Final Work Plan

Days Creek Watershed Comprehensive Aquatic Ecosystem Restoration

City of Texarkana, Texas

$9.8 million NRDA Funding Award
Involving 10 Projects

October 1, 2020

With Project Partners:

City of Texarkana, Texas

NRDA Project Work Plan

Days Creek Enhancement and Restoration along Cowhorn, Days, Howard, Swampoodle, and Waggoner Creeks for Ten (10) Projects

Restoration associated with natural resources damages from the Former Kerr-McGee Chemical Corporation Wood-Treating Facility (TRONOX LLC), Texarkana, Bowie County, Texas

Prepared By

City of Texarkana, Texas

Planning & Community Development Department

The City of Texarkana, Texas submits this final Work Plan to the NRDA Trustees. This Work Plan is for the purposes of initiating/obtaining data, permits, preparing design development and construction documents, schedules, and allocation of funds per final June 8, 2020 Interlocal Agreement for the Enhancement and Restoration of Days Creek Watershed Project in Texarkana, Bowie, Texas terms and conditions. The Trustees' approval of the Work Plan is not intended to constitute any amendment to the Agreement.

Days Creek Enhancement and Restoration Projects for Cowhorn, Days, Howards, Swampoodle, and Waggoner Creeks- Ten (10) Projects Work Plan

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1.0 Work Plan Introduction

1.1 NRDA Project Background

A final Restoration Plan/Environmental Assessment (RP/EA) was developed by the Texas Commission on Environmental Quality (TCEQ), Texas Parks and Wildlife Department (TPWD), Texas General Land Office (GLO), and the United States Fish and Wildlife Service (USFWS) acting on behalf of the United States Department of the Interior (DOI) (collectively, the Trustees). The RP/EA was prepared jointly by the Trustees pursuant to their respective authorities and responsibilities as natural resource Trustees under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601 *et seq*., and other applicable federal and state laws. Relevant regulations include Subpart G of the National Oil and Hazardous Substances Pollution Contingency Plan (40 C.F.R. §§ 300.600 through 300.615), and DOI's regulations at 43 C.F.R. Part 11, which provides guidance for the Natural Resources Damage Assessment (NRDA) process under CERCLA. In addition, the Texas Water Code provides for recovery of costs to determine impacts on the environment of a spill or discharge and to restore land and aquatic resources held in trust or owned by the State (Tex. Water Code § 26.265).

The purpose of the RP/EA was to describe how the Trustees propose to use recovered funds to restore natural resources injured, lost, or destroyed due to releases of hazardous substances at or from the former Kerr-McGee Chemical Corporation (Kerr-McGee) wood-treating facility in Texarkana, Bowie County, Texas (the Facility). The Trustees determined that there had been injury to freshwater aquatic benthic habitat at three perennial streams at or downstream of the Facility: Days Creek, Howard Creek, and Waggoner Creek. In addition, there was potential injury to riparian and bottomland hardwood habitats adjacent to Days and Howard Creeks. The Trustees have recovered approximately $21.3 million in natural resource damages.

The Trustees, among other restoration project proposals, selected 10 project components from the City of Texarkana's (the City) Days Creek Comprehensive Watershed Restoration Project proposal and awarded the City $9.8 million to undertake these 10 projects. These selected 10 projects are described in the City's September 23, 2019 revised restoration proposal. Each of the 10 projects of the City's revised Days Creek Comprehensive Watershed Restoration Project are set forth in the Final RP/EA and the June 8, 2020 Interlocal Agreement between the City of Texarkana, Texas and the NRDA Trustees. Collectively, these 10 projects are the City of Texarkana, Texas' NRDA Project. The term "agreement" is used throughout the Work Plan to refer to the Agreement and not the Work Plan, and that the phrase "effective date" is consistently used to refer to the effective date of the Agreement and not the Work Plan.

1.2 NRDA Project Goals, Individual Project Descriptions and Construction Criteria

The City of Texarkana, Texas understands the Work Plan is not the Agreement. This Work Plan is for the purposes of initiating/obtaining data, permits, preparing design development and construction documents, schedules, and allocation of funds per final June 8, 2020 Interlocal Agreement for the Enhancement and Restoration of Days Creek Watershed Project in Texarkana, Bowie, Texas terms and conditions. The City of Texarkana, Texas' NRDA Project goals to be achieved through implementation of this Work Plan are to **stabilize**, **naturalize 33,365 linear feet** of stream channels, **create 36 acres** of wetlands including 4 acres adjacent riparian habitat, **enhance 32 acres** of forest, **restore 25 acres** of forest and scrub shrub habitat, and **preserve 135 acres** of forest. These NRDA Project goals will be accomplished in 10 individual projects described as follows and are listed in Table 1 with goals, identified as quantities, and individual project budgets. Individual project locations are shown in Figure 1 Project(s) Location Map.

Project 1 - Cowhorn Creek Enhancement: Naturalization of approximately 2,600 linear feet of creek channel along Cowhorn Creek near the Convention Center. Additional actions include planting native species and expanding bottomland hardwood habitats along this reach with native species.

Project 2 - Cowhorn Creek Enhancement: Stabilization of approximately 11,000 linear feet of eroding banks with approximately 9,000 linear feet of bioengineering and approximately 2,000 linear feet of native planting along Cowhorn Creek. Bioengineering includes the use of approved materials (e.g., combination of engineered and natural plant materials for live staking, fascines, brushwood, brush layers, and vegetation) to stabilize the banks as an alternative to lining the banks with concrete.

Project 3A – Cowhorn Creek Enhancement: Components include combination of restoration of the natural alignment, stabilization, and enhancement of approximately 3,000 linear feet along Cowhorn Creek near Texarkana Community College and Beverley Park Road and creation of approximately 6 acres of wetlands through the restoration of the meandering creek channel by various techniques which may include hard and soft approaches: bank protection/stabilization, bank re-grading, weirs, step pools, and floodplain re-activation via side channels and wetland creation.

Project 3B – Cowhorn Creek Preservation: Preservation in perpetuity of an estimated 2.5 to 3 acres of forested habitat adjacent to the area enhanced in Project 3A.

Project 4A – Days Creek Enhancement: Preservation in perpetuity of approximately 32 acres of wet forested habitat.

Project 4B – Enhancement of approximately 32 acres of wet forested habitat east of the Tronox Facility and Days Creek in the vicinity of Project 4A, consisting of high-quality deciduous hardwoods. Planned enhancements include litter pickup and understory seeding with native shade-tolerant species to increase the biodiversity.

Project 5 – Days Creek Enhancement: Preservation in perpetuity of approximately 100 acres of high-quality forested riparian habitat along Days Creek, south of the Texas Viaduct. If sufficient acreage if not available, preservation of the balance will occur along Waggoner Creek.

Project 6 – Days and Howard Creek Enhancement: Restoration and enhancement of approximately 2,000 linear feet at confluence of Howard Creek with Days Creek and the construction of approximately 23 acres of wetlands adjacent to Days Creek south of FM 151 and west of State Line Avenue. Activities include conducting a site assessment and modeling and providing a design in accordance with Sections 6.2 and 6.3 of Interlocal Agreement. If site conditions cannot support 23 acres of wetlands, then a new or amended Work Plan will be submitted, pursuant to Section 6.1, to the Trustees for review and approval allowing the wetlands balance to be transferred to Project 10.

Project 7 – Swampoodle Creek Enhancement: Construction of approximately 2.85 to 3 acres of wetlands, removal of approximately 665-1,000 linear feet of concrete liner along a tributary of Swampoodle Creek at Ferguson Park, and naturalization of the stream through Ferguson Park achieved through concrete removal, plan re-alignment of existing channel, and by creation of fringe wetlands and bioswales with the addition of native plantings. The existing concrete-lined channel is 10 feet wide, approximately 2.5 to 3.0 feet deep, and approximately 650 linear feet in length with no natural banks or creek bed. Wetlands will be created by allowing surface water to meander and sheet flow through parts of the landscape using bioswales.

Project 8 – Swampoodle Creek Enhancement: Naturalization and stabilization of approximately 11,000 linear feet of creek channel on Swampoodle Creek between Ferguson Park and Days Creek. Swampoodle Creek flows directly into Days Creek north of the Tronox Facility. Portions of the channel have concrete-lined banks and bed. The unlined channel is unstable with eroding banks. Activities include conducting a site assessment and modeling and providing a design in accordance with Section 6.2 of Interlocal Agreement to determine feasible method for channel stabilization. After Trustee review and approval of the modeling and preliminary project design, activities will proceed with construction actions under this

project that may include 1) removal of concrete lining, where applicable, 2) restoration of natural bed and bank conditions, 3) naturalization of channel alignment, and 4) planting of native vegetation.

Project 9 – Swampoodle Creek Enhancement: Restoration of the natural alignment of approximately 1,100 linear feet of Swampoodle Creek. Currently, portions of the creek channel, specifically at road crossings, are concrete lined. The existing concrete lining will not be removed. Unlined portions of the banks will be laid back to recreate the natural meander and restore forested riparian habitat along this segment pending development of an approved Work Plan and preliminary design development in Phase II. Swampoodle Creek will be naturalized through a combination of stream restoration techniques that may include excavation, re-grading, planting of native vegetation, and other measures. The bottomland hardwoods cleared from this project site will be restored with appropriate clearing, grubbing, soil enhancements as applicable, and native tree, shrub, and herbaceous ground cover plantings and seeding following/integrated with project site overall channel enhancement activities.

Project 10 – Waggoner Creek Enhancement: Restoration of approximately 2,000 linear feet of creek channel and at least 4 acres of riparian habitat along Waggoner Creek east of Interstate 369. Restoration techniques may include live staking, live fascines, and brush layers where banks are eroding. Activities will restore approximately 25 acres of bottomland hardwood forest and scrub shrub wetland habitat to a more native state in cleared areas that are currently a mix of grasses based on a site assessment and enhance an additional 4 ac with litter pick up and understory seeding with native shade-tolerant species to increase the biodiversity.

Table 1. Project Description Summary with Budgets

Project	Quantity Goals	Description	Budget
Cowhorn Creek			
Project 1	2,600 linear feet	Naturalize creek channel	$1,300,000
Project 2	2A-9,000 linear feet	Stabilize eroding banks through bioengineering	$364,000
	2B-2,000 linear feet	Stabilize eroding banks through native planting	$181,500
Project 3A	3,000 linear feet	Restore natural creek alignment, stabilize, and enhance along creek	$1,341,500
	6 acres	Create wetlands along meandering creek channel	
Project 3B	2.5-3 acres	Preserve in perpetuity forested habitat	$10,500
Days Creek			
Project 4A	32 acres	Preserve in perpetuity wet forested habitat	$15,000
Project 4B	32 acres	Enhance wet forested habitat	$15,000
Project 5	100 acres	Preserve in perpetuity high quality forested riparian habitat	$20,000
Howard Creek at Days Creek Confluence			
Project 6	2,000 linear feet	Restore and enhance along creek confluence with Days Creek	$455,000
	23 acres	Construct wetland adjacent to creek	
Swampoodle Creek			
Project 7	2.85-3 acres	Construct wetlands	$3,350,000
	665-1,000 linear feet	Remove concrete liner along tributary and naturalize creek channel	
Project 8	11,000 linear feet	Naturalize and stabilize creek channel	$1,697,500
Project 9	1,100 linear feet	Restore natural creek alignment	$650,000
Waggoner Creek			
Project 10	2,000 linear feet	Restore creek channel near recreation center	$400,000
	25 acres	Restore cleared grass areas to bottomland hardwood forest and scrub shrub wetland habitat and enhance 4 ac w seeding	
	4 acres	Restore riparian habitat along creek channel	

Note: green highlights preservation only projects

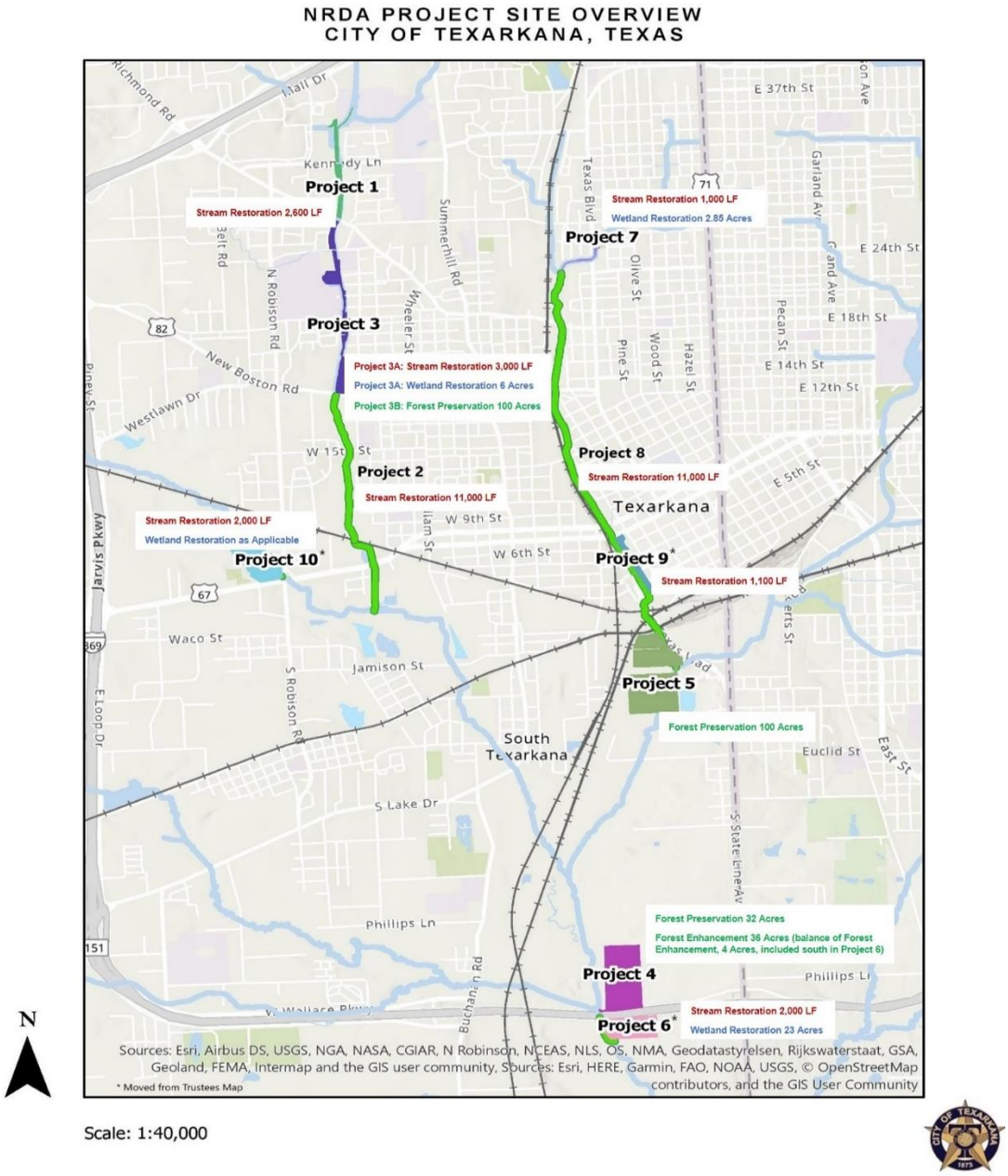

Figure 1. Projects Location Map

Table 2 provides an overview of restoration objectives by habitat type: steam channel, wetland, or forested habitat, with construction criteria identified as quantities of habitat types to be stabilized, naturalized, enhanced, restored, and/or created. Objectives lay out how the restoration goals will be met. These objectives include, but may not be limited to, bioengineering for stabilizing stream banks; re-shaping banks and plan alignment and planting riparian plant species for naturalizing, modifying the stream bed and establishing native aquatic, wetland, and riparian plants for enhancing; re-contouring and shaping areas to establish wetland hydrology, hydric soils, and predominance of wetland vegetation for wetland creation; and preserving and enhancing forest with litter pick up and understory seeding and/or planting to increase biodiversity. Performance criteria is specified in Section 9.0, Monitoring.

Table 2. Restoration Objectives as Activities and Construction Criteria as Quantities by Habitat Type

Restoration Objectives/Activity	Project ID/Location	Quantity stream channel (lf)	Quantity wetland (ac)	Quantity Forest (ac) Preserved with Enhancement Comments
Stream Channel				
Re-shape and naturalize channel, increase benthic and fish habitat, install native plants, create safe public access	1 Cowhorn Creek near Convention Center	2,600 lf		
Stabilize channel, utilize bioengr techniques, install plantings	2 Cowhorn Creek	11,000 as Approx. 9,000 lf bioengineering with 2,000 lf plantings		
Naturalize plan alignment, add stream features & stabilize banks	3A Cowhorn Creek near campus	3,000 lf		
Restore/enhance with improved bank conditions, native plantings	6 Howard/Days	2,000 lf		
Remove concrete, naturalize channel, increase natural bed, add natural features	7 Swampoodle within Ferguson Park	665-1,000 lf		
Stabilize channel with re-grading banks and/or bioengineering and plants	8 Swampoodle	11,000 lf		
Restore/naturalize plan alignment, increase benthic and fish habitat	9 Swampoodle	1,100 lf		
Restore channel with naturalizing and stabilizing banks	10 Waggoner near Recreation Center	2,000 lf		
Channel Subtotal		**33,365 lf**		
Wetlands				
Create wetlands	3A Cowhorn Creek near Campus		6 ac	
Create wetlands as fringe wetlands and plantings to naturalized channel	7 Ferguson Park		3 ac	
Create wetlands	6 Howard/Days Creek		23 ac	
Created wetland subtotal			**32 ac**	
Restore riparian wetlands	10 Waggoner Creek near Recreation Center		4 ac	
Restore forested and scrub shrub wetlands	10 Waggoner Creek near Recreation Center		25 ac	
Restored wetlands subtotal			**29 ac**	
Wetland Subtotal			**61 ac**	
Forest				
Preserve forest	3B Cowhorn near Campus			3 ac
Preserve/enhance forest	4 Cowhorn			32 ac preserved; plus 32 ac enhanced with litter pick up/understory seeding

Restoration Objectives/Activity	Project ID/Location	Quantity stream channel (lf)	Quantity wetland (ac)	Quantity Forest (ac) Preserved with Enhancement Comments
Preserve forest	5 lower reach Swampoodle and Waggoner			100 ac
Forest Subtotal				**135 ac**

1.3 Work Plan Organization

The City of Texarkana, Texas developed this Work Plan in accordance with the NRDA Trustees' Restoration Plan and the Interlocal Agreement. Rather than 10 work plans associated with 10 projects, because the 10 projects are grouped into two categories within the Interlocal Agreement: 1) forest preservation and 2) stream and wetland construction; the City of Texarkana, Texas has organized this Work Plan to address overall project management protocols and budget allocations and expenditures tracking in Sections 1 and 2, and the work activities associated with forest preservation only projects: Project 3B, 4A, and 5 in **Forest Preservation Work Plan** in Section 3, and work associated with stream and wetland construction projects: Projects 1-3A, 4B, and 6-10 in **Stream and Wetland Work Plan** in the remaining Sections 4 through 12.

Section 3, the Forest Preservation Work Plan, lays out work in Phases I and II for the preservation projects with activities identifying a conservation easement holder and developing conservation easements and supporting due diligence documents. Putting a conservation easement on Projects 3B, 4A, and 5 will be the means for protecting these project sites in perpetuity. Forest preservation work primarily involves conducting due diligence records review and site surveys and working with the approved conservation easement holder and the NRDA Trustees on preparing a conservation easement for each of three sites: 3B, 4A, and 5. Section 3 identifies the additional work involved in undertaking due diligence according to criteria specified in 6.3.1.2 of the Interlocal Agreement and preparing a draft conservation easement including a site management plan. The Forest Preservation Work Plan provides for project activities and tasks to be performed, deliverables, and schedule. Work will include execution of conservation easements.

Section 4 presents general work associated with the major phases for stream and wetland work, as per the Interlocal Agreement, which are:

- Phase I - Planning & Project Phasing to 30% complete
- Phase II - Design Development to 80% complete and Construction Documents Preparation/Bidding/Contracting
- Phase III - Construction/Implementation with Oversight
- Phase IV - Post-Restoration Activities including Monitoring and Maintenance

The Stream and Wetland Work Plan provides for Project activities and tasks to be performed, deliverables, construction criteria, maps and photographs associated with Projects 1-3A, 4B, and 6-10. The proposal to protect these project properties in perpetuity is via deed restrictions. Work will include site assessment, modeling, design, and permitting in accordance with Section 6.2 of Interlocal Agreement.

The major work activities are further specified with the development of Data Collection Plan, Design Development Plan, Permitting Plan, Construction Plan, Monitoring Plan, Reporting Plan, and Maintenance Plan. Associated with Phase I, data collection is addressed in Section 5. Design development work is presented in Section 6. Permitting plan is in Section 7. Section 8 discusses anticipated construction plans while plans for monitoring, maintenance, and reporting are laid out in Sections 9, 10, and 11, respectively. Section 12 provides an overview of anticipated logistics.

Work products, such as cost estimates from planning, engineering designs, environmental compliance documents and construction documents, and anticipated work schedule are identified herein. All the work will be completed within 5 years of the Interlocal Agreement's Effective Date between the City of Texarkana, Texas and the NRDA Trustees. The term "agreement" used throughout the Work Plan refers to the Interlocal Agreement and not the Work Plan, and that the phrase "effective date" is consistently used to refer to the effective date of the interlocal Agreement and not the Work Plan.

The work specified herein will be adhered to and the project sites will be monitored to determine compliance with the Work Plan, the Interlocal Agreement, and construction criteria specified herein. Any corrective measures following construction, as applicable and/or as instructed by Trustees, will need coordination and additional funding.

This Work Plan may be amended by mutual written agreement as appropriate to accomplish the purpose of the Interlocal Agreement. The City of Texarkana, Texas will notify the Trustees and receive written approval to any material change from the approved Work Plan prior to taking further action on a Project.

The City is responsible for completing activities and work products as they are described herein. The Agreement was entered into between the Trustees and the City as the Performing Party. While any consultant or other partner under contract with the City may be responsible for completing certain tasks for the City, the City is ultimately responsible for completing tasks according to the Agreement.

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A general schedule of the work identifies when meetings among the team members would occur and when various deliverables and reporting to the NRDA Trustees is anticipated. There will be internal weekly and monthly work progress reports from the Project Delivery Team to the City. Quarterly reports, Phase completion reports, and annual monitoring reports will be submitted to the NRDA Trustees by the City. The schedule for forest preservation work is provided in Section 3.2 while the anticipated schedule for the stream and wetland work is laid out in Section 4.2.

Given the large geographic scale, number of project site locations, 5 year span of time, amount of fieldwork, coordination between monitoring results and site maintenance needs, staff, equipment, data collection and management, and the need for public and agency coordination, a defined project management program is an essential part of the Work Plan. As with any project of this size, complexity, and working with nature, problems may arise. Some problems can be anticipated, and therefore, remedial site maintenance activities can be identified in Section 10. Otherwise, a communication and decision-making process will be in place to best respond to the unexpected and protect the investments of time and money. Project management, in Section 1.4, provides a mechanism for addressing these issues.

Numerous products of the Stream and Wetland Work Plan and Forest Preservation Work Plan will be prepared over the course of site assessments, due diligence surveys, Phase I completion report, Phase II completion report, Phase III construction complete report, monitoring, management, and maintenance reports for the various individual project sites as well as an overall project completion report. These work products will include written text, site photo documentation, aerial imagery, and a database storage and retrieval system (GIS), as applicable. Work products will be delivered to the Trustees via a TCEQ sharepoint site. Data will be retained for the specified time as per the Interlocal Agreement, 14.2.

A public information program is outside the Agreement and not funded by the Trustees, however will be provided by the City as a component of the overall NRDA Project. The public information program will be developed and regularly disseminate project-related information, highlights of the results of monitoring and site maintenance, and achievement of project goals conveyed to the public by the City. Various public information products may be prepared and updated and may include newsletters, posters, media evens, signage, and the City's website, which should be noted are outside the Agreement and not funded by the Trustees.

1.4 Project Management

1.4.1 Teams

The City of Texarkana, Texas will establish two teams: Project Management Team (PMT) and Project Delivery Team (PDT). The PMT will be led by City of Texarkana with Keith Beason acting as Project Manager for the City. See Section 1.4.3 for contact information. The City will identify staff and layout hours allocated to the project on an as needed basis. The PMT consist of members from the City and its project partners. Members include, but may not limited to:

- David Orr Asst. City Manager and Project Director
- Keith Beason Project Manager Texarkana Planning
- Robby Robertson Texarkana Parks Department
- Dustin Henslee Texarkana Director Public Works
- Daphnea Ryan Texarkana Planning
- Jo Thomason @arwhlaw.com
- D Yells Texas A&M University Texarkana @tamutedu
- C Howard Texarkana Community College @texarkanacollege.edu
- Matt Fry @leisd.net
- Delores McCright @gmail.com

Other project partners may include individuals from the Liberty-Eylau Independent School District, Texarkana Convention Center, Texarkana Independent School District, Texarkana School District, and others. The PMT will be responsible for coordinating with the NRDA Trustees, reviewing and approving the work for submittal to the Trustees, and tracking expenditures and distribution of funds. The PMT will also set up the conservation easements, deed restrictions, and participate in project planning, design development, monitoring, and site maintenance.

The PDT will be led by the City's selected prime consultant Aqua Strategies Inc. (AS) and consist of staff from AS. The PDT Project Manager will be Georganna Collins. AS will enter into subcontracting agreements with two subcontractors: Titanium Environmental Services and MTG Engineers and Surveyors, Inc. to form the AS Team for project delivery.

The PDT will be responsible for project planning and engineering, data collection and assessment, coordination with the City on stakeholder outreach and engagement, design development, cost estimating, permitting, construction oversight, and monitoring oversight with the City's Project Partners. As will be responsible for identification/layout of PDT staff, allocation of hours to complete specified work activities, and the day to day flow and quality of the work. For example, during data collection: collecting existing data, identifying needed data, developing the sampling design, undertaking site characterization, surveying transects and quantities, and modeling will be the responsibility of the PDT. In addition, the PDT will be responsible for data management over the duration of the project. Data will be stored as per the interlocal Agreement. The Agreement was entered into between the Trustees and the City as the Performing Party. While any consultant or other partner under contract with the City may be responsible for completing certain tasks for the City, the City is ultimately responsible for completing tasks according to the Agreement.

1.4.2 Organization

An Organization Chart, provided in Figure 2, identifies individuals with primary roles and responsibilities. Contact list and contact protocols is provided in Section 1.4.3.

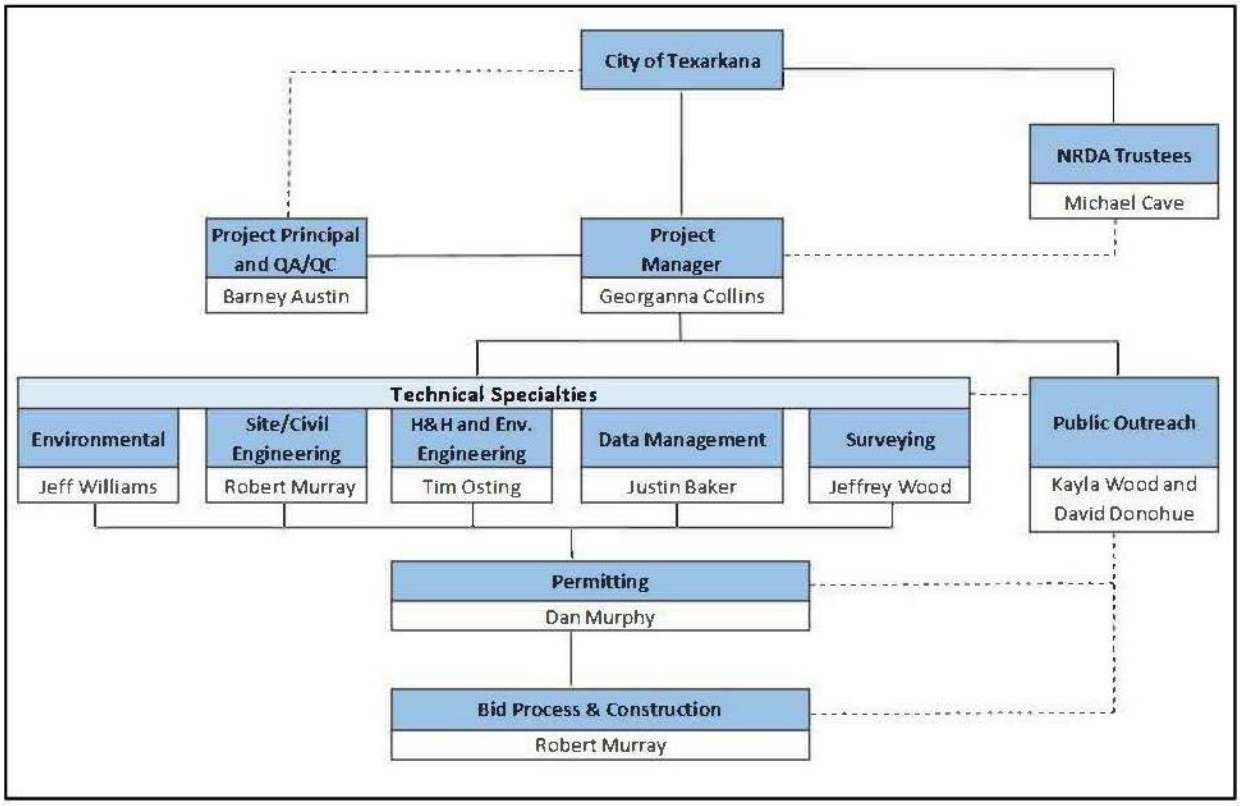


Figure 2. Project Management and Project Delivery Team Organization Chart

1.4.3. Contact List and Protocol

Project Management Team (PMT)

City Manager-
Shirley Jaster 903-798-3949 Jaster @txkusa.org

Assistant City Manager and Project Director-
David Orr 903-798-3902 office/ 903-278-7735 cell David.Orr@txkusa.org

PMT Lead and Project Manager-
Keith Beason
City Planner II 903-798-3901 office/903-278-0155 cell keith.beason@txkusa.org

Project Delivery Team (PDT)

PDT Lead and Project Manager-
Georganna Collins 346-293- 3844 gcollins@aquastrategies.com

Project Principal and QA/QC-
Barney Austin 512-826-2604 baustin@aquastrategies.com

Contact Protocol

In the event of a project emergency call Georganna Collins and/or local emergency services. For project management questions direct to the City, contact Keith Beason or David Orr.

1.4.4 Communication

The designated Project Management Team (PMT) lead is Keith Beason, the city's project manager. Keith Beason will be authorized for any coordination and communication with the Trustees and dealing with day to day project management activities and contact and coordination with the Project Delivery Team. The designated Project Delivery Team (PDT) lead is Georganna Collins, Aqua Strategies' project manager, who will be responsible for carrying out activities and preparing deliverables on behalf of the City for project planning, engineering, permitting, monitoring, reporting.

The PDT lead, Georganna Collins, should be copied on communications between the City and the Trustees. If there are any instances for the PDT lead to contact the Trustees, it would be on behalf of the City with the City's prior knowledge and approval and the City would be copied on any direct communication from the PDT lead to the Trustees. For example, this direct communication would involve, once approved by the PMT lead, the PDT lead will submit specified deliverables to the Trustees via a pre-arranged TCEQ share site. Communication throughout the project will occur as follows:

- Project kickoff meeting with PMT and PDT
- Establish a site visit priorities plan
- Determine PMT and PDT members roles/responsibilities
- Discuss issues of concern
- Meet with Convention Center and Texas High School responsible parties on Project 1
- Meet with Texarkana College staff on Project 3
- Meet with other school districts and/or Boys/Girls Clubs
- Meet with TAMU & Texarkana College regarding monitoring goals/objectives/limits
- Discuss/set schedule and PMT and PDT meetings/reporting schedule
- Data collection/data gap determination
- Weekly internal PDT status reports via email to G Collins
- Monthly internal PDT calls initiated by Aqua Strategies
- Quarterly Reports prepared by Aqua Strategies, submitted to City of Texarkana for review and approval, prior to submittal to NRDA Trustees
- PDTwill prepare specified deliverable and draft Phase Completion Reports, submitted to City for review and approval, prior to submitting to NRDA Trustees
- Other communication will follow as specified within Interlocal Agreement regarding fund expenditures, funding requests, time extensions, or other

2.0 Budget, Expenditures and Tracking

The PDT will work with the City to keep project activities, including construction within the allocated budget and track and report on project related expenditures, including those broken down and tracked as shown in Table 3. The PDT will maintain all records, documents, papers, and other evidence related to contractual project costs and implementation using financial records, contractor invoices and receipts, weekly status reports, quarterly reports, monitoring reports, and project performance information, in accordance with generally accepted business and accounting practices, and conditions set forth in the Interlocal Agreement, consistently applied.

The PDT will assist the City maintain the financial data used in the preparation of or support for any cost (direct and indirect) information or analysis for the City's Agreement with the NRDA Trustees with receipts and invoices as such to allow for tracing funds to a level of expenditures adequate to establish Trustees approvals and specified funds disbursements and that such funds are not used in violation of the City's Agreement or applicable federal or state laws. See also Section 12.4 Record Keeping.

A project management budget/expenditure tracking template has been prepared and will be used through the duration of the project. See Appendix A for example template.

