of WAA with excess sediment deposition: 0

☐ Sand deposits: 0 % of area, _____ average thickness ☐ Silt/Clay deposits: 0 % of area, _____ average thickness

Lacustrine fringe only: ☐ Upper end of impoundment ☐ Degrades wetland ☐ Contributes to wetland processes **Score:** 4

Soil Modification – Physical changes by human activities. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Farming R/P ☐ Logging R/P ☐ Mining R/P ☐ Filling R/P

☐ Grading R/P ☐ Dredging R/P ☐ Off-road vehicles R/P ☐ Other R/P: _____

Percent of WAA with recent soil modification: 0 % Degree of modification: ☐ High ☐ Low

Indicators of past modification: ☐ High bulk density ☐ Low organic matter ☐ Lack of soil structure ☐ Lack of horizons ☐ Hardpan

☐ Dramatic change in texture/color ☐ Heterogeneous mixture ☐ Other: _____

Indicators of recovery: ☐ Organic matter ☐ Structure ☐ Horizons ☐ Mottling ☐ Hydric soil ☐ Other: _____

Percent of WAA with past modification: 0 % Recovery: ☐ Complete ☐ High ☐ Moderate ☐ Low ☐ None **Score:** 4

PHYSICAL STRUCTURE

Topographic Complexity – See figures in section 2.3.4.1. Record % micro-topography and % WAA for each elevation gradient.

Elevation gradients (EG): 2 Evidence: ☒ Plant assemblages ☒ Level of saturation/inundation ☐ Path of water flow ☐ Slope

Micro-topography: 60 % of WAA (By EG: EG 1= 0% MT, 40% WAA, EG 2= 100% MT, 60% WAA)

Types: ☒ Depressions ☐ Pools ☐ Burrows ☐ Swales ☐ Wind-thrown tree holes ☒ Mounds ☐ Gilgai ☐ Islands

☐ Variable shorelines ☐ Partially buried debris ☐ Debris jams ☐ Plant hummocks/roots ☐ Other:_____ **Score:** 4

Edge Complexity – Confirm in office review. See figure in section 2.3.4.2 to evaluate wetland boundary.

WAA: ☒ In seasonal floodplain ☒ Contiguous to other wetland ☐ Edge vertical structure variation: _____

Horizontal variability: ☐ High ☐ Moderate ☒ Low ☐ None **Score:** 3

Physical Habitat Richness – See definitions and table in section 2.3.4.3 for habitat types applicable to each wetland type.

Label of habitat types qualifying as present in WAA: MNOR Total: 4 **Score:** 1

BIOTIC STRUCTURE

Plant Strata – Use applicable wetland delineation regional supplement and data from determination data form(s).

Number of plant strata: ☐ ≥ 4 ☐ 3 ☒ 2 ☐ 1 ☐ 0 **Score:** 2

Species Richness – Use data from determination data form(s) to count species with 5% or more relative cover in a stratum.

Number of species across all strata and determination data forms (not counting a species more than once): 9 **Score:** 4

Non-Native/Invasive Infestation – Use data from determination data form(s). See tables in section 2.3.5.3 for examples.

Average total relative cover of non-native/invasive species across all strata and determination data forms: 2.6 % **Score:** 3

Interspersion – Confirm in office review. Use figure in section 2.3.5.4 to determine the degree of interspersion of plant zones.

Degree of horizontal/plan view interspersion: ☐ High ☐ Moderate ☒ Low ☐ None ☐ Bottomland hardwood forest **Score:** 2

Strata Overlap – Use strata defined in plant strata metric using applicable regional supplement. See figures in section 2.3.5.5.

High overlap (≥ 3 strata overlapping): 0 % of WAA Moderate overlap (2 strata overlapping): 15 % of WAA

Herbaceous species/dense litter overlap (only in portion where there are no other strata overlapping): 0 % of WAA

Total percentage of WAA with some form of overlap (if more than one present): 15 % of WAA **Score:** 1

Herbaceous Cover – Estimate for entire WAA. In South Central Plains or East Central Texas Plains: ☐ Bottomland hardwood forest

Total cover of emergent and submergent plants: ☐ > 75% ☐ 51–75% ☐ 26–50% ☒ ≤ 25% **Score:** 1

Vegetation Alterations – Unnatural (human-caused) stressors. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Disking R/P ☐ Mowing/shredding R/P ☐ Logging R/P

☐ Cutting R/P ☐ Trampling R/P ☐ Herbicide treatment R/P ☐ Herbivory R/P ☐ Disease R/P ☐ Chemical spill R/P

☐ Pollution R/P ☐ Feral hog rooting R/P ☐ Woody debris removal R/P ☐ Other R/P: _____

Percent of WAA with recent vegetation alteration: 0 % Severity of alteration: ☐ High ☐ Low

Percent of WAA with past vegetation alteration: 100 % Degree of recovery: ☒ Complete ☐ High ☐ Moderate ☐ Low

☐ Alteration to improve wetland (degree of natural community recovery):_____ **Score:** 4

TXRAM WETLAND FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Wetland ID/Name: W-8, W-9, W-10, W-11 WAA No.: W-5-1 Size: 2.3 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Wetland Type: Lacustrine Fringe Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☒ Yes ☐ No

Notes: WAA includes emergent wetlands W-8, W-9, W-10 and scrub-shrub wetland W-11.

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Landscape	Aquatic Context	4	Sum of metric scores / 8 x 15	9.2
	Buffer	0.9		
Hydrology	Water source	2	Sum of metric scores / 12 x 30	17.5
	Hydroperiod	2		
	Hydrologic flow	3		
Soils	Organic matter	2	Sum of metric scores / 12 x 15	12.5
	Sedimentation	4		
	Soil modification	4		
Physical Structure	Topographic complexity	3	Sum of metric scores / 12 x 20	11.7
	Edge complexity	3		
	Physical habitat richness	1		
Biotic Structure	Plant strata	3	Sum of metric scores / 28 x 20	15.0
	Species richness	4		
	Non-native/invasive infestation	1		
	Interspersion	2		
	Strata overlap	4		
	Herbaceous cover	4		
	Vegetation alterations	3		
Sum of core element scores = overall TXRAM wetland score				65.9
Additional points for unique resources = overall TXRAM wetland score x 0.10 if: ☐ Area of Caddo Lake designated a "Wetland of International Importance" under the Ramsar Convention ☐ Bald cypress – water tupelo swamp ☐ Pitcher plant bog ☐ Spring				-
Additional points for limited habitats = overall TXRAM wetland score x 0.05 if: ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM wetland score and additional points = **total overall TXRAM wetland score**				66

Representative Site Photograph:

Facing east along the berm road with emergent wetland W-10 in the foreground and scrub-shrub wetland W-11 in the background.

TXRAM WETLAND DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Wetland ID/Name: W-8, W-9, W-10, W-11 WAA No.: W-5-1 Size: 2.3 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Wetland Type: Lacustrine Fringe Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☐ Yes ☐ No

Notes: WAA includes emergent wetlands W-8, W-9, W-10 and scrub-shrub wetland W-11.

LANDSCAPE

Aquatic Context – Confirm in office review. See figures in section 2.3.1.1 for examples.

Notes on any barriers or alterations that prevent connection: Roads, residential areas, and berms

Aquatic resources within 1,000 feet of WAA to which wetland connects (including number for other considerations): 9 **Score:** 4

Buffer – Evaluate to 500 feet from WAA boundary. Confirm in office review. See figures in section 2.3.1.2 for examples.

Buffer Type/Description	*Score (See Narratives)*	*Percentage*	*Subtotal*
1. Residential, development, roads	0	45	0
2. Golf Course/Hay Field	0.5	20	0.1
3. Power line ROW	1	15	0.15
4. PFO	4	5	0.2
5. Forested Upland/Emergent wetland	3	15	0.45

Score: 0.9

HYDROLOGY

Water Source – Degree of natural or unnatural/artificial influence. Confirm in office review for watershed.

Natural: ☒ Precipitation ☐ Groundwater ☒ Overbank flow/stream discharge ☒ Overland flow ☐ Beaver activity ☐ Other: _____

Unnatural/Manipulated: ☒ Impoundment ☐ Outfall ☐ Irrigation/pumping ☐ Other artificial influence or control: _____

Watershed: ☒ Development ☐ Irrigated agriculture ☐ Wastewater treatment plant ☒ Impoundment ☐ Other: _____

Degree of artificial influence/control: ☐ Complete ☒ High ☐ Low ☐ None

Wetland created/restored/enhanced: ☐ Sustainable/replicates natural ☐ Controlled **Score:** 2

Hydroperiod – Variability and recent alteration of the duration, frequency, and magnitude of inundation/saturation.

Evaluate the hydroperiod including natural variation: Seasonal inundation, low variation

Direct evidence of alteration: Natural: ☐ Log-jam ☐ Channel migration ☐ Other: _____

Human: ☐ Diversions ☐ Ditches ☐ Levees ☒ Impoundments ☐ Other: _____

Riverine only: ☐ Recent channel in-stability/dis-equilibrium (☐ Degradation or ☐ Aggradation)

Indirect evidence of alteration: ☐ Wetland plant stress: _____ ☐ Plant morphology: _____

☐ Upland species encroachment: _____ ☐ Plant Community: _____ ☐ Soil: _____

Change/Alteration of hydroperiod: ☒ None ☐ Due to natural events ☐ Human influences (☐ Slight or ☐ High)

Degree hydroperiod of wetland created/restored/enhanced replicates natural patterns: _____

Lacustrine fringe on human impoundment: ☐ High variability ☒ Low variability ☐ Recent changes to hydroperiod **Score:** 2

Hydrologic Flow – Movement of water to or from surrounding area and openness to water moving through the WAA.

Flow: ☒ Inlets: 1 ☒ Outlets: 2 ☒ Signs of water movement to or from WAA: Streams

Restrictions: ☐ Levee ☒ Berm/dam ☐ Diversion ☐ Other: _____

High flowthrough: ☐ Floodplain ☐ Drift deposits ☐ Drainage patterns ☐ Sediment deposits ☐ Other: _____

Low flowthrough: ☐ High landscape position ☐ Stagnant water ☒ Closed contours ☐ Other: _____ **Score:** 3

SOILS

Organic Matter – Use data and indicators from wetland determination data form(s) based on applicable regional supplement.

☐ High (organic soil or indicator A1, A2, A3)

☐ Moderate (indicator A9, S1, F1 in AW or A9, S1, S2, F1 in GP or A6, A7, A9, S7, F13 in AGCP)

☒ Low (indicated by thin organic or organic-mineral layer) ☐ None observable in surface layer as described herein **Score:** 2

Sedimentation – Deposition of excess sediment due to human actions. Confirm in office review for landscape.

Landscape with stress that could lead to excess sedimentation? ☐ Yes ☒ No Landscape position: ☐ High ☐ Low

Magnitude of recent runoff/flooding events: ☐ High ☐ Low Percent of WAA with excess sediment deposition: 0

☐ Sand deposits: 0 % of area, _____ average thickness ☐ Silt/Clay deposits: 0 % of area, _____ average thickness

Lacustrine fringe only: ☐ Upper end of impoundment ☐ Degrades wetland ☐ Contributes to wetland processes **Score:** 4

Soil Modification – Physical changes by human activities. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Farming R/P ☐ Logging R/P ☐ Mining R/P ☐ Filling R/P

☐ Grading R/P ☐ Dredging R/P ☐ Off-road vehicles R/P ☐ Other R/P: _____

Percent of WAA with recent soil modification: 0 % Degree of modification: ☐ High ☐ Low

Indicators of past modification: ☐ High bulk density ☐ Low organic matter ☐ Lack of soil structure ☐ Lack of horizons ☐ Hardpan

☐ Dramatic change in texture/color ☐ Heterogeneous mixture ☐ Other: _____

Indicators of recovery: ☐ Organic matter ☐ Structure ☐ Horizons ☐ Mottling ☐ Hydric soil ☐ Other: _____

Percent of WAA with past modification: 0 % Recovery: ☐ Complete ☐ High ☐ Moderate ☐ Low ☐ None **Score:** 4

PHYSICAL STRUCTURE

Topographic Complexity – See figures in section 2.3.4.1. Record % micro-topography and % WAA for each elevation gradient.

Elevation gradients (EG): 2 Evidence: ☒ Plant assemblages ☒ Level of saturation/inundation ☐ Path of water flow ☐ Slope

Micro-topography: 10 % of WAA (By EG: EG 1= 0% MT, 30% WAA, EG 2= 15% MT, 70% WAA)

Types: ☐ Depressions ☐ Pools ☐ Burrows ☐ Swales ☐ Wind-thrown tree holes ☐ Mounds ☐ Gilgai ☐ Islands

☒ Variable shorelines ☐ Partially buried debris ☐ Debris jams ☐ Plant hummocks/roots ☐ Other:_____ **Score:** 3

Edge Complexity – Confirm in office review. See figure in section 2.3.4.2 to evaluate wetland boundary.

WAA: ☒ In seasonal floodplain ☒ Contiguous to other wetland ☐ Edge vertical structure variation: _____

Horizontal variability: ☐ High ☐ Moderate ☐ Low ☒ None **Score:** 3

Physical Habitat Richness – See definitions and table in section 2.3.4.3 for habitat types applicable to each wetland type.

Label of habitat types qualifying as present in WAA: JKL Total: 3 **Score:** 1

BIOTIC STRUCTURE

Plant Strata – Use applicable wetland delineation regional supplement and data from determination data form(s).

Number of plant strata: ☐ ≥ 4 ☒ 3 ☐ 2 ☐ 1 ☐ 0 **Score:** 3

Species Richness – Use data from determination data form(s) to count species with 5% or more relative cover in a stratum.

Number of species across all strata and determination data forms (not counting a species more than once): 11 **Score:** 4

Non-Native/Invasive Infestation – Use data from determination data form(s). See tables in section 2.3.5.3 for examples.

Average total relative cover of non-native/invasive species across all strata and determination data forms: 51 % **Score:** 1

Interspersion – Confirm in office review. Use figure in section 2.3.5.4 to determine the degree of interspersion of plant zones.

Degree of horizontal/plan view interspersion: ☐ High ☐ Moderate ☒ Low ☐ None ☐ Bottomland hardwood forest **Score:** 2

Strata Overlap – Use strata defined in plant strata metric using applicable regional supplement. See figures in section 2.3.5.5.

High overlap (≥ 3 strata overlapping): 5 % of WAA Moderate overlap (2 strata overlapping): 10 % of WAA

Herbaceous species/dense litter overlap (only in portion where there are no other strata overlapping): 85 % of WAA

Total percentage of WAA with some form of overlap (if more than one present): 100 % of WAA **Score:** 4

Herbaceous Cover – Estimate for entire WAA. In South Central Plains or East Central Texas Plains: ☐ Bottomland hardwood forest

Total cover of emergent and submergent plants: ☒ > 75% ☐ 51–75% ☐ 26–50% ☐ ≤ 25% **Score:** 4

Vegetation Alterations – Unnatural (human-caused) stressors. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Disking R/P ☒ Mowing/shredding R/P ☐ Logging R/P

☐ Cutting R/P ☐ Trampling R/P ☐ Herbicide treatment R/P ☐ Herbivory R/P ☐ Disease R/P ☐ Chemical spill R/P

☐ Pollution R/P ☐ Feral hog rooting R/P ☐ Woody debris removal R/P ☒ Other R/P: Pond construction

Percent of WAA with recent vegetation alteration: 2 % Severity of alteration: ☐ High ☒ Low

Percent of WAA with past vegetation alteration: 100 % Degree of recovery: ☐ Complete ☒ High ☐ Moderate ☐ Low

☐ Alteration to improve wetland (degree of natural community recovery):_____ **Score:** 3

TXRAM WETLAND FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☐ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Wetland ID/Name: Restored Wetland WAA No.: 1 Size: 2.99 ac Date: N/A Evaluator(s): HDR

Wetland Type: riverine Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☐ Currently

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: n/a Representative: ☐ Yes ☐ No

Notes: Restored/relocated forested wetland adjacent to Dudley Branch

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Landscape	Aquatic Context	4	Sum of metric scores / 8 x 15	10.2
	Buffer	1.425		
Hydrology	Water source	4	Sum of metric scores / 12 x 30	30.0
	Hydroperiod	4		
	Hydrologic flow	4		
Soils	Organic matter	2	Sum of metric scores / 12 x 15	10.0
	Sedimentation	4		
	Soil modification	2		
Physical Structure	Topographic complexity	1	Sum of metric scores / 12 x 20	8.3
	Edge complexity	3		
	Physical habitat richness	1		
Biotic Structure	Plant strata	3	Sum of metric scores / 28 x 20	10.7
	Species richness	2		
	Non-native/invasive infestation	4		
	Interspersion	2		
	Strata overlap	1		
	Herbaceous cover	1		
	Vegetation alterations	2		
Sum of core element scores = overall TXRAM wetland score				69.2
Additional points for unique resources = overall TXRAM wetland score x 0.10 if: ☐ Area of Caddo Lake designated a "Wetland of International Importance" under the Ramsar Convention ☐ Bald cypress – water tupelo swamp ☐ Pitcher plant bog ☐ Spring				0.0
Additional points for limited habitats = overall TXRAM wetland score x 0.05 if: ☐ Dominated by native trees greater than 24-inch diameter at breast height ☒ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				3.5
Sum of overall TXRAM wetland score and additional points = **total overall TXRAM wetland score**				73

Representative Site Photograph:

[Insert Photograph]	See wetland design figures in Attachment E and Attachment I Appendix B.

TXRAM WETLAND DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☐ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Wetland ID/Name: Restored Wetland WAA No.: 1 Size: 2.99 ac Date: N/A Evaluator(s): HDR

Wetland Type: riverine Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☐ Currently

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: n/a Representative: ☐ Yes ☐ No

Notes: Restored/relocated forested wetland adjacent to Dudley Branch

LANDSCAPE

Aquatic Context – Confirm in office review. See figures in section 2.3.1.1 for examples.

Notes on any barriers or alterations that prevent connection: None

Aquatic resources within 1,000 feet of WAA to which wetland connects (including number for other considerations): 9 **Score:** 4

Buffer – Evaluate to 500 feet from WAA boundary. Confirm in office review. See figures in section 2.3.1.2 for examples.

Buffer Type/Description	*Score (See Narratives)*	*Percentage*	*Subtotal*
1. Forested riparian/forested wetland	4	20	0.8
2. Transmission line ROW and maintained mixed grassland	1	35	0.35
3. Golf Course	0.5	15	0.075
4. Moderately maintained native grassland	2	10	0.2
5. Residential/road/cut off buffer	0	20	0

Score: 1.425

HYDROLOGY

Water Source – Degree of natural or unnatural/artificial influence. Confirm in office review for watershed.