Table 3. Project Budget Breakdown by Activity

Activity	Project 1 (near convention center)	2A bioengr 9,000 lf	2B Plantings +9,162 lf	3A Tx College restore 3,000 ft + 6ac wet	3B preserve 2.5 ac	4A preserve 32 ac	4 B enhance 36 ac	5 Viaduct preserve 100 ac	6 Confluence Howard/days 2,000 lf + 23 ac wet	7 Ferguson	8 stabilize 11,000 Swampoodle	9 meander downtown	10 2,000-3,000 lf Waggoner near rec center	Totals
Phase 1														
Site survey- including topo	$8,000	$15,000	Included in 2A	Included in 2A	NA	NA	$1,500	NA	$4,000	$6,000	$15,000	$6,000	$10,000	$65,500
Site survey-including boundary	NA	NA	NA	NA	$1,000	$1,000	NA	NA	NA	NA	NA	NA	NA	$2,000
WOUS- MHW/wet	$5,000	$5,000	Included in 2A	included in 2A	NA	NA	NA	NA	$5,000	$5,000	$5,000	$5,000	$5,000	$35,000
Botany/field due diligence as applicable to project site (Contractor)	$2,500	$1,500	Included in 2A	included in 2A	$1,000	$1,000	$1,500	NA	$2,500	$2,500	$2,500	$2,500	$2,500	$20,000
Conservation easements with desktop due diligence/deed restrictions (City)	$5,000	$2,500	Included in 2A	$2,500	$2,500	$5,000	NA	$4,500	$5,000	$5,000	$2,500	$5,000	$5,000	$45,000
Results Reporting	$3,000	$3,000		$2,000	$1,000	$500	$1,000	$500	$3,000	$3,000	$3,000	$3,000	$3,000	$26,000
30% Plan development	$18,000	$5,000	$7,000	$10,000	NA	NA	NA	NA	$10,000	$20,000	$10,000	$10,000	$10,000	$100,000
H&H	$6,250	$6,250	NA	$6,250	NA	NA	NA	NA	$6,250	$6,250	$6,250	$6,250	$6,250	$50,000
Permitting with 60% plan development	$12,000	$8,000	$5,000	$10,000	NA	NA	NA	NA	$9,000	$10,000	$8,000	$10,000	$8,000	$80,000
PHASE 1 Subtotals	$59,750	$46,250	$12,000	$30,750	$5,500	$7,500	$4,000	$5,000	$44,750	$57,750	$52,250	$47,750	$44,750	$418,000

Activity	Project 1 (near convention center)	2A bioengr 9,000 lf	2B Plantings +9,162 lf	3A Tx College restore 3,000 ft + 6ac wet	3B preserve 2.5 ac	4A preserve 32 ac	4 B enhance 36 ac	5 Viaduct preserve 100 ac	6 Confluence Howard/days 2,000 lf + 23 ac wet	7 Ferguson	8 stabilize 11,000 Swampoodle	9 meander downtown	10 2,000-3,000 lf Waggoner near rec center	Totals
PHASE 2														
Construction Docs 100% plan Development	$15,000	$15,000	$4,000	$15,000	NA	NA	NA	NA	$15,000	$16,000	$15,000	$15,000	$15,000	$125,000
Order plants and other material	$2,500	$2,500	$2,500	$2,500	NA	NA	$2,500	NA	$2,500	$2,500	$2,500	$2,500	$2,500	$25,000
Construction including plantings/seeds	$1,143,250	$221,750	$109,500	$1,219,750	NA	NA	NA	NA	$329,250	$3,195,250	$1,549,250	$506,250	$254,250	$8,528,500
Construction observation	$27,000	$26,000	$20,000	$26,000	NA	NA	$1,000	NA	$21,000	$26,000	$26,000	$26,000	$26,000	$225,000
Phase 2 subtotals	$1,187,750	$265,250	$136,000	$1,265,250	NA	NA	$3,500	NA	$367,750	$3,239,750	$1,592,750	$549,750	$297,750	$8,903,500
Phase 3														
Monitoring with TAMU & TC	$26,250	$26,250	$22,250	$25,000	NA	NA	NA	NA	$21,250	$26,250	$26,250	$26,250	$26,250	$226,000
Reporting	$11,250	$11,250	$11,250	$12,500	NA	NA	NA	NA	$6,250	$11,250	$11,250	$11,250	$11,250	$97,500
Phase 3 subtotals	$37,500	$37,500	$37,500	$37,500	NA	NA	NA	NA	$27,500	$37,500	$37,500	$37,500	$37,500	$323,500
City Project Admin	$15,000	$15,000	Included in 2A	$10,000	$5,000	$7,500	$7,500	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$150,000
City Proposed Budget	$1,300,000	$364,000	$181,500	$1,341,500	$10,500	$15,000	$15,000	$20,000	$455,000	$3,350,000	$1,697,500	$650,000	$400,000	$9,800,000
Grand Totals	**$ 1,300,000**	**$364,000**	**$181,500**	**$1,341,500**	**$10,500**	**$15,000**	**$15,000**	**$20,000**	**$455,000**	**$3,350,000**	**$1,697,500**	**$650,000**	**$400,000**	**$9,800,000**

2.1 Project Coordination

City of Texarkana, Texas' responsibilities will include oversight of contract agreement with prime contractor, Aqua Strategies, Inc., administration of the Interlocal Agreement between the City and the NRDA Trustees, establishing and maintaining conservation easements and deed restrictions in perpetuity, and project coordination that includes coordinate meetings, meeting venues, review and submission of project documents, financial oversight of NRDA funds, public outreach, coordination with City administration and project partners participating in monitoring.

2.3 Funds Disbursements

The project funds for the activities, shown in Table 3, will be disbursed across four payments to the City of Texarkana, Texas by the NRDA Trustees, as shown Section 10 of the Interlocal Agreement, in Table 2, for the work activities indicated in Table 3 and described within this Work Plan.

2.4 Documentation Needed to Receive/Spend Funds

2.4.1 Forest Preservation Projects

Initial Disbursement. Within ten days after the Effective Date, the initial disbursement listed in Table 2 of the Interlocal Agreement for Forest Preservation Projects 3B, 4A, and 5 will be made for use by the City to undertake activities associated with preparing and recording a conservation easement for these Conservation Properties. The initial disbursement is conditioned upon obtaining a recorded conservation easement as described in Section 6.3 of the final Interlocal Agreement. If Performing Party fails to execute and properly record conservation easements, Trustees retain the option to request a refund of the disbursed amount.

Final Disbursement. Following Trustees' approval of the Final Report and Trustees' Certification of Project Completion and provided that all applicable terms of the Interlocal Agreement have been met, Trustees will authorize the transfer of the final disbursement amount listed in Table 2 of the Interlocal Agreement for the applicable project, 3B, 4A, and/or 5, for the conservation only activities. The Trustees may disburse less than the amount if the Trustees determine that this amount exceeds the City's financial expenditures. If Performing Party does not provide Trustees with the Final Report pursuant to Section 13.3.3.2 of the final Interlocal Agreement, the City will forfeit up to $27,000.

2.4.2 Stream and Wetland Restoration Projects

Initial Disbursement. Within ten days after the Effective Date, the initial disbursement listed in Table 2 of the Interlocal Agreement, for stream and wetland restoration Projects 1-3A, 4B, and 6-10 will be made for use by the City to develop Work Plan(s) for the Projects.

Subsequent Disbursement for Phases I and II. Within ten days after Trustee approval of a Work Plan, the subsequent disbursement for Phases I and II listed in Table 2 of the Interlocal Agreement, will be made for the City to implement Phases I and II. Phase II will not be initiated until after the issuance of Trustees' approval of the Phase I Completion Report.

Subsequent Disbursement for Phase III. Within 30 days after the date of Trustees' approval of the Phase II Completion Report, the subsequent disbursement for Phase III listed in Table 2 of the Interlocal Agreement will be made for use to implement Phase III.

Final Disbursement. Following Trustees' approval of a Project's Phase III Construction Completion Report, the final disbursement amount listed in Table 2 of the Interlocal Agreement for applicable Project monitoring. The Trustees may disburse less than the amount listed if the Trustees determine that this amount exceeds the City's financial expenditures.

Documents needed to receive disbursements are summarized in Table 4.

Table 4 Documents to Submit to Receive Disbursements

Disbursement	Amount	Forest Preservation Projects 3B, 4A, and 5	Stream and Wetland Projects 1-3A, 4B, and 6-10
Initial	$58,000	None	None
Subsequent Phase I and II	$360,000	NA	Approved Work Plan
Subsequent Phase III	$8,903,500	NA	Approved Phase I & Phase II Completion Reports
Final	$478,500	Recorded Conservation Easement/Deed Restrictions; Final Report and Trustees' Certification of Project Completion	Approved Phase III Construction Completion Report

2.5 Additional Funding Requests.

The City may request additional funds beyond the Authorized Disbursement of $9,800,000. Any requests for additional payment disbursements shall be in writing to the Trustees Project Officer, Michael Cave, and include references to a Project and Budget categories and shall include:

- A brief description, cost, and purpose of the work or services to be performed, the date the work or services is expected to commence, and the date the work or services is expected to be completed;
- A listing, description, cost, and purpose of materials, products, or supplies necessary for the Project; and
- Copies of any invoices, bills, or receipts for work, services, or purchases in excess of $10,000.

If requested by Trustees, the City would provide additional written information, documentation, or explanation concerning a request for additional payment disbursement. This additional written information, documentation, or explanation, along with the associated request for payment disbursement, shall constitute an amended request.

Within 30 days of Trustees receiving a request for additional payment, or an amended request, Trustees will authorize or deny the transfer of funds at Trustees' sole discretion or not act within the 30-day period, which will constitute request denial.

3.0 Forest Preservation Work Plan

3.1 Tasks

The entity responsible for completing tasks is identified in Table 5, however if it is not clear, the Trustees should assume the City is completing any task where the performer is not clearly stated. The Agreement was entered into between the Trustees and the City as the Performing Party. While any consultant or other partner under contract with the City may be responsible for completing certain tasks for the City, the City is ultimately responsible for completing tasks according to the Agreement. Work for Projects 3B, 4A, and 5 (Conservation Properties) will be undertaken in two Phases as follows:

3.1.1 Phase I consists of:

- identify a qualified conservation easement holder
- conduct due diligence on Conservation Properties to determine sites are not contaminated
- verify Conservation Property boundaries are certain and clear
- within 30 days after the Effective Date of June 8, 2020, submit the identified conservation easement holder to the Trustees for review and approval
- within 120 days after the Effective Date, submit the due diligence documents to the Trustees for review and approval. Due diligence includes environmental assessment(s), appraisal(s) by a state-certified general appraiser, title searches, and property land survey(s) that meets the requirements of a Category 1A, Land Title Survey, as defined in the Manual of Practice for Land Surveying in Texas, published by the Texas Society of Professional Surveyors. No title search or appraisal is needed since these are City owned properties
- compile and submit the following documentation: final title commitment to include all known encumbrances on the Conservation Property and resolution of any objections to title; a description of the Conservation Property; the Conservation Property deed; and any documents compiled to conduct due diligence
- obtain Trustees' written approval of the conservation easement holder, due diligence documents, and the Conservation Property prior to submission of the Phase I Completion Report
- within 150 days after the Effective Date, prepare and submit Phase I Completion Report for Trustees' review and approval
- obtain Trustees written approval of the Phase I Completion Report prior to initiation of Phase II

3.1.2 Phase II consists of:

- prepare draft conservation easement similar to Exhibit C in the Interlocal Agreement
- within 60 days after the date of Trustees' approval of the Phase I Completion Report, submit a draft conservation easement to Trustees for approval
- obtain Trustees' written approval on draft easement
- within 30 days after Trustees' approval of draft easement, execute and record a conservation easement
- prepare and submit Phase II Completion Report which serves as Forest Preservation Projects Final Report. This may be submitted separately from or jointly with Stream and Wetland projects Final Report.

Upon written request and justification by the City of Texarkana, Texas, Trustees may grant flexibility in meeting the deadline to identify a conservation easement holder or submitting or recording the

conservation easement. Any request to extend the deadline shall include information in a format prescribed by Trustees.

If the City of Texarkana, Texas is unable to secure a conservation easement holder for a Conservation Property after a good-faith effort, the City may request Trustee approval to file a deed restriction approved by Trustees in lieu of a conservation easement. Trustees have sole discretion in determining approval of a deed restriction in lieu of a conservation easement. If Trustees approve deed restrictions in lieu of a conservation easement, the City will annually inspect the Conservation Property for violations of the deed restrictions and take corrective action to address the violation(s).

The Trustees will have reasonable access to areas that may be affected by the Projects and other areas as needed to monitor the Project to the extent the City of Texarkana, Texas has the authority to allow access.

3.2 Schedule

Table 5 Forest Preservation Work Schedule for Delivery to Trustees

Activity/Work Product	Timeline for Submittal	Deliverable	Responsibility	Additional Information	Follow up Action Item
PHASE I Preservation Projects 3B, 4A, & 5 Year 1					
Initial Disbursement	Within 10 days after the Effective date		Trustees		City to track expenditures
Identify qualified conservation easement holder	Within 30 days after the Effective Date	Written notice of proposed conservation easement holder	City of Texarkana, Texas		Trustees' approval
Disbursement for Phase I Prepare conservation easement supporting documents: project location maps with boundary descriptions; environmental due diligence; title search; appraisal	Within 120 days after the Effective Date	$18,000 Due diligence report(s)	Aqua Strategies	includes environmental assessment(s), appraisal(s) by a state-certified general appraiser, title searches, and property land survey(s) that meets the requirements of a Category 1A, Land Title Survey, as defined in the Manual of Practice for Land Surveying in Texas, published by the Texas Society of Professional Surveyors and in compliance with American Society for Testing and Materials (ASTM) Standard E-1527-13	City track expenditures Trustees' approval

Activity/Work Product	Timeline for Submittal	Deliverable	Responsibility	Additional Information	Follow up Action Item
Disbursement for Phase I (continued)				which adheres to the Environmental Protection Agency All Appropriate Inquiries Rule, codified into the federal regulations by the EPA (40 CFR Part 312).	
Obtain any required permit authorizations	Within 300 days after the Effective Date	Copies of permit authorizations	Aqua Strategies		Trustees approval
Draft Phase I Completion Report for sites 3B, 4A, & 5 and obtain letter of intent from approved conservation easement holder	Within 30 days after completion of Phase I and prior to initiating Phase II for preservation only projects	Phase I Completion Report; Letter of intent; summary of financial accounting	City and Aqua Strategies		Trustees approval
PHASE II Preservation Projects 3B, 4A, & 5					
Draft the conservation easement	Within 60 days after the date of Trustees' approval of the Phase I Completion Report	Draft Conservation Easements	City		Trustees approval
Execute and record the conservation easement	Within 30 days after the date of Trustees' approval of the draft conservation easement	Recorded conservation easements	City	Proposal indicated Conservation Easements completed 6 months	
Draft Phase II Completion Report as Final Report for preservation only sites 3B, 4A, and 5	Within 30 days after completion of Phase II	Phase II Completion Report as Final Report	City and Aqua Strategies		Trustees approval
Final Disbursement	Following Trustees approval of Final report	$27,500 and certificate of completion	Trustees		City acknowledge receipt

3.3 Submittals

- Written notice of proposed conservation easement holder
- Due diligence report
- Copies of any required permit authorizations
- Phase I Completion Report
- Letter of intent
- Summary of financial accounting/expenditures on Forest Preservation activities
- Draft conservation easements
- Copy of recorded conservation easements
- Phase II Completion Report as Final Report

3.4 Detailed Scope of Work

3.4.1 Phase I Activity-Identify Conservation Easement Holder

The City will review the conservation easement example in the Interlocal Agreement Exhibit C along with guidance from the Texas Land Trust Council and *Conservation Easements: A Guide for Texas Land Owners.* The City will meet with the potential conservation easement holder, a local 501 C3 organization with mission, interests, and capacity to conserve forested land in perpetuity and discuss conditions of an easement and responsibilities of the holder. The City will prepare a written notice of proposed conservation easement holder and submit to NRDA Trustees for review and approval. The City will work with a qualified real-estate appraiser and/or the Bowie County Tax Appraisal District, as under U.S. tax law, to determine the 2020 land/market value of the conservation easement properties.

3.4.2 Phase 1 Activity-Due Diligence and Completion Reports

Three locations have been targeted for preservation via a conservation easement in perpetuity under the NRDA Agreement: Project 3B, an estimated 2.5-3 acres of forested habitat adjacent to the area enhanced in Project 3A; Project 4A, approximately 32 acres of wet forested habitat associated with Days Creek, and Project 5, approximately 100 acres of high-quality forested riparian habitat along Days Creek, south of the Texas Viaduct. If 100 areas total is not at the targeted Project 5 site, the balance may be secured near Project 10 along Waggoner Creek.

Within 120 days after the Effective Date, June 8, 2020, therefore by October 5, 2020, the City will submit the due diligence documents to the Trustees for review and approval. To accompany the Conservation Easement that will be prepared by the City, the following will be required by Due Diligence investigations undertaken on these project sites to determine that the properties are 1) not contaminated, 2) the boundaries are certain and clear, and 3 document the property's conservation value:

Due Diligence investigations will follow EPA regulations and state survey requirements and involve:

- Environmental Assessment Baseline Documentation Report. Includes records review and site investigation for description of the properties, Phase I ASTM Issues (CERCLA/RCRA Issues) i.e. presence/absence of any hazardous materials (lead/asbestos/MTBE/) or petroleum products and other based on past land uses (pesticides); historical research (which may include historical aerials, street directories, planning records, building permits, Sanborn Fire Maps, USGS topographic maps, Bowie County soil survey, oil and gas maps, timbering records, geology and

depth to groundwater, natural resources, and cultural resources, regulatory review with local fire department, database search of TCEQ records, EPA records).

- Title Report. A title report is a legal document identifying all owners of the property, description of the property, any lien holders or mortgages, known encumbrances and pre-existing easements (i.e. gas or power line), resolution of any objections to title, and conservation property deed.

- Property Land Survey & Legal Description. These two documents, a surveyed plat and legal description, will identify the exact property being protected by the conservation easement. The survey will comply with Category 1A, Land Title Survey, as defined in the Manual of Practice for Land Surveying in Texas, published by the Texas Society of Professional Surveyors to is a graphic representation(plat/map) with the property's size, shape, and location, while the Legal Description provides a written legal description of the property's meets and bounds or other applicable. Both the survey and legal description will be attached to the final conservation easement. Current survey and legal description may be obtained from the Bowie County Records office and completed by a licensed Land Surveyor authorized to practice in the State of Texas.

- Appraisal. by state certified general appraiser that may include the Bowie County Tax Appraiser for 2020 values.

Due diligence will consist of Phase I Environmental Site Assessment (ESA) records survey that utilizes a variety of historical resources, including local, state, and federal records, to identify past uses and/or occupants of the property that may present an environmental risk. This portion of the Data Collection Plan for sites 3B, 4A, and 5 does not include Phase II or III: contamination determination or clean-up activities.

3.4.2.1 Project 3B

Preserve 2.5 ac forested habitat with Project site 3 shown in Figure 3. Accompanying color aerial photographs in Figure 4 shown current site conditions.

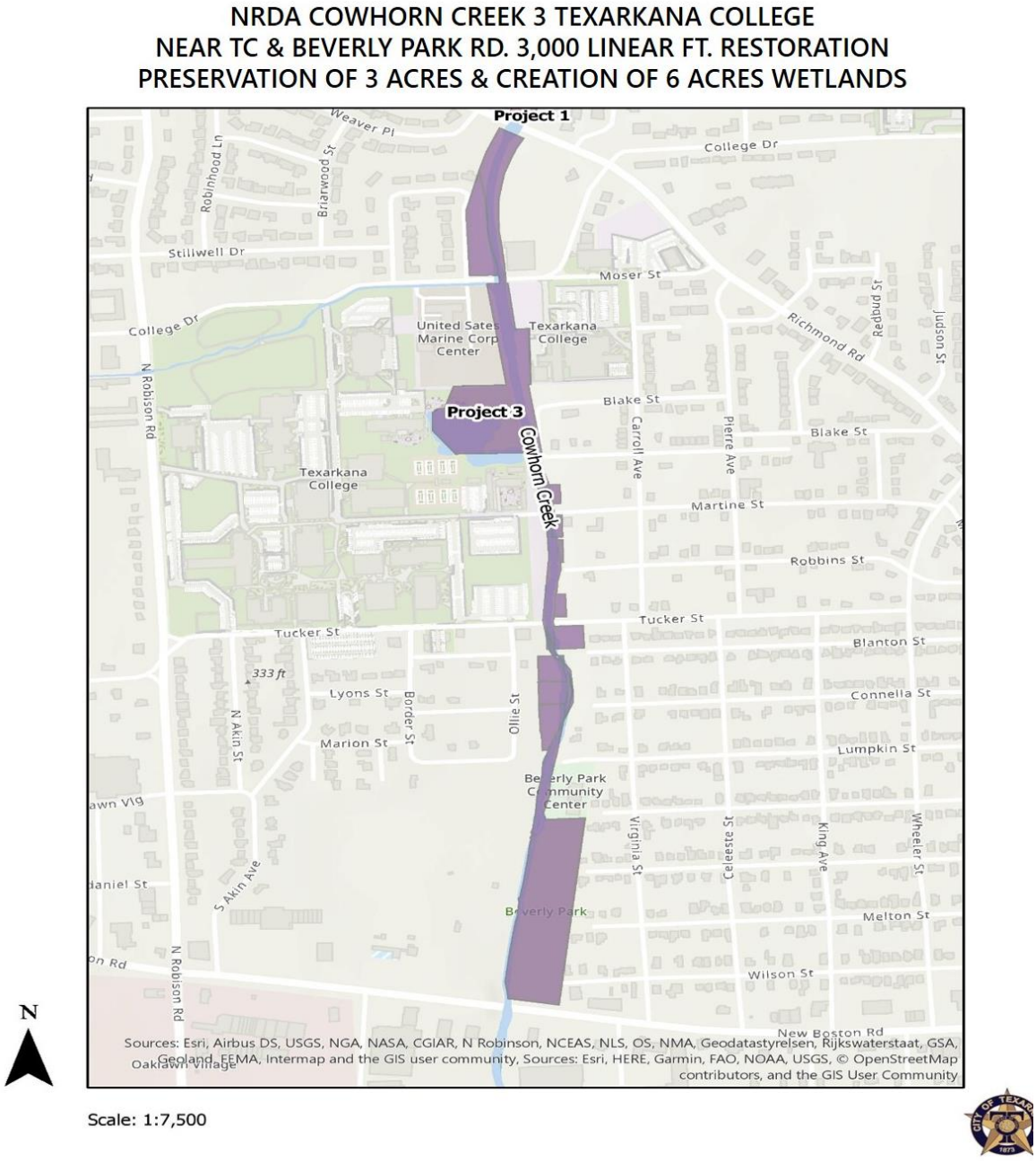


Figure 3. Project 3 Location Map.

Figure 4. **Project 3B Color Aerial Photograph.**
Note photo shows general location of forested area within and adjacent to Project site 3 to be investigated for preservation as Project 3B. Conduct due diligence surveys on the area within Project site 3, that may include approx. 2.5-3 ac.

3.4.2.2 Project 4A

Preserve 32 acres forested habitat east of Tronox Facility & Days Creek. Target area is shown in Figure 5.

Figure 5. Project 4 Location Map.
Note proximity to Project site 6.

Figure 6. Project 4B Color Aerial Photograph.

Conduct surveys within targeted 32 acres, outlined in white polygon north of SH 151. This target area may be expanded west and east based on property boundary surveys and site investigations since area boundaries shown are approximate at this time. Note Project site 6 is outlined south of SH 151.

3.4.2.3 Project 5

Preserve 100 acres forested riparian habitat. This project site is located along Days Creek South of Texas Viaduct and northeast of the Tronox site on City owned property near the confluence of Nix Creek and Days Creek. This property provides approximately 4,000 linear feet of creek with wooded bottomland forest. Other adjoining city owned parcels with same forested conditions may also be investigated for preservation.

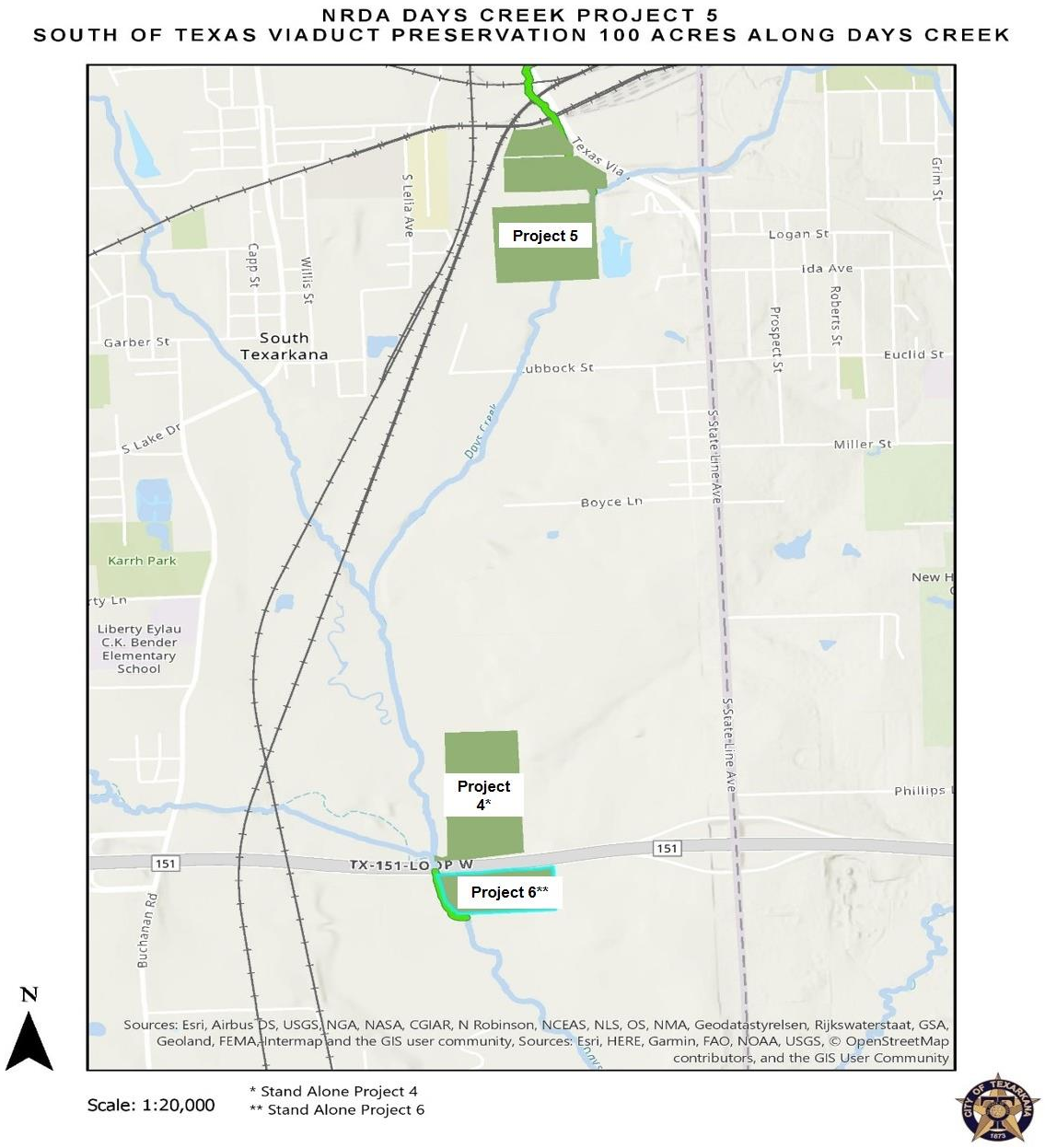


Figure 7. Project 5 Location Map.

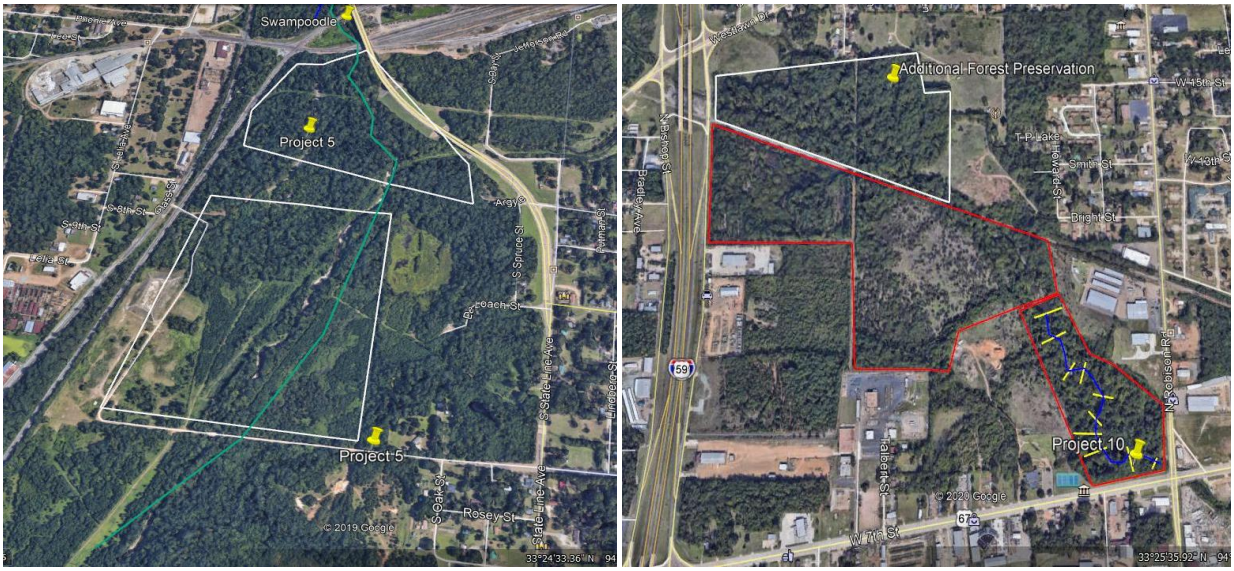


Figure 8. Project 5 Color Aerial Photographs.
Note Project 5 forest preservation (above left) boundaries shown are approximate and additional preservation targets 66.5 acres on north side of Project 10 (above right).

Preserve approx. 100 ac forested riparian habitat in lower reach of Swampoodle as it joins Nix Creek. Conduct due diligence survey within target areas, Figure 8 above left photo (outlined white polygons), north area approx. 39 ac and south area approx. 70 ac. Boundaries are approximate and the location of 100 acres may vary. Areas contain Days Creek channel and floodplain woods/wetlands. If adequate acreage of city owned property is not available at the Project 5 location, additional city owned property (outlined in white, above right photo) containing high quality floodplain forest is targeted near Project 10 (outlined in red) along Waggoner Creek (Figure 8 above right photo).

3.4.2.4 Due Diligence Surveys and Report

Due diligence surveys will include conducting Phase I ESA with current and historical uses of the subject properties to identify any recognized environmental conditions (RECs) or historical RECs, obtaining appraisal by state certified general appraiser, undertaking as applicable title search, and preparing property land survey that meets the requirements of a Category 1A, Land Title Survey, as defined in the Manual of Practice for Land Surveying in Texas, published by the Texas Society of Professional Surveyors and in compliance with the American Society for Testing and Materials (ASTM) Standard E-1527-13 which adheres to the Environmental Protection Agency (EPA) All Appropriate Inquires Rule, codified into the federal regulations by EPA (40 CFR Part 312).

Phase I ESA will be in accordance with the ASTM Standard E-1527-2005 and Brownfield Revitalization Act (Brownfield Amendments) of 2002 (the Federal rule which describes what constitutes an All Appropriate Inquiry (AAI) is the formal process of assessing properties for the presence or potential presence of environmental contamination with following:

- Undertake a records review of 1/8 to 1-mile radius of the sites of state water board, fire and health departments
- Evaluate risks of neighboring properties on the sites
- Examine chain-of-title for environmental liens and/or activities and Land Use Limitations

On-site inspection will undertake and collect the following data:

- View and record present with color photographs site condition, particularly any evidence of chemical spill residue, vegetation die-back, hazardous substances or petroleum product usage, i.e. presence of above or below ground storage tanks, and evaluation of any likely environmental hazardous site history through interviews with relevant parties and review of historical aerial imagery;
- Examine current LiDAR and USGS and topographic maps and site conditions to assess drainage patterns
- Inspect and record land use, tree survey for species presence/health/maturity and forest habitat condition; wetlands; T&E species; and any debris piles/flow.

See Appendix B for anticipated Due Diligence report content.

3.2.4.5 Forest Management Plans

Based on site inspection and conservation values at each Conservation Property, prepare Management Plan for Projects 3B, 4A, and 5 that will address access, allowable activities/usage, monitoring and long-term site management/maintenance as part of final conservation easement documents.

3.2.4.6 Required Permits

At this time, based upon properties owned by the City of Texarkana, Texas, and property owner's knowledge of activities and conditions of these sites, no permits are anticipated at this time. Should results of Due Diligence Surveys determine otherwise, the City will notify the NRDA Trustees and undertake necessary permitting. Copies of any required permit authorizations will be provided to NRDA trustees and pending conservation easement holder.

3.2.4.7 Phase I Completion Report

Within 30 days after due diligence report has been completed, the City will prepare a Phase I Completion Report that identifies the conservation easement holder with a Letter of Intent from the conservation easement holder and a summary of financial accounting/expenditures on Forest Preservation activities to date. The Phase I Completion Report will be submitted to the Trustees for review and approval.

3.4.3 Phase II Activities

3.4.3.1 Conservation Easement

A conservation easement will be placed on each of the three forest preservation only sites: 3B, 4A, and 5 with provisions to protect them in perpetuity following the template provided in the Interlocal Agreement. For added protection, outdoor signage may be installed notifying the public of the site's preservation protection status, conservation values, and contact information in case reports need to be made.

The City, working with the conservation easement holder, will draft conservation easements on three sites: 3B, 4A, and 5 as a protective means to preserve the conservation value of these sites in perpetuity. A conservation easement is a voluntary, written agreement between a landowner and the "holder" of the conservation easement under which a landowner voluntarily restricts certain uses of the property to protect its natural, productive or cultural features. The City will refer to the example of a conservation easement provided in Exhibit C of the Interlocal Agreement. The holder of the conservation easement will be a qualified conservation organization. With a conservation easement, the landowner retains legal

title to the property and determines the types of land uses to continue and those to restrict. As part of the agreement, the landowner grants the holder of the conservation easement the right to periodically (typically annually) assess the condition of the property to ensure that it is maintained according to the terms of the legal conservation agreement.

Pending Trustees' review and approval, the City will then record the conservation easements in the local county land/real estate office as a part of the chain of title for the properties and submit copy of recorded conservation easements to the Trustees.

3.4.3.2 Phase II Completion Report as Final Report

The City will prepare a Phase II Completion Report regarding the forest preservation sites: 3B, 4A, and 5. This report will contain the contents of the Phase I Completion report plus the Letter of Intent from the conservation easement holder, a summary of all expenditures associated with the forest preservation activities, and copies of the conservation easement with due diligence documents and real estate record. This report will become part of the overall Project Final Report following stream and wetland restoration activities.