Natural: ☐ Precipitation ☐ Groundwater ☒ Overbank flow/stream discharge ☒ Overland flow ☐ Beaver activity ☐ Other: _____

Unnatural/Manipulated: ☐ Impoundment ☐ Outfall ☐ Irrigation/pumping ☐ Other artificial influence or control: _____

Watershed: ☒ Development ☐ Irrigated agriculture ☐ Wastewater treatment plant ☐ Impoundment ☐ Other: _____

Degree of artificial influence/control: ☐ Complete ☐ High ☐ Low ☒ None

Wetland created/restored/enhanced: ☒ Sustainable/replicates natural ☐ Controlled **Score:** 4

Hydroperiod – Variability and recent alteration of the duration, frequency, and magnitude of inundation/saturation.

Evaluate the hydroperiod including natural variation: Seasonal High Variation

Direct evidence of alteration: Natural: ☐ Log-jam ☐ Channel migration ☐ Other: _____

Human: ☐ Diversions ☐ Ditches ☐ Levees ☐ Impoundments ☐ Other: _____

Riverine only: ☐ Recent channel in-stability/dis-equilibrium (☐ Degradation or ☐ Aggradation)

Indirect evidence of alteration: ☐ Wetland plant stress: _____ ☐ Plant morphology: _____

☐ Upland species encroachment: _____ ☐ Plant Community: _____ ☐ Soil: _____

Change/Alteration of hydroperiod: ☒ None ☐ Due to natural events ☐ Human influences (☐ Slight or ☐ High)

Degree hydroperiod of wetland created/restored/enhanced replicates natural patterns: High

Lacustrine fringe on human impoundment: ☐ High variability ☐ Low variability ☐ Recent changes to hydroperiod **Score:** 4

Hydrologic Flow – Movement of water to or from surrounding area and openness to water moving through the WAA.

Flow: ☒ Inlets: 1 ☒ Outlets: 1 ☐ Signs of water movement to or from WAA: drainage ways

Restrictions: ☐ Levee ☐ Berm/dam ☐ Diversion ☐ Other: _____

High flowthrough: ☒ Floodplain ☐ Drift deposits ☐ Drainage patterns ☐ Sediment deposits ☐ Other: _____

Low flowthrough: ☐ High landscape position ☐ Stagnant water ☐ Closed contours ☐ Other: _____ **Score:** 4

SOILS

Organic Matter – Use data and indicators from wetland determination data form(s) based on applicable regional supplement.

☐ High (organic soil or indicator A1, A2, A3)

☐ Moderate (indicator A9, S1, F1 in AW or A9, S1, S2, F1 in GP or A6, A7, A9, S7, F13 in AGCP)

☒ Low (indicated by thin organic or organic-mineral layer) ☐ None observable in surface layer as described herein **Score:** 2

Sedimentation – Deposition of excess sediment due to human actions. Confirm in office review for landscape.

Landscape with stress that could lead to excess sedimentation? ☐ Yes ☒ No Landscape position: ☐ High ☒ Low

Magnitude of recent runoff/flooding events: ☐ High ☐ Low Percent of WAA with excess sediment deposition: 0

☐ Sand deposits: 0 % of area, _____ average thickness ☐ Silt/Clay deposits: 0 % of area, _____ average thickness

Lacustrine fringe only: ☐ Upper end of impoundment ☐ Degrades wetland ☐ Contributes to wetland processes **Score:** 4

Soil Modification – Physical changes by human activities. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Farming R/P ☐ Logging R/P ☐ Mining R/P ☐ Filling R/P

☐ Grading R/P ☐ Dredging R/P ☐ Off-road vehicles R/P ☒ Other R/P: wetland restoration

Percent of WAA with recent soil modification: 0 % Degree of modification: ☐ High ☒ Low

Indicators of past modification: ☐ High bulk density ☐ Low organic matter ☐ Lack of soil structure ☐ Lack of horizons ☐ Hardpan

☐ Dramatic change in texture/color ☐ Heterogeneous mixture ☒ Other: wetland restoration

Indicators of recovery: ☒ Organic matter ☐ Structure ☐ Horizons ☐ Mottling ☒ Hydric soil ☐ Other: _____

Percent of WAA with past modification: 100 % Recovery: ☐ Complete ☐ High ☒ Moderate ☐ Low ☐ None **Score:** 2

PHYSICAL STRUCTURE

Topographic Complexity – See figures in section 2.3.4.1. Record % micro-topography and % WAA for each elevation gradient.

Elevation gradients (EG): 2 Evidence: ☐ Plant assemblages ☒ Level of saturation/inundation ☒ Path of water flow ☒ Slope

Micro-topography: 7 % of WAA (By EG: EG1= 60%WAA, 5%MT; EG2=40%WAA, 10%MT)

Types: ☐ Depressions ☐ Pools ☐ Burrows ☐ Swales ☐ Wind-thrown tree holes ☐ Mounds ☐ Gilgai ☐ Islands

☐ Variable shorelines ☐ Partially buried debris ☒ Debris jams ☐ Plant hummocks/roots ☐ Other:_____ **Score:** 1

Edge Complexity – Confirm in office review. See figure in section 2.3.4.2 to evaluate wetland boundary.

WAA: ☒ In seasonal floodplain ☐ Contiguous to other wetland ☒ Edge vertical structure variation: moderate

Horizontal variability: ☐ High ☐ Moderate ☐ Low ☒ None **Score:** 3

Physical Habitat Richness – See definitions and table in section 2.3.4.3 for habitat types applicable to each wetland type.

Label of habitat types qualifying as present in WAA: MN Total: 2 **Score:** 1

BIOTIC STRUCTURE

Plant Strata – Use applicable wetland delineation regional supplement and data from determination data form(s).

Number of plant strata: ☐ ≥ 4 ☒ 3 ☐ 2 ☐ 1 ☐ 0 **Score:** 3

Species Richness – Use data from determination data form(s) to count species with 5% or more relative cover in a stratum.

Number of species across all strata and determination data forms (not counting a species more than once): 5 **Score:** 2

Non-Native/Invasive Infestation – Use data from determination data form(s). See tables in section 2.3.5.3 for examples.

Average total relative cover of non-native/invasive species across all strata and determination data forms: 0 % **Score:** 4

Interspersion – Confirm in office review. Use figure in section 2.3.5.4 to determine the degree of interspersion of plant zones.

Degree of horizontal/plan view interspersion: ☐ High ☐ Moderate ☒ Low ☐ None ☐ Bottomland hardwood forest **Score:** 2

Strata Overlap – Use strata defined in plant strata metric using applicable regional supplement. See figures in section 2.3.5.5.

High overlap (≥ 3 strata overlapping): 5 % of WAA Moderate overlap (2 strata overlapping): 20 % of WAA

Herbaceous species/dense litter overlap (only in portion where there are no other strata overlapping): 0 % of WAA

Total percentage of WAA with some form of overlap (if more than one present): 25 % of WAA **Score:** 1

Herbaceous Cover – Estimate for entire WAA. In South Central Plains or East Central Texas Plains: ☐ Bottomland hardwood forest

Total cover of emergent and submergent plants: ☐ > 75% ☐ 51–75% ☐ 26–50% ☒ ≤ 25% **Score:** 1

Vegetation Alterations – Unnatural (human-caused) stressors. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Disking R/P ☐ Mowing/shredding R/P ☐ Logging R/P

☐ Cutting R/P ☐ Trampling R/P ☐ Herbicide treatment R/P ☐ Herbivory R/P ☐ Disease R/P ☐ Chemical spill R/P

☐ Pollution R/P ☐ Feral hog rooting R/P ☐ Woody debris removal R/P ☒ Other R/P: wetland restoration

Percent of WAA with recent vegetation alteration: 100 % Severity of alteration: ☒ High ☐ Low

Percent of WAA with past vegetation alteration: 0 % Degree of recovery: ☐ Complete ☐ High ☐ Moderate ☐ Low

☒ Alteration to improve wetland (degree of natural community recovery): moderate **Score:** 2

Stream Final Scoring Sheets and Data Sheets

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☑ Fill/Impact (☐ Linear ☐ Non-linear) ☑ Mitigation/Conservation

Stream ID/Name: S-1 SAR No.: 1 Size (LF): 196 Date: 9/19/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: 200+ ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☑ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes: Stream S-1 connects 2 OCPs (OCP-1 and OCP-2).

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 26'	Avg. Banks: 2.5'
Avg. Waters Edge: 15'	Avg. Water: 1.5'
Avg. OHWM: 16'	Avg. OHWM: 1.5'

Scoring Table

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Channel condition	Floodplain connectivity	4	Sum of metric scores / 15 x 30	28
	Bank condition	5		
	Sediment deposition	5		
Buffer condition	Composite buffer (left bank)	2.628	Sum of bank scores / 10 x 20	9.9
	Composite buffer (right bank)	2.34		
In-stream condition	Substrate composition	2	Sum of metric scores / 10 x 25	12.5
	In-stream habitat	3		
Hydrologic condition	Flow regime	3	Sum of metric scores / 8 x 25	21.9
	Channel flow status	4		
Sum of core element scores = overall TXRAM stream score				72
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				0
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				72

Representative Site Photograph:

Note the lack of canopy cover along the stream.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Stream ID/Name: S-1 SAR No.: 1 Size (LF): 196 Date: 9/19/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: 200+ ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☐ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

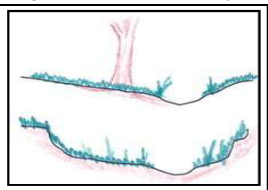
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank 25-	Avg. Banks: 2.5'
Avg. Waters Edge: 15'	Avg. Water: 1.5'
Avg. OHWM: 16'	Avg. OHWM: 1.5'

Notes: Stream S-1 connects 2 OCPs (OCP-1 and OCP-2).

CHANNEL CONDITION

Floodplain Connectivity

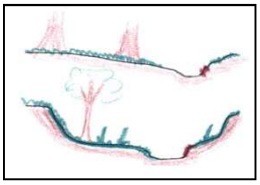
Perennial / Intermittent



6 / 5

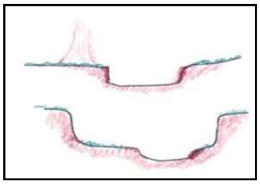
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ☐

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐



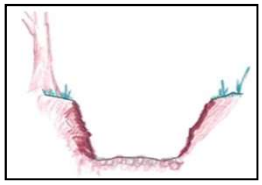
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☑



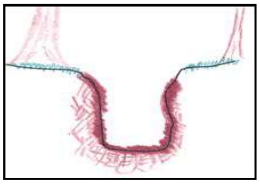
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☐



2

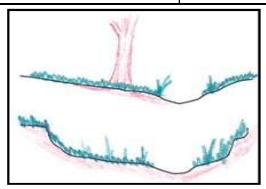
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ☐



1

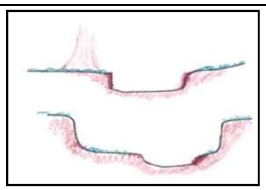
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ☐

Ephemeral



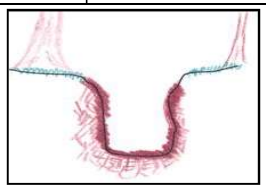
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ☐



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 4

Bank Condition

Left Bank Active Erosion: 0 % Right Bank Active Erosion: 0 % Average: 0

Bank Protection/Stabilization: ☒ Natural ☐ Artificial: _____

Score: 5

Sediment Deposition

☒ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☐ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 5

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

Left Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Deciduous Forest	80	Mixed	Moderate	3	45	1.35
2. Emergent Wetland	0	Native	Moderate	2	20	0.4
3. Forested Wetland	75	Mixed	Moderate	3	25	0.75
4. OW	-	-	-	-	-	-
5. Manicured Sod	0	Non-native	Intensive	0.5	10	0.05
Left Bank Primary Buffer Subtotal: 2.55 **X 0.7 = Left Bank Primary Buffer Total** 1.785						
Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
1. Deciduous Forest	70	Moderate		4	66	2.64
2. Manicured Sod	0	Intensive		0.5	34	0.17
3.						
4.						
5.						
Left Bank Secondary Buffer Subtotal: 2.81 **X 0.3 = Left Bank Secondary Buffet Total** 0.843						
Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 2.628						

Right Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Maintained ROW	0	Native	High	1	20	0.2
2. Deciduous Forest	80	Mixed	Moderate	3	35	1.05
3. Forested Wetland	75	Mixed	Moderate	3	30	0.9
4. Emergent Wetland	0	Native	Moderate	2	5	0.15
5. Unmanicured Bermuda	0	Non-native	High	1	10	0.1
Right Bank Primary Buffer Subtotal: 2.4 **X 0.7 = Right Bank Primary Buffer Total** 1.68						
Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
1. Deciduous Forest	80	Moderate		4	35	1.4
2. Maintained ROW	0	High		1	60	0.6
3. Forested Wetland	75	Moderate		4	5	0.2
4.						
5.						
Right Bank Secondary Buffer Subtotal: 2.2 **X 0.3 = Right Bank Secondary Buffer Total** 0.66						
Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 2.34						

Stream ID/Name: S-1 SAR No.: 1

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder:	Gravel:	Fines (silt, clay, muck): 60	Artificial:	Large Woody Debris/Leaf Packs:
Cobble: 10	Sand: 30	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 2

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks													
Overhanging Vegetation	✓	✓											
Rootmats													
Rootwads													
Woody Debris/Leaf Packs													
Boulders/Cobbles													
Aquatic Macrophytes	✓												
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present	2	1											
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)		✓											
Transect has 6-29% cover (2)	✓												
Transect has 30-50% cover (3)													
Transect has > 50% cover (4)													
Percent Cover Score	2	1											
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater													
Natural Step-pools													
Number Present	0	0											
Total Score	4	2											

Average: 3 **Score:** 3

HYDROLOGIC CONDITION

Flow Regime

- ☐ Noticeable surface flow present (4)
- ☒ Continual pool of water but lacking noticeable flow (3)
- ☐ Isolated pools and interstitial (subsurface) flow (2)
- ☐ Isolated pools and no evidence of surface or interstitial flow (1)
- ☐ Dry channel and no observable pools or interstitial flow (0)

Artificial / altered water source ☐ No ☐ Yes: _____

Score: 3

Channel Flow Status

- ☒ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
- ☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
- ☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
- ☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
- ☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 4

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☑ Fill/Impact (☐ Linear ☐ Non-linear) ☑ Mitigation/Conservation

Stream ID/Name: S-2 SAR No.: 1 Size (LF): 85 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,600

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☑ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes: Small stream that flows through W-10 and into S-4; outlet for OCP-2.

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 6'	Avg. Banks: 3'
Avg. Waters Edge: 3'	Avg. Water: 1'
Avg. OHWM: 4'	Avg. OHWM: 1.5'

Scoring Table

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Channel condition	Floodplain connectivity	3	Sum of metric scores / 15 x 30	24.0
	Bank condition	4		
	Sediment deposition	5		
Buffer condition	Composite buffer (left bank)	3.98	Sum of bank scores / 10 x 20	14.2
	Composite buffer (right bank)	3.11		
In-stream condition	Substrate composition	1	Sum of metric scores / 10 x 25	10.0
	In-stream habitat	3		
Hydrologic condition	Flow regime	3	Sum of metric scores / 8 x 25	21.9
	Channel flow status	4		
Sum of core element scores = overall TXRAM stream score				70
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				70

Representative Site Photograph:

Facing down stream at S-2-1. Note the dense overhanging vegetation.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Stream ID/Name: S-2 SAR No.: 1 Size (LF): 85 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,600

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☐ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

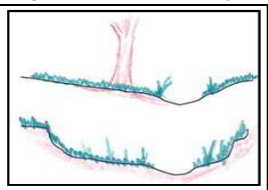
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank	Avg. Banks: 3'
Avg. Waters Edge: 3'	Avg. Water: 1'
Avg. OHWM: 4'	Avg. OHWM: 1.5'

Notes: Small stream that flows through W-10 and into S-4; outlet for OCP-2.

CHANNEL CONDITION

Floodplain Connectivity

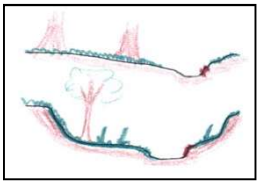
Perennial / Intermittent



6 / 5

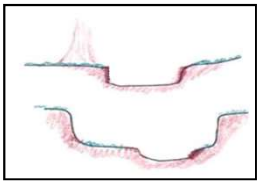
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ☐

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐



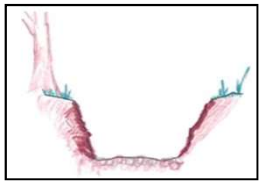
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☐



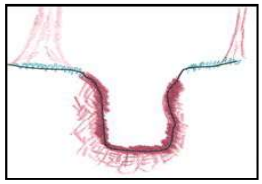
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☑



2

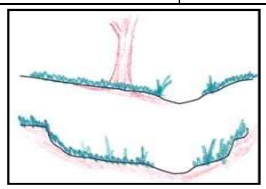
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ☐



1

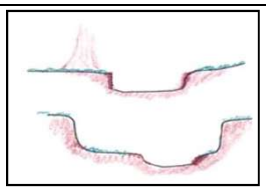
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ☐

Ephemeral



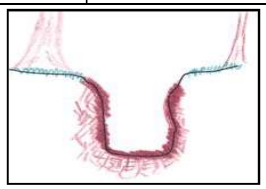
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ☐



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 3

Bank Condition

Left Bank Active Erosion: 15 % Right Bank Active Erosion: 15 % Average: 15

Bank Protection/Stabilization: ☒ Natural ☐ Artificial: _____

Score: 4

Sediment Deposition

☒ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☐ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 5

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

Left Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forested Riparian	80	Native	Low	5	65	3.25
2. Berm Road	10	Urban	Complete	0	10	0
3. PEM/PSS Wetland	15	Mix	Low	2	25	0.5
4.						
5.						
Left Bank Primary Buffer Subtotal: 3.75 **X 0.7 = Left Bank Primary Buffer Total** 2.63						
Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
1. Forested Riparian	80	Low		5	90	4.5
2. Berm Road	10	Complete		0	10	0
3.						
4.						
5.						
Left Bank Secondary Buffer Subtotal: 4.5 **X 0.3 = Left Bank Secondary Buffet Total** 1.35						
Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 3.98						

Right Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forested Riparian	80	Native	Low	5	50	2.5
2. Berm Road	10	Urban	Complete	0	10	0
3. Upand	10	Mix	High	1	25	0.25
4. PEM Wetland	5	Non-native	low	1	15	0.15
5.						
Right Bank Primary Buffer Subtotal: 2.9 **X 0.7 = Right Bank Primary Buffer Total** 2.03						
Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
1. Forested Riparian	80	Low		5	65	3.25
2. Upand	5	High		1	35	0.35
3.						
4.						
5.						
Right Bank Secondary Buffer Subtotal: 3.6 **X 0.3 = Right Bank Secondary Buffer Total** 1.08						
Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 3.11						

Stream ID/Name: S-2 SAR No.: 1

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder:	Gravel:	Fines (silt, clay, muck): 80	Artificial:	Large Woody Debris/Leaf Packs:
Cobble:	Sand: 20	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 1

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks													
Overhanging Vegetation	✓	✓											
Rootmats													
Rootwads													
Woody Debris/Leaf Packs													
Boulders/Cobbles													
Aquatic Macrophytes	✓												
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present	2	1											
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-29% cover (2)	✓												
Transect has 30-50% cover (3)		✓											
Transect has > 50% cover (4)													
Percent Cover Score	2	3											
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater													
Natural Step-pools													
Number Present	0	0											
Total Score	4	4											

Average: 4 **Score:** 3

HYDROLOGIC CONDITION

Flow Regime

☐ Noticeable surface flow present (4)
☒ Continual pool of water but lacking noticeable flow (3)
☐ Isolated pools and interstitial (subsurface) flow (2)
☐ Isolated pools and no evidence of surface or interstitial flow (1)
☐ Dry channel and no observable pools or interstitial flow (0)
Artificial / altered water source ☐ No ☐ Yes: _____

Score: 3

Channel Flow Status

☒ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 4

Version 2.0 - Final

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☑ Fill/Impact (☐ Linear ☐ Non-linear) ☑ Mitigation/Conservation

Stream ID/Name: S-3 SAR No.: 1 Size (LF): 26 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,800 ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☑ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes: Outfall from OCP-2.