4.0 Stream and Wetland Work Plan

Stream and wetland restoration work will utilize an interdisciplinary team with a planning process using a watershed approach. Project goals and objectives will target, to the extent practicable for urban stream restoration, restoring Cowhorn Creek, Swampoodle Creek, and portions along Waggoner, Howard, and Days Creeks' corridors, and include:

- Provide habitat enhancement for native fishes, to increase abundance and diversity
- Prevent streambank erosion, to reduce excessive sedimentation, suspended solids, and loss of riparian habitat while protecting properties and infrastructure
- Restore hydrologic function, including limited dynamic channel processes within urban setting and integrated with stormwater management needs
- Establish abutting wetland and companion riparian habitats, from an incised or channelized reach, to increase ecosystem processes and local biodiversity
- Improve water quality, to reduce excessive temperature swings, nutrients, and maintain desirable dissolved oxygen levels
- Improve conditions for benthic species
- Remove non-native riparian vegetation, replacing with desirable native species
- Reestablish a sinuous channel from a channelized reach and/or naturalize where practicable

The planning process followed will: identify specific site problem(s) targeted to environmental restoration, undertake site inventory and analysis, develop site alternatives, evaluate alternatives against achievement of goals, H&H modeling, and cost/benefits, select a preferred plan with stakeholder involvement, and refine the selected plan through detailed engineering design and construction.

During the planning and design processes, the attributes of each of the restoration projects will be individually assessed to assure that the NRDA project goals are being fully satisfied. After construction, monitoring will be undertaken to assess if the goals and objectives are being met. If not, remediation may be needed through adaptive management. Documentation of project progress and performance will be maintained by the PDT for communication with the PMT, Trustees, and stakeholders.

4.1 Tasks

The entity responsible for completing tasks is identified in Table 6, however if it is not clear, the Trustees should assume the City is completing any task where the performer is not clearly stated. The Agreement was entered into between the Trustees and the City as the Performing Party. While any consultant or other partner under contract with the City may be responsible for completing certain tasks for the City, the City is ultimately responsible for completing tasks according to the Agreement. Work for Projects 1-3A, 4B, and 6-10 (Construction Sites) will be undertaken in four Phases with tasks as follows:

4.1.1 Phase I Project Planning and Preliminary Design Development consists of:

- collect data, including LiDAR, and compile baseline conditions results for each project site,
- conduct hydrologic studies for appropriate boundary conditions, i.e. site or watershed,
- develop 30% design (s),
- initiate preparation of any necessary permit applications for construction,
- develop 60% designs,
- submit permit application,
- draft quarterly reports, and

- prepare Phase I Completion Report.

Data collection plan will be prepared as indicated in Section 4.4.1.1 and data collection is further described in Section 5. Hydrologic studies and 30% design(s) will be submitted to Trustees for review and approval. Hydrologic studies will follow modeling guidelines as provided by USACE Fort Worth District in Hydrologic Modeling Guidelines for Regulatory Permit Actions: Checklist and Final Technical Report, both dated Januarys 18, 2018. Following Trustees' approval of the 30% design(s), prepare and submit a Phase I Completion Report. Obtain Trustees' written approval on the Phase I Completion Report prior to initiation of Phase II. Continue design development to 60% sufficient for permitting purposes.

4.1.2 Phase II 80% Design Development consists:

- acquire any necessary permits,
- develop 80% design(s),
- continue quarterly reports,
- prepare an opinion of probable costs,
- prepare monitoring plan,
- submit the 80% design and monitoring plan to Trustees for review and approval,
- prepare and submit the Phase II Completion Report for review and approval, and
- obtain Trustees' written approve of the Phase II Completion Report prior to initiation of Phase III.

4.1.3 Phase III Project Construction consists:

- develop an opinion of probable costs,
- continue with quarterly reports,
- develop the 100% design(s) and submit to Trustees for review and approval,
- obtain Trustees' written approval of the 100% design prior to the commencement of construction,
- develop bid documents,
- undertake contractor bidding and selection,
- undertake general contractor contracting,
- construction mobilization,
- construct project,
- undertake final walk-through with General Contractor,
- undertake any applicable corrective actions,
- undertake final review and approval with Trustees,
- obtain Trustees' written approval of construction,
- construction demobilization,
- prepare/submit Phase III Construction Completion Report with supporting documentation, and
- obtain Trustees' written approval on Phase III Completion report.

Upon Trustees' approval of the Phase III Construction Completion Report, City of Texarkana, Texas will initiate Phase IV Monitoring

4.1.4 Phase IV Monitoring will address:

- Erosion control
- Water quality improvement
- Vegetative cover condition

- Fauna Utilization
- Habitat development
- Stream restoration
- Wetland restoration
- Forest enhancement

Detailed monitoring plans will be developed following 60% design development and as part of USACE permit application and pursuant to NRDA project goals, objectives, and construction criteria as specified in Table 2. See Section 9.0 for further information on monitoring plan elements.

4.2 Schedule

Factors that can affect schedule include weather and storm events, general construction contractor contracting, unforeseen site conditions, among other factors. Written notification to Trustees will be provided in the case of any schedule changes. Table 6 provides general work schedule for stream and wetland restoration activities.

Table 6 Stream and Wetland Work Schedule for Delivery to Trustees

Activity/Work Product	Timeline for Submittal	Deliverable	Responsibility	Additional Information	Follow up Action Item
Phase I Restoration/Construction Projects 1, 2, 3A, 4B, 6, 7, 8, 9, & 10 Year 1					
Prepare quarterly reports	April 30 for January – March July 31 for April-June October 31 for July-September January 31 for October-December	Quarterly Reports	City and Aqua Strategies	Submit to Trustees	Viewing
Initial Disbursement of $58,000	Within 10 days after the Effective Date		Trustees	To develop Work Plan by City	City track expenditures
Prepare Work Plan	Within 60 days after the Effective Date	Work Plan	City and Aqua Strategies	Any material changes require written approval	Trustees approval
Phase I & II Disbursement of $342,000	Within 10 days after the date of Trustees' approval of Project's Work Plan		Trustees		City track expenditures

Activity/Work Product	Timeline for Submittal	Deliverable	Responsibility	Additional Information	Follow up Action Item
Task 1 Prepare project location maps with boundary descriptions Prepare Data Collection Plan, Design Development Plan, Permitting Plan	3 months from Effective Date		City and Aqua Strategies		
Prepare quarterly report	Every quarter	Quarterly Report 1	City and Aqua Strategies	April 30 for January - March, July 31 for April - June, October 31 for July – September, and January 31 for October - December	Trustees review
Task 1 Undertake data collection with hydrologic study	6 months from Effective Date		Aqua Strategies		
Task 1 30% plans with data collection results	8 months from Effective Date	30% plans and data results report	City and Aqua Strategies		Trustees approval
Quarterly report 2		Quarterly Report 2	City and Aqua Strategies	Dependent upon timeframe for Phase I Completion report	Trustees review
Phase I completion report	12 months from Effective Date	Phase I Completion Report	City and Aqua Strategies	Submit within 30 days of Phase I completion includes summary of financial accounting	Trustees approval
Phase II Planning/Design Development Year 2					
60 % plans with hydrologic modeling and USACE permit application	4 months duration, 16 months from Effective Date	60% plans and H&H results	City and Aqua Strategies	Permit process underway with 6-8 months anticipated to receive permit(s)	Trustees approval
Prepare and submit quarterly report 3		Quarterly Report 3	City and Aqua Strategies		Trustees review
Develop cost estimate	2 months duration	Preliminary Cost estimate	Aqua Strategies		Trustees approval

Activity/Work Product	Timeline for Submittal	Deliverable	Responsibility	Additional Information	Follow up Action Item
Prepare quarterly report 4		Quarterly report 4	City and Aqua Strategies		Trustees review
Prepare and submit 80% complete plans with monitoring plan	4 months duration	80% plans and Monitoring Plan	City and Aqua Strategies		Trustees approval
Prepare quarterly report 5		Quarterly Report 5	City and Aqua Strategies		Trustees review
Prepare and submit Phase II Completion Report		Phase II Completion Report	City and Aqua Strategies	Submit within 30 days of Phase II completion (80% design plans) includes summary of financial accounting	Trustees approval
Phase III Construction Year 3					
Phase III Disbursement of $8,903,500	Within 30 days after the date of Trustee approval of Phase II Completion Report		Trustees		City track expenditures per project budget as per Tables 1 and 2
Prepare 100% plans, Construction Sequencing Plan, Reporting Plan, and Maintenance Plan and probable cost estimate	2 months duration, 18 months from Effective Date	100% Plans, Construction Sequencing Plan, Reporting Plan, and Maintenance Plan	Aqua Strategies	City to make any budget increase requests	City and Trustees approval
100% plans to go to contractor bidding	3 months duration; 21 months from Effective Date		City		
Prepare cost estimate		Construction Cost Estimate	Aqua Strategies	City to make any budget increase requests	Trustees approval
Prepare quarterly report 6		Quarterly Report 6	City and Aqua Strategies		Trustees review
Construction start in phases	12 months into Year 2, 24 months from Effective Date				

Activity/Work Product	Timeline for Submittal	Deliverable	Responsibility	Additional Information	Follow up Action Item
Prepare quarterly reports 7 and 8 with photos		Quarterly Reports 7 and 8 with photos	City and Aqua Strategies		Trustees review
Phase IV Monitoring and Adaptive Management Year 3					
Construction continues			City's general contractor	Dependent upon construction schedule	
Prepare quarterly reports 9 and 10 with photos		Quarterly Reports 9 and 10 with photos	City and Aqua Strategies		Trustees review
Construction ends			City's general contractor	Dependent upon schedule and approvals	Trustees approval
Prepare Phase III Completion Report	Within 30 days after the completion of Phase III	Phase III Completion Report with financial accounting	City and Aqua Strategies	Initiates monitoring	Trustees approval
Final Disbursement $451,000	Upon approval Phase III Completion Report		Trustees		City acknowledges receipt
Initial USACE Monitoring Report(s)	Within 1-year post construction		City, Aqua Strategies, and Project Partners	As USACE permit requirements reporting may be 30 days, 60 days, 90 days, 6 months, 12 months, and as applicable with significant precipitation event(s).	
Prepare quarterly reports 11, 12, and 13 with photos		Quarterly Reports 11, 12 and 13 with photos	City and Aqua Strategies		Trustees review

Activity/Work Product	Timeline for Submittal	Deliverable	Responsibility	Additional Information	Follow up Action Item
First Annual NRDA Monitoring report	Within 1-year post construction	First Monitoring Report	City, Aqua Strategies, and Project partners and	First annual monitoring report due within one year from the date of Trustees' approval of the Phase III Construction Completion Report. Subsequent reports due annually on the anniversary of the submission of the first monitoring report.	Trustees approval
Year 4					
Prepare quarterly reports 14, 15 and 16 with photos		Quarterly Reports 14, 15 and 16 with photos	City and Aqua Strategies		Trustees review
Second Annual Monitoring Report	12 months	Second Monitoring Report	City, Aqua Strategies, and Project partners and		Trustees approval
Year 5					
Prepare quarterly reports 17, 18 and 19 with photos		Quarterly Reports 17, 18 and 19 with photos	City and Aqua Strategies		Trustees review
Third and Final Annual Monitoring Report	12 months	Third Monitoring Report	City, Aqua Strategies, and Project partners and		Trustees approval
Prepare final Project Report as Final Close-out Summary		Draft Final Project Report on final project including financial accounting	City and Aqua Strategies		Trustees approval
Issue Certification of Completion to certify completion of each Phase and Project		Certification of all Projects Completion	Trustees		

4.2.1. Sequence of Restoration Activities Including Construction

Restoration activities may be grouped by stream channels and ease/complexity of the project. Projects 1, 2 and 3 may be grouped together for efficiency with data collection, design development, and construction since they are all located along Cowhorn Creek. Project 7, 8 and 9 may be grouped together for data collection. However, Projects 7, 8, and 9 will be designed separately since their restoration needs are different from one another. Project 6 and 10 may be surveyed in similar timeframes yet designed separately since they share similar site conditions, i.e. forested floodplains and may share similar restoration design approaches/techniques, however they are geographically separated. Table 7 provides an overview of restoration activities over the 5-year project timeframe. It is anticipated that construction would begin with Project 1 and 7 and proceed downstream. Until 80% and 100% plan completion and consultation with project team members, construction may also occur on multiple project sites simultaneously.

Table 7 Anticipated Project Schedule

Stream and Wetland Restoration Project #	1	2	3	6	7	8	9	10
YR 1 (2020)								
August	Data							
September	Collection							
October								
November	Reporting							
December	30% Design							
YR 2 (2021)								
January	H&H							
February	60% Design							
March	Permitting							
April								
May								
June	Phase I	Completion	Report					
July	80% Design							
August	Permit Submittal							

Stream and Wetland Restoration Project #	1	2	3	6	7	8	9	10
September	Completed H&H							
October	Cost Estimating							
November	Phase II	Completion	Report					
December	Construction							
YR 3 (2022)								
January	Start							
February	Staggered							
March								
April								
May								
June (24 months from Effective Date)								
July								
August								
September		Monitoring	Start	May	Be	Staggered		
October		Phase III	Completion	Report				
November								
December								
YR 4 (2023)								
YR 5 (2024)	End of year	Final	Completion	Report				

Tasks/Activities

Data Collection Reporting 30% Design/Permitting H&H 60% Design/Permitting 80% Design/Engineering 100% Construction Documents; includes bidding and contracting, Construction Monitoring

4.3 Submittals

- Work Plan
- Quarterly Report 1
- 30% Plans and Data Collection Results
- Quarterly Report 2
- Phase I Completion Report
- 60% Plans and H&H Results
- Quarterly Report 3
- Permit copies
- Preliminary Cost Estimate
- Quarterly Report 4
- 80% Plans and Monitoring Plan
- Quarterly Report 5
- Phase II Completion Report
- Construction Plans with Reporting and Maintenance Plans
- Construction Cost Estimate
- Quarterly Reports 6 -10
- Phase III Completion Report with financial accounting
- Quarterly Reports 11, 12, and 13
- 1st Annual Monitoring Report
- Quarterly Reports 11, 15, and 16
- 2nd Annual Monitoring Report
- Quarterly Reports 17, 18, and 19
- 3rd Annual Monitoring Report
- Final Project Report and Close Out

4.4 Detailed Scope of Work

4.4.1 Phase I Task 1. Planning and 30% Design Development

The City will enter into a subcontract with Aqua Strategies Inc. (AS) to provide planning, engineering, environmental compliance permitting, construction documentations preparation, construction oversight, monitoring and assist the City with maintenance requirements to achieve NRDA project restoration goals.

An initial step following contracting is to undertake a project kickoff meeting between the PMT and the PDT to review the scope, schedule, deliverables, and begin compiling existing data within the first week. Establishment of a project schedule would include setting internal and public focus groups and applicable public meetings, and other community engagement opportunities as health concerns permit. The PDT will meet with City staff and also present a project overview to the Mayor and City Council, as directed.

AS will develop Data Collection Plan, Design Development Plan, Permitting Plan, Construction Plan, Monitoring Plan, Reporting Plan, and Maintenance Plan as part of Work Plan development.

4.4.1.1 Data Collection Plan

Collect mapped information on each site including property boundaries and work limits within property boundaries. Data to be collected includes bathymetric and topographic survey of the stream channels,

i.e. current LiDAR that is supplemented with site elevation surveys as needed, soil assessment of the project sites focused on intended work areas, applicable geotechnical investigation, extent and severity of erosion and biological site review including plants to be preserved. Historical and current aerial imagery will be gathered and for assessment of hydrologic and habitat modifications over time to support opportunities and constraints mapping. A stream and wetland delineation, supported by handheld GPS, will be undertaken to identify waters of the U.S. under the jurisdiction of US Army Corps of Engineers. Data collected in support of the delineation and design development includes elevation data, current and historical aerial imagery, supporting maps: National Wetlands Inventory, FEMA floodplain, and US Geological Survey quad maps; TNRIS winter LiDAR, site(s) photo log, and shapefiles. Within the first four months, baseline surveys and existing data collection will be completed. Data collection will also support subsequent hydrology and hydraulics analyses and modeling that follows USACE Fort Worth District's guidance. See Section 5.0 for more information on data collection. Post-construction monitoring funded by the Trustees is limited to parameters needed to determine project success (e.g., demonstrating the accuracy of the as-builts, percent survival of native vegetation, percent invasive species), rather than extensive research, ambient water quality monitoring, or impairment monitoring (e.g., forest and understory structure, rapid bioassessment protocols, in-stream benthic and aquatic species presence/utilization, surface water quality use-attainability analysis, aquatic life monitoring) or public utilization of the project (e.g., safe conditions for access, trail use, ground condition, human disturbance).

4.4.1.2 Design Development Plan

Includes the integration with existing stormwater plans and all site surveys and baseline monitoring results, undertaking coordination with the City's project partners, preparing illustrative site concepts to allow AS to update the conceptual designs, estimating material quantities, calculating impacts to natural resources, and providing an opinion of probable costs for the construction sites for 30% design drawings with applicable preliminary cross sections. The 30% plans will be reviewed by the City. Any comments will be addressed. The City will coordinate submittal of 30% plans to the Trustees to review and approve the results of site surveys, preliminary engineering designs, and cost estimates.

As an integral part to planning and design development, the PDT will coordinate and undertake public outreach including public meetings, open houses, workshops, and design charrettes on several occasions to gain stakeholder input on project component concept plans. Design charrettes would include preliminary concepts for project component planning with stakeholders at various sites. It is expressly noted that public outreach and education associated with the NRDA project are outside the Interlocal Agreement and not funded by the NRDA Trustees.

Results from public comments and data collection will allow the PDT to further project designs to 60% complete and initiate permitting, including USACE stream/wetland permit, TCEQ water quality certification, applicable stormwater/floodplain permits, and others. See Section 6.0 for more information on design development. See Section 6.0 for more information on design development.

4.4.1.3 Permitting Plan

AS will act as the City's authorized agent for regulatory permitting. A pre-application meeting with USACE Fort Worth District and coordinating agencies (TCEQ, TGLO, and TPWD) as a joint evaluation meeting (JEM) will be undertaken. The JEM would confirm that a Nationwide Permit 27 for stream restoration is acceptable and establish other permit requirements and other permits required. The PDT will prepare a

permit application(s) for use of a USACE permit under Nationwide 27 for stream restoration. Permitting support will include follow up application meetings and site visits with USACE Fort Worth District, preparation of permit application(s) that includes identification of potential impacts to jurisdictional areas, determination of fill volumes, USACE engineer form, project location and description, adjacent property owner information, applicable cultural resources survey as required by USACE, adherence to nationwide permit general conditions, and TCEQ 401 water quality certification. Correspondence/coordination will be provided with the federal and state regulatory agencies throughout the project process/duration on behalf of the City and the PMT addressing any permit review comments. The PDT will prepare project applicable stormwater pollution prevention plans, under the National Pollution Discharge Elimination System (NPDES) regulations and coordinate with the local floodplain manager on applicable floodplain regulatory requirements. See Section 7.0 for more information on permitting.

The PDT will provide brief weekly progress reports to the City, to keep the project schedule on track, and identify and resolve any issues early. The PDT anticipates quarterly and milestone-based progress reports will also be prepared by the PDT for the City to submit to the NRDA Trustees. See Table 6 in Section 4.2 Schedule for Quarterly Reports due dates.

4.4.2 Phase II Task 1. 60% and 80% Design Development and Construction Documents

The PDT will work with City staff, city project partners, and NRDA Trustees on design development of each of the project components, including preparing suitable 60% plans for USACE permitting and budgetary requirements under Interlocal Agreement conditions, thus keeping the overall project within budget. See Table 3 Section 2 for individual project components budgets. Permitting is anticipated to be accomplished over a 6 to 8-month timeframe during this Task. Following USACE permitting and Trustees approvals, the PDT will undertake 80% complete design development and plans.

Following Trustees approval, the PDT will move into preparation of construction documents in coordination with the City, including final (100%) plans and technical specification, construction criteria for review submittals. The PDT will also develop construction level drawings for inclusion in the contract documents. A complete set of contract documents will be developed as part of this scope. 100% completion contract documents will be available for review and comment as part of this process. Due to uncertainty of construction timing, 100% level contract documents will not be sealed and signed by AS or its subconsultant MTG. These documents will be sealed and signed prior to bid solicitation to ensure that the data contained within the document still coincides with the project, site conditions, and permits/approvals.

4.4.3 Phase III Task 1. Construction

The PDT will assist the City with the bid process including identification of general contractor qualifications, bid document preparation, attending pre-bid meeting, answering questions and providing clarifications during bidding, helping with contractor selection.

The PDT will work with the PMT to order/acquire seeds/plants, and other materials to reduce construction mobilization timeframe.

With Trustees' approval, the City will pursue construction The PDT will assist the City during the construction phase, including providing oversight of the construction and restoration activities for

successful restoration outcome and achievement of NRDA performance requirements, i.e. wetland acres, riparian/forest acres, and stream channel lengths. This will include providing oversight of restoration site work and native plant establishment.

The PDT will prepare as-built drawings and a monitoring plan and provide oversight of the monitoring before, during, and after restoration activities to meet NRDA requirements. The PDT will also provide coordination with City project partners and the public during construction the phase, that includes the initial monitoring and disseminate information as needed. It is anticipated that establishing a City project web page to maintain public outreach during the flow of the work, providing progress reports on a mileage basis would occur. It is expressly noted that public outreach and education, specifically via the City's website, is outside the Interlocal Agreement and not funded by the NRDA Trustees.

Attend NRDA Trustees meeting with site visit to review and approve construction.

4.4.4 Phase IV Task 1. Post-Restoration Activities including Monitoring

Undertaken Years 4 and 5, the PDT will develop monitoring reports in coordination with City project partners and work with City staff to develop a maintenance plan for each of the project components. This will include coordination with the City on maintenance needs, staffing, equipment and budget. Monitoring results would be conveyed to NRDA Trustees on an annual basis or as specified in the City's agreement with the NRDA Trustees.

During Phase IV, the PDT will undertake monitoring and will include erosion, water quality, targeted plant community establishment, native benthic and aquatic organization utilization within restored sites/Days Creek aquatic ecosystem. The PDT will coordinate with the City and its partners on monitoring data collection and reporting as needed/specified in the final approved Work Plan. The PDT will provide project progress reports, including monitoring results to the City and on behalf of the City to the NRDA Trustees. See Section 9 for further information on monitoring. Various anticipated work activities described under each task are highlighted by project in Table 8. Specific work activities by major tasks are provided in Table 9.

Table 8 Anticipated Work Activities by Restoration Project

Activity	Project 1	2	3 A	4 B	6	7	8	9	10
Site survey-topo, erosion, etc.	*	*	*		*	*	*	*	*
Site survey-i.e. boundaries	*	*	*	*	*	*	*	*	*
WOUS-wetland			*	*	*	*	*		*
WOUS-stream (MHW)	*	*	*		*	*	*	*	*
Other surveys/data collection, i.e. vegetation	*	*	*	*	*		*	*	*
In-stream habitat and aquatic species	*	*	*		*			*	
Results reporting	*	*	*	*	*	*	*	*	*
Plan development	*	*	*	*	*	*	*	*	*
H&H	*	*	*		*	*	*	*	*
Permitting	*	*	*		*	*	*	*	*
Construction Docs	*	*	*		*	*	*	*	*
Plant order	*	*	*	*	*	*	*	*	*
Other materials	*	*	*	*	*	*	*	*	*
Construction	*	*	*		*	*	*	*	*
Construction observation	*	*	*		*	*	*	*	*
Plantings/seeding	*	*	*	*	*	*	*	*	*
Monitoring	*	*	*	*	*	*	*	*	*
Reporting	*	*	*	*	*	*	*	*	*
Conservation easements			*	*					
Deed restrictions	*	*			*	*	*	*	*

Table 9 Work Activity[1] by Major Task

Task	Work Activity
Phase I (Task 1) Planning & Project Phasing	1. Attend project kickoff meeting with City 2. Establish project schedule 3. Meet with City staff/project partners 4. Prepare/deliver/present a project overview to city council 5. Participate in an initial organizing call with The City and NRDA Trustees regarding Work Plan 6. Attend NRDA Trustees meeting with site visit if scheduled 7. Develop a draft/final Work Plan 8. Prepare Data Collection Plan, Design Development Plan, Permitting Plan, Construction Plan, Monitoring Plan, Reporting Plan, and Maintenance Plan 9. Undertake baseline surveys and existing data collection 10. Undertake 30% project designs for NRDA approved project components 11. Initiate/provide permitting support 12. Help develop conservation easements 13. Coordinate with City Public Works Dept to integrate with existing stormwater plans and prepare project applicable stormwater pollution prevention plans 14. Coordinate with the City's project partners 15. Provide all site surveys and baseline monitoring results 16. Coordinate and undertake public outreach 17. Provide brief weekly progress reports
Phase II (Task 2) Design Development, Permitting, Construction Documents	1. Undertake design development of each of the project components, including preparing suitable 60% plans 2. Prepare/submit permit applications 3. Respond to permit review comments 4. Prepare construction documents in coordination with the City, including 80% and 100% final plans
Phase III (Task 3) Construction	1. Assist the City with the bid process 2. Providing construction oversight 3. Provide restoration activities oversight and document restoration outcome with applicable as-built drawings/plans and achievement of NRDA performance requirements 4. Provide monitoring and monitoring oversight 5. Establish a City project web page to maintain public outreach 6. Provide monthly progress reports
Phase IV (Task 4) Post-Restoration Activities including Monitoring	1. Prepare monitoring forms for city project partners to use 2. Collect monitoring results with applicable surveys and compile 3. Prepare monitoring report and conveyed to the City and NRDA Trustees on an annual basis or as specified 4. Coordinate with City on maintenance needs 5. Project Close-out Reports

Note: 1. Quarterly Reports throughout Project Duration; Work undertaken January-March quarterly report due April 30; work April-June quarterly report due July 31; work in July-Sept quarterly report due October 31;
Work in October- December quarterly report due January 31.

4.5 Work Schedule by Year

Figure 9. Project Activities and Anticipated Timeframe.

	Year 1				Year 2				Year 3				Year 4				Year 5			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Phase I/Task1: Planning & Preliminary Design																				
Kickoff Meeting, Work Plan, Coordinate with NRDA	■																			
Initiate: Data Collection: Site surveys, baseline for monitoring, conservation easement activities	■	■																		
Initiate 30% project designs; initiate permitting		■	■																	
Reporting; Address stormwater issues, incl. pollution plan. Public outreach begins			■	■																
Phase II/Task 2: Design Development, Construction Documents																				
Design 60% plans, plus H&H; permitting, cost est					■															
Prepare 80% plans, discuss construction strategies with City; final 100% for approvals						■														
Assist City with bid docs, contractor selection and oversight							■	■												
Phase III/Task 3: Construction Assist City during construction phase									■	■	■	■	■	■	■	■				
Prepare monitoring plans and provide oversight before, during and after restoration activities									■	■	■	■	■	■	■	■	■	■	■	■
Provide oversight of restoration activities, including site work and native plant establishment									■	■	■	■	■	■	■	■	■	■	■	■
Coordinate with City partners and public during construction, and disseminate information									■	■	■	■	■	■	■	■	■	■	■	■
Phase IV /Task 4: Post Restoration Activities & Monitoring																				
Develop monitoring reports & maintenance plan													■							
Coordinate with City on maintenance needs													■							
Monitoring erosion, water quality, plant establishment, benthic and aquatic organisms, etc.														■	■	■	■	■	■	■
Coordinate with City and its partners on monitoring data collection and reporting														■	■	■	■	■	■	■

4.5.1 Anticipated Schedule Activities by Year

For a more complete list or over view of all project related work activities, the Work Plan will maintain consistency between various ways schedule is displayed/presented between Section 4. 2 and Tables 4, 5, 6, 7, and 13 and the items below. Refer to these tables for additional scope of work items and deliverables, such as Phase I, II, and III Completion Reports which are all to be incorporated into anticipated activities by year with this list.

Year 1: 2020-2021

- June-July draft work plan
- June subcontracting
- August 6 submit draft Work Plan for Trustees approval
- June 10 PDT project kick off meeting
- July 30 PDT and PMT kickoff meeting
- August start restoration data collection/site surveys and preservation due diligence surveys, undertake site 3A, 4B, and 5 first, then proceed with sites 6 and 10, continue with sites 1, 2, 3 and 7, 8, and 9.
- June id conservation easement holder, begin drafting conservation easements
- September begin data collection and due diligence reports
- October 5 Due Diligence Reports with conservation easements due
- August-September pending Work plan approval, begin 30% design development, undertake H&H, USACE pre application meeting, begin preparation monitoring/maintenance plans, stream/wetland delineation, preliminary cost estimate
- September complete site surveys, boundary surveys, provide any revisions on project location maps to NRDA, undertake WOUS report and USACE permit application
- October complete WOUS report, USACE permit application, and 30% plans, begin tree, plant, seed ordering; establish nursery
- October 1st stakeholder meeting
- October undertake forest enhancement on Project 4B
- October continue 30% plans and preliminary cost estimate, undertake planting only on Component 1, Component 2B, identify general contractors qualifications
- November begin data collection reporting, submit USACE permit, begin 80% plans
- December complete 30% plans
- January continue H&H
- February begin 60% design
- March continue permitting
- April undertake 60% design with cost estimating

Year 2: 2021-2022

- May 2021 2nd stakeholder meeting
- council approvals
- June Phase I Completion report,
- July begin 80% design
- August submit permit

- September design conservation sites' signage
- October install conservation sites' signage
- November 2021 Phase II Completion Report, develop to 100% construction documents
- December contractor bidding, undertake planting Project 10 seeding/plantings
- January 2021 contractor selection, award
- February contractor mobilization, begin Project 1 stabilization 2,000 lf channel, begin construction Project 7 Ferguson Park remove concrete Project 7, begin Project 6 create 23 ac wetlands begin Project 3 stabilize 3,000 lf, staged delivery
- March continue Ferguson Park re-align channel, install weirs, staged delivery
- April continue Project 6 plantings, begin construction Component 8
- April component Ferguson Park final grading, begin plantings
- May 3 plantings, handle any contingencies

Year 3: 2022-2023

- May 2021 finalize/fine tune monitoring plan and adaptative maintenance plan, begin component 2A stabilize 11,000 lf; undertake supplemental plantings after soils/hydrology established in wetlands
- June continue stabilizing 11,000 lf
- July continue stabilizing 11,000 lf, undertake monitoring and performance criteria checks, undertake as-builts
- August site surveys for contractor punch list, repairs? Contractor de-mob
- September begin component 8 stabilize 11,000 lf with plantings, plant delivery Component 2A
- October continue component 8 stabilize 11,000 lf
- November continue component 8 stabilize 11,000 lf
- December continue component 8 stabilize 11,000 lf, repairs?
- November-December 2022 Phase III Completion Report pending construction
- January 2022 plant delivery for component 8
- February through April planting/seeding; monitoring

Year 4: 2023-2024

- May through November monitoring, reporting, supplemental repairs, supplemental plantings
- November/December annual monitoring/reporting; site management funding requests as needed

Year 5: 2024-2025

- Monitoring and Reporting throughout year as planned;
- November submit annual monitoring report
- Project close out report

4.6 Individual Project Descriptions, Maps, Photos

4.6.1 Project 1

Total project budget: $1,300,000.00

Cowhorn Creek Enhancement: Naturalize approximately 2,600 linear feet of creek channel along Cowhorn Creek near the Convention Center. Additional actions include, increase benthic and fish habitat, planting native species to expand riparian and bottomland hardwood habitats along this reach.

Located north end of Cowhorn Creek (2,600 LF stream restoration extent shown) adjacent to the city's convention center (left) and TISD sports fields (right). Approximately 2.85 acres north of Kennedy Lane and 4.54 acres south available for laying back eroding stream banks, creating adjacent riparian and wetlands.

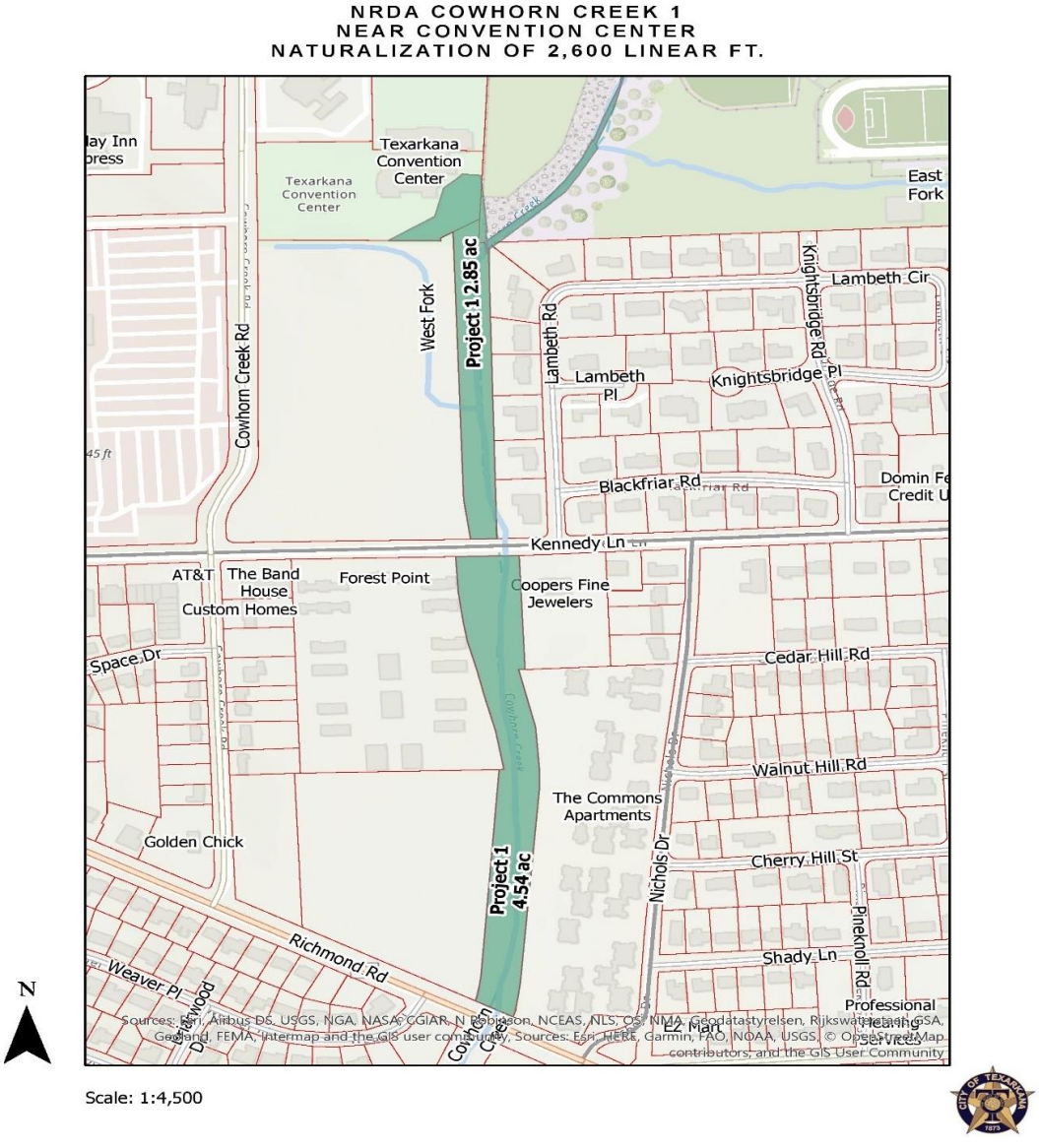


Figure 10. Project Location Map.