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 20'	Avg. Banks: 5'
Avg. Waters Edge: 8'	Avg. Water: 0.5'
Avg. OHWM: 11'	Avg. OHWM: 1.5'

Scoring Table

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Channel condition	Floodplain connectivity	4	Sum of metric scores / 15 x 30	26.0
	Bank condition	4		
	Sediment deposition	5		
Buffer condition	Composite buffer (left bank)	3.7	Sum of bank scores / 10 x 20	12.0
	Composite buffer (right bank)	2.3		
In-stream condition	Substrate composition	2	Sum of metric scores / 10 x 25	12.5
	In-stream habitat	3		
Hydrologic condition	Flow regime	3	Sum of metric scores / 8 x 25	18.8
	Channel flow status	3		
Sum of core element scores = overall TXRAM stream score				69.3
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				69

Representative Site Photograph:

Facing east at S-3-1 which starts at the spillway from OCP-2.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Stream ID/Name: S-3 SAR No.: 1 Size (LF): 26 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,800 ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☐ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

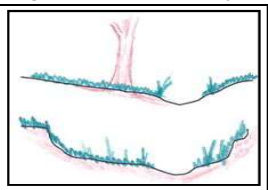
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank	Avg. Banks: 5'
Avg. Waters Edge: 8'	Avg. Water: 0.5'
Avg. OHWM: 11'	Avg. OHWM: 1.5'

Notes: Outfall from OCP-2.

CHANNEL CONDITION

Floodplain Connectivity

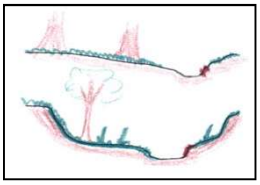
Perennial / Intermittent



6 / 5

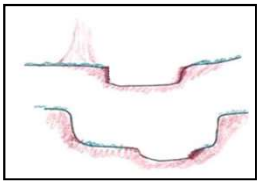
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ☐

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐



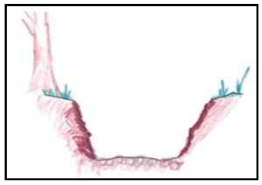
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☑



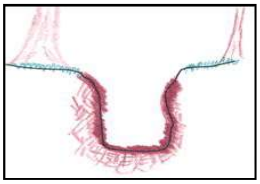
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☐



2

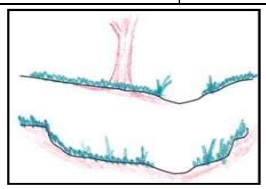
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ☐



1

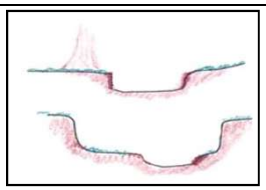
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ☐

Ephemeral



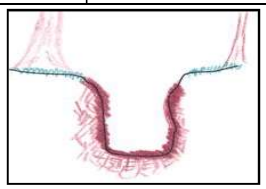
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ☐



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 4

Bank Condition

Left Bank Active Erosion: 10 % Right Bank Active Erosion: 10 % Average: 10

Bank Protection/Stabilization: ☒ Natural ☐ Artificial: _____

Score: 4

Sediment Deposition

☒ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☐ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 5

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

Left Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest Riparian	70	Native	Low	5	60	3
2. Scrub/shrub riparian	35	Native	moderate	3	40	1.2
3.						
4.						
5.						
Left Bank Primary Buffer Subtotal: 4.2 **X 0.7 = Left Bank Primary Buffer Total** 2.94						

Secondary Buffer Type	*Canopy Cover*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest Riparian	70	Low	5	45	2.25
2. Scrub/shrub riparian	35	moderate	3	5	0.015
3. Maintained sod	0	intensive	0.5	50	0.25
4.					
5.					
Left Bank Secondary Buffer Subtotal: 2.515 **X 0.3 = Left Bank Secondary Buffet Total** 0.75					
Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 3.69					

Right Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest Riparian	70	Native	Low	5	10	0.05
2. Scrub/shrub riparian	35	Native	Low	3	90	2.7
3.						
4.						
5.						
Right Bank Primary Buffer Subtotal: 2.75 **X 0.7 = Right Bank Primary Buffer Total** 1.93						

Secondary Buffer Type	*Canopy Cover*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Scrub/shrub riparian	35	Low	3	100	3
2.					
3.					
4.					
5.					
Right Bank Secondary Buffer Subtotal: 3 **X 0.3 = Right Bank Secondary Buffer Total** 0.9					
Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 2.83					

Stream ID/Name: S-3 SAR No.: 1

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder: 5	Gravel: 15	Fines (silt, clay, muck): 60	Artificial:	Large Woody Debris/Leaf Packs:
Cobble:	Sand: 20	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 2

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks													
Overhanging Vegetation	✓												
Rootmats													
Rootwads	✓												
Woody Debris/Leaf Packs													
Boulders/Cobbles													
Aquatic Macrophytes	✓												
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present	3												
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-29% cover (2)	✓												
Transect has 30-50% cover (3)													
Transect has > 50% cover (4)													
Percent Cover Score	2												
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater													
Natural Step-pools													
Number Present													
Total Score	5												

Average: 5 **Score:** 3

HYDROLOGIC CONDITION

Flow Regime

☐ Noticeable surface flow present (4)
☒ Continual pool of water but lacking noticeable flow (3)
☐ Isolated pools and interstitial (subsurface) flow (2)
☐ Isolated pools and no evidence of surface or interstitial flow (1)
☐ Dry channel and no observable pools or interstitial flow (0)
Artificial / altered water source ☐ No ☐ Yes: _____

Score: 3

Channel Flow Status

☐ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
☒ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 3

Version 2.0 - Final

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☑ Fill/Impact (☐ Linear ☐ Non-linear) ☑ Mitigation/Conservation

Stream ID/Name: S-4 SAR No.: 1 Size (LF): 765 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,800 ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☑ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes: This SAR flows through three large culverts that bridge a road into a golf course. 20-30' of the stream channel on the downstream side is lined with rip-rap.

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 25'	Avg. Banks: 4'
Avg. Waters Edge: 12'	Avg. Water: 1.75'
Avg. OHWM: 14'	Avg. OHWM: 2'

Scoring Table

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Channel condition	Floodplain connectivity	3	Sum of metric scores / 15 x 30	22
	Bank condition	3		
	Sediment deposition	5		
Buffer condition	Composite buffer (left bank)	1.32	Sum of bank scores / 10 x 20	5.9
	Composite buffer (right bank)	1.63		
In-stream condition	Substrate composition	1	Sum of metric scores / 10 x 25	10.0
	In-stream habitat	3		
Hydrologic condition	Flow regime	3	Sum of metric scores / 8 x 25	21.9
	Channel flow status	4		
Sum of core element scores = overall TXRAM stream score				59.8
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				60

Representative Site Photograph:

S-4-1 is a portion of perennial stream S-4 with a narrow scrub-shrub riparian corridor buffered predominantly by manicured sod and power line right-of-way.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Stream ID/Name: S-4 SAR No.: 1 Size (LF): 765 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,800 ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☐ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

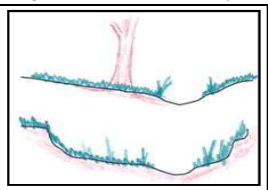
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank 25'	Avg. Banks: 4'
Avg. Waters Edge: 12'	Avg. Water: 1.75'
Avg. OHWM: 14'	Avg. OHWM: 2'

Notes: This SAR flows through three large culverts that bridge a road into a golf course. 20-30' of the stream channel on the downstream side is lined with rip-rap.

CHANNEL CONDITION

Floodplain Connectivity

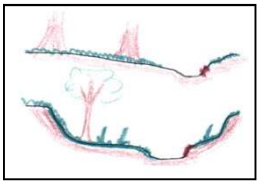
Perennial / Intermittent



6 / 5

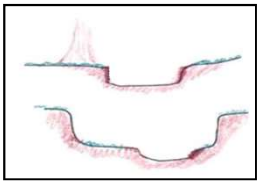
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ☐

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐



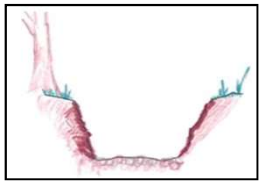
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☐



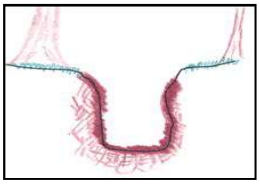
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☑



2

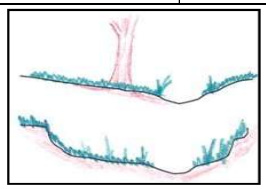
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ☐



1

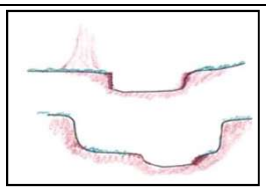
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ☐

Ephemeral



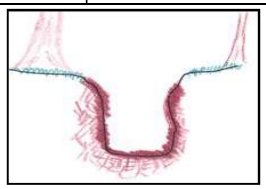
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ☐



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 3

Bank Condition

Left Bank Active Erosion: 30 % Right Bank Active Erosion: 10 % Average: 20

Bank Protection/Stabilization: ☒ Natural ☐ Artificial: _____

Score: 3

Sediment Deposition

☒ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☐ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 5

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.
Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

	Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
Left Bank	1. Road/Development	0	N/A	Complete	0	10	0
	2. S/S Riparian	65	Native	Low	4	20	0.8
	3. Power line ROW	0	Mix	High	1	70	0.7
	4.						
	5.						
	Left Bank Primary Buffer Subtotal: 1.5 **X 0.7 = Left Bank Primary Buffer Total** 1.05						
	Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
	1. Road/Development	0	Complete		0	10	0
	2. Power line ROW	0	High		1	90	0.9
	3.						
	4.						
	5.						
	Left Bank Secondary Buffer Subtotal: 0.9 **X 0.3 = Left Bank Secondary Buffet Total** 0.27						
	Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 1.32						
Right Bank	*Primary Buffer Type*	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
	1. Road	0	N/A	Complete	0	20	0
	2. S/S Riparian	65	Native	Low	4	45	1.80
	3. Manicured Sod	0	Non-native	Intensive	0.5	25	0.125
	4. Manicured Sod	60	Mix	Intensive	1	5	0.05
	5. Power line ROW	0	Mix	High	1	5	0.05
	Right Bank Primary Buffer Subtotal: 2.025 **X 0.7 = Right Bank Primary Buffer Total** 1.42						
	Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
	1. Road/Parkinglot	0	Complete		0	30	0
	2. Manicured Sod	40	Intensive		1	70	0.7
	3.						
	4.						
	5.						
	Right Bank Secondary Buffer Subtotal: 0.7 **X 0.3 = Right Bank Secondary Buffer Total** 0.21						
	Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 1.88						

Stream ID/Name: S-4 SAR No.: 1

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder:	Gravel:	Fines (silt, clay, muck): 80	Artificial: 10	Large Woody Debris/Leaf Packs:
Cobble:	Sand: 10	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 1

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks							✓						
Overhanging Vegetation					✓	✓	✓						
Rootmats						✓							
Rootwads													
Woody Debris/Leaf Packs	✓		✓										
Boulders/Cobbles													
Aquatic Macrophytes		✓		✓			✓						
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present	1	1	1	1	1	2	3						
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)	✓			✓									
Transect has 6-29% cover (2)					✓	✓	✓						
Transect has 30-50% cover (3)													
Transect has > 50% cover (4)													
Percent Cover Score	1			1	2	2	2						
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)			✓										
Transect has > 30% cover (4)		✓											
Percent Cover Score		4	3										
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater													
Natural Step-pools													
Number Present	0	0	0	0	0	0	0						
Total Score	2	5	4	2	3	4	5						

Average: 3.57 **Score:** 3

HYDROLOGIC CONDITION

Flow Regime

☐ Noticeable surface flow present (4)
☒ Continual pool of water but lacking noticeable flow (3)
☐ Isolated pools and interstitial (subsurface) flow (2)
☐ Isolated pools and no evidence of surface or interstitial flow (1)
☐ Dry channel and no observable pools or interstitial flow (0)
Artificial / altered water source ☐ No ☐ Yes: _____

Score: 3

Channel Flow Status

☒ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 4

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☑ Fill/Impact (☐ Linear ☐ Non-linear) ☑ Mitigation/Conservation

Stream ID/Name: S-4 SAR No.: 2 Size (LF): 393 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,750 ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☑ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes: A power line crosses over the stream in this SAR. This ROW dominates the SAR's buffer.

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 20'	Avg. Banks: 7'
Avg. Waters Edge: 12'	Avg. Water: 1.5'
Avg. OHWM: 15'	Avg. OHWM: 2'

Scoring Table

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Channel condition	Floodplain connectivity	2	Sum of metric scores / 15 x 30	22.0
	Bank condition	4		
	Sediment deposition	5		
Buffer condition	Composite buffer (left bank)	0.76	Sum of bank scores / 10 x 20	3.4
	Composite buffer (right bank)	0.935		
In-stream condition	Substrate composition	1	Sum of metric scores / 10 x 25	7.5
	In-stream habitat	2		
Hydrologic condition	Flow regime	3	Sum of metric scores / 8 x 25	21.9
	Channel flow status	4		
Sum of core element scores = overall TXRAM stream score				54.8
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				55

Representative Site Photograph:

This picture depicts the transition from S-4-1 (background) to S-4-2 (foreground). This reach is within a transmission line ROW.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Stream ID/Name: S-4 SAR No.: 2 Size (LF): 393 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,750 ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☐ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

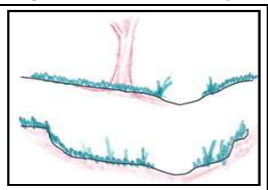
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank 20'	Avg. Banks: 7'
Avg. Waters Edge: 12'	Avg. Water: 1.5'
Avg. OHWM: 15'	Avg. OHWM: 2'

Notes: A power line crosses over the stream in this SAR. This ROW dominates the SAR's buffer.

CHANNEL CONDITION

Floodplain Connectivity

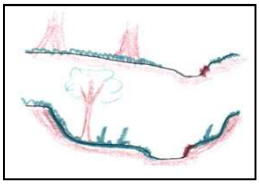
Perennial / Intermittent



6 / 5

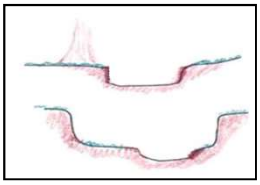
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ☐

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐



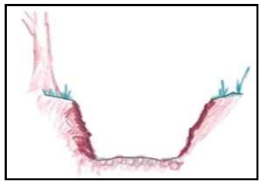
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☐



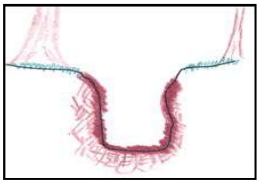
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☐



2

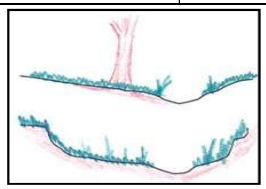
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ✓



1

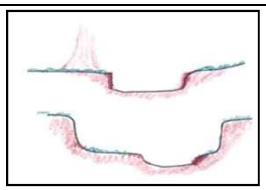
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ☐

Ephemeral



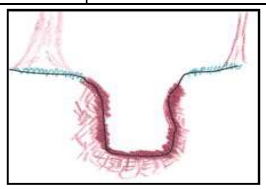
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ☐



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 2

Bank Condition

Left Bank Active Erosion: 20 % Right Bank Active Erosion: 10 % Average: 15

Bank Protection/Stabilization: ☐ Natural ☒ Artificial: Concrete armoring and some rip-rap

Score: 4

Sediment Deposition

☒ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☐ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 5

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

Left Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Power line ROW	0	Mix	High	1	60	0.6
2. Hay Field	0	Mix	Intensive	0.5	40	0.2
3.						
4.						
5.						
Left Bank Primary Buffer Subtotal: 0.8 **X 0.7 = Left Bank Primary Buffer Total** 0.56						
Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
1. Power line ROW	0	High		1	30	0.3
2. Hay Field	0	Intensive		0.5	70	0.35
3.						
4.						
5.						
Left Bank Secondary Buffer Subtotal: 0.65 **X 0.3 = Left Bank Secondary Buffet Total** 0.195						
Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 0.76						

Right Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Power line ROW	0	Mix	High	1	95	0.95
2. Manicured Sod	0	Mix	Intensive	0.5	5	0.025
3.						
4.						
5.						
Right Bank Primary Buffer Subtotal: 0.975 **X 0.7 = Right Bank Primary Buffer Total** 0.68						
Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
1. Parking lot	40	Complete		0	10	0
2. Power line ROW	0	High		1	80	0.8
3. Manicured Sod	0	Intensive		0.5	10	0.05
4.						
5.						
Right Bank Secondary Buffer Subtotal: 0.85 **X 0.3 = Right Bank Secondary Buffer Total** 0.255						
Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 0.935						

Stream ID/Name: S-4 SAR No.: 2

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder:	Gravel:	Fines (silt, clay, muck): 80	Artificial: 10	Large Woody Debris/Leaf Packs:
Cobble:	Sand: 10	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 1

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks			✓										
Overhanging Vegetation	✓	✓	✓	✓									
Rootmats			✓										
Rootwads													
Woody Debris/Leaf Packs													
Boulders/Cobbles													
Aquatic Macrophytes													
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present	1	1	3	1									
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)	✓	✓		✓									
Transect has 6-29% cover (2)			✓										
Transect has 30-50% cover (3)													
Transect has > 50% cover (4)													
Percent Cover Score	1	1	2	1									
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater													
Natural Step-pools													
Number Present	0	0	0	0									
Total Score	2	2	5	1									

Average: 2.5 **Score:** 2

HYDROLOGIC CONDITION

Flow Regime

☐ Noticeable surface flow present (4)
☒ Continual pool of water but lacking noticeable flow (3)
☐ Isolated pools and interstitial (subsurface) flow (2)
☐ Isolated pools and no evidence of surface or interstitial flow (1)
☐ Dry channel and no observable pools or interstitial flow (0)
Artificial / altered water source ☐ No ☐ Yes: _____

Score: 3

Channel Flow Status

☒ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 4

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☑ Fill/Impact (☐ Linear ☐ Non-linear) ☑ Mitigation/Conservation

Stream ID/Name: S-4 SAR No.: 3 Size (LF): 480 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,700 ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☑ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes: This SAR flows through a 60-85' wide wooded area with a dense tree canopy cover.