Figure 11. Project 1 Vicinity

Figure 12. Project 1 Aerial and On-ground Color Photograph.

Project site 1 point of beginning 33°27’34.60N and 94°04’21.14W; site end 33°26’58.43N and 94°04’28.84W. Cowhorn Creek appears to drain from pond(S) located in the North Ridge Country Club area, flowing through various subdivisions as a rectified ditch passing under US 59 before entering Project Site 1. Within Project Site 1, there is approximately 4,000 lf to be surveyed. Investigate potential drainage from Convention Center at northwest corner of Project Site. Investigate drainage tributary entering in from the east from around the ball fields. Investigate an unmowed naturalized 0.64-ac area abutting from the east which appears open mix of grasses and forbs that transitions to a 0.84-ac wooded riparian corridor on the left descending bank before the tributary. Investigate this wooded riparian area. The channel is approximately 16 ft wide and gradually widens to approximately 40 ft at the HWY 559 road crossing. The channel is unlined in the upper reach, concrete lined for approximately 1,169 lf adjacent to a residential subdivision, before becoming unlined again. Investigate the stormwater inlets to the channel and document culverts under Hwy 559 road crossing. Coordinate site access with the City and Convention Center staff. Do not go on adjacent wooded private property south of the Convention Center.

The location and number of survey transects shown in following Figure 13.

Figure 13. Project 1 Data Collection Planned Transect Locations. (yellow lines).

During Site Survey, check extent of concrete along both banks.

Determine who maintains/mows corridor both sides top of bank north Project Site 1 to HWY 59.

Address water quality issues from athletic fields, roads and parking lots

- Check Central Mall parking lot runoff/drains where? Potential for bioswale?
- Check water quality in ditch drains to Cowhorn, typical water quality sampling protocol is 3 sites up/at/just below a ditch or storm inlet
- Note apt complex parking lot north of Richmond Road on left descending bank

Note opportunities and constraints such as 4.54 ac wooded property on right descending bank north of Richmond Road; open areas to create forested wetland in front (east side) of convention center to eliminate forest fragmentation north Project Site 1.

Note properties already in the floodplain, particularly off the right descending bank Forest Point complex south of Kennedy Ln and east of Cowhorn Creek Rd. Check and coordinate with stormwater management plans and City's Public Works goals/objectives on flooding/drainage/stormwater management.

4.6.2 Project 2

2A and 2B Total project budget: $545,500.00 (2A = $364,000 and 2B = $181,500)

Cowhorn Creek Enhancement: Stabilize approximately 11,000 linear feet of eroding banks with approximately 9,000 linear feet of bioengineering (Project 2A) and approximately 2,000 linear feet of native plantings (Project 2B) along Cowhorn Creek. Bioengineering includes the use of approved materials (e.g., combination of engineered and natural plant materials for live staking, fascines, brushwood, brush layers, etc. and vegetation) to stabilize the banks as an alternative to lining the banks with concrete.

Project 2 begins at 33°26'58.43 N and 94°04'28.84W as a continuation south from Project Site 1 along Cowhorn Creek for 11,000 LF to its confluence with Waggoner Creek at 33°25'03.32N and 94°04'26.52 W. investigate for stream stabilization using various bioengineering techniques to be determined with more detailed design development and engineering including approximately 9,200 LF native plantings to address erosion and lack of riparian and aquatic habitat. Investigate and record cause and extent of erosion. Within the 11,000 lf, approx. 9,000 lf, may be bioengineering that also includes plantings. Therefore, some combination of bioengineering only, native plantings only, or bioengineering and native plantings are anticipated based on actual site conditions and detailed design development during Phase 1. Investigate soil conditions and document any trees to be preserved along with other data collection. Note Project 2 is alongside/adjacent to Project 3.

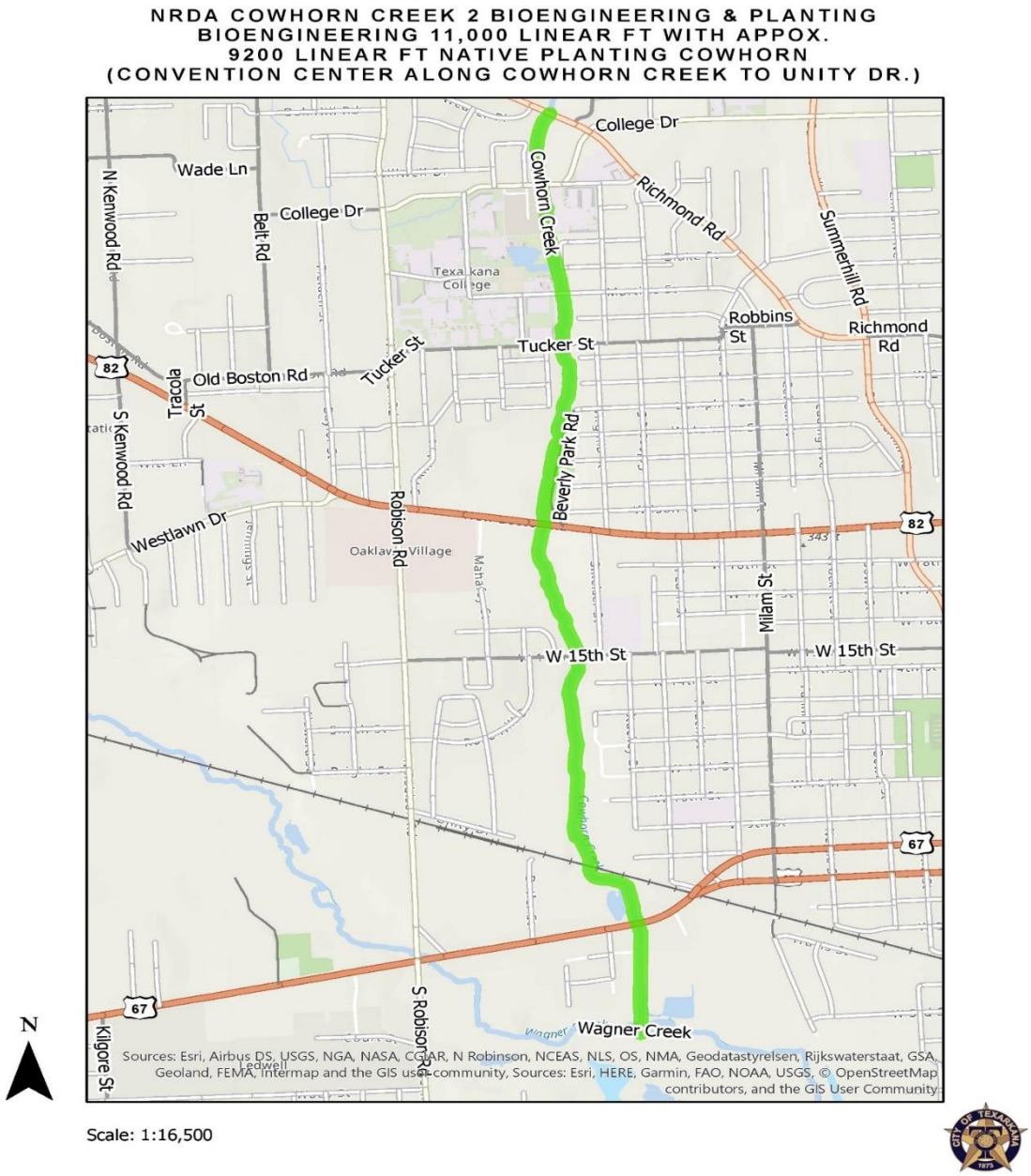


Figure 14. Project 2 Location Map.

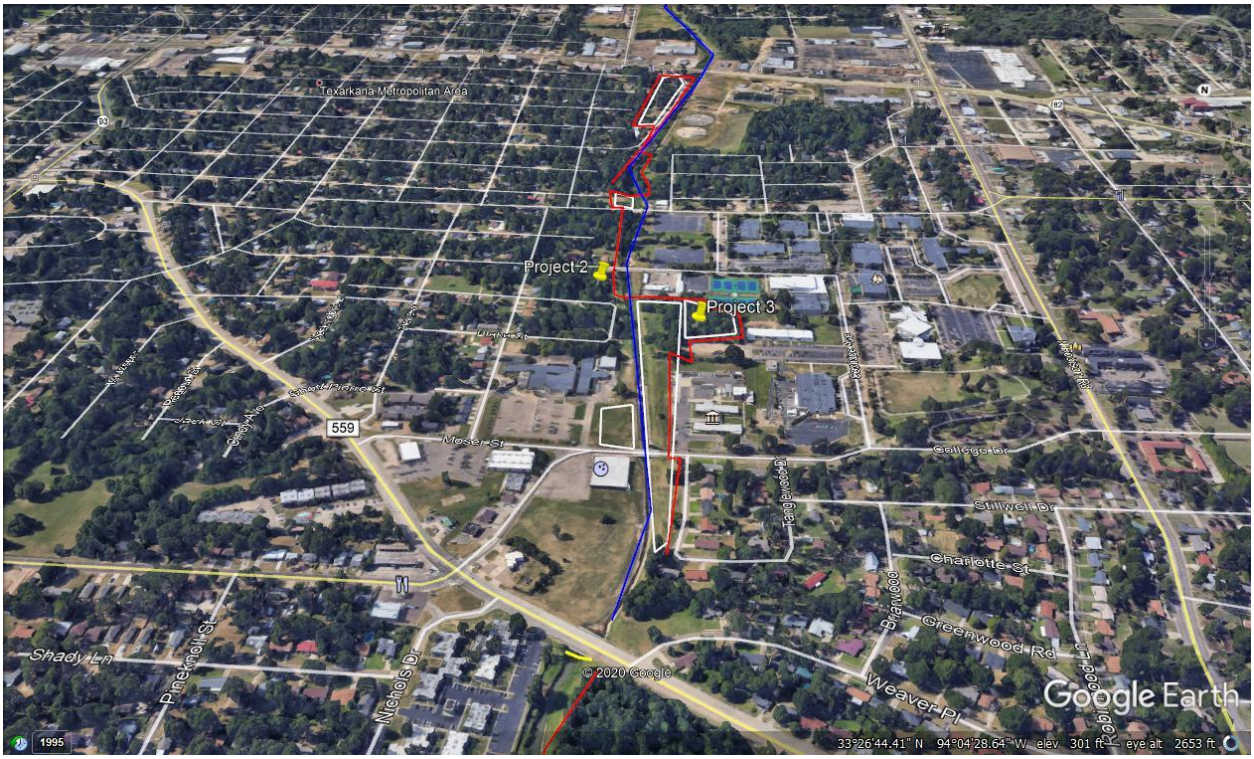


Figure 15. Project 2 Vicinity.

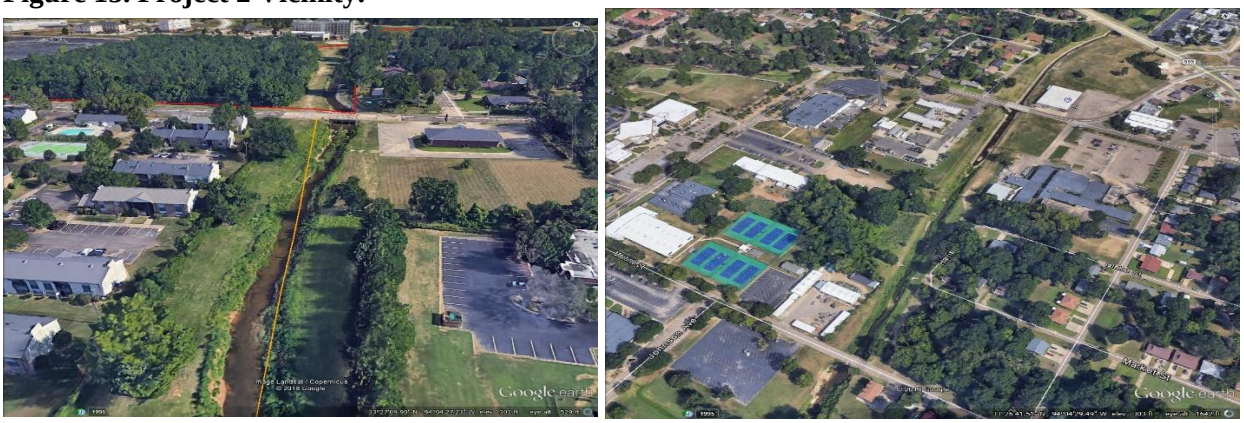


Figure 16. Project 2 Adjacent to Project 3 Color Aerial Photographs.

Project site 2 channel, point of beginning 33°26'57.39" N and 94°04'28.61" W, end point 33°25'03.09" N and 94°04'28.77" W. The channel is concrete lined from its point of beginning at Richard Road (559) crossing for approximately 1,321 lf when it becomes unlined for approximately 2,300 lf. The channel becomes concrete lined again for approximately 3546 lf. However, this lower concrete reach has naturalized channel or in stream habitat that has developed. Investigate the instream aquatic habitat that is present. The remainder of this channel is unlined and in a much more natural condition as it passing through heavily forested floodplain on both sides. Portions of the unlined banks are well vegetated while others are not vegetated experiencing erosion. Investigate and record the cause and extent of the erosion. The channel varies in width from 33 ft to 60 ft. Investigate bank conditions, applicable in stream habitat, various road crossing culverts, and multiple stormwater inlets. Review adjacent property ownership maps to determine and document Project 2 boundaries. Note the railroad tracks. Note no trespassing on the

railroad tracks. Note open area left descending bank between Moser, College, and 559 as an opportunity for the project to restore forest and add shade to water surface.

The general location and number of survey transects, 38 transects, are shown as yellow lines in Figures 17, 18, and 19 planned for data collection along Project site 2. Project site 2 may end at RR tracks, survey floodplain woods future south for reference.

Figure 17. Aerial View South at the Southern End of Project 2 with Planned Transect Locations. Note proximity to Project 10.

Figure 18. Aerial View South at Middle of Project 2 with Transect Locations..
Survey adjacent open space and forested area adjacent to water treatment/fire station for project opportunities. Note drainage ditch enters Project 2 from the College, note unpaved portion of parking lot also drains to Project 2 to be addressed.

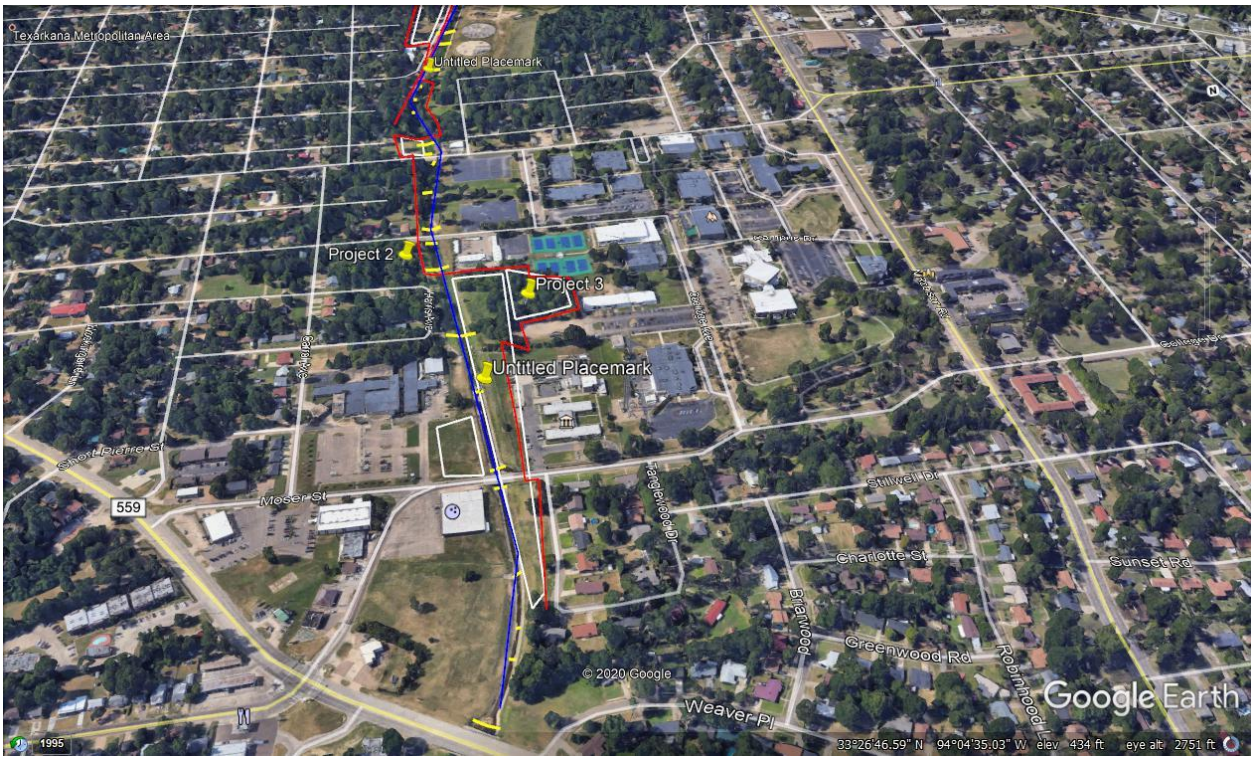


Figure 19. Project Site 2 Color Aerial View South with Transects and Project Site 3. (outlined in white)

4.6.3 Project 3

3A and 3B Total project budget: $1,350,000.00
3A Restoration 3,000 lf near Texarkana College & Beverley Park Rd
3B Preservation 3 Acres & Creation 6 Acres Wetlands

Cowhorn Creek Enhancement: Components include combination of restoration of the natural alignment, stabilization, and enhancement of approximately 3,000 linear feet along Cowhorn Creek near Texarkana Community College and Beverley Park Road and creation of approximately 6 acres of wetlands through the restoration of the meandering creek channel by various techniques which may include hard and soft approaches: bank protection/stabilization, bank re-grading, weirs, step pools, and floodplain re-activation via side channels and wetland creation.

Located with point of beginning at 33°26’48.82” N and 94°04’29.00” W, end point at 33°26’07.99” N and 94°04.29.72” W, adjacent to Project 2 with areas of city owned properties available for Project 3 stream restoration of 3,000 LF with preservation of 3 acres of forested habitat and areas to create 6 acres of wetlands.

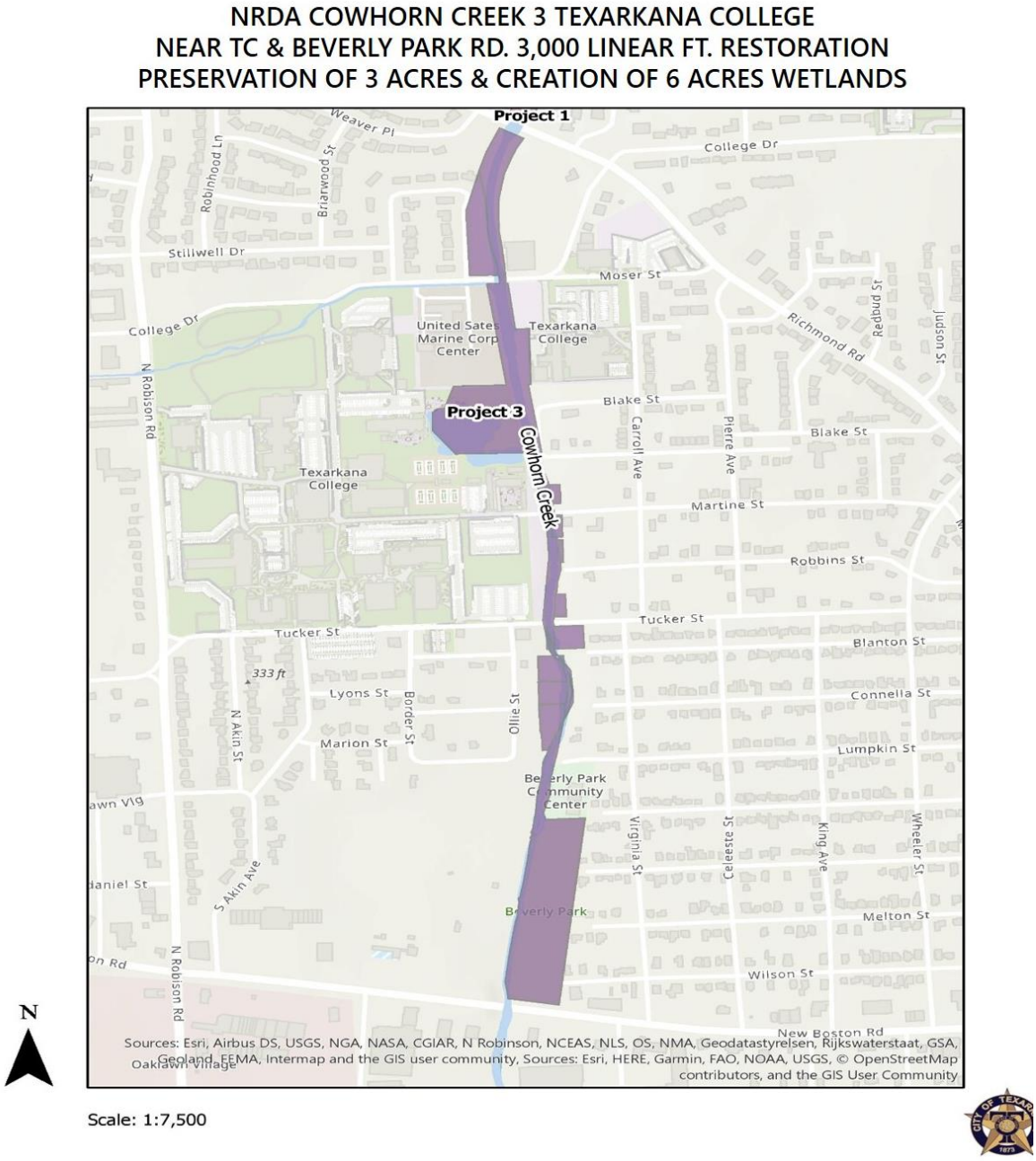


Figure 20. Project 3 A & 3B Location Map.

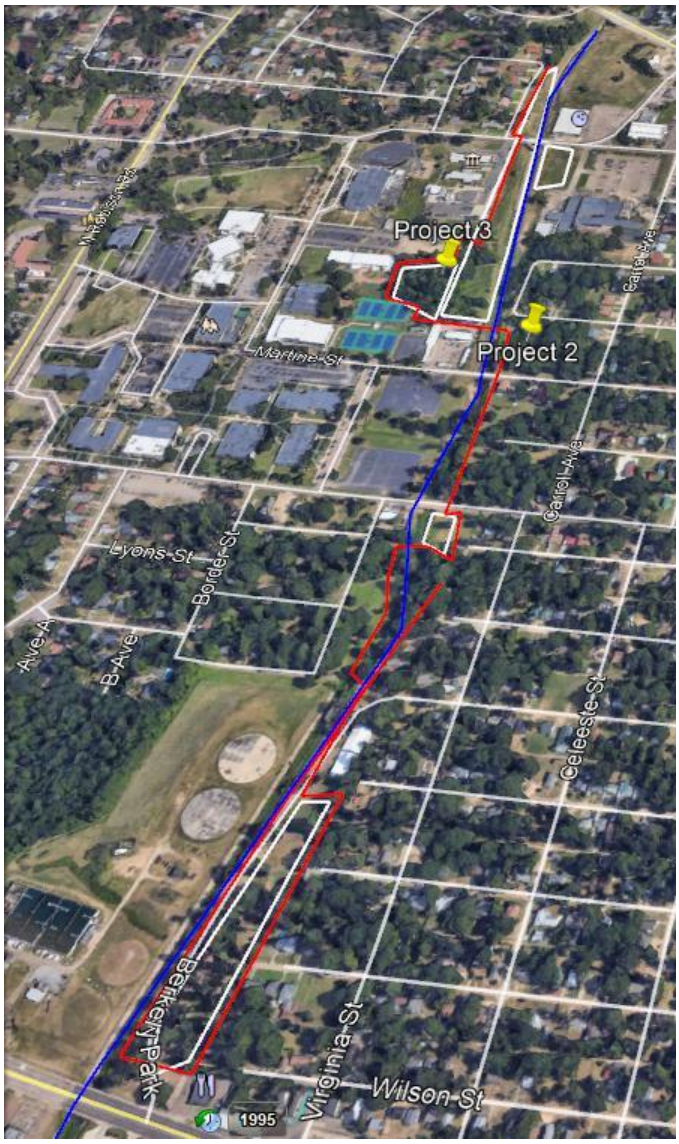


Figure 21. Aerial View North along Project 3 (outlined in white) with Project 2.
Note the proximity of Project Site 2 in relation to Project Site 3.

Figure 22 a and b. Aerial Views North along Projects 2 and 3.

Note the bank erosion to be addressed on right descending bank in Figure 22 b. Approximately 18 transects are anticipated for Project 3, many a continuation in length away from stream transects in Project 2. Transects for Project 3 shown as yellow lines in the following series of figures. Investigate opportunity to create fringe wetland along stream channel at north end of this site on the right descending bank. Investigate opportunity to create 0.5-acre wetland at north end east of the left descending bank. Investigate and document forested conditions at college campus on the right descending bank. South of Tucker Street on the left descending bank, investigate opportunity to create 0.31 ac wetlands. Investigate and record cause and extent of erosion and laying back banks both sides just south of Tucker Street to create additional fringe wetlands. At south end of Project 3, adjacent to Berkey Park Road, investigate forested habitat conditions for preservation.

Figure 23. Project 3 (outlined in white) Planned Transects (yellow lines) Looking North.

Figure 24. View North at Project 3 Transects (in yellow) Continuing from Project 2 at stream Channel.

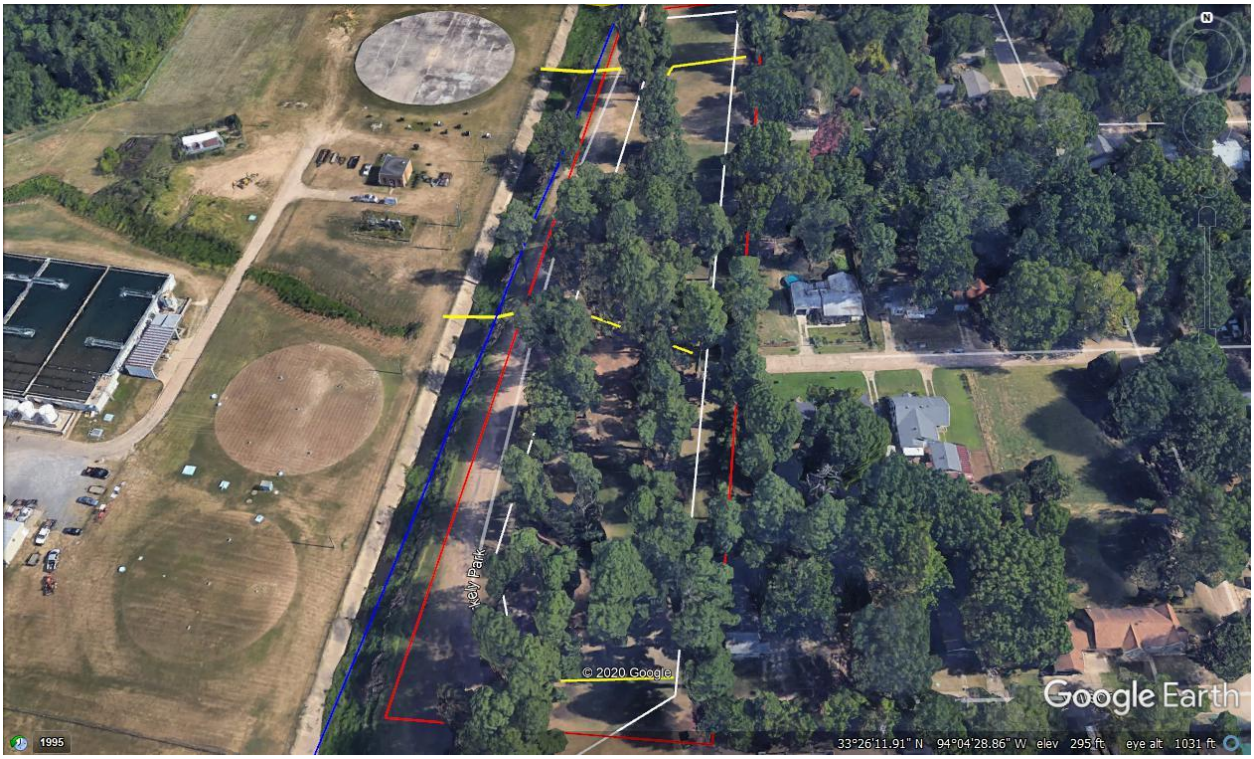


Figure 25. View North at Southern End of Project 3 with Planned Transects.
Note project 3 outlined in white, planned transects shown as yellow lines.

Continue field surveys to nearby Project 10, then proceed to Project sites 4 and 6 which are adjacent to each other.

4.6.4 Project 4B

Total project budget: $15,000.00

The 32 acres will be enhanced based on actual site conditions. The balance of 32 acres of forest proposed for enhancement may be undertaken either immediately to the east in the adjoining city owned property or other project locations such as Project 6 or 10, for a total of 32 enhanced acres of forested habitat. Enhancement work will include botanical review of existing conditions, preparing list of species to be added to increase biodiversity, with a review of Texas Riparian Association and Common Plants of Riparian Areas of Central Texas by Steve Nelle and seed lists from North American Seed and others, order and acquisition of plant materials, site/seed bed preparation, installation of plant materials. Enhancement work may also include litter pick up and weed species removal.

Prepare a planting and seeding list, acquire plant materials, and undertake enhancement activities including removing weed species and litter for Project 4B

4.6.5 Project 6

Total project budget: $455,000.00

Days and Howard Creek Enhancement: Restore and enhance approximately 2,000 linear feet at confluence of Howard Creek with Days Creek and construct approximately 23 acres of wetlands adjacent to Days Creek south of FM 151 and west of State Line Avenue. Activities include conducting a site assessment and modeling and providing a design in accordance with Sections 6.2 and 6.3 of Interlocal Agreement. If site conditions cannot support 23 acres of wetlands, then a new or amended Work Plan will be submitted, pursuant to Section 6.1, to the Trustees for review and approval allowing the wetlands balance to be transferred to Project 10.

This project may transfer some of the 23-ac wetland creation between Project 10 based on site conditions and detailed design development and engineering. Project 6 is located due south of Project site 4 with project 4 located north of Hwy 151 and Project 6 is south of Hwy 151 and at point of beginning 33°23’06.27” N and 94°03’18.97” W and ending at 33°22’59.84” N and 94°03’16.20” W. Both are forested floodplain sites. Review property boundary maps and NWI maps prior to field investigations. Project site 4 is investigated for due diligence survey for preservation and enhancement while Project 6 is investigated for stream restoration and wetland creation opportunities.

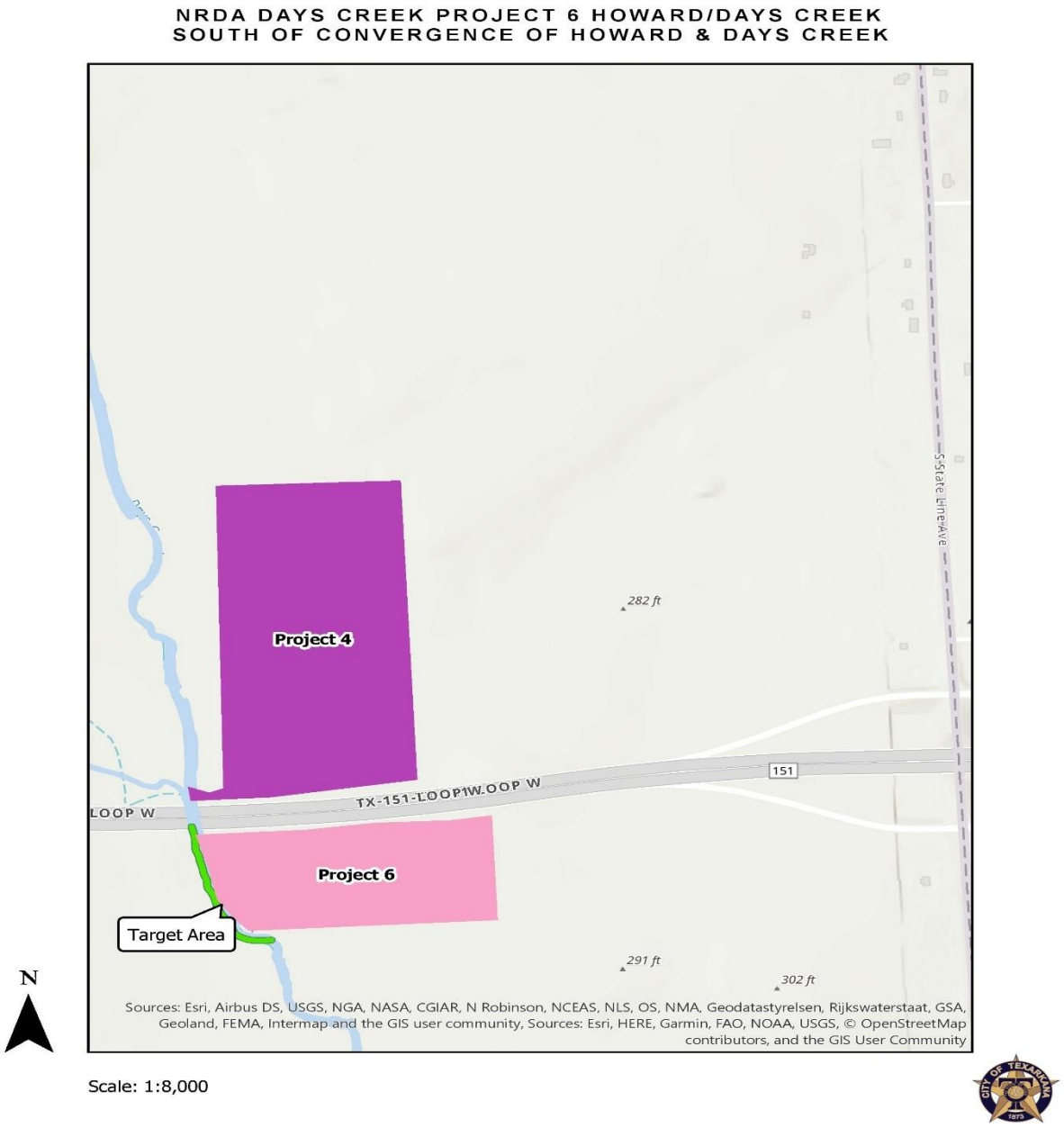


Figure 26. Project 6 Location Map.