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 20'	Avg. Banks: 8'
Avg. Waters Edge: 4'	Avg. Water: 2'
Avg. OHWM: 6'	Avg. OHWM: 2.5'

Scoring Table

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Channel condition	Floodplain connectivity	2	Sum of metric scores / 15 x 30	22.0
	Bank condition	4		
	Sediment deposition	5		
Buffer condition	Composite buffer (left bank)	1.13	Sum of bank scores / 10 x 20	9.6
	Composite buffer (right bank)	3.68		
In-stream condition	Substrate composition	1	Sum of metric scores / 10 x 25	10.0
	In-stream habitat	3		
Hydrologic condition	Flow regime	3	Sum of metric scores / 8 x 25	21.9
	Channel flow status	4		
Sum of core element scores = overall TXRAM stream score				63.5
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				64

Representative Site Photograph:

At S-4-3 facing downstream (west). S-4-3 is characterized by a dense canopy of trees. Also, note the root wads and overhanging vegetation.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Stream ID/Name: S-4 SAR No.: 3 Size (LF): 480 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,700 ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☐ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

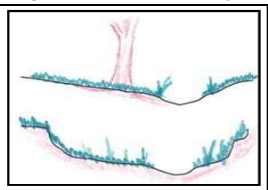
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank 20'	Avg. Banks: 8'
Avg. Waters Edge: 4'	Avg. Water: 2'
Avg. OHWM: 6'	Avg. OHWM: 2.5'

Notes: This SAR flows through a 60-85' wide wooded area with a dense tree canopy cover.

CHANNEL CONDITION

Floodplain Connectivity

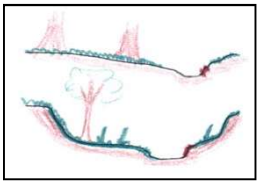
Perennial / Intermittent



6 / 5

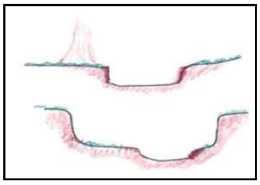
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ☐

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐



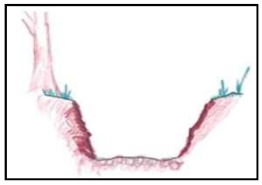
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☐



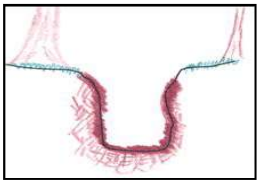
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☐



2

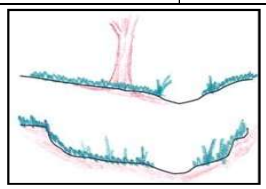
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ✓



1

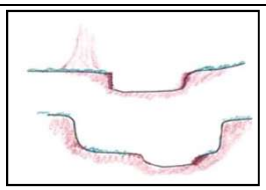
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ☐

Ephemeral



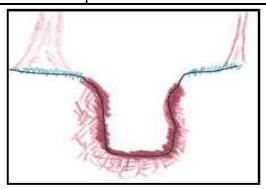
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ☐



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 2

Bank Condition

Left Bank Active Erosion: 20 % Right Bank Active Erosion: 5 % Average: 12.5

Bank Protection/Stabilization: ☒ Natural ☐ Artificial: _____

Score: 4

Sediment Deposition

☒ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☐ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 5

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.
Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

Left Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest Riparian	80	Native	Low	5	20	1
2. Hay Field	0	Mix	Intensive	0.5	80	0.4
3.						
4.						
5.						
Left Bank Primary Buffer Subtotal: 1.4 **X 0.7 = Left Bank Primary Buffer Total** 0.98						
Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
1. Hay Field	0	Intensive		0.5	100	0.5
2.						
3.						
4.						
5.						
Left Bank Secondary Buffer Subtotal: 0.5 **X 0.3 = Left Bank Secondary Buffet Total** 0.15						
Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 1.13						

Right Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest Riparian	85	Native	Low	5	70	3.5
2. Berm Road	10	Urban	Complete	0	10	0
3. PEM Wetland	10	Mix	Low	2	10	0.2
4. PSS Wetland	65	Mix	Low	4	10	0.4
5.						
Right Bank Primary Buffer Subtotal: 4.1 **X 0.7 = Right Bank Primary Buffer Total** 2.87						
Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
1. PEM Wetland	10	Low		3	85	2.55
2. Power line ROW	0	High		1	15	0.15
3.						
4.						
5.						
Right Bank Secondary Buffer Subtotal: 2.7 **X 0.3 = Right Bank Secondary Buffer Total** 0.81						
Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 3.68						

Stream ID/Name: S-4 SAR No.: 3

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder:	Gravel:	Fines (silt, clay, muck): 80	Artificial: 10	Large Woody Debris/Leaf Packs:
Cobble:	Sand: 10	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 1

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks	✓	✓	✓	✓	✓								
Overhanging Vegetation	✓		✓	✓									
Rootmats		✓			✓								
Rootwads													
Woody Debris/Leaf Packs													
Boulders/Cobbles													
Aquatic Macrophytes													
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present	2	2	2	2	2	1	2						
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)		✓			✓								
Transect has 6-29% cover (2)			✓	✓									
Transect has 30-50% cover (3)													
Transect has > 50% cover (4)	✓												
Percent Cover Score	4	1	2	2	1								
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater	✓	✓	✓	✓	✓								
Natural Step-pools													
Number Present	1	1	1	1	1								
Total Score	7	4	5	5	4								

Average: 5 **Score:** 3

HYDROLOGIC CONDITION

Flow Regime

☐ Noticeable surface flow present (4)
☒ Continual pool of water but lacking noticeable flow (3)
☐ Isolated pools and interstitial (subsurface) flow (2)
☐ Isolated pools and no evidence of surface or interstitial flow (1)
☐ Dry channel and no observable pools or interstitial flow (0)
Artificial / altered water source ☐ No ☐ Yes: _____

Score: 3

Channel Flow Status

☒ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 4

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☑ Fill/Impact (☐ Linear ☐ Non-linear) ☑ Mitigation/Conservation

Stream ID/Name: S-4 SAR No.: 4 Size (LF): 280 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,650 ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☑ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes: The upstream boundary of the SAR is where the stream exits an RCB, and the downstream edge is where water flows in from the OCP to the north.

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 15'	Avg. Banks: 6'
Avg. Waters Edge: 7'	Avg. Water: 0.5'
Avg. OHWM: 8'	Avg. OHWM: 1'

Scoring Table

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Channel condition	Floodplain connectivity	3	Sum of metric scores / 15 x 30	24.0
	Bank condition	5		
	Sediment deposition	4		
Buffer condition	Composite buffer (left bank)	1.1	Sum of bank scores / 10 x 20	8.1
	Composite buffer (right bank)	2.97		
In-stream condition	Substrate composition	2	Sum of metric scores / 10 x 25	12.5
	In-stream habitat	3		
Hydrologic condition	Flow regime	4	Sum of metric scores / 8 x 25	21.9
	Channel flow status	3		
Sum of core element scores = overall TXRAM stream score				66.5
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				67

Representative Site Photograph:

View upstream (east) along S-4-4. Note the overhanging vegetation and dense tree canopy cover.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☒ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Stream ID/Name: S-4 SAR No.: 4 Size (LF): 280 Date: 5/2/18 Evaluator(s): Mike Keenan & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,650 ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: Yes Representative: ☐ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

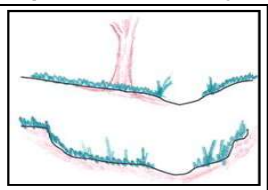
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank 15'	Avg. Banks: 6'
Avg. Waters Edge: 7'	Avg. Water: 0.5'
Avg. OHWM: 8'	Avg. OHWM: 1'

Notes: The upstream boundary of the SAR is where the stream exits an RCB, and the downstream edge is where water flows in from the OCP to the north.

CHANNEL CONDITION

Floodplain Connectivity

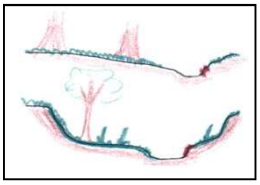
Perennial / Intermittent



6 / 5

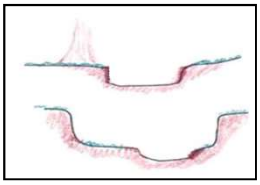
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ☐

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐



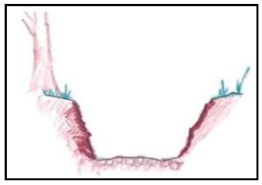
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☐



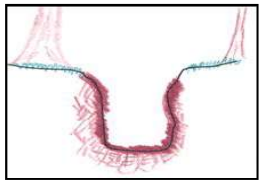
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☑



2

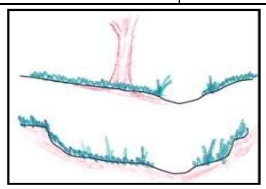
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ☐



1

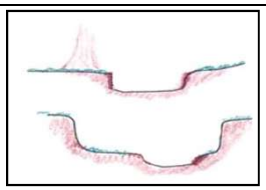
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ☐

Ephemeral



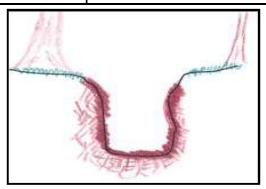
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ☐



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 3

Bank Condition

Left Bank Active Erosion: <10 % Right Bank Active Erosion: <10 % Average: <10

Bank Protection/Stabilization: ☒ Natural ☐ Artificial: _____

Score: 5

Sediment Deposition

☐ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☒ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☐ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 4

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

Left Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest Riparian	70	Native	Low	5	25	1.25
2. Hay Field	0	Mix	Intensive	0.5	50	0.25
3. Road	2	Urban	Complete	0	25	0
4.						
5.						
Left Bank Primary Buffer Subtotal: 1.5 **X 0.7 = Left Bank Primary Buffer Total** 1.05						

Secondary Buffer Type	*Canopy Cover*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Hay Field	0	Intensive	0.5	15	0.075
2. Road	2	Complete	0	70	0
3. Manicured Sod	0	Intensive	0.5	15	0.075
4.					
5.					
Left Bank Secondary Buffer Subtotal: 0.15 **X 0.3 = Left Bank Secondary Buffet Total** 0.05					
Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 1.1					

Right Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest Riparian	70	Native	Low	5	60	3
2. Maintained Berm	0	Mix	Intensive	0.5	35	0.175
3. PEM Wetland	5	Mix	Low	2	5	0.1
4.						
5.						
Right Bank Primary Buffer Subtotal: 3.275 **X 0.7 = Right Bank Primary Buffer Total** 2.29						

Secondary Buffer Type	*Canopy Cover*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Maintained Berm	0	Intensive	0.5	30	0.15
2. PEM Wetland	5	Low	3	70	2.1
3.					
4.					
5.					
Right Bank Secondary Buffer Subtotal: 2.25 **X 0.3 = Right Bank Secondary Buffer Total** 0.675					
Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 2.97					

Stream ID/Name: S-4 SAR No.: 4

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder: 5	Gravel: 15	Fines (silt, clay, muck): 60	Artificial:	Large Woody Debris/Leaf Packs:
Cobble:	Sand: 20	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 2

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks		✓											
Overhanging Vegetation		✓											
Rootmats	✓	✓											
Rootwads													
Woody Debris/Leaf Packs													
Boulders/Cobbles													
Aquatic Macrophytes													
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present	1	3	3										
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)			✓										
Transect has 1-5% cover (1)	✓												
Transect has 6-29% cover (2)		✓											
Transect has 30-50% cover (3)													
Transect has > 50% cover (4)													
Percent Cover Score	1	2	1	1									
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater	✓	✓	✓										
Natural Step-pools													
Number Present	1	1	1										
Total Score	3	6	7										

Average: 5.3 **Score:** 3

HYDROLOGIC CONDITION

Flow Regime

- ☒ Noticeable surface flow present (4)
- ☐ Continual pool of water but lacking noticeable flow (3)
- ☐ Isolated pools and interstitial (subsurface) flow (2)
- ☐ Isolated pools and no evidence of surface or interstitial flow (1)
- ☐ Dry channel and no observable pools or interstitial flow (0)

Artificial / altered water source ☐ No ☐ Yes: _____

Score: 4

Channel Flow Status

- ☐ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
- ☒ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
- ☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
- ☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
- ☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 3

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Reference Project Type: ☐ Fill/Impact (☐ Linear ☐ Non-linear) ☑ Mitigation/Conservation

Stream ID/Name: RS-1 SAR No.: 1 Size (LF): 693 Date: 4/4/19 Evaluator(s): John Wooten & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,450 ac

Aerial Photo Date and Source: Google Imagery 2019 Site Photos: Yes Representative: ☑ Yes ☐ No

Stressor(s): Trail; trash Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes: Urban stream with trash/mixed substrate. Trail on north side of the stream.

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 30	Avg. Banks: 6
Avg. Waters Edge: 8	Avg. Water: 1
Avg. OHWM: 12	Avg. OHWM: 3

Scoring Table

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Channel condition	Floodplain connectivity	4	Sum of metric scores / 15 x 30	28.0
	Bank condition	5		
	Sediment deposition	5		
Buffer condition	Composite buffer (left bank)	2.70	Sum of bank scores / 10 x 20	10.4
	Composite buffer (right bank)	2.51		
In-stream condition	Substrate composition	5	Sum of metric scores / 10 x 25	22.5
	In-stream habitat	4		
Hydrologic condition	Flow regime	4	Sum of metric scores / 8 x 25	25.0
	Channel flow status	4		
Sum of core element scores = overall TXRAM stream score				85.9
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				0.0
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				86

Representative Site Photograph:

Note the shallow channel with wide floodplain benches.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Dudley Branch Reference Project Type: ☐ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Stream ID/Name: RS-1 SAR No.: 1 Size (LF): 693 Date: 4/4/19 Evaluator(s): John Wooten & Brandon Tate

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☒ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,450 ac

Aerial Photo Date and Source: Google Imagery 2019 Site Photos: Yes Representative: ☑ Yes ☐ No

Stressor(s): Trail; trash Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

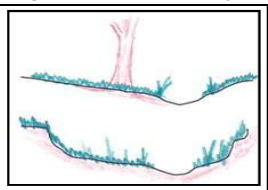
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank 30	Avg. Banks: 6
Avg. Waters Edge: 8	Avg. Water: 1
Avg. OHWM: 12	Avg. OHWM: 3

Notes: Urban stream with trash/mixed substrate. Trail on north side of the stream.

CHANNEL CONDITION

Floodplain Connectivity

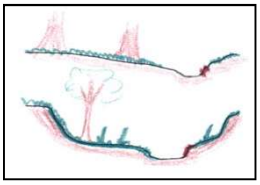
Perennial / Intermittent



6 / 5

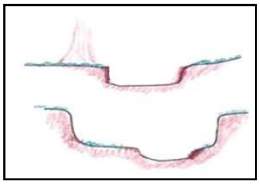
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ☐

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐



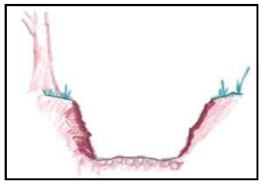
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☑



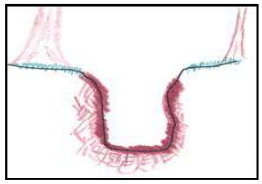
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☐



2

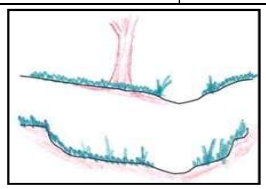
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ☐



1

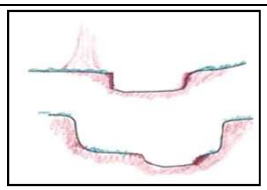
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ☐

Ephemeral



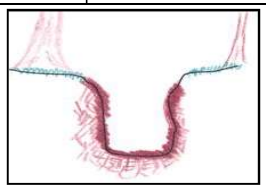
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ☐



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 4

Bank Condition

Left Bank Active Erosion: 5 % Right Bank Active Erosion: 5 % Average: 5

Bank Protection/Stabilization: ☒ Natural ☐ Artificial: _____

Score: 5

Sediment Deposition

☒ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☐ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 5

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

	Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
Left Bank	1. Wooded Riparian	85	Native	Low	5	50	2.5
	2. Pasture	5	Mixed	Moderate	1	50	0.5
	3.						0
	4.						0
	5.						0
	Left Bank Primary Buffer Subtotal: 3.0 **X 0.7 = Left Bank Primary Buffer Total** 2.10						
	Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
	1. Pasture	0	Moderate		2	100	2
	2.						0
	3.						0
	4.						0
	5.						0
	Left Bank Secondary Buffer Subtotal: 2.00 **X 0.3 = Left Bank Secondary Buffet Total** 0.60						
	Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 2.70						
Right Bank	*Primary Buffer Type*	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
	1. Wooded Riparian	65	Native	low	5	70	3.5
	2. Trail and Cut off RZ	10	Undesirable	complete	0	30	0
	3.						0
	4.						0
	5.						0
	Right Bank Primary Buffer Subtotal: 3.50 **X 0.7 = Right Bank Primary Buffer Total** 2.45						
	Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
	1. Trail and Cut off RZ	10	Complete		0	95	0
	2. Wooded Riparian	65	Moderate		4	5	0.2
	3.						0
	4.						0
	5.						0
	Right Bank Secondary Buffer Subtotal: 0.20 **X 0.3 = Right Bank Secondary Buffer Total** 0.06						
	Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 2.51						

Stream ID/Name: RS-1 SAR No.: 1

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder:	Gravel: 60	Fines (silt, clay, muck): 10	Artificial:	Large Woody Debris/Leaf Packs:
Cobble: 15	Sand: 15	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 5

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks		✓			✓	✓	✓						
Overhanging Vegetation				✓	✓		✓						
Rootmats	✓	✓	✓	✓	✓	✓	✓	✓					
Rootwads	✓	✓		✓	✓	✓	✓						
Woody Debris/Leaf Packs													
Boulders/Cobbles			✓	✓									
Aquatic Macrophytes													
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present	2	3	2	4	4	3	4	1					
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)	✓	✓					✓	✓					
Transect has 6-29% cover (2)					✓	✓							
Transect has 30-50% cover (3)			✓										
Transect has > 50% cover (4)				✓									
Percent Cover Score	1	1	3	4	2	2	1	1					
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence		✓	✓	✓		✓	✓	✓					
Canopy Cover 70% or Greater		✓		✓	✓	✓		✓					
Natural Step-pools													
Number Present	0	2	1	2	1	2	1	2					
Total Score	3	6	6	10	7	7	6	4					

Average: 6.1 **Score:** 4

HYDROLOGIC CONDITION

Flow Regime

- ☒ Noticeable surface flow present (4)
- ☐ Continual pool of water but lacking noticeable flow (3)
- ☐ Isolated pools and interstitial (subsurface) flow (2)
- ☐ Isolated pools and no evidence of surface or interstitial flow (1)
- ☐ Dry channel and no observable pools or interstitial flow (0)

Artificial / altered water source ☐ No ☐ Yes: _____

Score: 4

Channel Flow Status

- ☒ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
- ☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
- ☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
- ☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
- ☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 4

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☐ Fill/Impact (☐ Linear ☐ Non-linear) ☑ Mitigation/Conservation

Stream ID/Name: Restored Dudley Branch SAR No.: 1 Size (LF): 1,586 Date: N/A Evaluator(s): HDR Inc.

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☐ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,650 ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: N/A Representative: ☐ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes: See section 2.2.1 of TXRAM Report (Attachment E).

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 45	Avg. Banks: 4
Avg. Waters Edge: 16.75	Avg. Water: 1.5
Avg. OHWM: 19	Avg. OHWM: 3

Scoring Table

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Channel condition	Floodplain connectivity	5	Sum of metric scores / 15 x 30	30.0
	Bank condition	5		
	Sediment deposition	5		
Buffer condition	Composite buffer (left bank)	3.86	Sum of bank scores / 10 x 20	14.9
	Composite buffer (right bank)	3.58		
In-stream condition	Substrate composition	3	Sum of metric scores / 10 x 25	17.5
	In-stream habitat	4		
Hydrologic condition	Flow regime	4	Sum of metric scores / 8 x 25	25.0
	Channel flow status	4		
Sum of core element scores = overall TXRAM stream score				87.4
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☑ ☑ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				4.4
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				92

Representative Site Photograph:

[Insert Photograph]	See stream design figures in Attachment E and Attachment I Appendix B.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Dudley Branch Project Type: ☐ Fill/Impact (☐ Linear ☐ Non-linear) ☒ Mitigation/Conservation

Stream ID/Name: Restored Dudley Branch SAR No.: 1 Size (LF): 1,586 Date: N/A Evaluator(s): HDR Inc.

Stream Type: Perennial Ecoregion: Texas Blackland Prairies Delineation Performed: ☐ Previously ☐ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): developed Watershed Size: ~2,650 ac

Aerial Photo Date and Source: Google Imagery 2018 Site Photos: N/A Representative: ☐ Yes ☐ No

Stressor(s): Urban setting Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

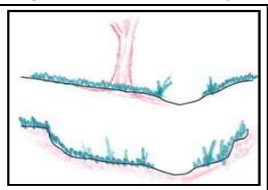
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank 45	Avg. Banks: 4
Avg. Waters Edge: 16.75	Avg. Water: 1.5
Avg. OHWM: 19	Avg. OHWM: 3

Notes: See section 2.2.1 of TXRAM Report (Attachment E).

CHANNEL CONDITION

Floodplain Connectivity

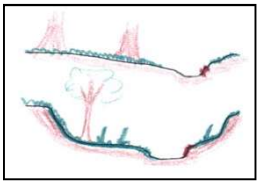
Perennial / Intermittent



6 / 5

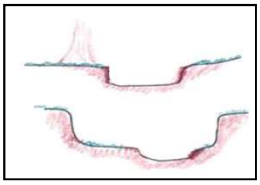
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ✓

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐



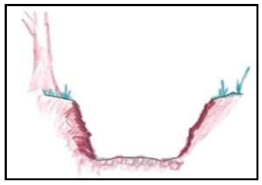
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☐



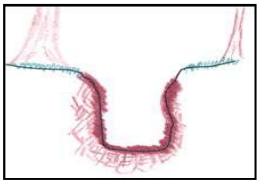
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☐



2

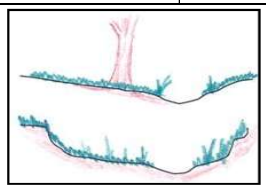
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ☐



1

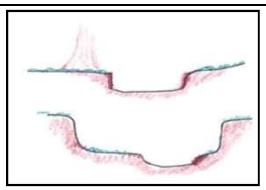
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ☐

Ephemeral



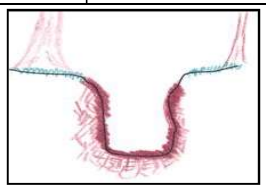
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ☐



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 5

Stream ID/Name: Restored Dudley Branch SAR No.: 1

Bank Condition

Left Bank Active Erosion: 5 % Right Bank Active Erosion: 5 % Average: 5

Bank Protection/Stabilization: ☒ Natural ☐ Artificial: _____

Score: 5

Sediment Deposition

☒ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☐ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 5

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

Left Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. PFO/Woodland	90	native	low	5	78	3.9
2. Transmission ROW	0	mixed	high	1	19	0.19
3. Grassland	0	native	Intensive	0.5	3	0.015
4.						0
5.						0
Left Bank Primary Buffer Subtotal: 4.1 **X 0.7 = Left Bank Primary Buffer Total** 2.87						
Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
1. PFO/Woodland	90	low		5	60	3
2. Transmission ROW	0	high		1	20	0.2
3. Grassland	0	Intensive		0.5	20	0.1
4.						0
5.						0
Left Bank Secondary Buffer Subtotal: 3.30 **X 0.3 = Left Bank Secondary Buffet Total** 0.99						
Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 3.86						

Right Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. PFO/Woodland	90	native	low	5	67	3.35
2. Transmission ROW	0	mixed	high	1	33	0.33
3.						0
4.						0
5.						0
Right Bank Primary Buffer Subtotal: 3.68 **X 0.7 = Right Bank Primary Buffer Total** 2.58						
Secondary Buffer Type	*Canopy Cover*	*Land Use*		*Score*	*Percentage of Area*	*Subtotal*
1. PFO/Woodland	90	low		5	59	2.95
2. Transmission ROW	0	high		1	40	0.4
3. Parking lot	0	complete		0	1	0
4.						0
5.						0
Right Bank Secondary Buffer Subtotal: 3.35 **X 0.3 = Right Bank Secondary Buffer Total** 1.01						
Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 3.58						

Stream ID/Name: Restored Dudley Branch SAR No.: 1

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder: 5	Gravel: 10	Fines (silt, clay, muck): 60	Artificial:	Large Woody Debris/Leaf Packs:
Cobble: 10	Sand: 15	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 3

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks													
Overhanging Vegetation													
Rootmats													
Rootwads													
Woody Debris/Leaf Packs													
Boulders/Cobbles													
Aquatic Macrophytes													
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present													
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-29% cover (2)													
Transect has 30-50% cover (3)													
Transect has > 50% cover (4)													
Percent Cover Score													
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater													
Natural Step-pools													
Number Present													
Total Score	0	0	0	0	0	0	0	0	0	0	0	0	0

this metric is based off of the reference scores only* Average: 5 to 6 **Score: 4

HYDROLOGIC CONDITION

Flow Regime

- ☒ Noticeable surface flow present (4)
- ☐ Continual pool of water but lacking noticeable flow (3)
- ☐ Isolated pools and interstitial (subsurface) flow (2)
- ☐ Isolated pools and no evidence of surface or interstitial flow (1)
- ☐ Dry channel and no observable pools or interstitial flow (0)

Artificial / altered water source ☐ No ☐ Yes: _____

Score: 4

Channel Flow Status

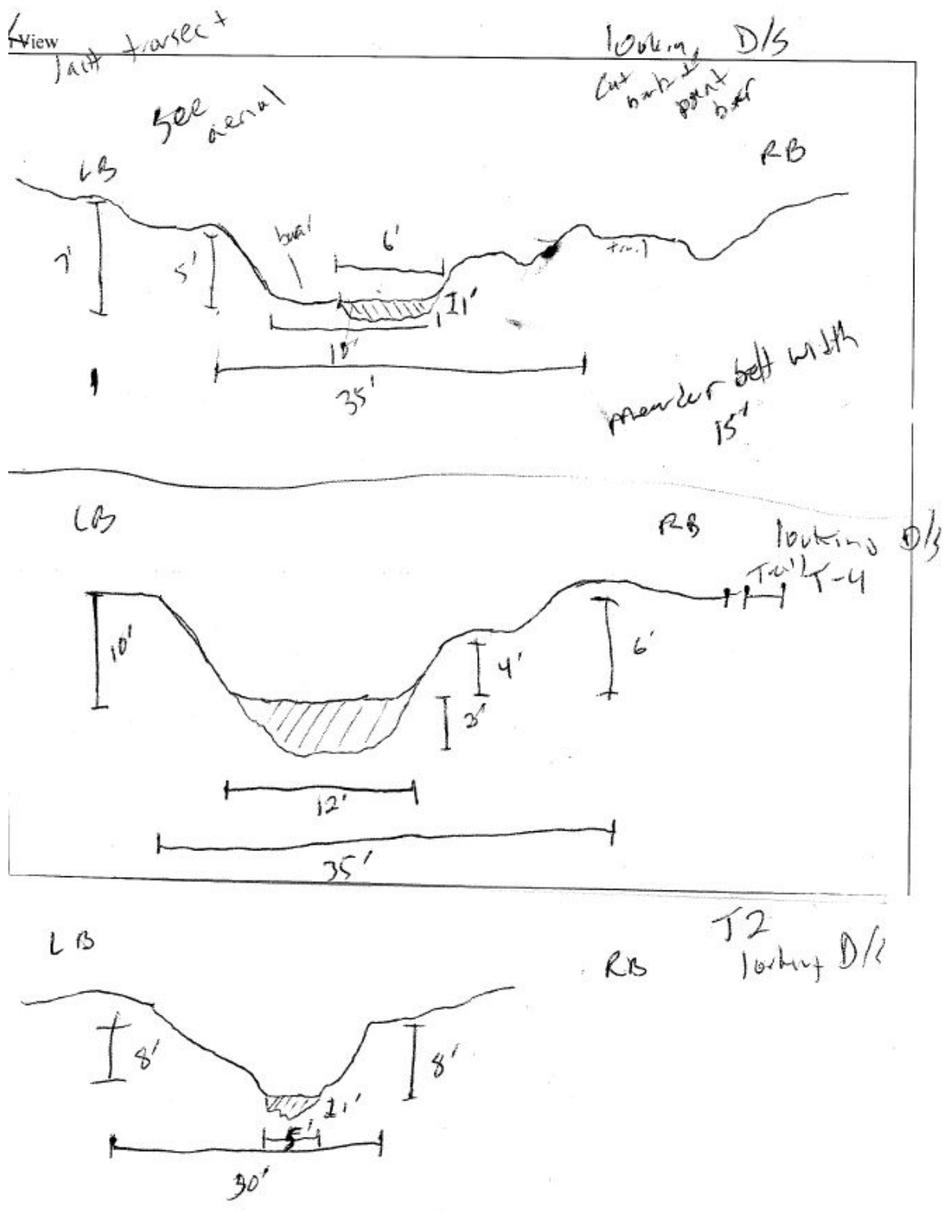
- ☒ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
- ☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
- ☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
- ☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
- ☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 4

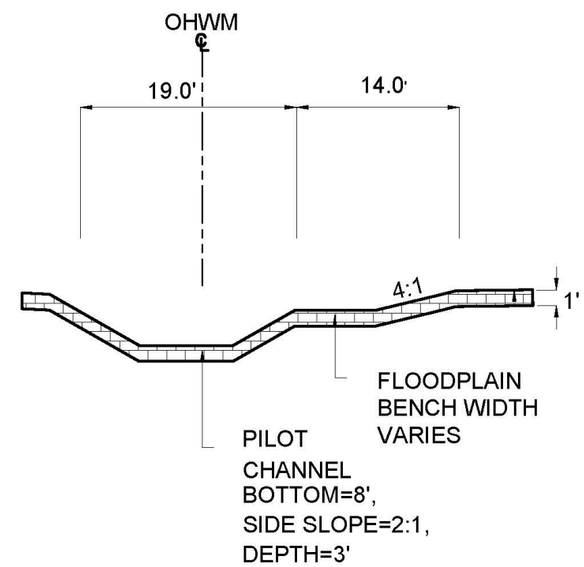
Attachment 2: Figures

Cross Section Design Comparison

REFERENCE REACH FIELD-DRAW CROSS SECTIONS

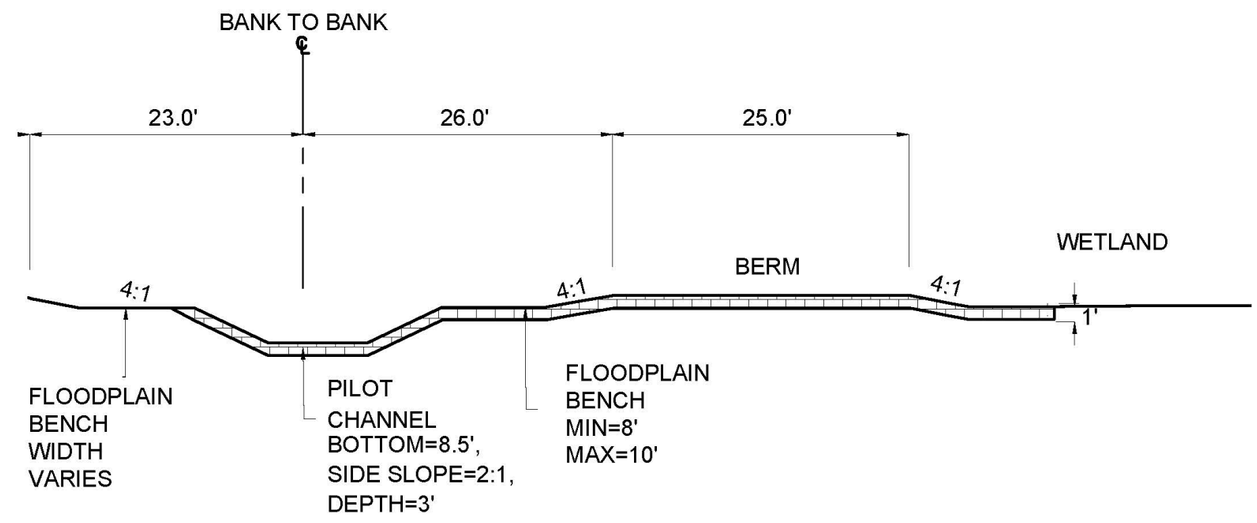


DESIGN CROSS SECTIONS

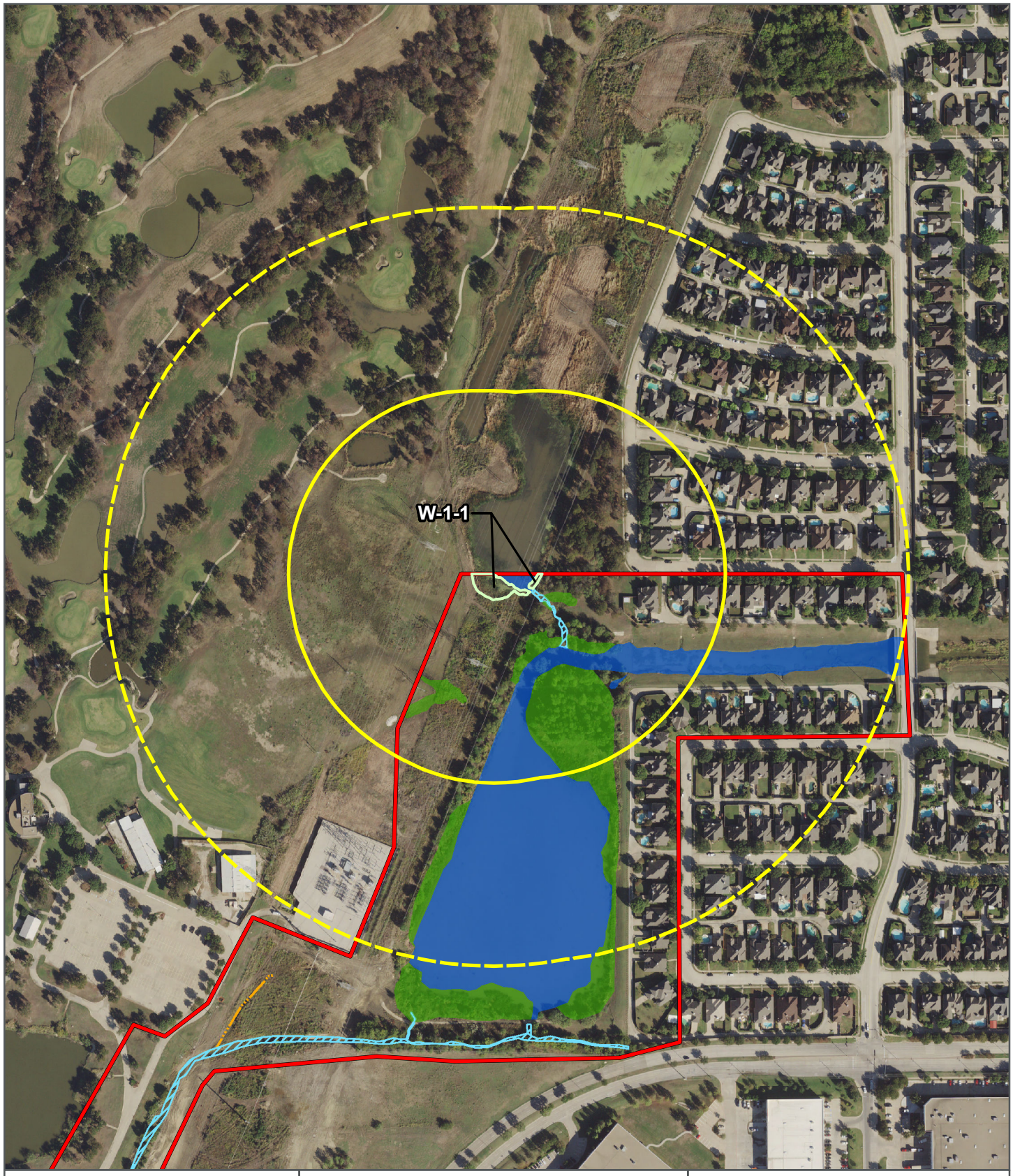


NOTES:

1. SECTION VIEW IS LOOKING DOWNSTREAM.



Wetland Assessment Areas (WAAs)



N

0 250 500
FEET

WATERS OF THE U.S.
- PERENNIAL STREAM
- WAA BOUNDARY
- WETLAND
- POND

NOT WATERS OF THE U.S.
- STUDY AREA
- NON-JURISDICTIONAL DRAINAGE
- AREA 1000 FT FROM WAA
- AREA 500 FT FROM WAA

CARROLLTON TEXAS

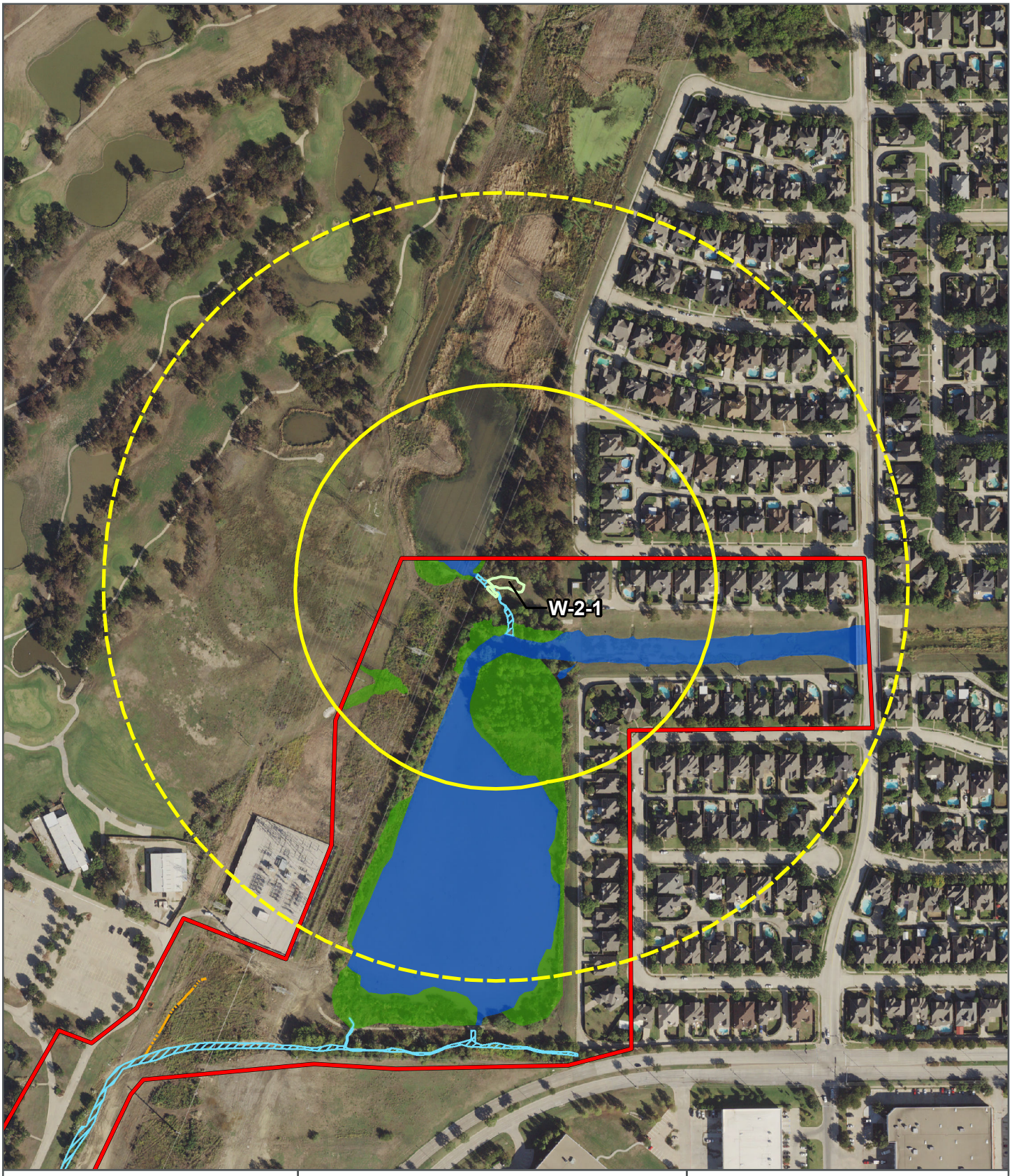
HDR

WAAs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 2-1

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG2_TXRAM_WAAS_8X11.MXD - USER: WKEENAN - DATE: 3/25/2020



N

0 250 500
FEET

WATERS OF THE U.S.

- PERENNIAL STREAM
- WAA BOUNDARY
- WETLAND
- POND

NOT WATERS OF THE U.S.

- STUDY AREA
- NON-JURISDICTIONAL DRAINAGE
- AREA 1000 FT FROM WAA
- AREA 500 FT FROM WAA

CARROLLTON TEXAS

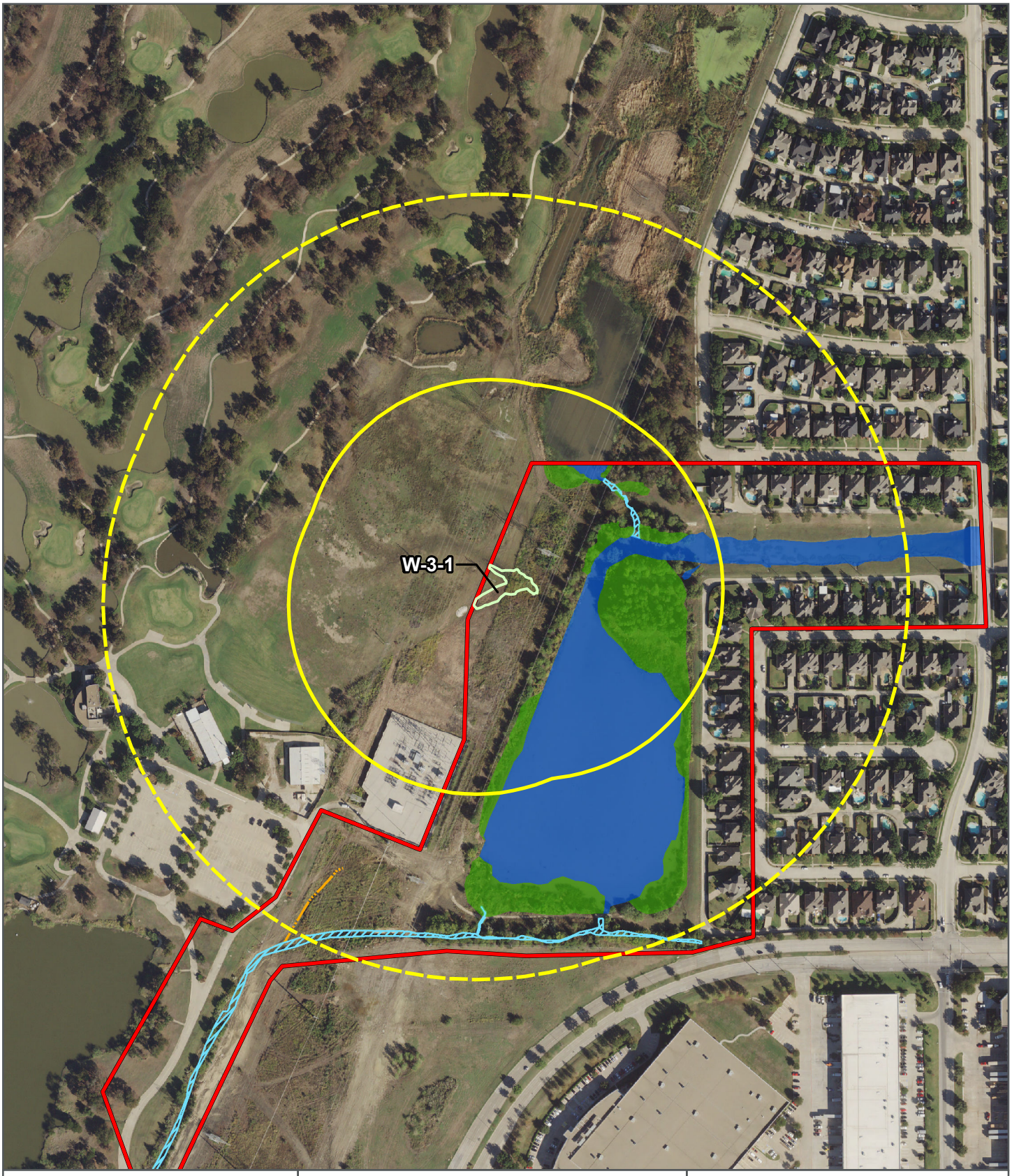
HDR

WAAs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 2-2

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG2_TXRAM_WAAS_8X11.MXD - USER: WKEENAN - DATE: 3/25/2020



N

0 250 500
FEET

WATERS OF THE U.S.
- PERENNIAL STREAM
- WAA BOUNDARY
- WETLAND
- POND

NOT WATERS OF THE U.S.
- STUDY AREA
- NON-JURISDICTIONAL DRAINAGE
- AREA 1000 FT FROM WAA
- AREA 500 FT FROM WAA

CARROLLTON TEXAS

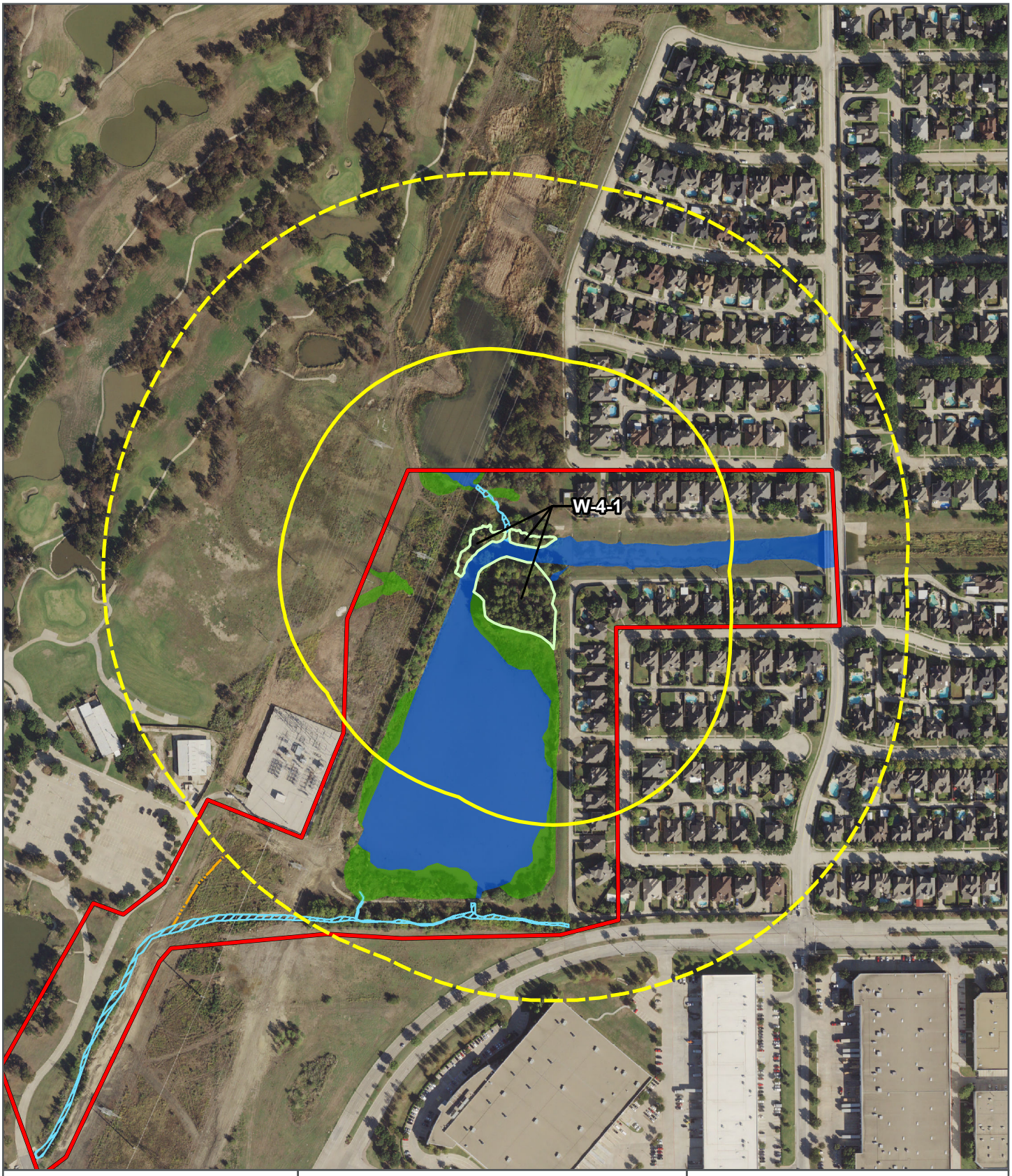
HDR

WAAs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 2-3

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG2_TXRAM_WAAS_8X11.MXD - USER: WKEENAN - DATE: 3/25/2020



N

0 250 500
FEET

WATERS OF THE U.S.
- PERENNIAL STREAM
- WAA BOUNDARY
- WETLAND
- POND

NOT WATERS OF THE U.S.
- STUDY AREA
- NON-JURISDICTIONAL DRAINAGE
- AREA 1000 FT FROM WAA
- AREA 500 FT FROM WAA

CARROLLTON TEXAS

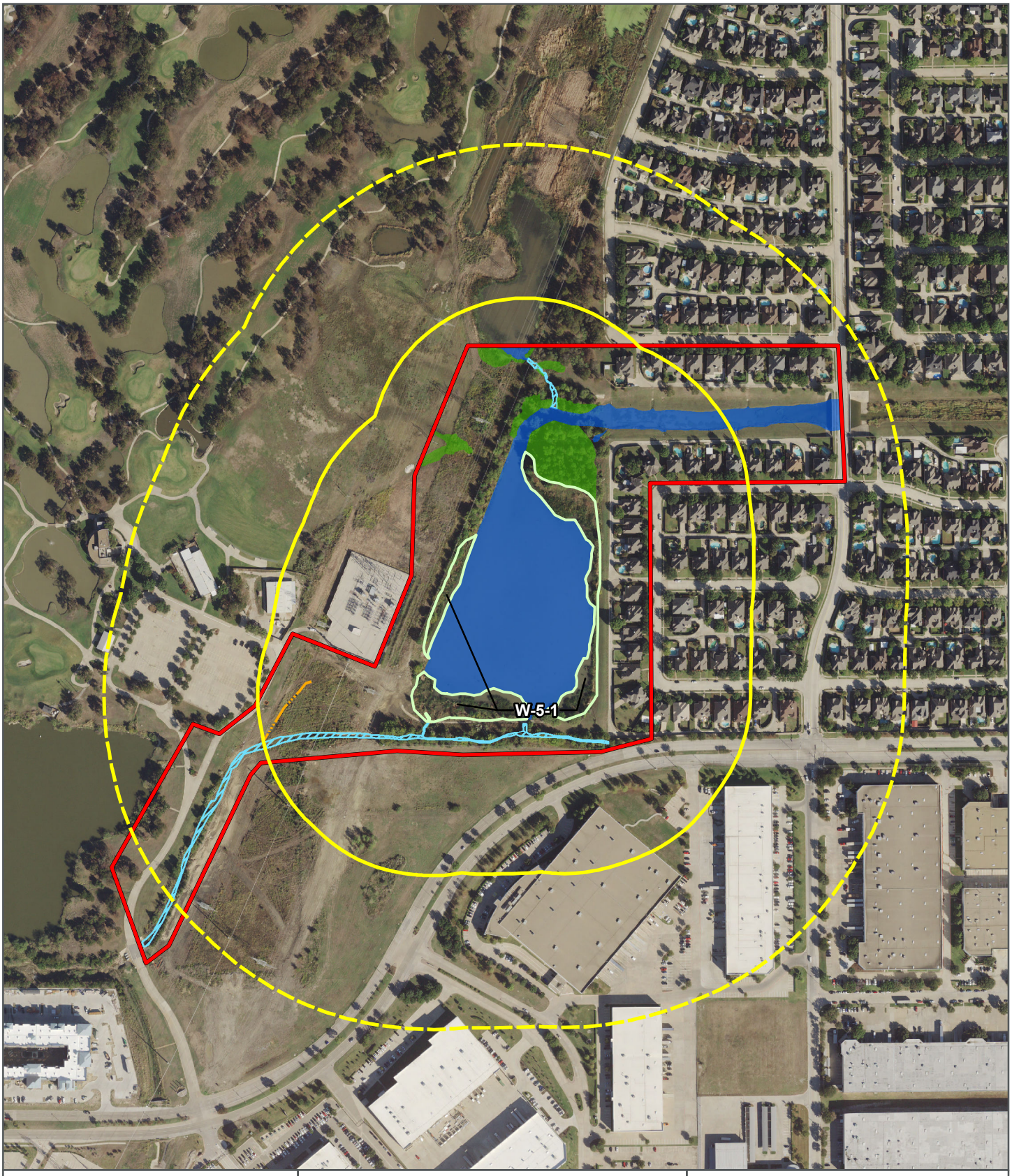
HDR

WAAs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 2-4

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG2_TXRAM_WAAS_8X11.MXD - USER: WKEENAN - DATE: 3/25/2020



N

0 250 500
FEET

WATERS OF THE U.S.

- PERENNIAL STREAM
- WAA BOUNDARY
- WETLAND
- POND

NOT WATERS OF THE U.S.