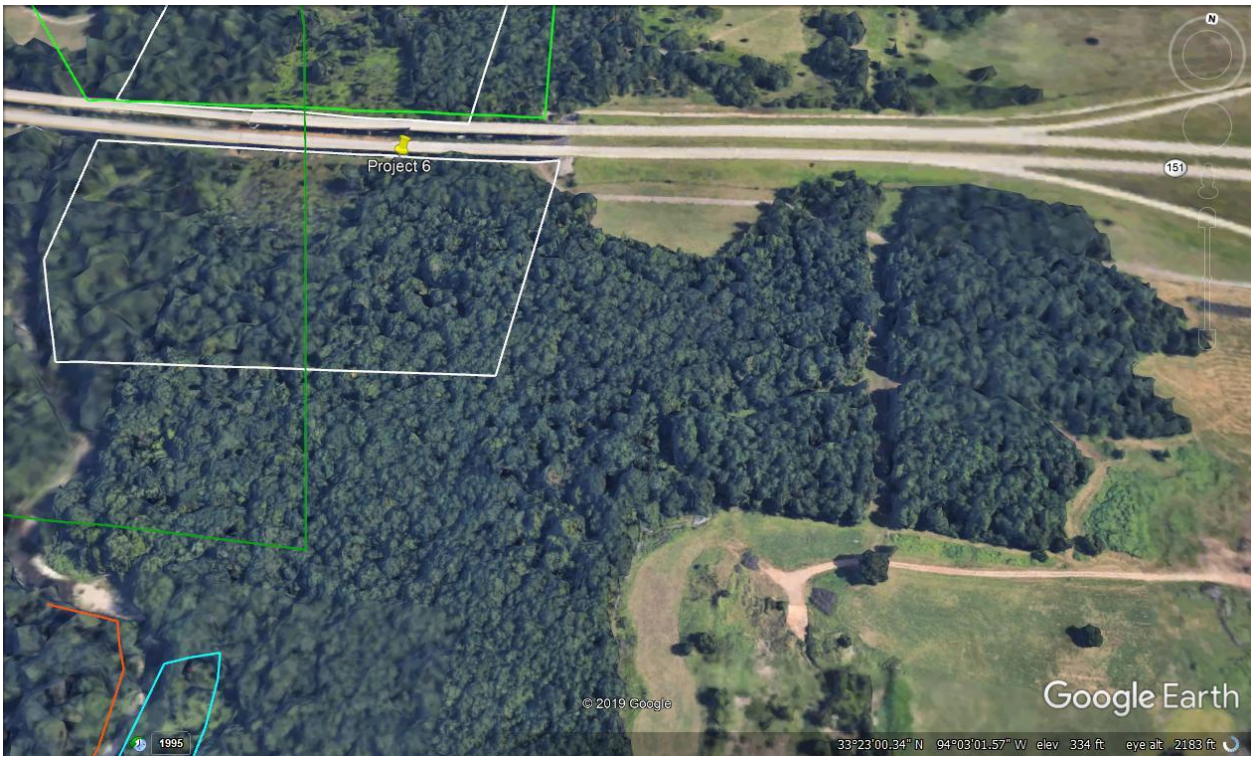


Figure 27. Project 6 (outlined in white) Color Aerial Photograph.

Project 6 is outlined in white, south side of Hwy 151 in Figure 27. There is an existing access road on both sides of the highway that can be incorporated to provide site access for data collection, implementation, monitoring, and management.

Figure 28. Project 6 Transect Locations.
The transects shown are approximately 1,234 ft long.

4.6.6 Projects 7, 8, and 9

Proposed Projects 7, 8, and 9 shown together conveying City's proposal of link as many project components as possible for more comprehensive restoration of Swampoodle Creek. Further south from Spring Lake Park along Swampoodle Creek, the conceptual restoration plan is address water quality improvement along the way before water reaches Days Creek by undertaking stream restoration and wetland creation within various parks and connecting these Parks along Swampoodle. The City proposes to create series of bioswales and wetlands as shown in the figure below. Approximately 4.14 acres of wetlands would be created. These projects with other stream restoration components will serve to connect Spring Lake to Ferguson, Lee, and Kidtopia Parks along Swampoodle Creek.

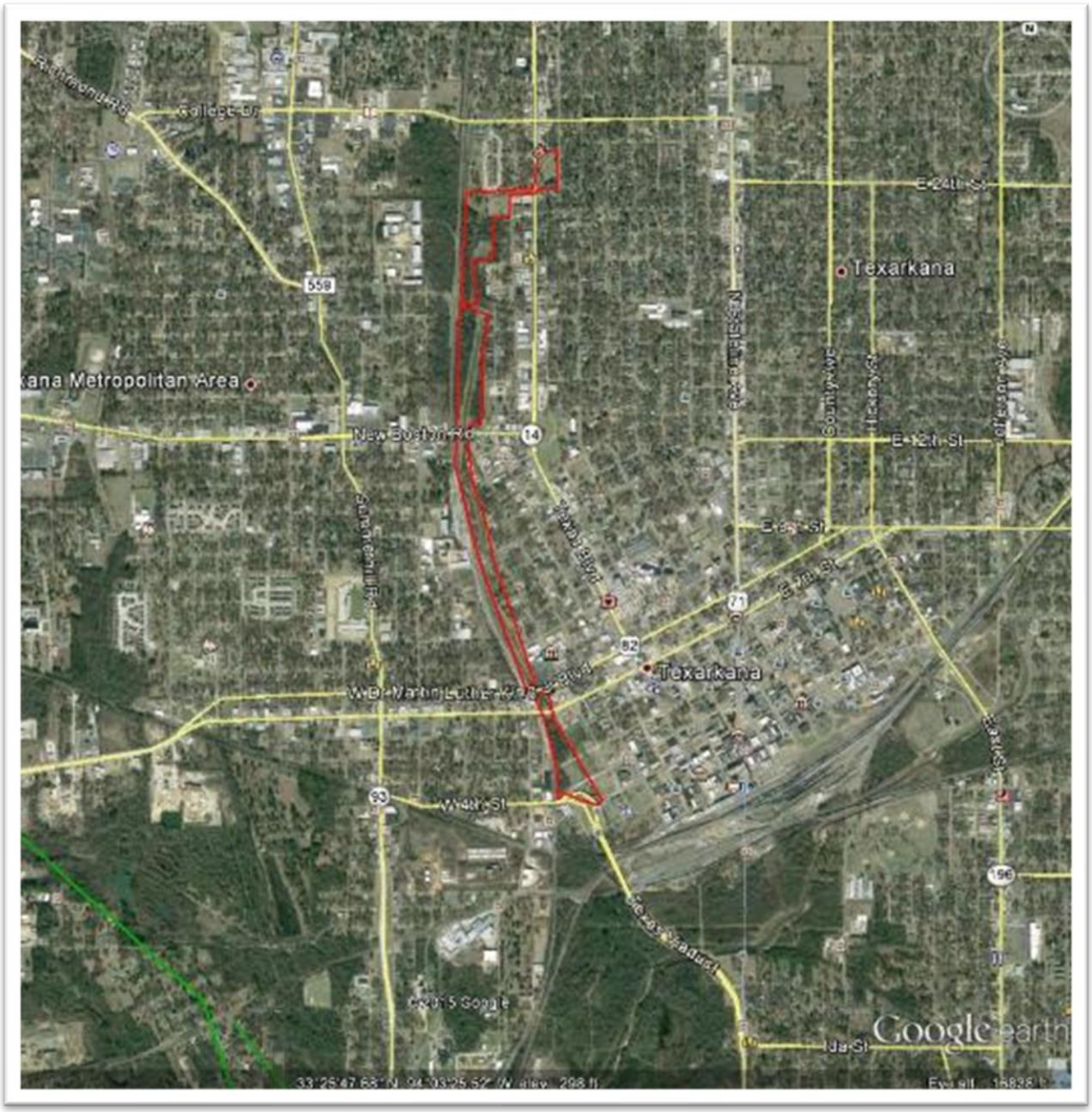


Figure 29. Aerial Image showing proximity of Project Sites 7, 8, and 9 connected to each other.

4.6.6.1 Project 7

Total project budget: $3,350,000.00

Swampoodle Creek Enhancement: Enhancement involves removal of approximately 665-1,000 linear feet of concrete liner along a tributary of Swampoodle Creek at Ferguson Park, naturalization of the stream through Ferguson Park with plan re-alignment, and construction of approximately 2.85 to 3 acres of wetlands as fringe along the channel and bioswales. Enhancement includes addition of native plantings. The existing concrete-lined channel is 10 feet wide, approximately 2.5 to 3.0 feet deep, and approximately 650 linear feet in length with no natural banks or creek bed. Wetlands will be created by allowing surface water to meander and sheet flow through parts of the park landscape using bioswales.

Involves enhancing additional channel immediately downstream of the Park based on site conditions and detail design in Phase 1. Project located at point of beginning 33°26’49.71” N and 94°03’07.88” W and ends at about 33°26’39.32” N and 94°03’20.64” W. This project continues southwest from the park and would investigate opportunities to remove additional concrete, add riparian plantings, and create 3 acres of wetlands.

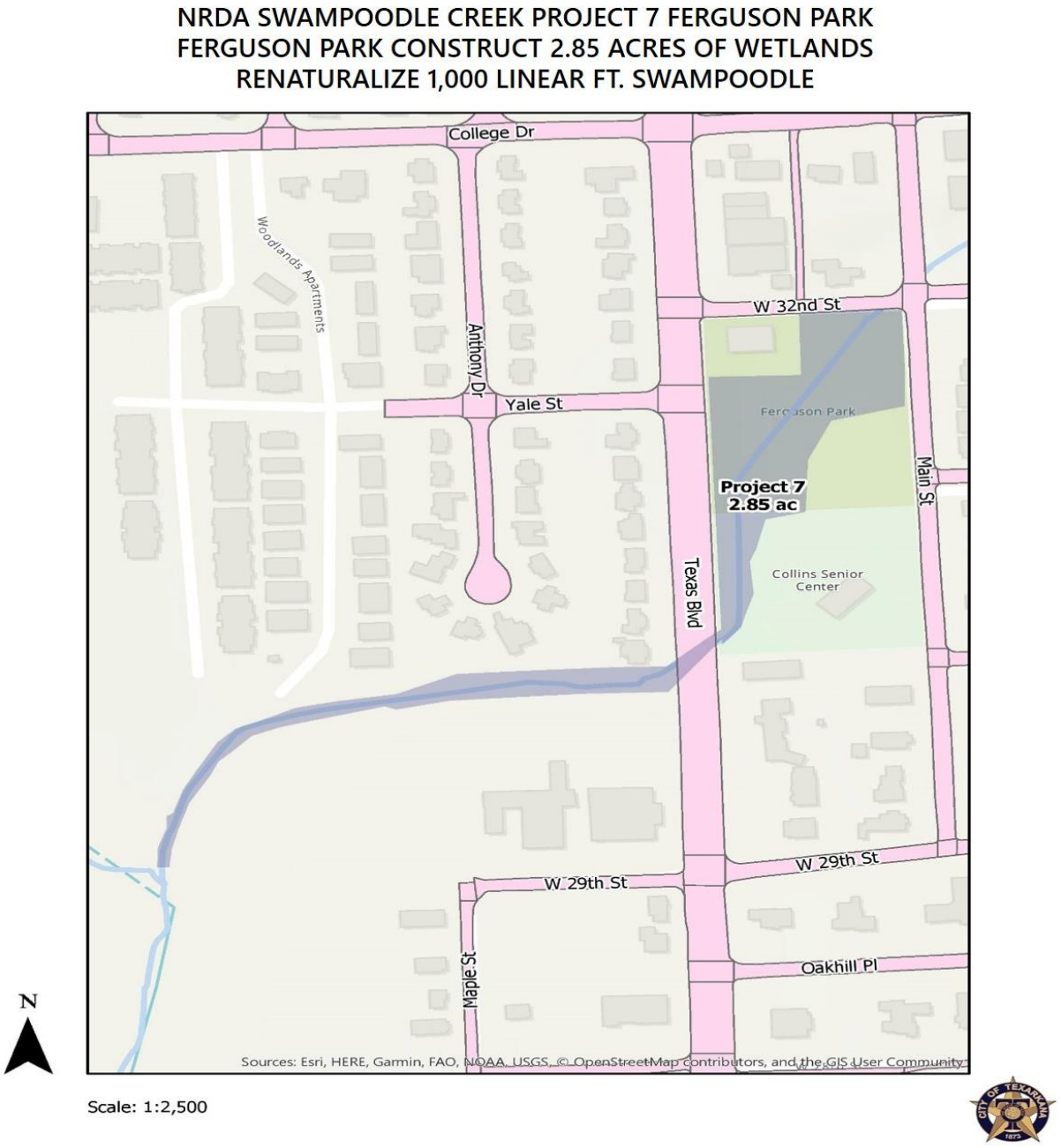


Figure 30. Project 7 Location Map.

Figure 31. Various Views Ferguson park (left) and Desired Stream Restored Condition (right).

Figure 32. Project 7 Vicinity.

Three transects planned, shown in Figure 33, since stream is currently concrete lined. Transects located at beginning, middle, and end of channel within Ferguson Park. Multiple spot elevations may be required. Coordinate with City parks Department on existing site plans with elevation data on existing park features: tot lot, parking, building, inlets and outlets. A site topo survey to be undertaken to determine concrete volume and soil cut and fill volumes for subsequent design development. Investigate channel upstream and downstream for required integration with local stormwater system. Determine sub-basin providing drainage to the stream channel within the Park. Coordinate with parks Department prior to survey field work.

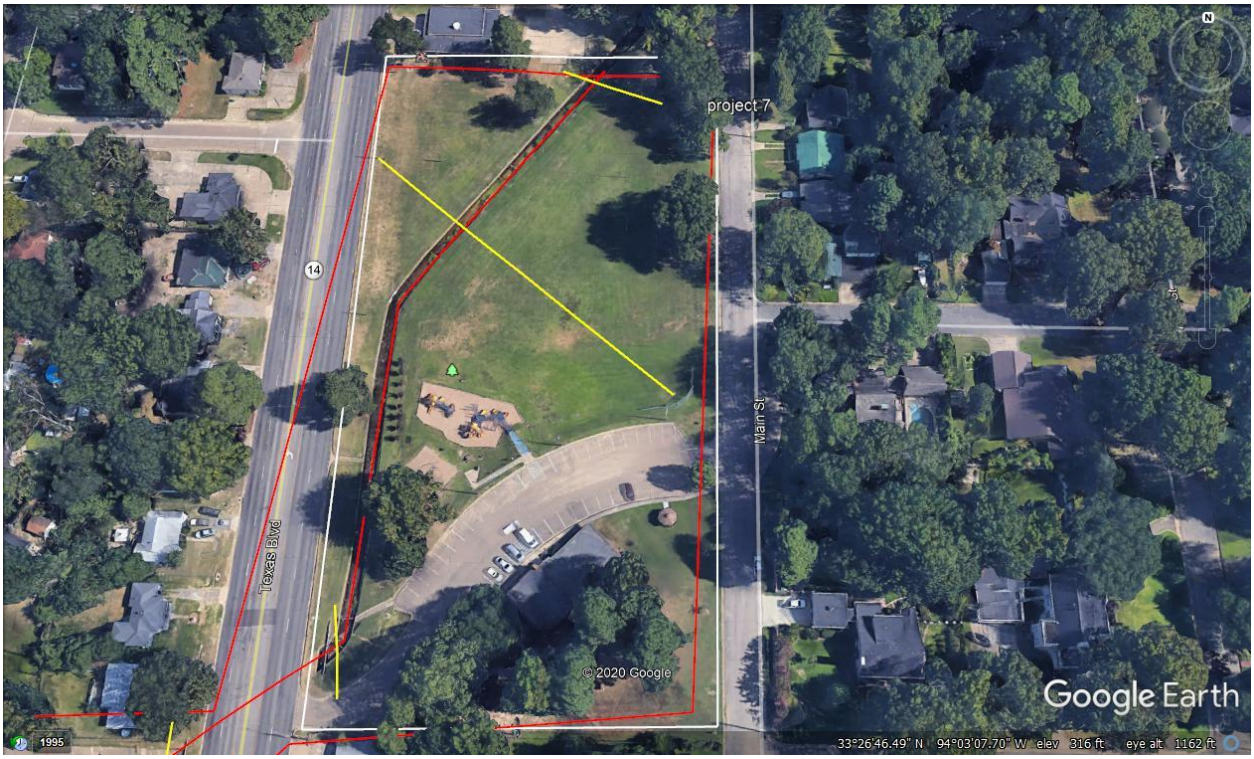


Figure 33. Project 7 Transect Locations within Ferguson Park.

Figure 34. Channel Conditions Downstream of Ferguson Park with 4 Planned Transects.

Investigate concrete condition, parking lot (south) and apartment complex (north) discharge points. Investigate opportunities for water quality improvement with aeration, shade, fixed instream planting pockets, boulder clusters/rock riffles, instream islands, bioswales, increased riparian. Coordinate with Public Works and Engineering.

Projects 8 and 9 continue southward from Project 7. They involve restoring natural plan alignment and meander along approx. 1,700 linear feet of Swampoodle from Project 7 at Ferguson Park as shown in Figure 35 with Project 8 in middle and Project 9 at southern end.

Figure 35. Project 8 Vicinity.

4.6.6.2 Project 8

Total project budget: $1,697,500.00

Swampoodle Creek Enhancement: Naturalize and stabilize approximately 11,000 linear feet of creek channel on Swampoodle Creek between Ferguson Park and Days Creek. Swampoodle Creek flows directly into Days Creek north of the Tronox Facility. Portions of the channel have concrete-lined banks and bed. The unlined channel is unstable with eroding banks. Activities include conducting a site assessment and modeling and providing a design in accordance with Section 6.2 of Interlocal Agreement to determine feasible method for channel stabilization. After Trustee review and approval of the modeling and preliminary project design, activities may include 1) removal of concrete lining, where applicable, 2) restoration of natural bed and bank conditions, 3) naturalization of channel alignment, and 4) planting of native vegetation. Naturalize/stabilize 11,000 lf between Ferguson southward along Swampoodle would include bioengineering and other measures to increase instream aquatic habitat and improve water quality.

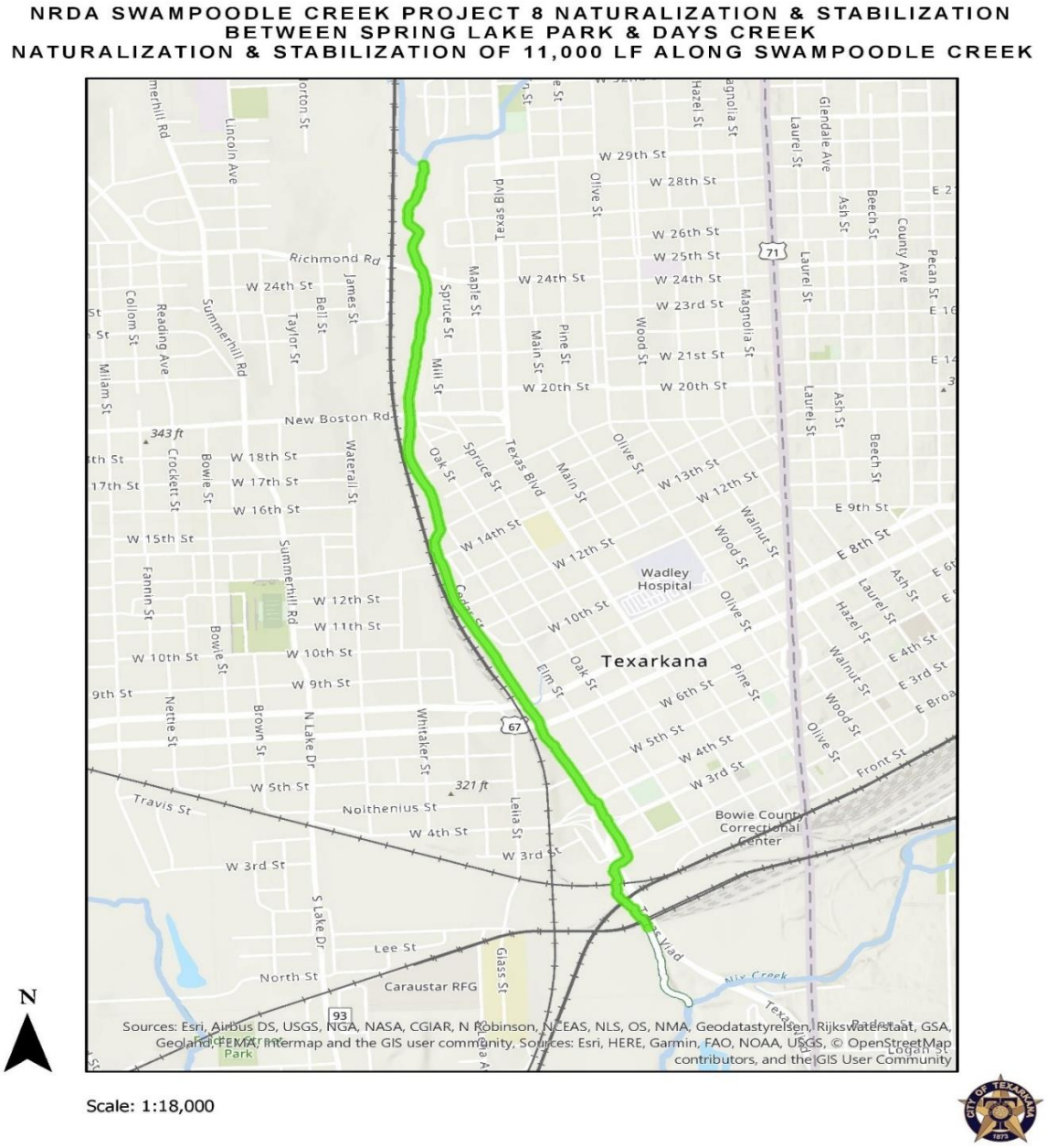


Figure 36. Project 8 Location Map.

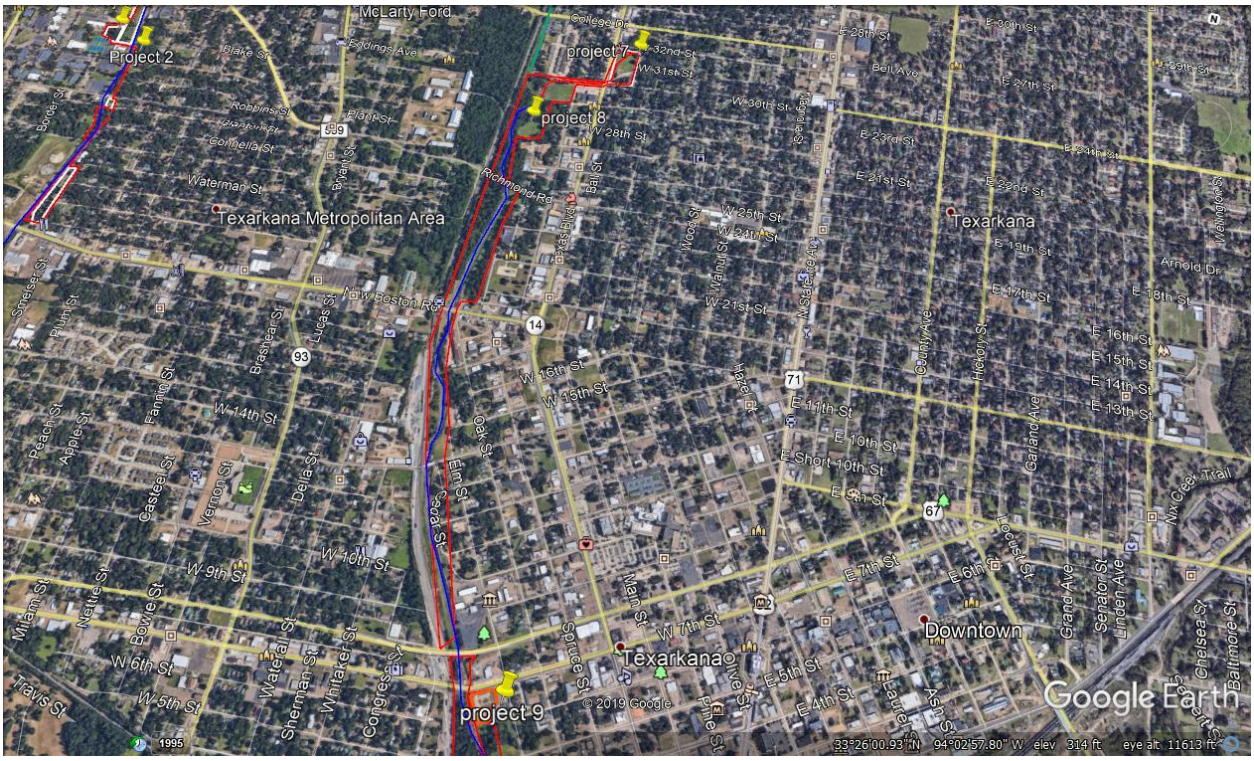


Figure 37. Aerial Image of Project 8 with Project 7 at North and Project 9 at South.

Portions of the stream channel appear to be concrete lined while other segments are not lined. Investigate a tributary located along railroad track discharging in to the right descending bank below Project site 7 and opposite the ball field. The channel becomes contained within a forested segment for 1,242 lf north of Richmond Road. South of Richmond Road, investigate instream aquatic habitat conditions established within concrete lined channel. Investigate abutting forested habitat at top of bank. The channel is armored upstream and downstream of Hwy 82 road crossing. Investigate opportunities to lay back channel banks between Hwy 82 and 14th Street. Note restricted conditions with railroad on right descending bank and industrial area on left descending bank and concrete lining as shown in Figure 42. No trespassing on railroad property.

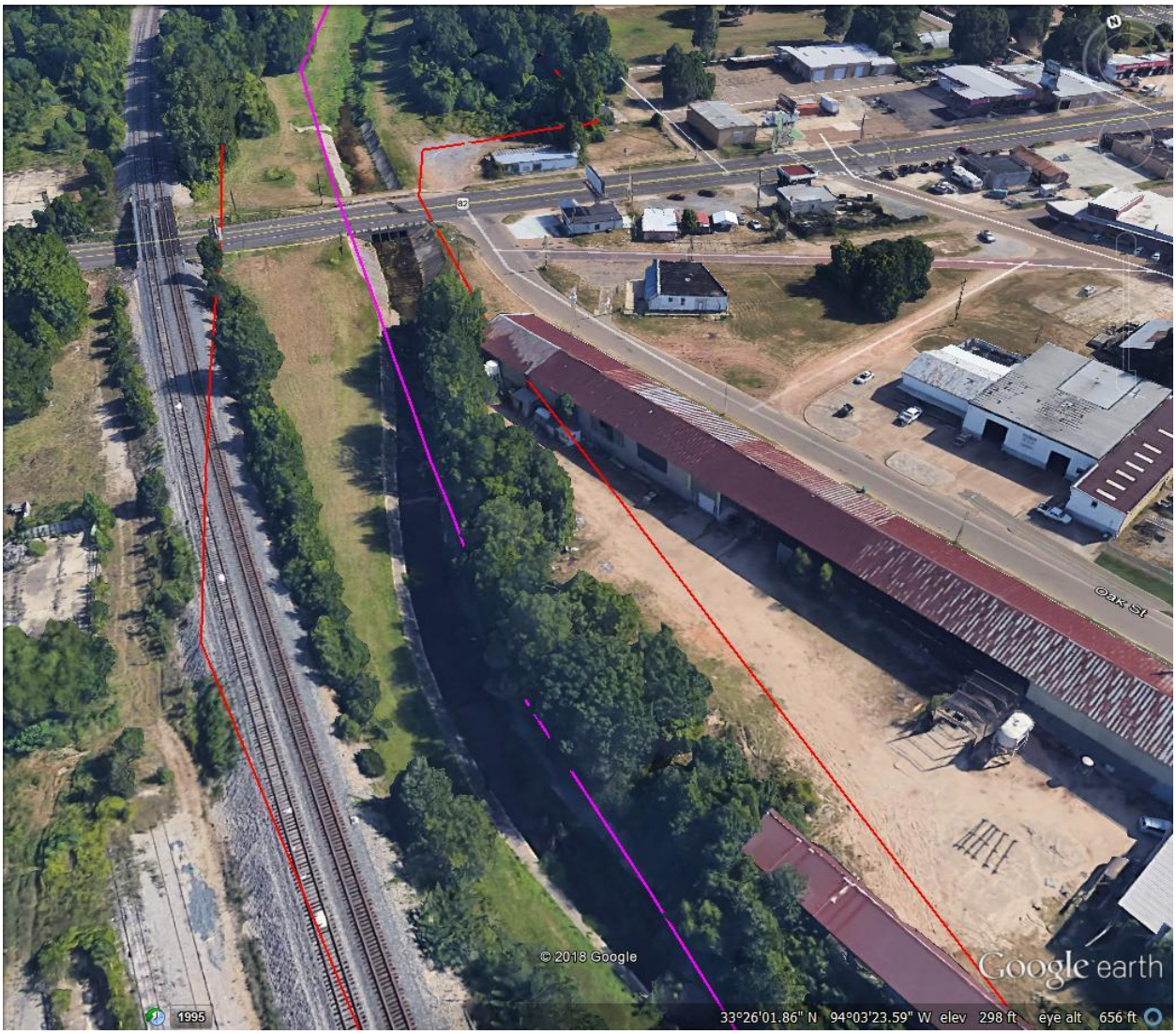


Figure 38. Southern End of Project Site 8.
Note New Boston Road/Hwy 82 crossing. Determine property boundaries for railroad and adjacent industrial land uses that have frontage off Oak Street.

There are 25 planned transects located in Figures 39 to 42 planned for Project 8. Survey transects to be determined based on existing data available from City Public Works and supplemental TNRIS LiDAR data.

Figure 39. Project 8 Planned Transect Locations.

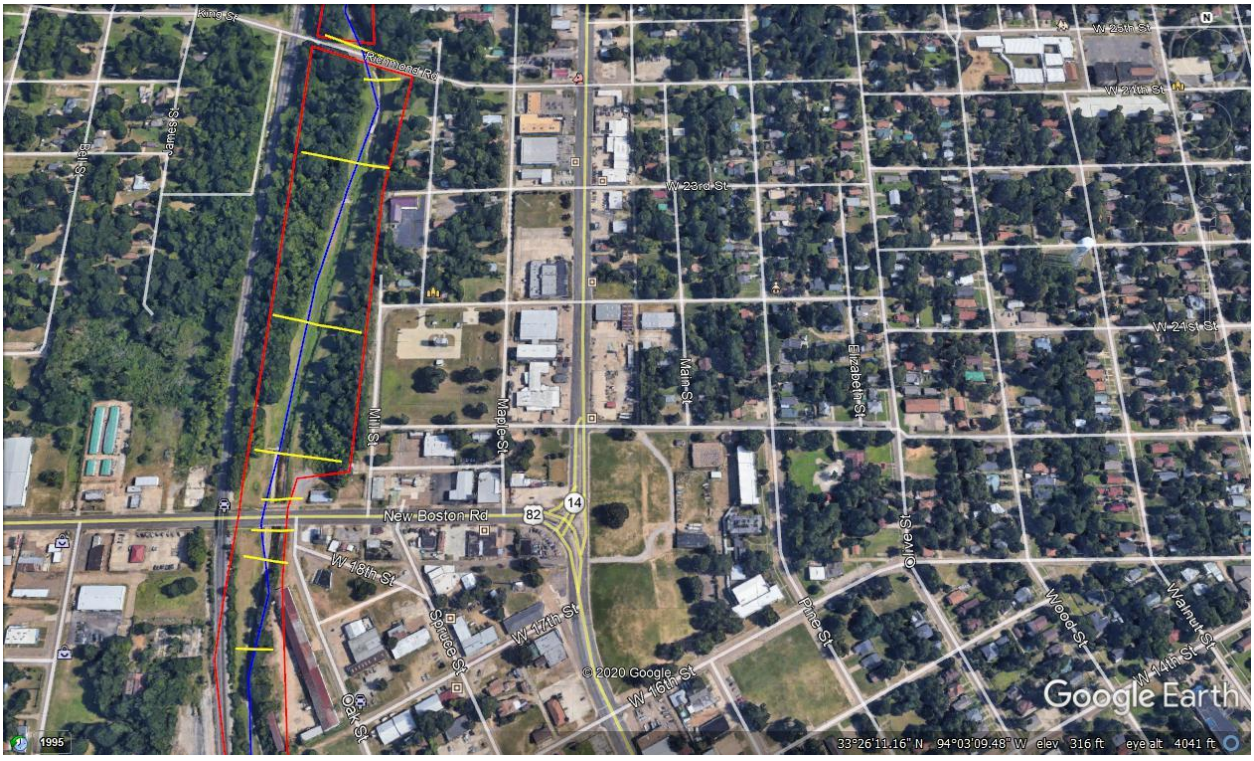


Figure 40. Project 8 Planned Transect Locations.