- STUDY AREA
- NON-JURISDICTIONAL DRAINAGE
- AREA 1000 FT FROM WAA
- AREA 500 FT FROM WAA

CARROLLTON TEXAS

HDR

WAAs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 2-5

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG2_TXRAM_WAAS_8X11.MXD - USER: WKEENAN - DATE: 3/25/2020

Stream Assessment Reaches (SARs)

N

0 50 100
FEET

WATERS OF THE U.S.
- SAR
- STREAM
- WETLAND
- POND

NOT WATERS OF THE U.S.
- STUDY AREA
- SAR PRIMARY BUFFER
- SAR SECONDARY BUFFER
- NON-JURISDICTIONAL DRAINAGE

CARROLLTON TEXAS

HDR

SARs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 3-1

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG3_TXRAM_SARS_8X11.MXD - USER: KNAGY - DATE: 3/24/2020

N

0 50 100
FEET

WATERS OF THE U.S.
- SAR
- STREAM
- WETLAND
- POND

NOT WATERS OF THE U.S.
- STUDY AREA
- SAR PRIMARY BUFFER
- SAR SECONDARY BUFFER
- NON-JURISDICTIONAL DRAINAGE

CARROLLTON TEXAS

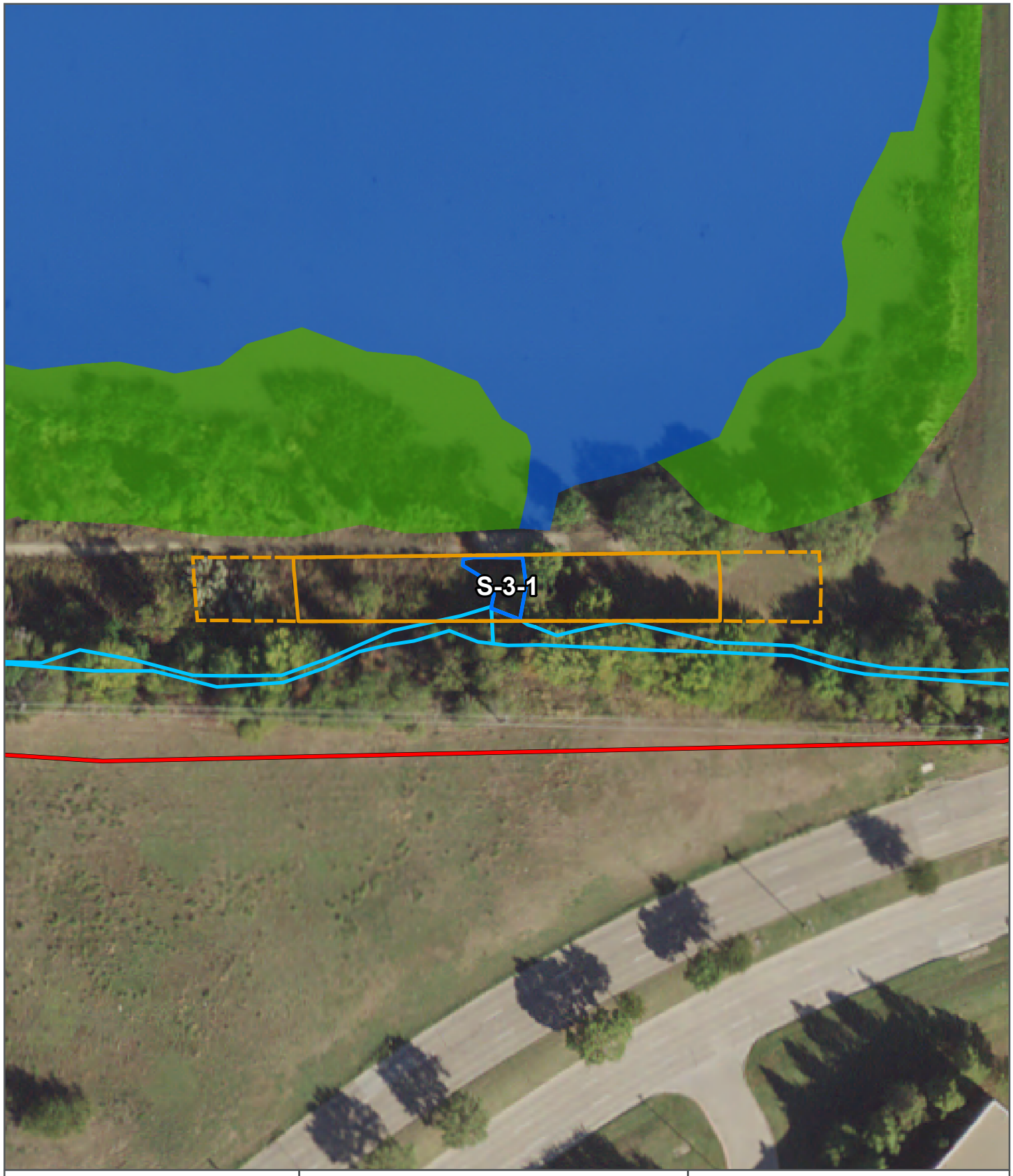
HDR

SARs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 3-2

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG3_TXRAM_SARS_8X11.MXD - USER: KNAGY - DATE: 3/24/2020



N

0 50 100
FEET

WATERS OF THE U.S.
- SAR
- STREAM
- WETLAND
- POND

NOT WATERS OF THE U.S.
- STUDY AREA
- SAR PRIMARY BUFFER
- SAR SECONDARY BUFFER
- NON-JURISDICTIONAL DRAINAGE

CARROLLTON TEXAS

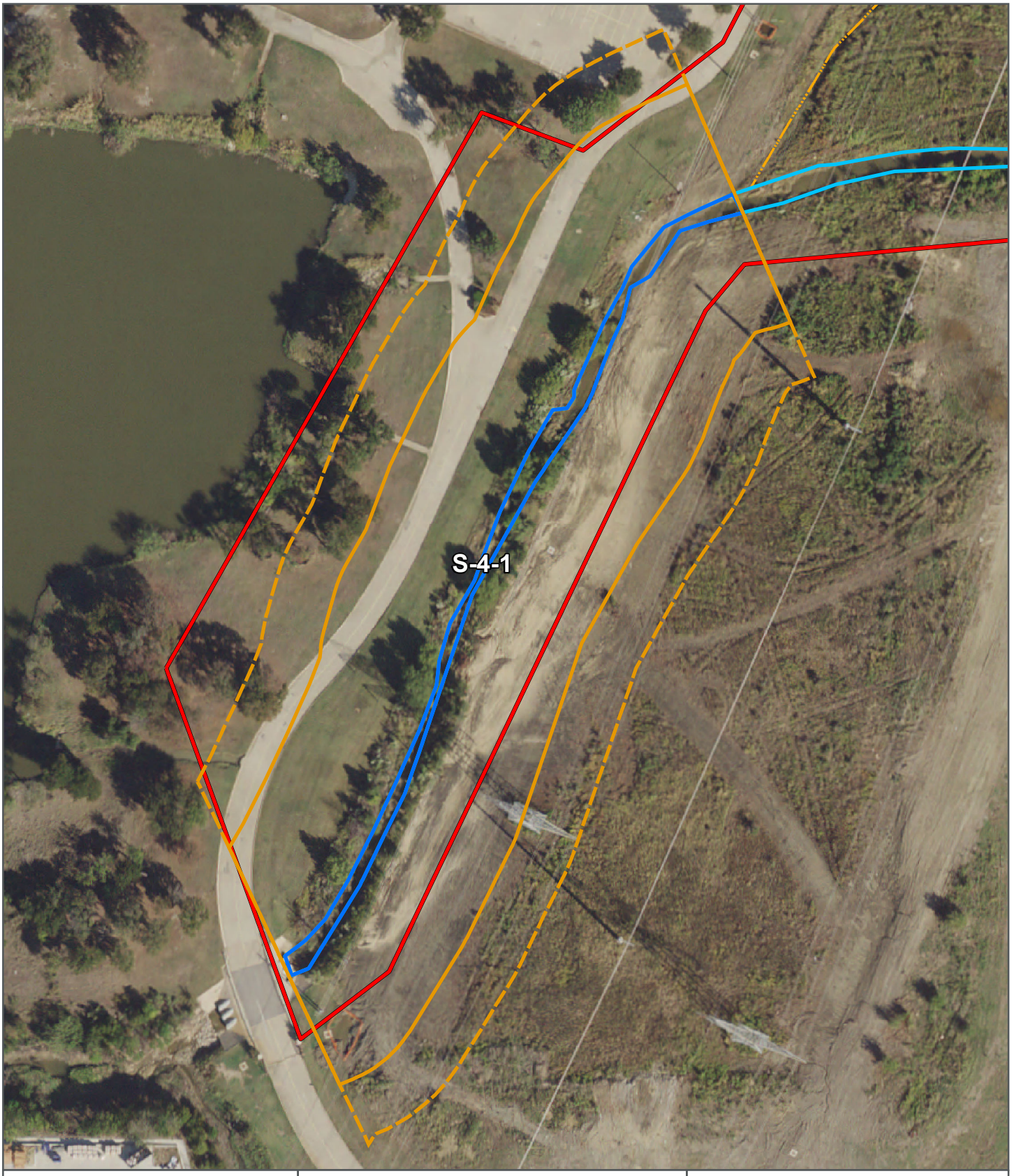
HDR

SARs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 3-3

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG3_TXRAM_SARS_8X11.MXD - USER: KNAGY - DATE: 3/24/2020



N

0 50 100
FEET

WATERS OF THE U.S.
- SAR
- STREAM
- WETLAND
- POND

NOT WATERS OF THE U.S.
- STUDY AREA
- SAR PRIMARY BUFFER
- SAR SECONDARY BUFFER
- NON-JURISDICTIONAL DRAINAGE

CARROLLTON TEXAS

HDR

SARs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 3-4

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG3_TXRAM_SARS_8X11.MXD - USER: KNAGY - DATE: 3/24/2020

N

0 50 100
FEET

WATERS OF THE U.S.
- SAR
- STREAM
- WETLAND
- POND

NOT WATERS OF THE U.S.
- STUDY AREA
- SAR PRIMARY BUFFER
- SAR SECONDARY BUFFER
- NON-JURISDICTIONAL DRAINAGE

CARROLLTON TEXAS

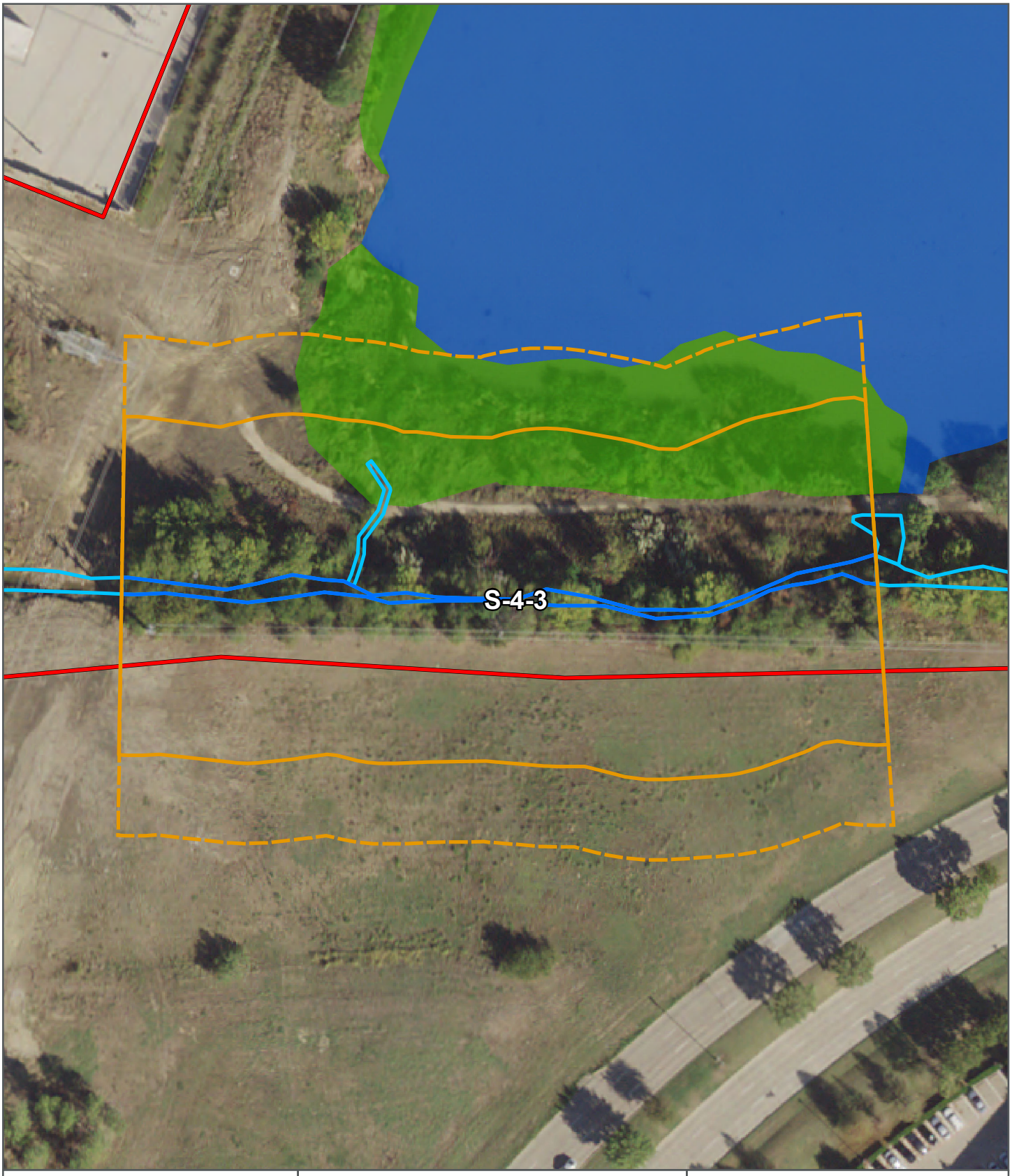
HDR

SARs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 3-5

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG3_TXRAM_SARS_8X11.MXD - USER: KNAGY - DATE: 3/24/2020



N

0 50 100
FEET

WATERS OF THE U.S.
- SAR
- STREAM
- WETLAND
- POND

NOT WATERS OF THE U.S.
- STUDY AREA
- SAR PRIMARY BUFFER
- SAR SECONDARY BUFFER
- NON-JURISDICTIONAL DRAINAGE

CARROLLTON TEXAS

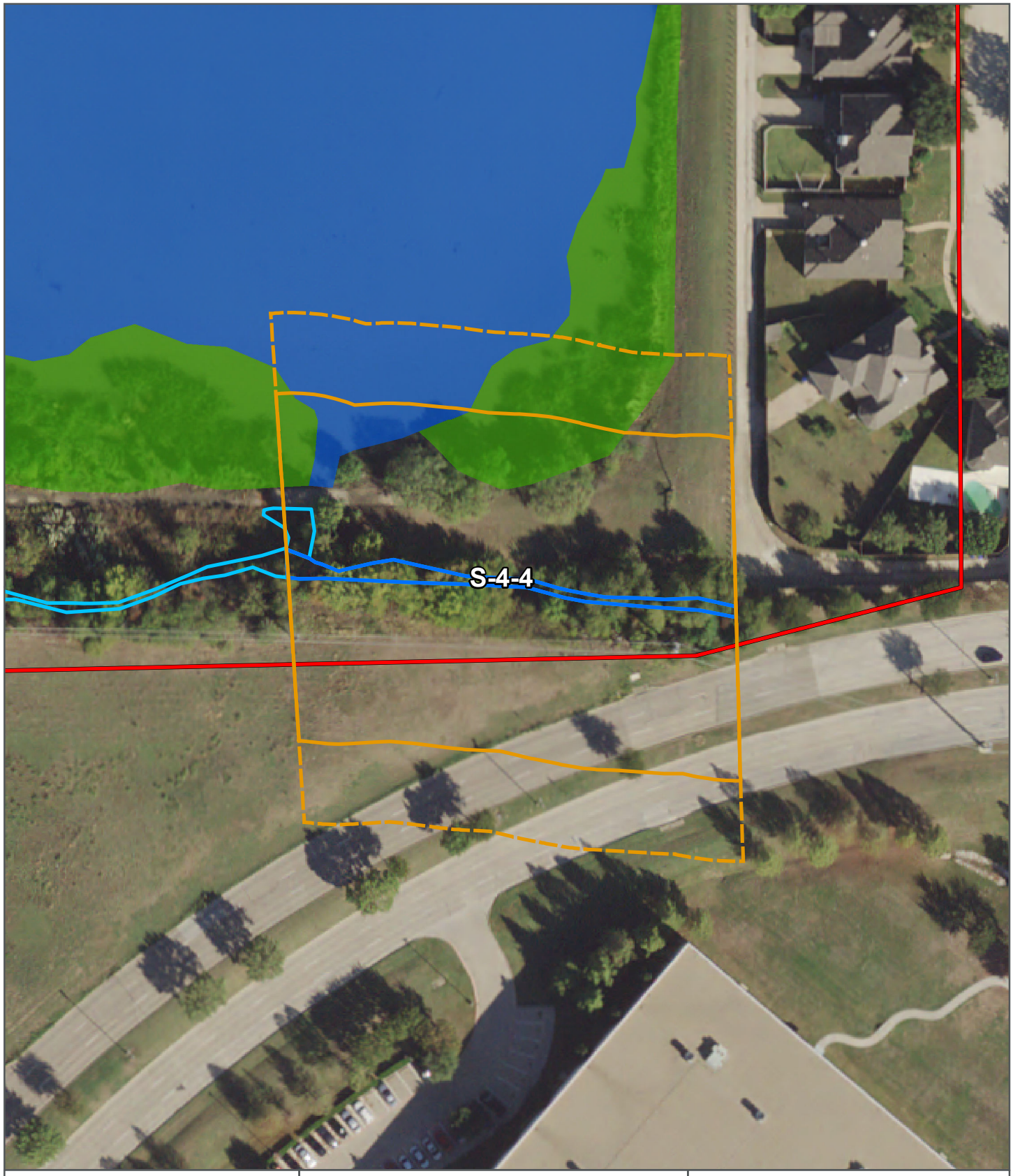
HDR

SARs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 3-6

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG3_TXRAM_SARS_8X11.MXD - USER: KNAGY - DATE: 3/24/2020