Figure 41. Project 8 Planned Transect Locations.

Figure 42. Project 8 Planned Transect Locations. Note Project 9 located south end Project 8.

4.6.6.3 Project 9

Total porject budget: $650,000.00

Swampoodle Creek Enhancement: Restoration of the natural alignment of approximately 1,100 linear feet of Swampoodle Creek. Currently, portions of the creek channel, specifically at road crossings, are concrete lined. The existing concrete lining will not be removed. Unlined portions of the banks will be laid back to recreate the natural meander and restore forested riparian habitat along this segment pending development of an approved Work Plan and preliminary design development in Phase II. Swampoodle Creek will be naturalized through a combination of stream restoration techniques that may include excavation, re-grading, planting of native vegetation, and other measures. The bottomland hardwoods cleared from this project site will be restored with appropriate clearing, grubbing, soil enhancements as applicable, and native tree, shrub, and herbaceous ground cover plantings and seeding following/integrated with project site overall channel enhancement activities.

Near downtown Texarkana, Texas, restore natural plan alignment with meanders along approx. 1,100 linear feet of Swampoodle within city owned properties with opportunities to integrate forested floodplain/wetland habitats which will be determined based upon baseline surveys and in detailed design and engineering. Additionally, an adjacent 1.4-ac tract will be acquired separately, not using project funds, and donated to the project to provide adequate space for meandering the stream channel. Project site 9 begins at 33°25’23.33” N and 94°03’08.65” W and ends at 33°25’07.00” N and 94°02’58.59” W.

Figure 43. Project 9 Location Map.

Figure 44. Project 9 Vicinity.
Note Lee Park to north and Kidtopia Park to southeast with City Hall 3 blocks to the east.

Figure 45. Aerial View Project Site 9 Showing Proximity to Downtown.

The aerial image shows the general project boundary for Project 9. In the north end, an existing gravel parking area will be acquired and removed in order to re-align the creek, provide additional area for wetland creation, and improve water quality by removing parking lot runoff into the stream. The parcel to be acquired is shown in the figure below.

Figure 46. Parcel to be Acquired.
Note using separate funds and donated to the project.

Figure 47. Aerial View of Northern End of Project 9.

Figure 48. Aerial View Southern End of Project 9.

Figure 49. At Grade Photograph of Stream Alignment and Condition in Project 9 Southern End.

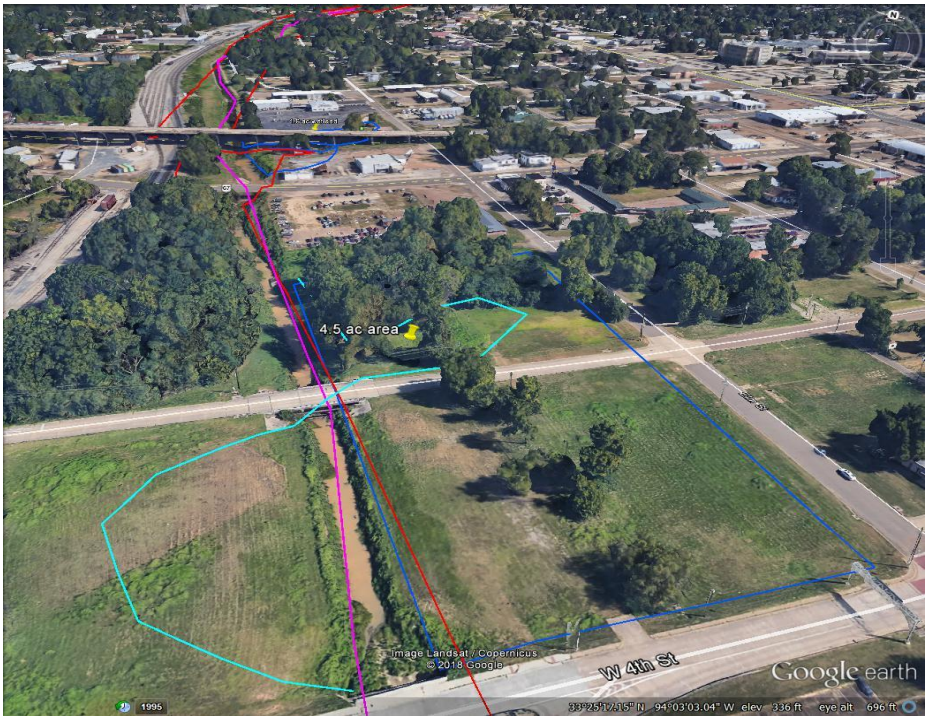


Figure 50. Aerial Image Showing Planned Re-alignment.

Figure 50 shows planned meander alignment, with opportunity to create 5 ac wooded floodplain wetland west right descending bank and hard edge east left descending bank between Martin Luther King Blvd. and W. 4th Street. Following figure shows 14 planned data collection survey transects.

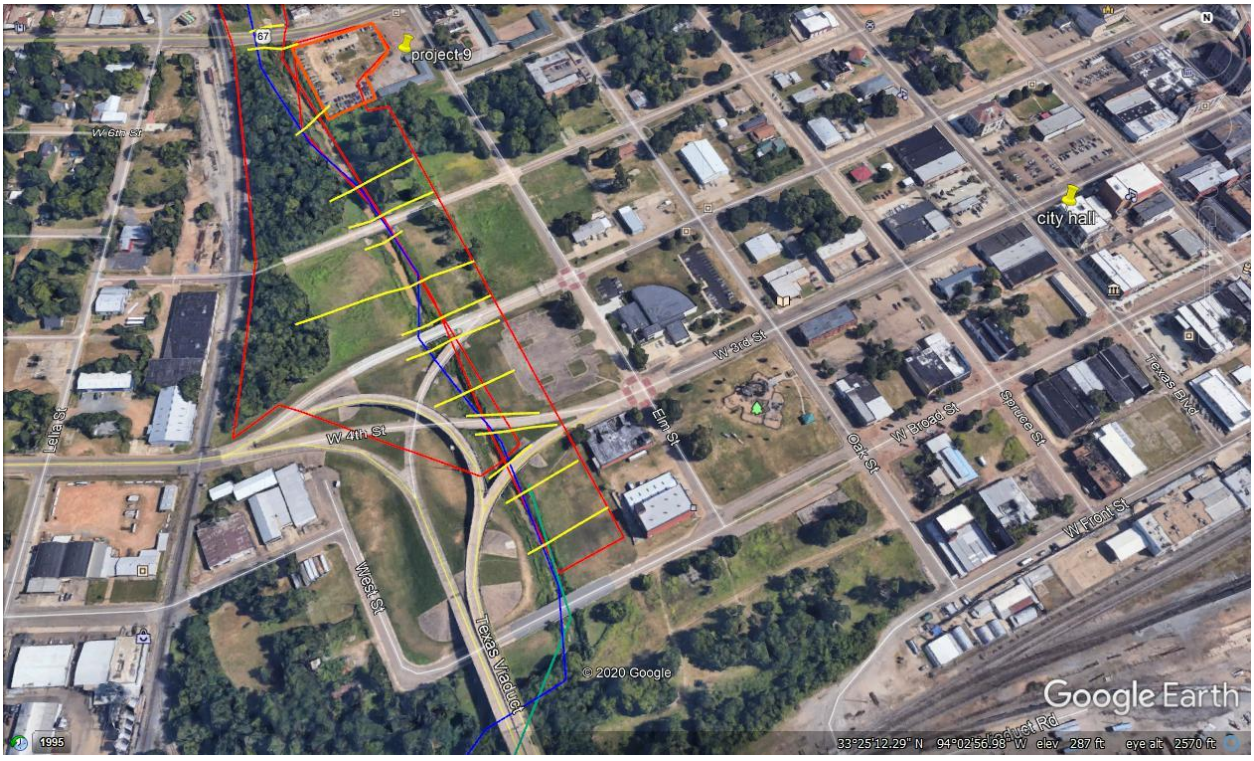


Figure 51. Project 9 Planned Transect Locations.

4.6.7 Project 10

Total project budget: $400,000.00

Waggoner Creek Enhancement: Restoration of approximately 2,000 linear feet of creek channel and at least 4 acres of riparian habitat along Waggoner Creek east of Interstate 369. Restoration techniques may include live staking, live fascines, and brush layers where banks are eroding. Activities will restore approximately 25 acres of bottomland hardwood forest and scrub shrub wetland habitat to a more native state in cleared areas that are currently a mix of grasses based on a site assessment and enhance an additional 4 ac with litter pick up and understory seeding with native shade-tolerant species to increase the biodiversity.

Figure 52 shows approximately 2,000 LF of stream restoration along Waggoner Creek (shown in blue line) within a city owned property (approx. project boundary outlined in green). Project 10 point of beginning is 33°25’30.09” N and 94°05’03.73” W, end point 33°25'46.16"N and 94° 05'42.97"W. Refer to City project maps for more accurate property boundary. This project site is adjacent to city recreation center and has opportunity for wetland creation proposed in Project 6. Depending upon site conditions and design development, 23 acres of wetlands would be created and shared between Projects 10 and 6. This Project 10 site location is revised from the original city proposal. Note the proximity of the southern extent of Project 2. These Projects 10 and 2 are just above the confluence of Waggoner and Cowhorn Creeks. Ten (10) survey transects are anticipated as shown in Figure 53.

Figure 52. Project 10 Location Map.
Project area may be expanded to incorporate more forest.

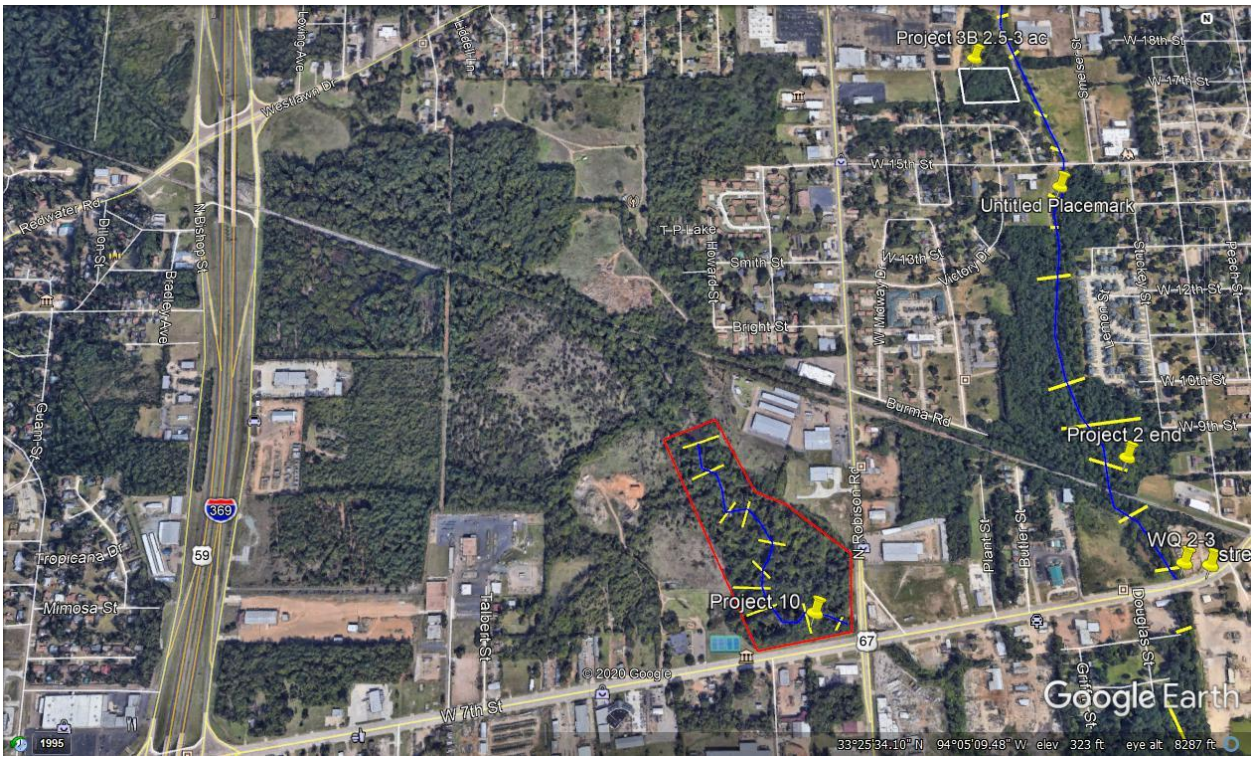


Figure 53. Project 10 Vicinity.
Note targeted Project 10 site (red polygon) with planned transects and proximity to Project 2.

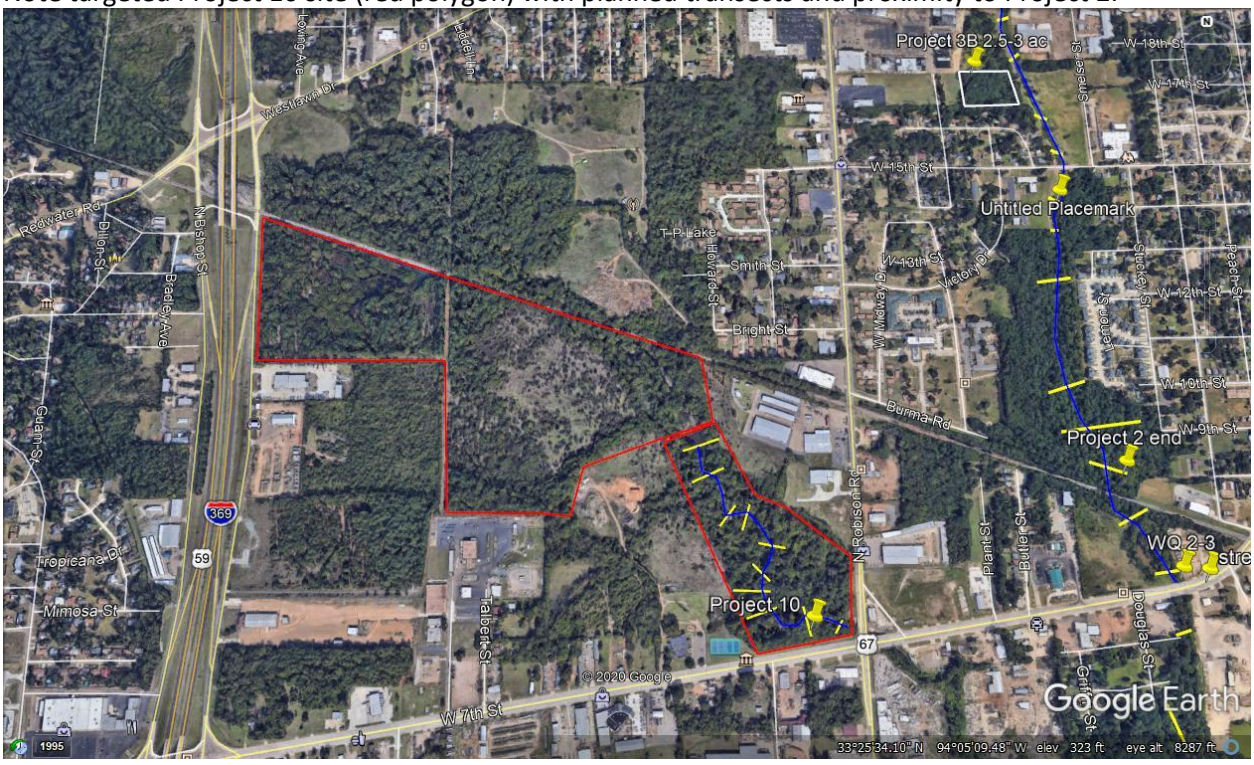


Figure 54. Project 10 Planned Transect Locations.
Note Project 10 target area may be expanded by 88 acres further north and west to incorporate additional floodplain forest on city owned property.

Coordinate with City and Recreation Center staff before access. Investigate both stream channel and floodplain forest within this site boundary. Review aerial imagery and NWI map. There may be scattered ponds and mosaic wetlands. Note and record both flora and fauna observations at this site. Look for opportunities for wetland creation toward the recreation center.

5.0 Data Collection Plan

The PDT will undertake data collection. This Plan covers data collection on the stream and wetland restoration sites: 1, 2, 3, 6, 7, 8, 9, and 10. It highlights types of data collection methods, data to be collected, survey methods and sampling designs including number and location of anticipated transects, materials and equipment needs, and anticipated dates and duration. This Plan may be updated during Phase I. Data will be used to assess current condition, establisha baseline, and includes streamflow, water diversion and inflows, and water quality data, flow frequency estimates, biological inventories, soils information, aerial imagery, and elevation data which is primarily from current LiDAR and City Public Works information. A Geographic Information System (GIS) will be the most appropriate method for viewing and analyzing spatial data.

Post-construction monitoring funded by the Trustees should be limited to parameters needed to determine project success (e.g., demonstrating the accuracy of the as-builts, percent survival of native vegetation, percent invasive species), rather than extensive research, ambient water quality monitoring, or impairment monitoring (e.g., forest and understory structure, rapid bioassessment protocols, in-stream benthic and aquatic species presence/utilization, surface water quality use-attainability analysis, aquatic life monitoring) or public utilization of the project (e.g., safe conditions for access, trail use, ground condition, human disturbance). Data collection will not be for extensive research. Data will be collected via two methods: 1) in-house gathering provided by the PMT and readily available public information and 2) on-site field surveys.

The in-house gathering and desktop review will be performed to support the characterization of the physical, biological features within and around each project site. As applicable, after reviewing information involving internet searches, review of existing mapping sources, and any information provided by the City, the PDT may coordinate with relevant agencies and organizations to supplement the data base. Prior to conducting a site visits, the PDT will review data on the watershed and individual sites, develop an understanding of the physical watershed characteristics, watershed hydrology, and the hydraulic and geomorphic characteristics of the restoration sites, and use Geographic Information System (GIS) technology to compile applicable mapped information.

Applicable mapped information to be compiled and reviewed before the field work may include:

- U.S. Geological Survey Hydrologic Atlas, i.e. USGS NHD data and/or USGS 8- and 12-digit HUC maps;
- U.S. Geological Survey topographic map(s),
- USDA Natural Resources Conservation Service Soil Survey,
- National Wetlands Inventory map,
- FEMA/FIRM maps, the 100-year floodplain elevation,
- High resolution LiDAR
- Aerial and infrared aerial photographs,
- Sanborn maps, and
- other related data such as historic rainfall data and storm information.

The PDT understands that the City maintains GIS-based information and will provide available GIS information to the PDT. GIS will be used throughout the project as a data management tool for desktop

and field data collection and management and for planning and restoration design development. This collaboration can reduce the time and costs typically necessary for the collection of various datasets and incorporating them into a single system. The use of source data such as property parcels, digital ortho-imagery, topographic mapping, and others, will provide for an integrated site mapping system upon which to include the results of site investigations and provides a sound foundation upon which to develop stream and wetland restoration plans and detailed designs.

Pre-construction survey work, including wildlife surveys, should be limited to work required to complete engineering and design and meet United States Army Corps of Engineer permit requirements.

In-house data collection and analysis may address the following:

5.1 Watershed and Sub-basins

The PDT will undertake the assessment of the watershed to determine stream order, flow volumes, and anticipated velocities. Guidance from EMRRP-SR-03 Preliminary Watershed Assessment, February 2000, will be applied. This assessment will be a desk-top effort, supplemented with minimal windshield surveys.

Days Creek starts in Texas, drains most of the Texarkana metropolitan area, and flows southeast into Arkansas before emptying into the Sulphur River. Days Creek is located within the Gulf Coastal Plain ecoregion and has a drainage area of approximately 144 mi^2 at its mouth as shown in Figure 55. The NRDA project sites are located within the upper portion of this watershed.

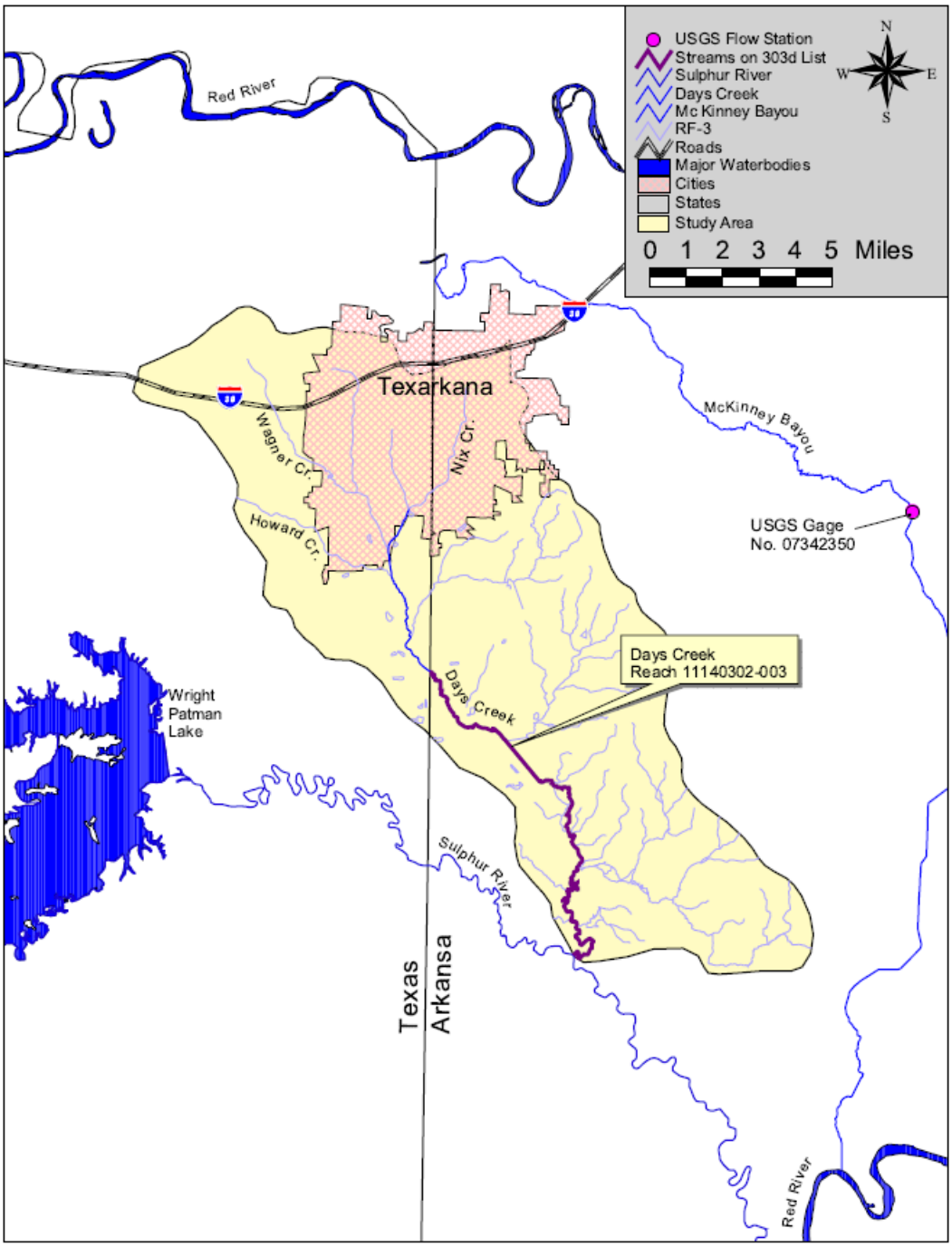


Figure 55. Watershed of Days Creek.
Source: TMDL Report ADEM 2005

The relevant Watershed/Floodplain Analysis and Hydrology/Hydraulics data collection will follow ***USACE Hydrologic Modeling Guidelines for Regulatory Permit Actions: Checklist and Final Technical Report (Jan 22, 2018) and USACE Hydraulic Design of Stream Restoration Projects 2001*** and collect data on the following:

- Watershed boundary
- Drainage patterns, water inlets/outlets, impediments such as bridge crossings
- Climate/weather (storm & drought) data
- Geology and soils
- Stream gauge and existing applicable reports
- Channel confinement
- Hydrologic regime
- Bank full flow levels/quantities/velocities
- Discharge and effective discharge
- Sediment supply
- Bed and bank sediment size and cohesiveness
- Vegetation size and type on floodplain and in the channel

This is not a complete list and data collected under one category will be used for multiple design development objectives. Other relevant data pursuant to restoration planning, permitting, and construction implementation, i.e. access, useful staging areas, and noise sensitive areas may be collected.

From a streamflow hydraulics perspective, there are several fundamental principles the PDT will consider that are valuable for assessing mechanisms underlying physical impairments to stream and riparian condition and function vital to apply for successful urban stream restoration which include total and unit stream power, velocities, shear stress, momentum, roughness and flow resistance, Lane's balance of stream slope to sediment transport, stream channel state and evolution potential, bankfull stage identification, and discharge measurements.

5.2 Water Quantity

- The PDT will review USGS water data: real-time and historical stream gage information, from the U.S. Geological Survey and the following:
- USGS StreamStats: watershed and stream statistics, including approximate flow frequency values, mean flows and minimum flows for ungauged streams with historic and current USGS stream gage information
- CLIMDB/HYDRODB: Open access streamflow and meteorological records, for research data (LTER, SUFS, USGS)
- Streamflow data sources ACWI Subcommittee on Hydrology, as applicable
- Springs Online Springs inventory data, from the Springs Stewardship Institute, as applicable
- FEMA floodplain mapping: 100-year flood inundation boundaries, from the Federal Emergency Management Agency

5.3 Water Quality

- The PDT will review USGS water quality data: real-time field parameter data, such as temperature, conductivity, and pH, as well as historical data for many constituents and the following:

- National Atmospheric Deposition Program: cooperative effort for the collection and dissemination of atmospheric deposition water quality data
- Water-Quality Changes in the Nation's Streams and Rivers: Trends in water chemistry (nutrients, pesticides, sediment, carbon, and salinity) and aquatic ecology (fish, invertebrates, and algae) for four time periods: 1972-2012, 1982-2012, 1992-2012, and 2002-2012
- BYU Sediment Transport Database: A database of more than 15,000 sediment transport observations from nearly 500 datasets
- USGS Regional SPARROW Model Assessments of Streams and Rivers: water quality results from SPAtially-Referenced Regression on Watershed attributes modeling
- EPA STORET: repository for water quality, biological, and physical data. Hosted by the Environmental Protection Agency
- NRDA Days Creek stream survey data results

5.4 Topography/Hydrology/Hydrography

- The PDT will review USGS Quadrangle maps and upstream/downstream drainage areas, LiDAR, and information on the past uses and conditions at each project site and watershed, specifically looking at historical maps and historical aerial images to compare historical water resources, topographic drainage patterns, drainage maps, as well as vegetation cover types to existing conditions, determining a site's hydrologic budget. Identification of groundwater sources and sinks, characterization of site hydrogeology, and a study of the groundwater interaction with geologic features in the surrounding areas is not included as part of this Work Plan.
- High resolution LiDAR and existing stormwater/drainage information will be used to generate/supplement field collected topographic data for creating cross sections.
- Coordination and guidance from USACE Fort Worth District on Hydrologic Modeling for Regulatory Permit Actions (final report and checklist 2018) will be used for hydrologic modeling.
- Coordination with City's Public Works, Engineering, and floodplain manager will be undertaken.

5.5 Soils

- The PDT will obtain GIS-based county soil survey information from the USDA-Natural Resources Conservation Service and incorporate into a project area database. Soil survey data will provide information on water table depth, soil properties such as drainage class, water holding capacity, permeability, and insights into micro-topography.
- Soils will be investigated during delineations for hydric and non-hydric conditions and classified following 1987 USACE manual and regional supplement

5.6 Cultural Resources

- The PDT will review applicable information for previously recorded cultural resources and/or historic properties as part of USACE permitting process.

5.7 Wildlife

- The PDT will review information for general wildlife species likely to occur in each of the projects site in the initial site assessments for developing the original restoration proposals by the NRDA Trustees and the City and will also record any wildlife observations during site surveys to determine the potential presence of animal species of concern and critical habitats on the sites.

Other in-house data collection will include climate data, land use/land cover, vegetation information.

Field surveys will follow inhouse data collection. There may be three 2-man survey crews collecting data simultaneously to streamline the duration of data collection which is anticipated to take 1-4 months to undertake field surveys, process the data, and prepare/report on the results.

Figure 56 provides an aerial overview of the City of Texarkana where the project sites are located within an urban setting. A project location map and color aerial photographs are provided below for each site to assist with data collection such as planning access and duration of field visits. Each site will be reviewed in closer detail to plan each field visit, determine the presence or absence of potential wetlands and existing instream habitat, and determine the number of final transects locations/number and sampling points.

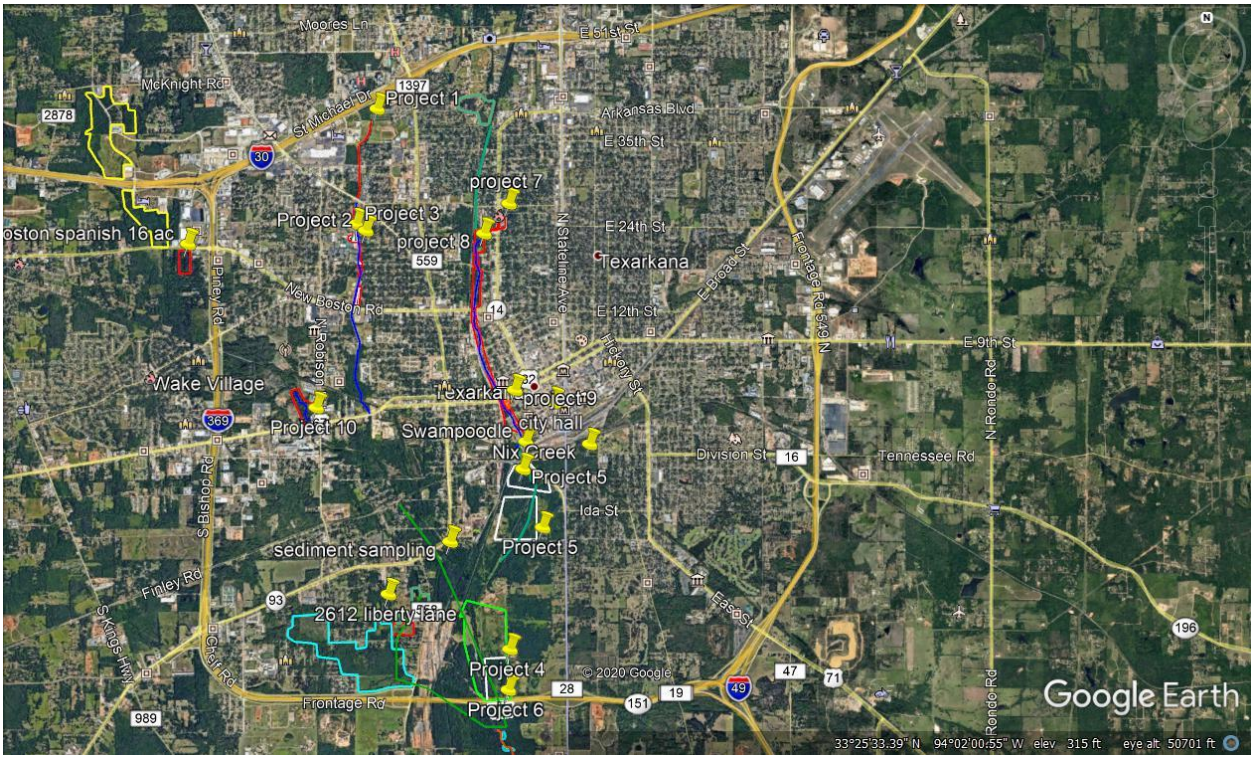


Figure 56. Aerial Image of City of Texarkana.
Note urban setting of the project sites.

There are five creeks of date collection focus: Cowhorn, Swampoodle, Waggoner, Howard, and Days Creeks as shown in Figure 57. These creeks flow from north to south and are perennial. Portions of these creeks have natural banks heavily wooded while others are rectified and mowed. Project coordinates are provided below with the individual site location maps.

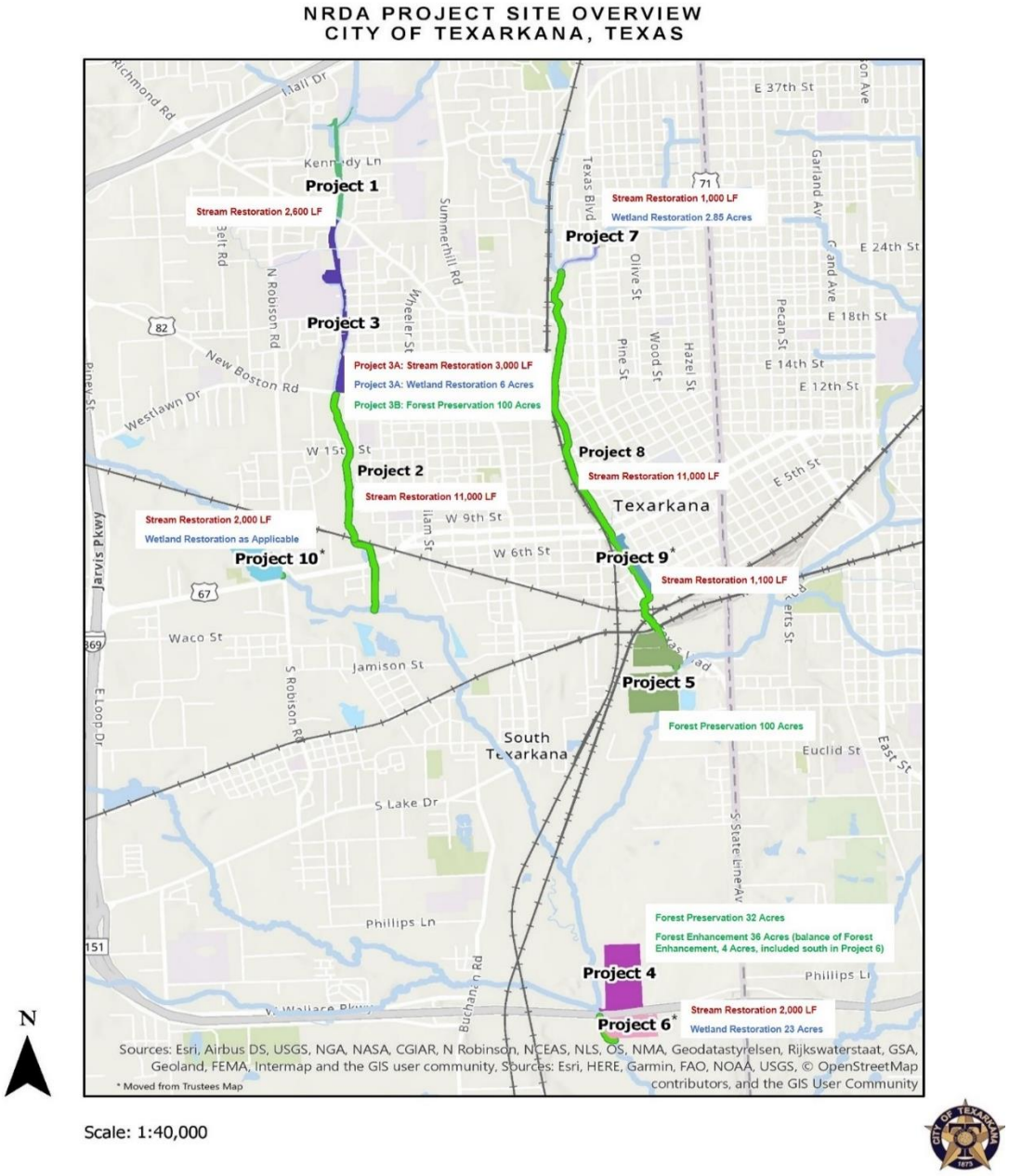


Figure 57. NRDA Project Sites Overview Map.

5.8 On-site Restoration Surveys

Accepted stream and wetland terminology will be used, for example: reach, segment, direction of flow, left descending bank, right descending bank, top of slope, toe of slope, thalweg and others as illustrated in Figure 58.

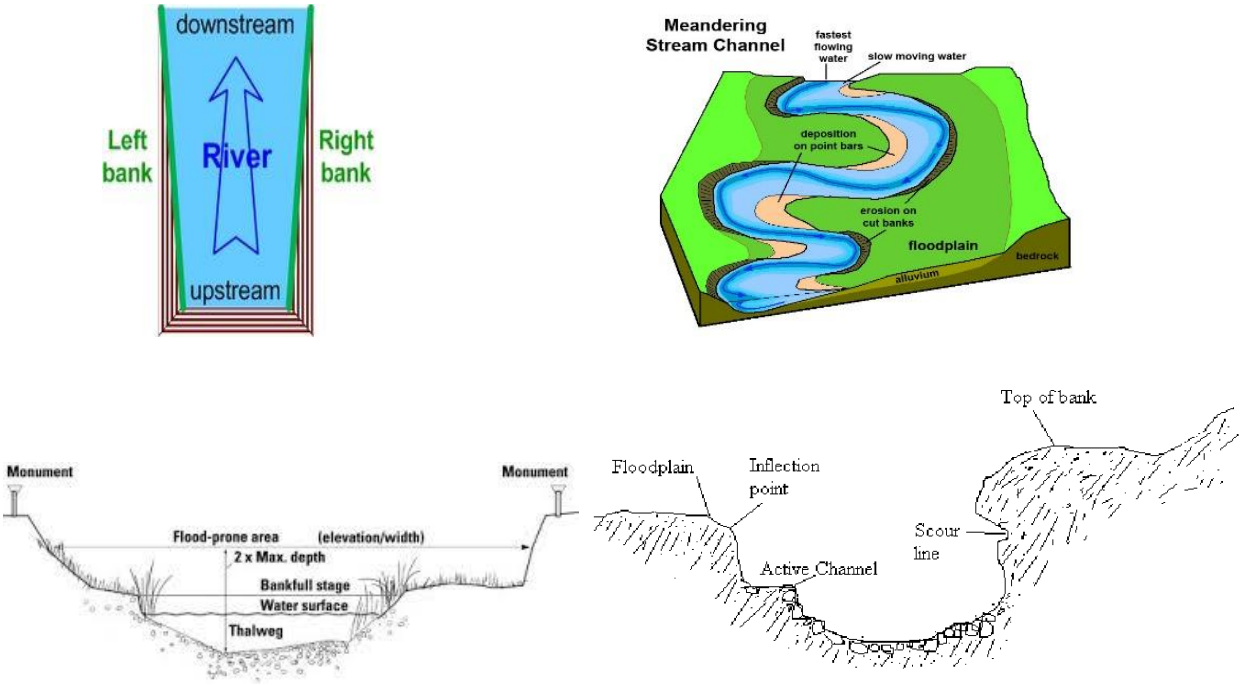


Figure 58. Terminology Illustrations.

On stream and wetland project components: 1, 2, 3A, 4B, 6, 7, 8, 9, and 10.

- Prepare health and safety plan
- Gather existing data/map acquisition prior to site visits
- Load up site boundaries in GPS hand held units
- Coordinate site access near Convention Center, Ferguson Park, and other sites
- Have appropriate protective gear and equipment, cell phones, and identification
- Site surveys
    - Topographic /elevation data LiDAR supplemented
        - Channel top bank/toe of slope, water levels as specified by project site, and locations of inlets and bridge crossings identified
    - Soils/geology
    - Extent/severity of erosion
    - Floodplains and flooding history-get HUC, watershed boundaries
    - Flora/Fauna
    - Land use/cultural/archeological
    - Infrastructure/roads/utilities and other information for H&H models
    - See also requirements for wetland delineation procedures and stream assessment protocol
- Document site conditions with georeferenced color photographs
- Record site conditions and field observations in field notebooks

- Prepare site boundary descriptions for deed restrictions/conservation easements
- Prepare baseline conditions report and preliminary monitoring protocols/locations

Boundary survey will be undertaken to determine property/project site lines and defines true property corners of a parcel of land described in a deed and project site boundaries. The survey also indicates the evidence of encroachments and disclosed easements, and may show the limitations imposed on the property by state or local requirements.

The topographic/elevation survey method will use survey-grade GPS (RTK system), as applicable to field conditions, i.e. dense foliage, that allows single individual to collect more frequent and accurate data points and locates surface features of a property and depicts natural features, terrain contours, and elevations on a plat or a 3D Computer Aided Drafting and Design (CADD) file. Additionally, total stations will be acquired that are essential for data collection in some areas with dense vegetative cover. Airborne-collected LiDAR data will also be used allowing for an excellent description of landforms. When combined with ground-based survey elevation data collection for below-water features, validation is needed to assure that the datasets are compatible.

Additionally, green LiDAR technology may be used to allow for bathymetry measurements. The survey-grade GPS will be georeferenced so that the data points can be easily overlaid with other data layers in GIS or CADD. This also provides more accurate construction layouts. As applicable, due to areas with vegetative canopy, surveying using an antenna designed to be more effective under canopy, or using a total station for filling in data gaps will be utilized. To properly geo-reference the data, an Online Positioning User Service (OPUS) solution can be obtained for the base station location, with this setup location and coordinates consistent and/or use of local benchmarks will be utilized. The extent of topographic survey data required depends upon site conditions and individual project goals and objectives. Tentative elevation survey data will be collected at prescribed transects shown in figures associated with each project site in Section 4.6.

The PDT will utilize electronic format of the property boundary surveys, showing property lines and applicable easements and property legal description of the restoration sites and, as applicable, locate within the City owned properties, the location of the restoration project site by a Professional Land Surveyor on the PDT. A topographic survey of the streams to be restored may be undertaken with one-foot accuracy on x/y coordinates and 0.5-foot accuracy on the z coordinates as part of the field investigation. This information will be used to provide the baseline for restoration planning and the hydraulic modelling and subsequent design development and final engineering.

The topographic survey will include stream cross-sectional data points collected relative to fixed datums and established benchmarks. Cross-sections of the stream segments will be collected as specified based on-site conditions and current LiDAR and supplemented with additional data points to be collected from areas of rapid elevation transition, as required, and necessary to maintain a one-foot accuracy of the topographical survey. Anticipated transect locations for each site are shown in subsequent figures describing data collection at each site, however their number and location may change based on existing data available, site conditions, and budget. The PDT will prepare elevation data from the sub-basin watershed area and floodplain collected from readily available digital elevation models (DEMs) created from LiDAR.

An underwater topographic survey, or bathymetric survey, may be used to measure the depth and location of underwater features using either sonar technology or GPS mounted to a boat. Tools and guidance for collecting, processing, and transforming survey data for stream work will include:

- River Bathymetry Toolkit: Suite of GIS tools for processing high resolution DEMs of channels
- CHaMP Transformation Tool: An ArcGIS add in for transforming survey data into real world coordinates
- CHaMP Topo Processing Tools: topographic survey processing aid in for ArcGIS, from the Columbia Habitat Monitoring Program
- OPUS: Online Positioning User Service to locate benchmarks using RTK survey-grade GPS, from NOAA
- Geomorphic Change Detection (GCD): software to determine differences in digital elevation models (DEM differencing), for such applications as computing volumetric changes

The extent and severity of streambank erosion factoring into subsequent restoration planning and design will be determined during field surveys by visual observations and recording evidence of degradation or aggradation, as shown in Table 10, and obtaining measurements of heights and widths of the erosion, bank slope, degree of undercutting.

Table 10 Potential Field Indicators of Stream Instability and Stability

Evidence of degradation
• perched tributaries • headcuts and nickpoints • terraces • exposed pipe crossings • perched culvert outfalls • undercut bridge piers • exposed tree roots • early-seral vegetation colonization • hydrophytic vegetation high on bank • narrow and deep channel • diversion points have been moved upstream • failed revetments due to undercutting
Evidence of aggradation
• buried culverts and outfalls • reduced bridge clearance • uniform sediment deposition across channel • tributary outlets buried in sediment • buried vegetation • channel bed above the floodplain elevation • significant tributary backwater effects • hydrophobic vegetation low on bank or dead in floodplain • evidence of stability vegetated bars and banks • limited bank erosion • older bridges and culverts with at-grade bottom elevations • mouth of tributaries at or near mainstem stream grade • no exposed pipeline crossings or bridge footings

(adapted from NRCS 2007, Ch3).

Field investigations for stream restoration planning will occur simultaneously with waters of the US delineation. A delineation of waters of the U.S., (WOUS) including wetlands, will be undertaken following ***1987 USACE Delineation Manual*** (Technical Report Y-87-1) and ***Atlantic & Gulf Coast Plain Regional Supplement*** (Version 2 Technical Report 10-20). Stream survey will be undertaken following ***TXRAM Stream and Wetland Assessment Module Version 2 Final September 2015*** or updated to provide a rapid, repeatable, and field-based method that generates a single overall score of wetland or stream integrity and health which will be used to gage restoration success. Delineation results will be documented on prescribed data forms. If wetlands or other water bodies are present on a site, an approved jurisdictional determination (JD) will be sought and obtained for the sites to identify and delineate those stream channels and abutting wetlands that are subject to Clean Water Act and the Rivers and Harbors Act jurisdiction. Documentation requires the use of data sheets, other data, and the JD Form A preliminary jurisdictional determination will be made by the PDT and concurrence requested from USACE Fort Worth District based upon a delineation report prepared by the PDT. The delineation will be undertaken to identify jurisdictional limits of waters of the U.S., at the ordinary high-water mark, and including any adjacent or abutting wetlands within each project site by identifying three criteria: wetland hydrology, hydric soils, and predominance of hydrophytic vegetation.

5.8.1 Hydrology

The PDT will look for field indicators of hydrology, such as inundation and/or saturation, as specified by the federal manual, to determine if the wetland hydrology criterion is present. This information will be recorded on the data forms.

5.8.2 Soils

It is estimated that 23 observation points and soil stations may be required to document upland and wetland boundary conditions, intersections with existing channels, and potential wet areas visible on the aerial images, and any significant plant community changes when encountered. Soil profiles will be observed and recorded as required by the manual. Work will consist of establishing locations for soil stations utilizing data from Natural Resources Conservation Service (NRCS, formerly the Soil Conservation Service) soils reports and available aerial photography of the area. Soil stations will be sampled with augers, soil probes, or shovel. Soils at each station will be examined and compared with NRCS descriptions and hue/value/chroma using the Munsell color chart. These data will be recorded on appropriate data forms.

5.8.3 Vegetation

Vegetation data in the area around each observation point will be identified according to species (to the extent possible), as specified by the federal manual. Species information will be recorded on the data forms to determine if a predominance of hydrophytic vegetation is present and determine plant community and wetland type.

Color photographs will be taken to document typical wetland, upland, and other property conditions.

5.8.4 Waters of the U.S.

The boundary of waters of the US, including wetlands encountered will be recorded using hand held Trimble units and GPS tied to state plane coordinate system and then display on aerial images with property boundaries and incorporate into the project GIS database. Following completion of the field work and processing data, a draft delineation report will be prepared describing the property,

methods/sampling procedures followed, and delineation results. The results would include number, size, and type of waters of the US encountered, including wetlands. The draft delineation report, including data forms, the wetland/upland boundary survey, and photographs will be submitted to The City for review and comment. The report will also provide documentation to support the findings regarding preliminary jurisdictional determination. After addressing one collated set of City review comments, a final report will be prepared with delineation results and findings on potential jurisdictional determination. On behalf of the City, the report will be submitted to the USACE Fort Worth District. Coordination with the District on their verification of the delineation and requesting their concurrence for an approved jurisdictional determination will be part of delineation activities required for permitting and restoration.

5.9 Survey Protocols

Concurrent with delineation, the site investigations will specifically collect and analyze specific information for erosion control and restoration potential, including flora and fauna species presence/diversity and stream health/proper functioning condition. Various protocols will be followed, as indicated below including the USDA Forest Service protocol for establishing stream channel reference sites. Field investigation will include taking color photographs to document conditions and include with Stream Impact Assessment Forms.

Data collection will follow standard site inventory and analysis practices and using desktop analysis of numerous maps and on-site surveys to collect data on the following:

- Waters of the US, including wetlands delineation following 1987 USACE Delineation Manual
- Channel physical condition following USACE stream assessment protocols, ***NRCS Stream Visual Assessment Protocol, and NRCS User Guide to Assessing Proper Functioning Condition***.
    - Stream order/type
    - Channel plan and profile, top of bank, toe of slope, thalweg, channel slope
    - Width to depth ratios
    - Channel & bed morphology (applicable reach features)
    - Channel bank condition, extent of erosion
    - Other geomorphic features
    - Infrastructure/utilities
    - Channel debris
- Channel habitat condition and flora/fauna following ***Biotic Stream Classification Naiman et al 1992 updated and TXRAM Stream and Wetland Assessment Module Version 2 Final September 2015*** or updated.
    - Vegetative cover dominant species presence in tree, shrub, groundcover stratums
    - Water condition flow rate
    - High/low flow conditions
    - Fish cover/migration obstacles
    - Macroinvertebrates presence
    - Beneficial woody debris
- Water quality, specifically temperature, dissolved oxygen, turbidity, and specific conductance only which will be measured with a hand-held probe such as a LaMotte turbidimeter, or equivalent
- Adjacent land condition/property owners

Protocols for field data collection for evaluating the status of stream baseline condition and subsequent monitoring for restoration trend in stream condition will follow:

- BLM 2015 BLM AIM National Aquatic Monitoring Framework: Interim Protocol for Wadeable, Lotic Systems
- Archer et al. 2014a Effectiveness monitoring for streams and riparian areas: Sampling protocol for stream channel attributes (PIBO)
- Kershner et al. 2004 Guide to Effective Monitoring of Aquatic and Riparian Resources (PIBO)
- Barbour 1999 Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, specifically benthic macroinvertebrates only to determine any presence. No fish or algae data collection.

The purpose of on-site analysis will be to supplement information obtained during the desktop data collection and review and to collect additional site-specific data necessary to evaluate existing conditions for restoration planning and erosion control. Stream and wetland assessment will develop applicable reach condition indices and use the USACE required Stream Assessment Compensation Evaluation Procedure for meeting restoration goals and any compensation requirements. Following completion of the field assessment, detailed site analysis report(s) will be prepared.

Reach condition indices and stream condition indices will be developed following Routine Stream Assessment Data Forms for Level 1 Streams (Form 1). The fundamental unit for evaluating stream impacts is the stream assessment reach (SAR). Stream Assessment Summary Forms (Form 2) will be prepared. Completed Routine Stream Assessment Data Forms and SAR map(s) will then be used for permit purposes and restoration planning.

As part of the on-site analysis, the PDT will undertake the following:

5.9.1 Visual Channel Assessment

The PDT will determine channel condition (i.e., degrading, aggrading, healing, or stable) by visually assessing certain geomorphological indicators supplemented with current LiDAR. These indicators will include: channel incision, access to original or recently created floodplains, channel widening, channel depositional features, rooting depth compared to streambed elevation, stream bank vegetative protection, and stream bank erosion. The approach will describe the particular combination of the state of these geomorphological indicators which generally correspond to a stream channel stability condition at some stage in the evolution process. The PDT will visually assess the channel's geometry, the degree of incision and/or widening (i.e., bank heights and channel cross-section compared to depth, the channel's stability, and the channel's ability to connect to the active floodplain) and record/integrate our findings on Assessment Scoring Forms. The PDT will assess pattern of erosion and deposition, presence or absence of depositional features such as point bars, a bank full bench, extent of vegetation either herbaceous or woody species, and the presence or absence of instability indicators that may include depositional features such as mid-channel bars, transverse bars, and transient sediments, as well as erosion features such as erosion scars, and denuded or armored banks.

5.9.2 Visual In-Stream Habitat Assessment

The PDT will visually assess the stream physical conditions for habitat suitability for effective colonization or use by fish, amphibians, and/or macro-invertebrates. The PDT will also visually survey and record the relative quantity and variety of natural in-stream structures which are available as refuge, feeding, or sites for spawning and nursery functions of aquatic macro-fauna, such as coarse substrate, deep pools, plunge

pools, backwater pools, riffles or runs, logs/large woody debris, thick root wads, undercut banks, overhanging vegetation, and/or dense native emergent/submerged vegetation to integrate with information provided by Delta and support our own findings and restoration planning. The pre-construction survey work, including wildlife surveys, limited to work required to complete engineering and design and meet United States Army Corps of Engineer permit requirements, the habitat and substrate suitable for the effective colonization or use by fish, amphibians, and/or macroinvertebrates will be assessed as per USACE requirements in the TXRAM Stream and Wetland Assessment Module Version 2 Final September 2015.

5.9.3 Visual Channel Alteration Assessment

The PDT will visually assess and record any direct impacts to the stream channel from anthropogenic sources that may include channel alterations that disrupt the natural stream conditions such as

- Straightening of channel or other channelization
- Stream crossings (bridges and bottomless culverts)
- Riprap, articulated matting, concrete aprons, gabions, or concrete blocks along stream bank or in streambed
- Manmade embankments on stream banks, including spoil piles
- Constrictions to stream channel or immediate flood prone area such as culverts, levees, weirs, and impoundments

5.9.4 Biological Surveys

The PDT will undertake limited biological (flora and fauna) field surveys and map existing vegetation communities and record flora species present. A vegetation survey will be undertaken across the site during the delineation activities to identify riparian vegetation to be preserved and identify rare, threatened, or endangered species and/or native natural communities that need to be avoided or preserved as part of the larger mitigation plan. The vegetation survey will record species present, size, age, and condition of individual mature trees (greater than 2-3 inches in caliper diameter at breast height (DBH)) that need be recorded and to remain as part of erosion control and the restoration preservation plan. The PDT will use global positioning system (GPS) to document the location of vegetation areas or individual trees that should be preserved. In order to support characterization of ecological resources, the PDT will also undertake limited fauna survey recording species observed and noting location and use (i.e. foraging, nesting, migrating) only when encountered. Observations would include birds, bats, mammals, and to a limited extent, insects. Benthic macroinvertebrates will be surveyed for presence only using a hand-held Surber net sampler, 200- to 500-µm [0.01- to 0.02-inch] mesh, or equivalent, that are easily collected. These invertebrates are insects, but also include worms, crayfish, snails, and freshwater clams. Assessing macroinvertebrates as part of stream biological integrity using is key to determining restoration success if species are present and what effect the restoration activities will have. No lab analysis.

5.9.5 Vegetation Assessment

The PDT will undertake botanical survey. Botanical survey will record vegetation in stream, on banks, and alongside the channels in riparian corridor, as applicable. Riparian vegetation provides multiple benefits to streams, including reduced erosion rates and increased bank stability, increased flow resistance and reduced velocities, increased vadose zone recharge, and the provision of cover, shade, and energy input to streams. Riparian vegetation is essential for healthy benthic macroinvertebrate populations, which in turn provides a critical food resource for fish. Hence, establishing the status of riparian vegetation is an

essential component of stream restoration planning and design. The following will be used, all, in part, or in combination to develop protocols for riparian data collection and subsequent monitoring:

- TXRAM Stream and Wetland Assessment Module Version 2 Final September 2015 or updated
- Merritt et al. 2017 The National Riparian Core Protocol: A Riparian Vegetation Monitoring Protocol for Wadeable Streams of the Conterminous United States
- Stromberg and Merritt 2015 Riparian Plant Guilds of Ephemeral, Intermittent, and Perennial Rivers
- Archer et al. 2014b Effectiveness Monitoring Program for Streams and Riparian Areas: 2014 Sampling Protocol for Vegetation Parameters (PIBO)
- Burton et al. 2011 Multiple Indicator Monitoring of Stream Channels and Streamside Vegetation
- Kershner et al. 2004 Guide to Effective Monitoring of Aquatic and Riparian Resources

Data collection by the PDT will generate for each site 1) Problem Identification, quantify extent of restoration/stabilization/naturalization requirements, 2) Site Opportunities and Constraints, and 3) Aquatic Ecosystem Analysis/Assessment/Response following ***Channel Processes, Classification, and Response by Montgomery and Buffington*** and ***Neale et al. 2011 Stream Ecological Valuation (SEV): A User's Guide, and Proper Functioning Condition by Prichard et al. 1998.*** This assessment is based on 14 stream functions, specifically:

- hydraulic functions (natural flow regime, floodplain effectiveness, longitudinal connectivity, groundwater connectivity)
- biogeochemical functions (water temperature, dissolved oxygen, organic matter input, instream organic particle retention, pollutant decontamination)
- habitat functions (fish spawning, aquatic fauna)
- biodiversity functions (intact fish, invertebrate, riparian vegetation populations)

Data collection forms and checklists will be prepared for consistency between the project sites and avoid data gaps.

The number of transects anticipated for data collection which includes stream elevation surveys, waters of US delineation, flora/fauna surveys, erosion survey, and reporting will be determined based on existing information available via current LiDAR and City Public Works data and budget.

Section 4.6 provided a brief recap on each individual project description, a project location map, color aerial images of each site, and the general location and number of planned survey transects. A project site boundary survey, stream/wetland delineation survey, and stream/site elevation survey will be undertaken as part of the overall data collection at each site.

5.11 Data Collection Deliverables

- Baseline Conditions Report covering the stream and wetland restoration projects: 1, 2, 3, 6, 7, 8, 9, and 10.
- Waters of the US Delineation Report covering Cowhorn Creek, Waggoner Creek, Swampoodle Creek, and Days Creek with applicable abutting floodplain wetlands.
- Preliminary Hydrology and Hydraulics Report with final H&H report with modeling results to be completed with later work during 30% and 60% design development.

5.12 Data Collection Schedule

Table 11 provides a breakdown per stream and wetland restoration project for data collection. Restoration site surveys are anticipated to be completed within 4 months from the Effective date. Various elements of data collection: site surveys, data assessments, and report preparation by project site are also shown in Table 11. The anticipated schedule for data collection is shown in Table 12.

Table 11 Anticipated Data Collection Durations

Project	Boundary/Elevation Surveys based on Numbers of Transects	Baseline Survey Duration	Delineation Duration[2]	Report Preparation Duration
1	11	1 week	1 week	1 week
2	38	2 weeks	2 weeks	1 week
3	18	1.5 weeks	1 week	1 week
10	10	1 week	2 weeks	1 week
4	NA	1 week	NA	1 week
6	3	1 week	1.5 weeks	1 week
7	7	3 days	3 days	1 week
8	25	2 weeks	2 weeks	1 week
9	14	1 week	1 week	1 week
Totals	126	10 weeks	11 weeks	4 weeks[1]

Notes:
1 Multiple reports may done concurrently
2. Delineation surveys may done concurrently with boundary/elevation surveys

Table 12 Anticipated Data Collection Schedule

Timeframe	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15
Projects															
1															
2															
3															
10															
4															
6															
7															
8															
9															

Baseline Surveys, Delineation Surveys, Reporting

6.0 Design Development Plan

The PDT will undertake design development. Project component 3B, preservation only is within Project 3A. Therefore, restoration planning and subsequent construction activities along the stream banks adjacent to Project 3B will require attention to preserve the forested habitat. Project component 4A is preservation with enhancement. Based upon due diligence site surveys, enhancement activities will be developed to include seeding and plantings of native species to increase biodiversity. Project 5 is preservation only. No design development is required on Project Site 5.

Design development will occur on stream and wetland project components: 1, 2, 3A, 4B, 6, 7, 8, 9, and 10. Design will be developed in stages or by percent complete: 30% for planning purposes, 60% for permitting purposes, 80% for cost estimating purposes, and 100% for construction. Design development will be unique to each site's conditions while focused attention on the following:

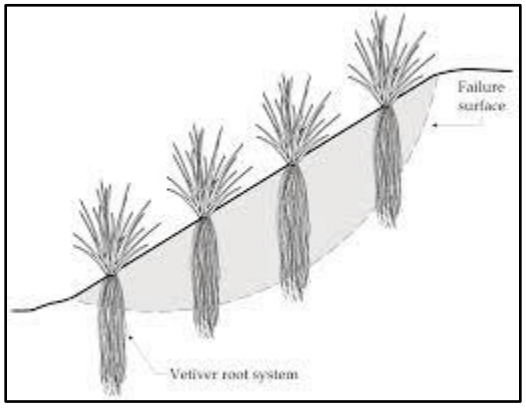
- Correct existing channel segments where banks are near vertical and/or otherwise eroding and not in proper functioning condition;
- Enhance site hydrology and hydraulics to improve floodplain connection and water quality through modifications in channel configuration, bank conditions, surface water elevations, flow velocities, water storage, and/or site hydro-periodicity;
- Improve in-stream habitat conditions for fish and other native species;
- Design stream restoration to withstand a 100-year flood event;
- Increase the total floodplain area and improve the occurrence and distribution of a variety of natural stream features and native plant communities to increase wildlife habitat function and productivity for numerous native plant and animal species including waterfowl; and
- Stay within project budget.

6.1 Restoration Focus

The most appropriate analyses for stream restoration projects are a function of the general design approach judged to be most appropriate for the setting, goals, and objectives. A process-based approach develops the baseline conditions that will allow the stream channel(s) and floodplains to evolve through fluvial processes and riparian succession towards more complex and dynamic habitats. In contrast, a form-based approach defines channel pattern, profile, and dimension and uses structural features (such as rock vanes, toe wood, and rip rap) to minimize channel adjustment. Due to the urban setting for the stream and wetland restoration, design will need occur along the spectrum of typical stream restoration approaches between process and form and instead target function using innovation and designing with nature.

Typical incised urban channels, such as those on the project sites, are deep and lack a stable low-flow channel. The banks are steep and subject to ongoing erosion. Pool habitat is usually lacking, riparian vegetation is limited or non-existent and much of the original floodplain habitat has been lost to erosion and drying by the receding streambed. An integral part of our restoration strategy is to apply, as applicable, various soil bioengineering lessons learned and guidance from the USACE ERDC Ecosystem Management and Restoration Research Program technical bulletins associated with stream restoration and erosion control based on a detailed erosion inventory. Addressing physical attributes to control water movement and increase stream and floodplain habitat would reduce the current causes of erosion and

affect the type and extent of soil bioengineering required. Various bioengineering techniques that will be considered are shown in Figures 59 through 71.



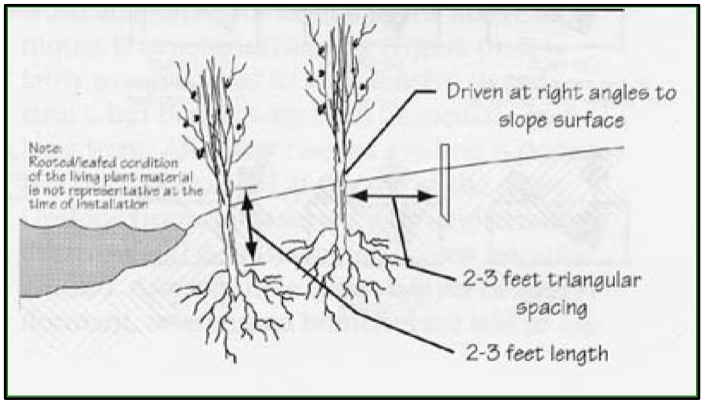
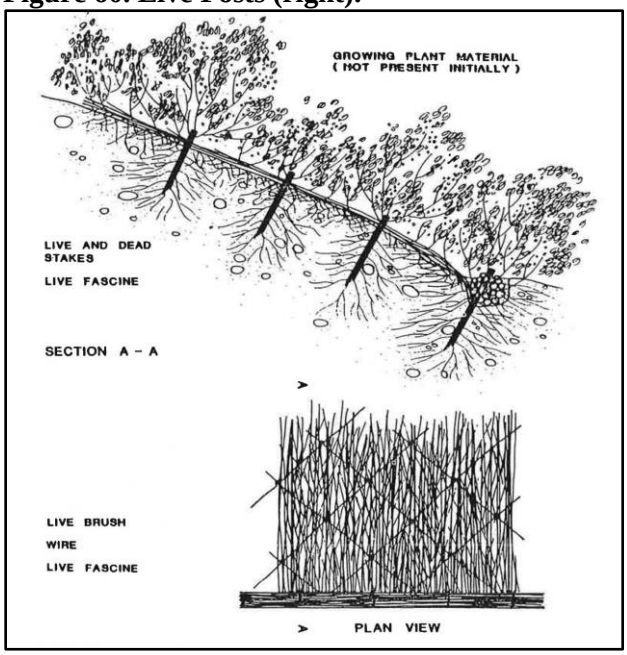


Figure 59. Planting Only Illustration (left).
Figure 60. Live Posts (right).



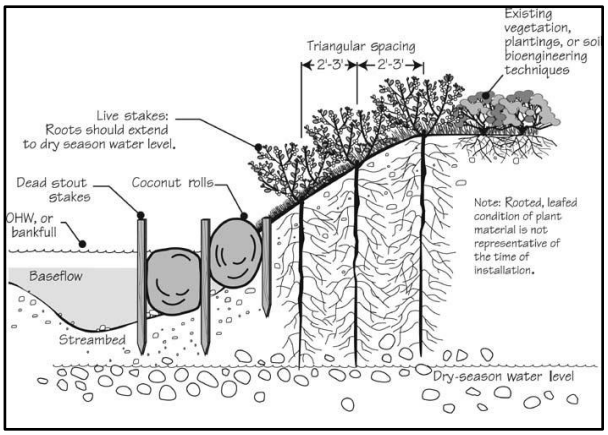
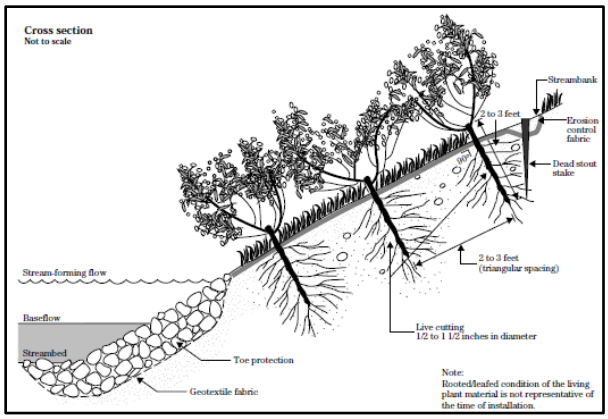


Figure 61. Brush Mattress with Live Fascine (left)
Figure 62. Stout Stakes, Fascines and Live Stakes (right).



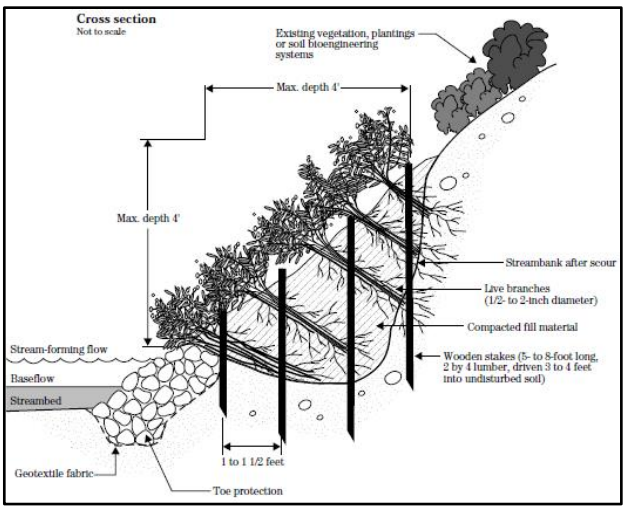
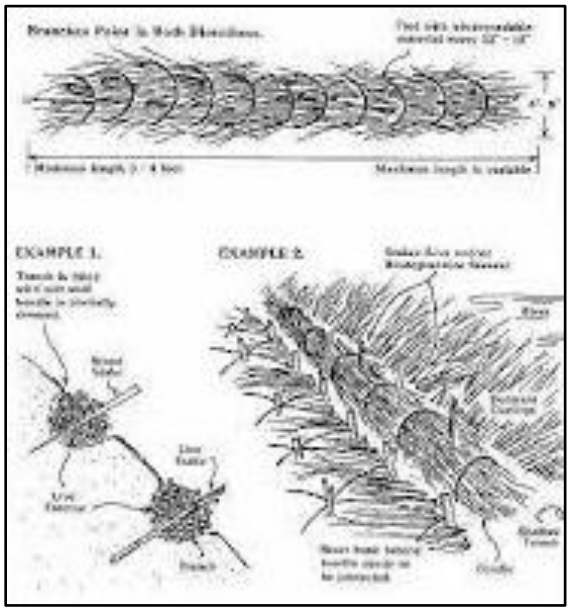


Figure 63. Live Stakes and Toe Scour Protection (left).
Figure 64. Branch Packing (right).