N

0 50 100
FEET

WATERS OF THE U.S.
- SAR
- STREAM
- WETLAND
- POND

NOT WATERS OF THE U.S.
- STUDY AREA
- SAR PRIMARY BUFFER
- SAR SECONDARY BUFFER
- NON-JURISDICTIONAL DRAINAGE

CARROLLTON TEXAS

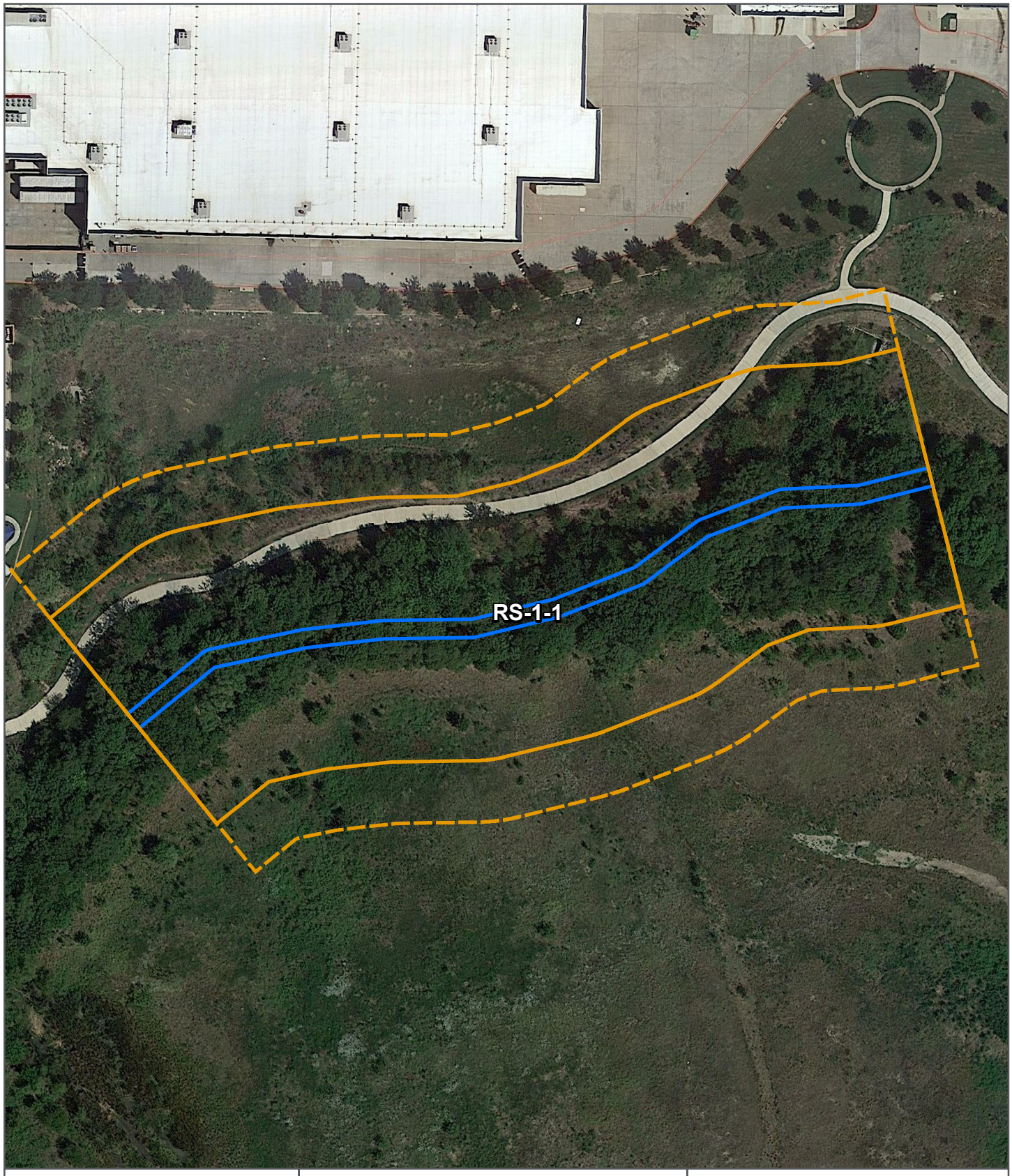
HDR

SARs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 3-7

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG3_TXRAM_SARS_8X11.MXD - USER: KNAGY - DATE: 3/24/2020



N

0 50 100
FEET

WATERS OF THE U.S.

SAR

NOT WATERS OF THE U.S.

SAR PRIMARY BUFFER

SAR SECONDARY BUFFER

CARROLLTON
TEXAS

HDR

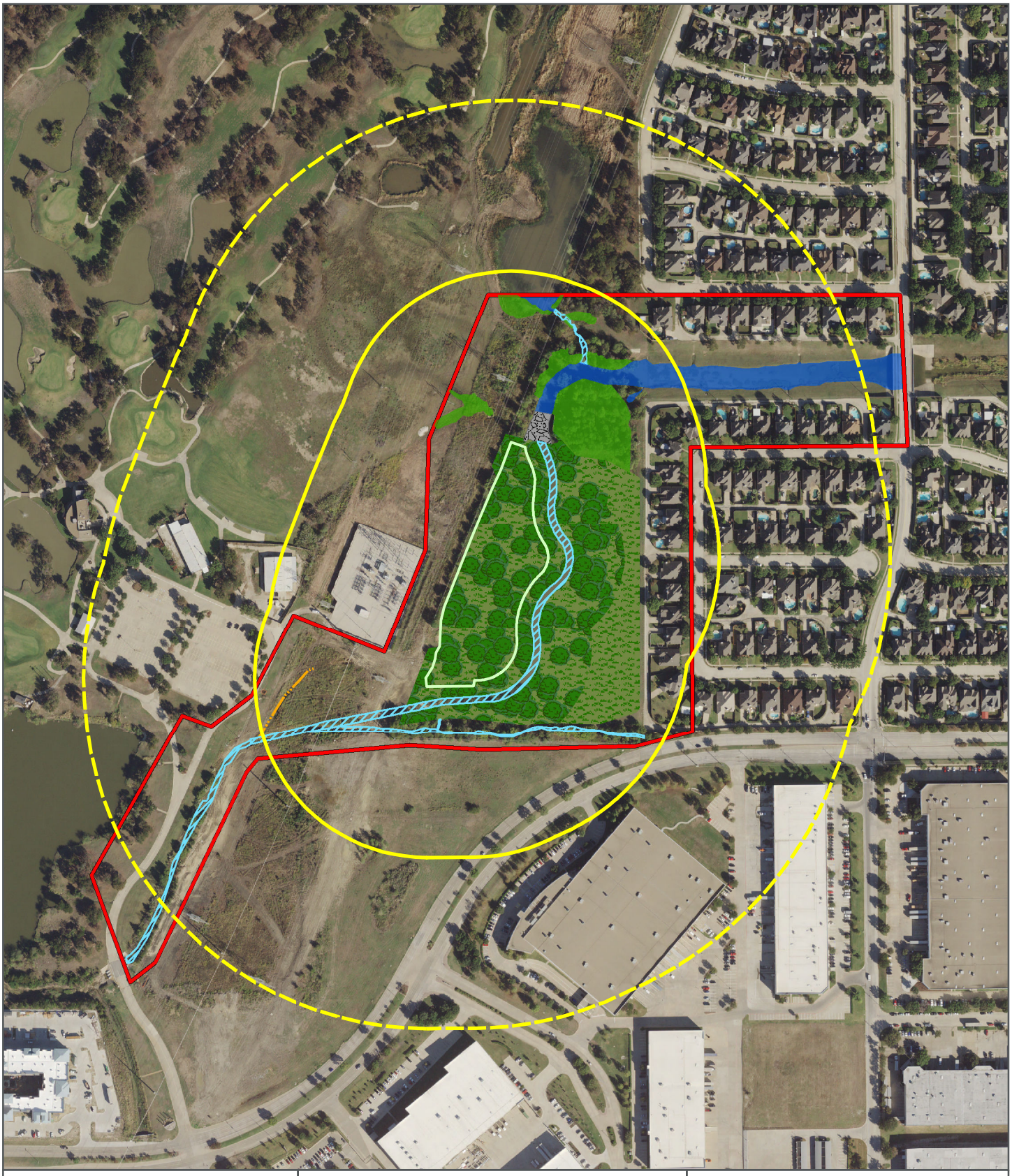
SARs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 3-8

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG3_TXRAM_SARS_REFERENCEREACH_8X11.MXD - USER: KNAGY - DATE: 3/24/2020

Post-Restoration Wetland Assessment Area (WAA)



N

0 250 500
FEET

CARROLLTON
TEXAS

HDR

WATERS OF THE U.S.

- PERENNIAL STREAM
- WAA BOUNDARY
- WETLAND
- POND

NOT WATERS OF THE U.S.

- TREES
- HERBACEOUS VEGETATION
- BOULDERS
- NON-JURISDICTIONAL DRAINAGE
- AREA 1000 FT FROM WAA
- AREA 500 FT FROM WAA
- STUDY AREA

PROPOSED WAA

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 4

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG4_TXRAM_PROPOSEDWAAS_8X11.MXD - USER: KNAGY - DATE: 3/24/2020

Post-Restoration Stream Assessment Reach (SAR)

N

0 100 200
FEET

CARROLLTON
TEXAS

HDR

WATERS OF THE U.S.

- SAR
- STREAM
- WETLAND
- POND

NOT WATERS OF THE U.S.

- TREES
- HERBACEOUS VEGETATION
- BOULDERS
- NON-JURISDICTIONAL DRAINAGE
- SAR PRIMARY BUFFER
- SAR SECONDARY BUFFER
- STUDY AREA

PROPOSED SARs

DUDLEY BRANCH
TXRAM EVALUATION

FIGURE 5

PATH: O:\10110387_10189_COC_DUDLEY_BRANCH_IMPROVEMENTS\MAP_DOCS\FIGURES\TXRAM\TXRAM_2020\DUDLEYBRANCH_FIG5_TXRAM_PROPOSEDSARS_8X11.MXD - USER: WKEENAN - DATE: 3/25/2020

Proposed Conceptual Restoration Plan

Appendix F

Net Ecological Condition Evaluation

Net Ecological Condition Evaluation

The U.S. Army Corps of Engineers (USACE), Fort Worth District, Regulatory Branch has published the Texas Rapid Assessment Method Version 2.0 (TXRAM) for use in evaluating the ecological condition of wetlands and streams. TXRAM is a rapid, repeatable, field-based method that generates a single overall score of wetland or stream integrity and health. TXRAM can be used to assess potential wetlands and stream impacts, as well as to assess the ecological condition of wetlands and streams created for potential compensatory mitigation and/or restoration. The data from the TXRAM evaluation of impacted waters of the U.S. and the potential restoration features can be used to evaluate the restoration for the project. The purpose of this net ecological condition evaluation is to describe the results of the TXRAM evaluation of the Dudley Branch restoration, combined with the acreage or linear feet of impact/restoration, to determine the efficacy of the proposed aquatic resource restoration activities.

Existing Conditions

The 37.3-acre (ac) study area consists of an impoundment of Dudley Branch and associated wetlands and stream inlets and outlets. The land use around these features is heavily urbanized with residential areas, a golf course, and a transmission line right-of-way.

Wetlands within the study area generally display moderate to low scores using the Texas Rapid Assessment Method (TXRAM) in landscape condition, hydrology, physical structure, and biotic structure as reported in Appendix E of the Conceptual Restoration Plan (CRP). Streams within the study area also display moderate-low scores in riparian buffer condition and in-stream condition. A summary of the TXRAM evaluation (see Attachment E of the CRP) for the existing WOTUS within the study area, the reference reach, and the projected post-restoration features is found in the net ecological condition evaluation discussed below.

Net Ecological Condition Evaluation

In the Study Area, each wetland or stream anticipated to be impacted was assessed using TXRAM, Version 2.0. These TXRAM scores and associated impact/restoration amounts were used to calculate TXRAM Conditional Units in order to evaluate the restoration needed to meet the net increase of aquatic functions for authorization of the proposed project by Nationwide Permit (NWP) 27.

Projected scores for post-restoration stream and wetland were developed by the methods previously discussed in the *Post-Restoration Score Development* section (see TXRAM evaluation in Attachment E of the CRP for scores).

The projected post-restoration scores for Dudley Branch and its associated wetland were then used to calculate the TXRAM conditional units projected from the proposed restoration acres of wetland and linear feet (LF) of stream within the Study Area (see Attachment E of the CRP).

As described below, the results demonstrate that the proposed restoration activities in the CRP provide the replacement and net increase of ecological condition and aquatic resource functions for the impacts of the proposed project.

TXRAM Conditional Units Calculation

The TXRAM Conditional Units were calculated from the acres of impacts to wetlands and linear feet of impacts to streams and the associated TXRAM score for individual WOTUS within the Study Area (see Attachment E of the CRP).

Table 1 includes the TXRAM report and delineation report ID, TXRAM wetland type, pre-restoration TXRAM score, projected impact acres and conditional units, post-restoration TXRAM score, and projected restoration acres and conditional units. Wetlands in Table 1 are cross-referenced by Delineation ID and TXRAM Report WAA ID.

Table 1. TXRAM Conditional Units for Wetland Restoration at Dudley Branch Improvements Study Area

Delineation ID	TXRAM Report WAA ID	TXRAM Wetland Type	Pre-Restoration TXRAM Score	Projected Impacts (Acres)	Impact Conditional Units*	Post-Restoration TXRAM Score	Projected Restoration (Acres)	Restoration Conditional Units**
W-8	W-5-1	Lacustrine Fringe	66	1.04	0.69	-	-	-
W-9	W-5-1	Lacustrine Fringe	66	0.33	0.22			
W-10	W-5-1	Lacustrine Fringe	66	0.74	0.49			
W-11	W-5-1	Lacustrine Fringe	66	0.05	0.03			
N/A	Restored Wetland	Riverine	-	-	-	73	2.99	2.18
Total	-	-	-	**2.16**	**1.43**	**-**	**2.99**	**2.18**

Note: Post-Restoration TXRAM Score based on restoration designs and conditional assessment of existing features. See Attachment E of the CRP.
* Pre-Restoration TXRAM Score / 100 x Projected Impacts (Acres)
** Post-Restoration TXRAM Score / 100 x Projected Restoration (Acres)

Projected impacts compared to the projected restoration indicate a 38% increase in the acreage of wetland within the study area. Additionally, the projected Post-Restoration TXRAM Score of the restored wetland is expected to be higher than the existing conditions within the study area, thus illustrating a net functional increase in aquatic function of 52%.

Table 2 includes the TXRAM report and delineation report ID, TXRAM stream type, pre-restoration TXRAM score, projected impact LF and conditional units, post-restoration TXRAM score, and projected restoration LF and conditional units. Streams in Table 2 are cross-referenced by Delineation ID and TXRAM Report SAR ID.

Table 2. TXRAM Conditional Units for Stream Restoration at Dudley Branch Improvements Study Area

Delineation ID(s)	TXRAM Report SAR ID	TXRAM Stream Type	Pre-Restoration TXRAM Score	Projected Impacts (LF)	Impact Conditional Units*	Post-Restoration TXRAM Score	Projected Restoration (LF)	Restoration Conditional Units**
S-2	S-2-1	Perennial	70	52	36	-	-	-
S-3	S-3-1	Perennial	69	26	18	-	-	-
S-4	S-4-1	Perennial	60	106	64			
S-4	S-4-2	Perennial	55	343	189	-	-	-
S-4	S-4-3	Perennial	64	26	17	-	-	-
S-4	S-4-4	Perennial	67	8	5	-	-	-
N/A	Restored Dudley Branch	Perennial	-	-	-	92	1,586	1,459
Total	**-**	-	-	**561**	**329**	**-**	**1,586**	**1,459**

Note: Post-Restoration TXRAM Score based on restoration designs and conditional assessment of existing features. See Attachment E of the CRP.
* Pre-Restoration TXRAM Score / 100 x Projected Impacts (LF)
** Post-Restoration TXRAM Score / 100 x Projected Restoration (LF)

Projected impacts compared to the projected restoration indicate a 183% increase in the LF of stream within the study area. Additionally, the projected Post-Restoration TXRAM Score of the restored stream is expected to be higher than the existing conditions within the study area, thus illustrating a net functional increase in aquatic function of 343%.

Proposed Conditions

Based on the proposed restoration methods and projected Post-Restoration TXRAM Scores of streams and wetlands, the proposed restoration of WOTUS within the Study Area will result in a significant net increase in the aquatic resource function. Based on the differences between the calculated TXRAM Conditional Units, the proposed restored wetlands and streams have the potential for a mean functional increase (conditional units) of 52% and 343% respectively.

Proposed Conceptual Restoration Plan

Appendix G

Schedule for Benchmarks

Stream and Wetland Restoration - Schedule for Benchmarks

Stream

Benchmark 1 - Compliance with initial success criteria:

A. Civil engineering and construction for final grading/contouring of graded surface to meet appropriate stream channel design.

Benchmark 2- Completion of re-vegetation and demonstration of hydrology, having met the following criteria:

A. Stream channel flow/hydrology meets the definition for the appropriate stream type (i.e., perennial) being re-established through restoration activities.
B. No unnecessary water control structures, including irrigation.

Benchmark 3- Two full bank events at least one year apart (Bank full events may occur any time after construction complete.):

A. Stream channels do not exhibit adverse impacts from erosion, head cutting, and excessive silt accumulation following a runoff event.
B. Planted riparian zones exhibit a minimum measurement of 150 feet on either side of the restored stream (250 stems per acre).
C. No excessive erosion or bare soils.

Benchmark 4 (Year 4) - Function/conditional assessment, having met the following criteria:

A. Has attained 50% of the predicted TXRAM scores (scores at release of monitoring).

Benchmark 5 (Year 5) - Function/conditional assessment, having met the following criteria:

A. Has attained 75% of the predicted TXRAM scores (scores at release of monitoring).

Benchmark 6- Function/conditional assessment, having met the following criteria:

A. Meets the definition of a water of the U.S. under the Regulatory Program regulations applicable at the time the project is authorized.
B. Has attained 95% of the predicted TXRAM score (i.e., score at release of monitoring).

Forested Wetland

Benchmark 1 - Compliance with initial success criteria:

A. Civil engineering and construction for final grading/contouring of graded surface to promote wetland hydrology.
B. Establishment of topographic micro-highs and micro-lows as appropriate.

Benchmark 2- Completion of re-vegetation and demonstration of hydrology, having met the following criteria:

A. Area is inundated or saturated to the surface continuously for at least 5% of the growing season in most years (50% probability of recurrence).
B. No unnecessary water control structures, including irrigation.

Benchmark 3- Completion of 2 full growing seasons, having met the following criteria

A. No excessive erosion or bare soils.
B. Meets at least 75% of the minimum density for tree and shrub plantings as described in Section 9 of the Conceptual Restoration Plan.

Benchmark 4 (Year 4) - Function/conditional assessment, having met the following criteria:

A. Has attained 50% of the predicted TXRAM score for a forested wetland re-established through restoration activities.
B. Meets the minimum density for tree and shrub plantings as described in Section 9 of the Restoration Plan.

Benchmark 5 (Year 5) - Function/conditional assessment, having met the following criteria:

A. Has attained 75% of the predicted TXRAM score for a forested wetland re-established through restoration activities.

Benchmark 6- Function/conditional assessment, having met the following criteria:

A. Meets the definition of a water of the U.S. under the Regulatory Program regulations applicable at the time the project is authorized.
B. Meets the definition of a wetland under the Regulatory Program regulations applicable at the time the project is authorized.

C. Has attained 95% of the predicted TXRAM score (i.e., score at release of monitoring) for a forested wetland re-established through restoration activities.
D. Provision of site protection and long-term management as appropriate.