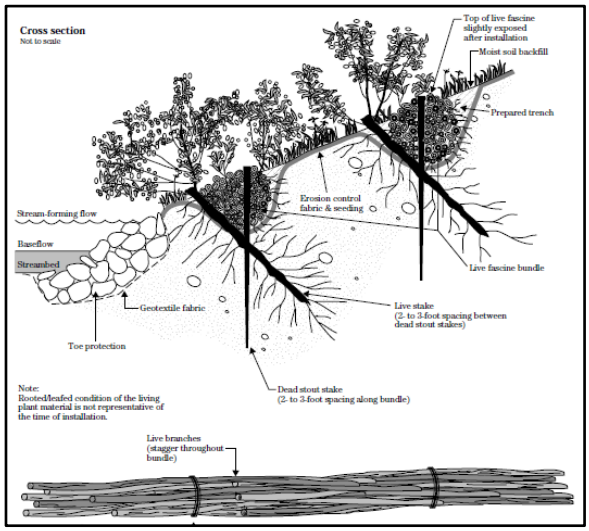
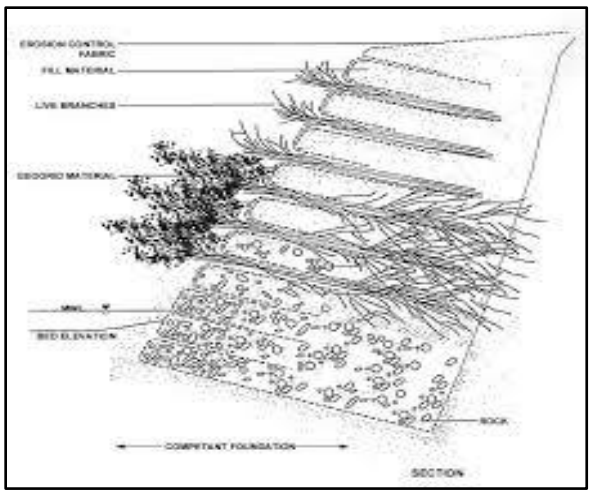


Figure 65. Live Fascine for Toe (left).
Figure 66. Live Fascines for Slope (right).



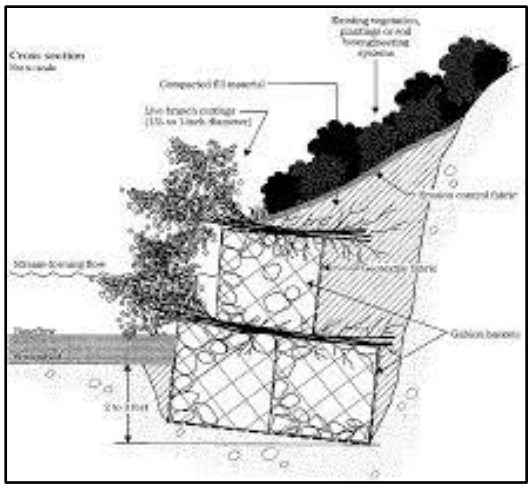
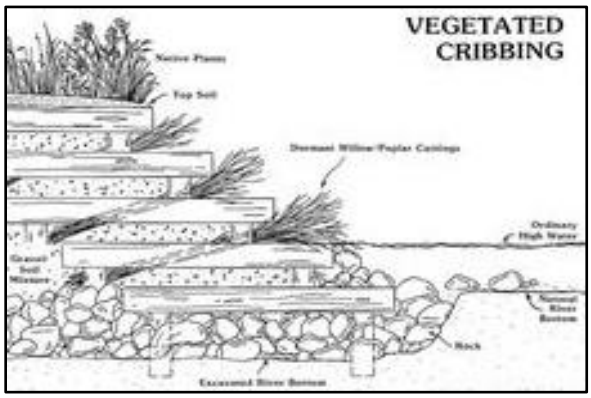


Figure 67. Vegetated Geogrid (left).
Figure 68. Gabions with Brush Layers (right).



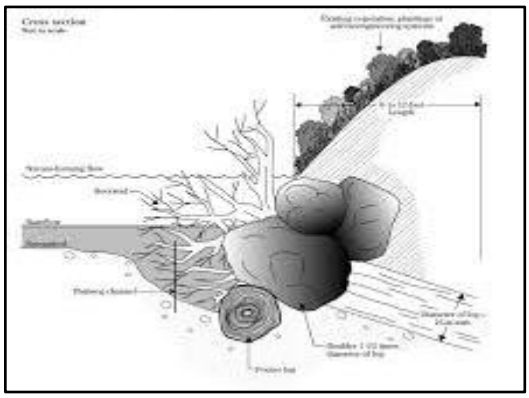


Figure 69. Crib Wall with Brush Layers (left).
Figure 70. Root Wads (right).

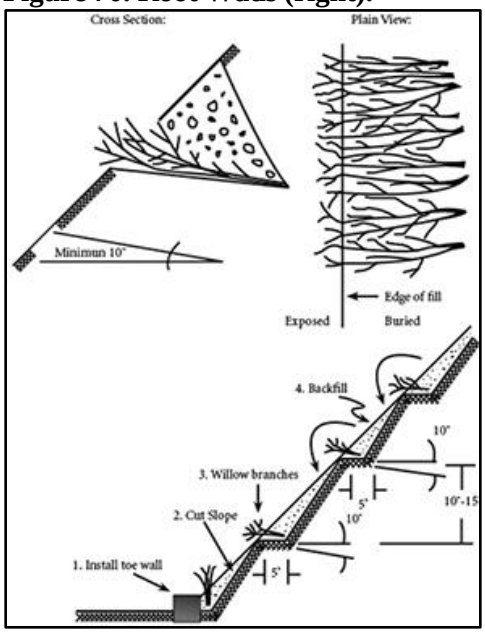


Figure 71. Slope Terracing.

Design development will address the increased water volume and water quality entering the Creek by initially detaining it on either on a site, within a park, or sub-basin, as applicable, spreading it out in a series of in-stream and side stream pools and ponds, as applicable, and establishment of adjacent bioswales, filter strips, and riparian and/or prairie buffers. The restoration approach will then include slowing the water flow velocities through a stream segment by increasing the meander lengths and floodplain area and incorporating/mimicking naturally associated sloughs, depressions, oxbows, fringe wetlands, and in-stream features. In combination with addressing the physical attributes to control water movement, the restoration approach will also address the planning and design of physical attributes to increase habitat through the proper water surface elevation relative to the conditions of the stream banks and bottoms and address any compensatory mitigation requirements, if applied to this project. This will include creating a forested riparian buffer on both sides of the restored stream channels, as space allows, and various bioengineering slope treatments that will eventually create habitat for numerous indigenous wildlife species including fish, mollusks, aquatic insects, mammals, and birds.

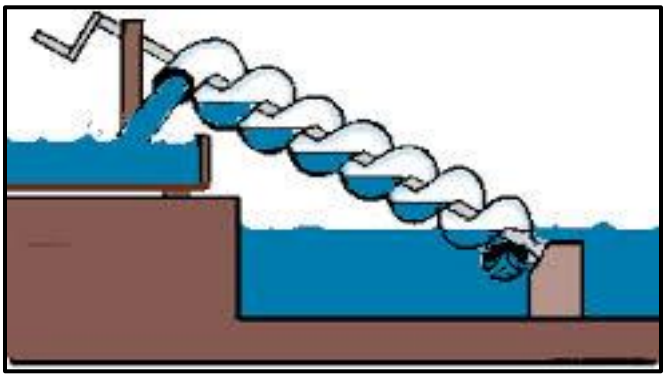


Figure 72. Schematic of an Archimedes Screw.

Because the creek segments within Texarkana are typical of urban waterways and therefore incised, an innovative technique using an Archimedes screw to raise water, place it in top of bank constructed wetlands and restored riparian areas, allows some water quality treatment before gravity returns the water back to the creek segment with increased dissolved oxygen may be used. Increased dissolved oxygen is one element to improve habitat conditions for benthic organisms, fish, and other aquatic species and techniques to cascade and aerate the water may be used.

6.2 Concept Plans

A few preliminary concept plans have been prepared for Projects 1, 6, 7, 9, and 10 as shown in Figures 72 through 77. Concept plans will be prepared for each site and used for assessing site opportunities and constraints, obtaining stakeholder input, and fine-tuning data collection and modeling. It is expressly noted that stakeholder outreach is outside the Interlocal Agreement and not funded by the NRDA Trustees. Further, parking, trails, overlook seating, and boardwalk shown in concept plan, for example Project 6, are as with any concept plan, especially given that these projects will be occurring with city parks, they illustrate potential elements that is expressly noted to be outside the Interlocal Agreement and not funded by the NRDA Trustees. Equally, with Project 7 Concept Plan Drawing, the elements illustrated for public gathering areas, octopus interactive play area, and playground are shown for illustrative purposes and it is expressly noted that these projects will be occurring with city parks, they illustrate potential elements and outside the Interlocal Agreement and not funded by the NRDA Trustees. It is expressly noted that in Project 10 concept plan, any new trail and seating shown are outside the Interlocal Agreement and not funded by the NRDA Trustees.

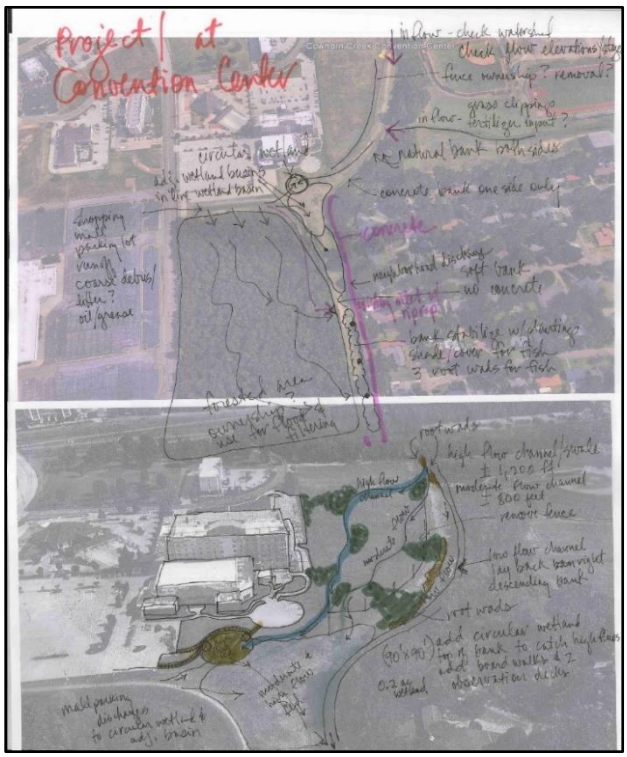


Figure 73. Project Site 1 Concept Plan (left).
Figure 74. Project 3B Wetland Creation Goal (right).

For Project 3B, 6 ac near Texarkana College, another 6 acres in various locations adjacent to the channel, Project 3A, will be investinvestigated for wetland creation. For Project 7, approximately 3 acres of upland in Ferguson Park will be investigated for wetland creation. Wetland creation at other Project site will use various techniques to establish the three parameters for a wetland: wetland hydrology, hydric soils, and a predominance of hydrophytic vegetation. Concept planning of wetland creation may involve adjacent areas, fringe wetlands, and bioswales as shown in Figures 75 and 76.

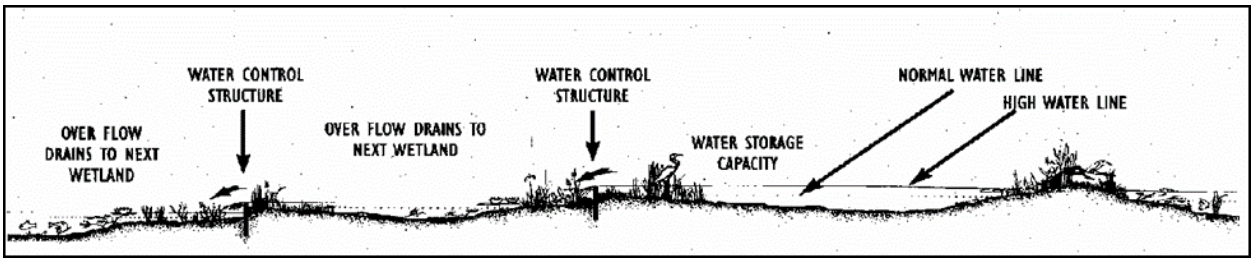


Figure 75. Schematic Cross Section through Series of Created Wetlands.

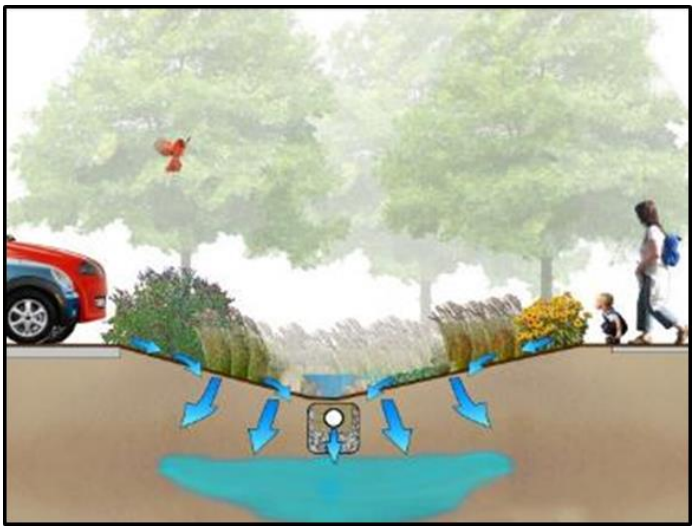


Figure 76. Illustration of a Bioswale Wetland.

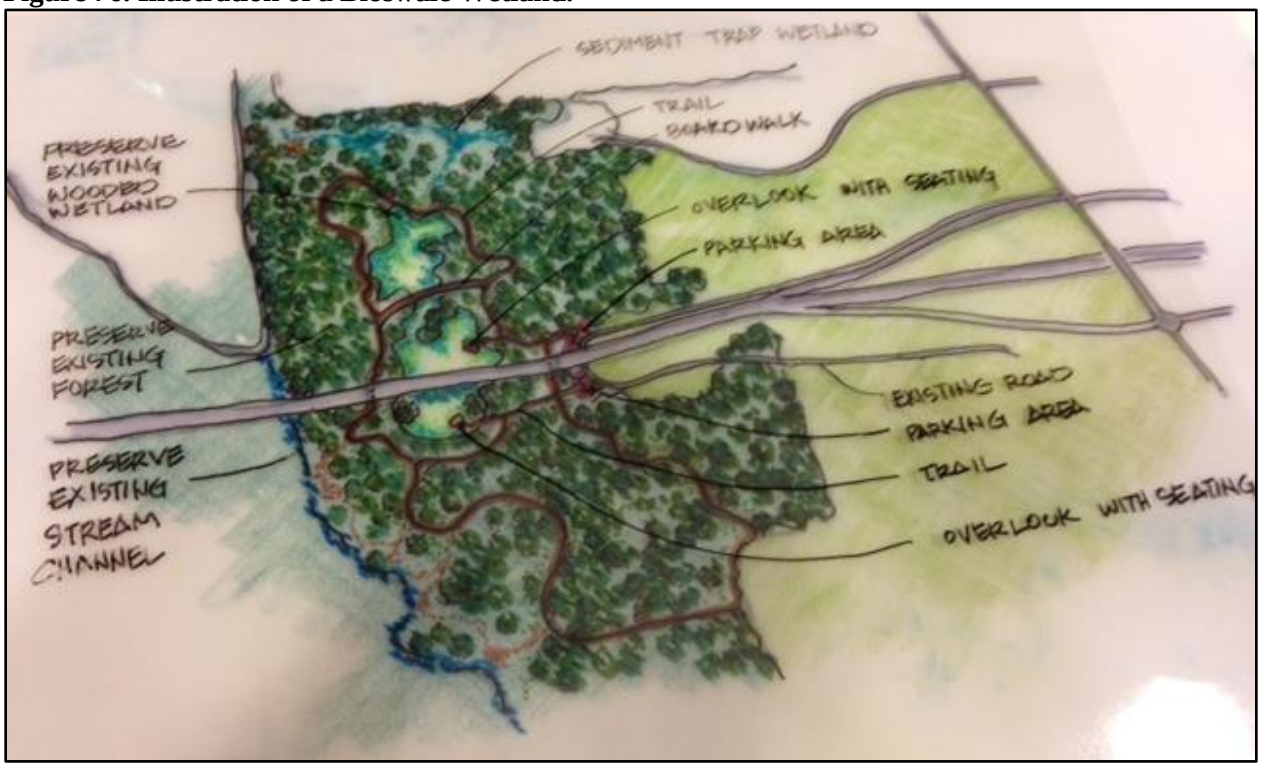


Figure 77. Project 6 Concept Plan.

Plan is to link together Project site 6 and 4 to reduce forested habitat fragmentation and provide connection to Days Creek. It is expressly noted that stakeholder outreach is outside the Interlocal Agreement and not funded by the NRDA Trustees. Further, parking, trails, overlook seating, and boardwalk shown in concept plan, for example Project 6, are as with any concept plan, especially given that these projects will be occurring with city parks, they illustrate potential elements that is expressly noted to be outside the Interlocal Agreement and not funded by the NRDA Trustees. Equally, with Project 7 Concept Plan Drawing, the elements illustrated for public gathering areas, octopus interactive play area, and playground are shown for illustrative purposes and it is expressly noted that although these projects will be occurring with city parks, they illustrate potential elements and outside the Interlocal Agreement and not funded by the NRDA Trustees.

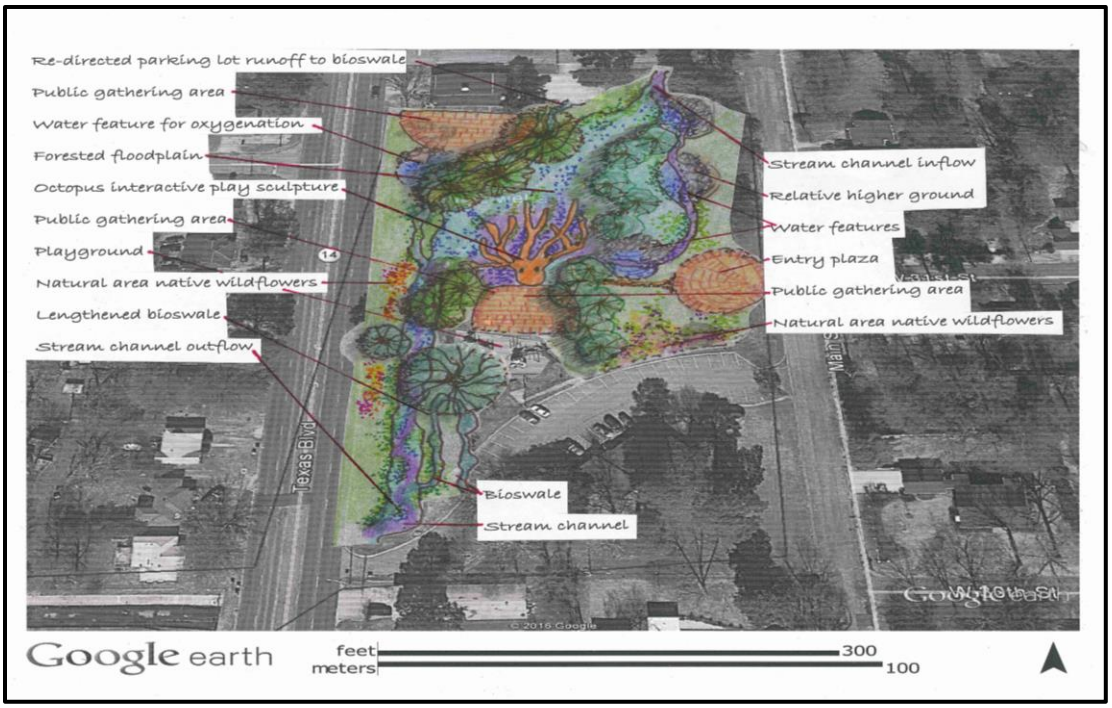


Figure 78. Project 7 Concept Plan.

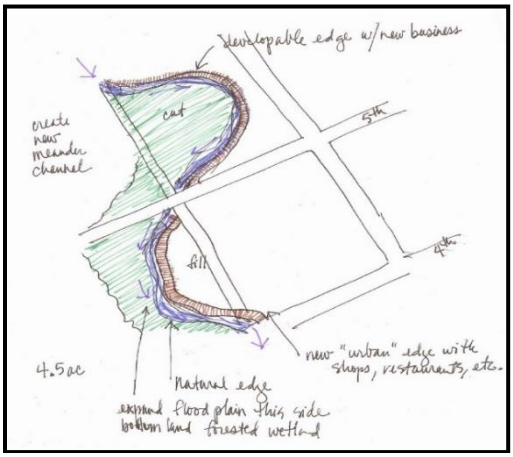


Figure 79. Project 9 Concept Plan (left).
Figure 80. Project 10 Concept Plan (right).

Proposed illustrative concept for Project 10 in Figure 80 shows targeted habitat types to be created adjacent to the recreation center and along 2,000 lf of Waggoner Creek and north of the recreation center. Project 10 does not include recreation center nor its amenities of parking, tennis, walks as they are existing. This concept is intended to show integration between existing and NRDA project. It is expressly noted that in Project 10 concept plan, any new trail and seating shown are outside the Interlocal Agreement and not funded by the NRDA Trustees.

Concept planning will be supported with preparation of schematic cross sections during 30% and-60% design as shown in Figures 73 and 77 through 80.

During design development several activities will be undertaken simultaneously:

- Plant propagation/seedling/seeds preliminary sourcing and pricing
- Design Development-60% for permitting purposes
- Bioengineering materials, viewing window, temp erosion control materials sourcing and pricing
- H&H Modeling
- Public Outreach
- Trustee Coordination & Reporting

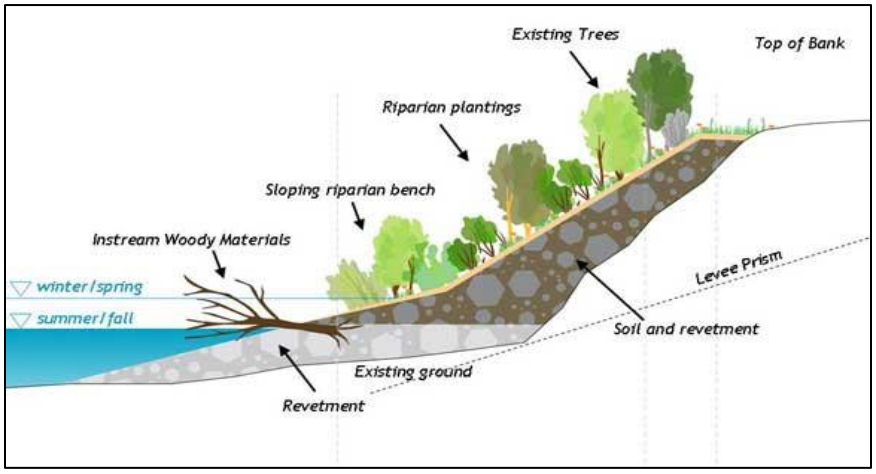


Figure 81. Schematic Cross Section Example.

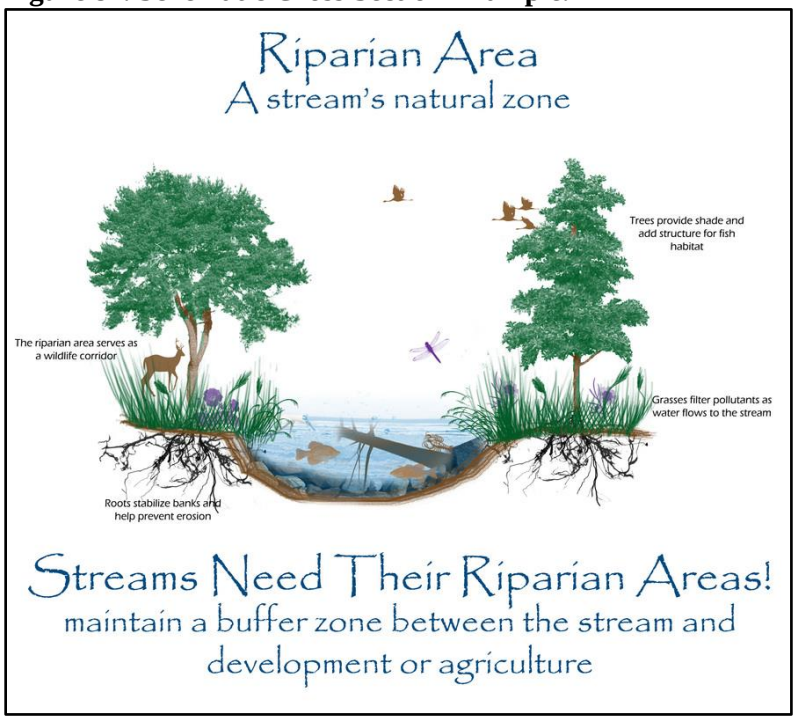


Figure 82. Idealized Schematic Cross Section of a Natural Stream as Restoration Goal.

6.3 Restoration Means and Methods

The PDT will determine restoration means and methods with review and approval from the City and NRDA trustees. While it is understood with ample space, stream restoration can restore natural channel features and ample riparian areas as shown in Figure 82 of an idealized schematic cross section of a natural stream. Given the urban setting of this project, stream restoration design development will investigate current and innovative methods appropriate for Texarkana in which to introduce elements that address stream functions over restoration of natural form in some settings. Examples of these methods include floating and anchored constructed wetland islands as a nature-based feature called Chinampas from ancient Mexico City (Figure 83), patterned and colored concrete to resemble natural features that handle high velocity flows while aerating water such as shown in Figure 84 and other means and methods may include non-traditional restoration approaches to naturalize the stream channel.

Figure 83. Floating Anchored Constructed Wetland Island in Chicago River.

Figure 84. Patterned Colored Concrete Mimics Riffles and Pool Sequences to Naturalize.

Design development will investigate means to restore stream corridor functions, illustrated in Figure 85, and examples of features in urban settings as shown in Figures 86 through 89 addressing plan form and bank and bed conditions.

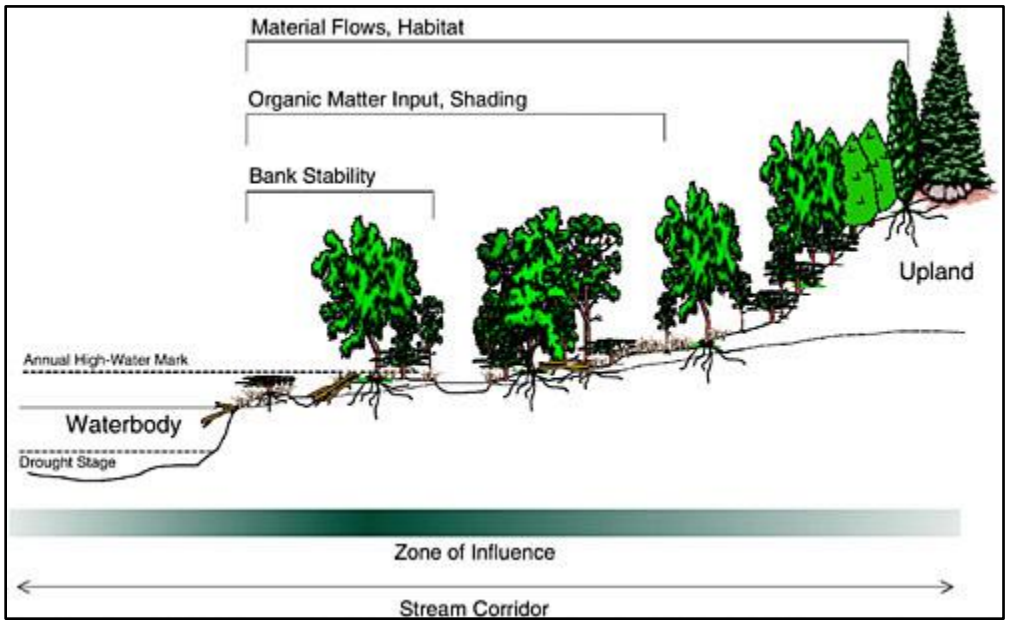


Figure 85. Illustrated Cross Section of Stream with Riparian Area and Some Functions Noted.

Figure 86. Dual Functioning Energy Dissipators Providing Pedestrian Stream Crossing.

Figure 87. Artificial Boulders to Slow Flows yet Look Natural.

Figure 88. Rock and Plantings to Naturalize a Shallow Urban Stream.

Figure 89. Undulating Bank and Bed Conditions in a Shallow Urban Stream to Naturalize.

7.0 Permitting Plan

7.1 Forest Preservation Projects

On three project components: 3B, 4A, and 5. No permits are anticipated.

7.2 Stream and Wetland Restoration Projects

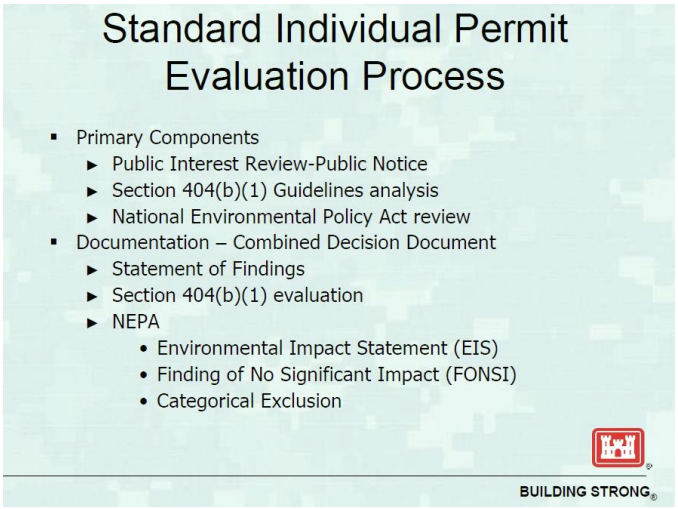
On the stream and wetland project components: 1, 2, 3A, 4B, 6, 7, 8, 9, and 10. The City acknowledges that the Trustees are bringing to the attention that specifically Marl, Sand, Gravel, Shell, or Mud shell mining permit and Aquatic Resource Relocation Permit may be required by Texas Parks and Wildlife Department (TPWD) as separate permits in addition to those normally required for stream restoration projects. The City will confirm if these permits are required for a NRDA project involving stream restoration during a pre-application meeting(s) with USACE and TPWD and other resource agencies which occurs prior to submitting a USACE or other permit application. The PDT will prepare all permit applications and supporting documents. The City will be the applicant and obtain all applicable permits for the project.

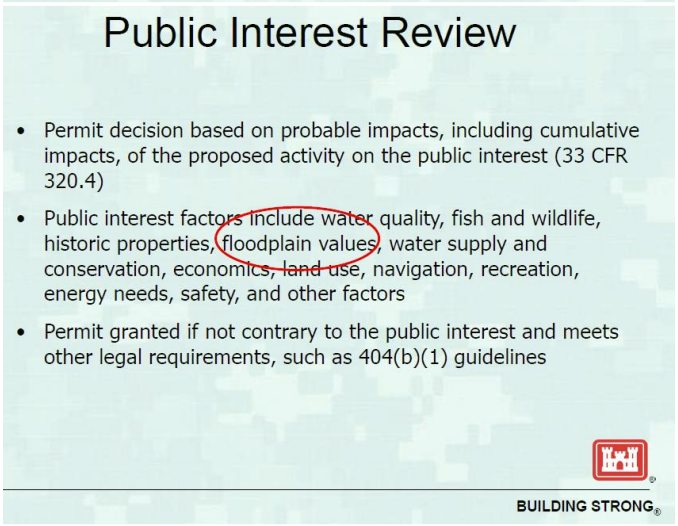
Cowhorn, Waggoner, Swampoodle, Howards, and Days Creeks are waters of the U.S. and under the jurisdiction of the USACE Fort Worth District. Any work within them would require delineation of jurisdictional boundaries, identification of potential impacts from proposed project activities, and a permit from the USACE Fort Worth District. All the projects would be pursed via permitting as a single and complete project. Permitting under a Nationwide permit (NWP) 27 for stream restoration will be pursed via per-application meeting with the District. NWP 27 includes 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. Any applicable regional condition as well as the general conditions of the nationwide permit program will be addressed. If a NWP 27 is not acceptable, the project would proceed under a Standard Individual Permit under Clean Water Act and Rivers and Harbors Act. Activities by the PDT under this task address:

- Pre-permitting and permitting activities/coordination
- USACE-CWA Sect 404/Rivers & Harbors Sect 10
- TCEQ water quality certificate
- Floodplain coordination
- Other: Endangered Species Act Section 7, Magnuson Stevens Essential Habitat/ Historic Preservation Act Section 106, Marl, Sand, Gravel, Shell, or Mud shell mining permit

NW 27 permit application preparation/submittal that includes name, address and telephone numbers of the prospective permittee, name, address, and telephone numbers of the current property owner, identify all encumbrances, easements, and liens on the property (e.g., utility right-of-way's, easements, mineral rights, etc.), which interferes with or is in conflict with establishment of the proposed aquatic habitat restoration, establishment, and enhancement, project location, project description, project purpose (goals/objectives), general need, existing conditions, historical conditions, proposed impacts, avoidance measures, success criteria, work methods, monitoring plan/reports, site management plan, site protection mechanisms for perpetuity, and project drawings.

If a standard individual permit is required, then elements of the process are highlighted in the following:





7.2.1 Schedule

Anticipated schedule is to be determined. The duration of an NWP is 6-8 months. The duration of standard permit may be 1-1.5 years.

7.2.2 Budget

The budget allocated for permitting activities is provided in Table 3 and totals $80,000 with 60% design development drawings.

8.0 Construction Plan

8.1 Forest Preservation Projects

No construction activities will occur on three project components: 3B, 4A, and 5.

8.2 Stream and Wetland Restoration Projects

Construction activities will occur on the stream and wetland project components: 1, 2, 3A, 6, 7, 8, 9, and 10. Planting and/or seeding is planned for Project 4B as enhancement activities, with no construction activities. Construction activities will be defined following 80% plans and laid out in detail prior to Phase III with 100% plans and technical specifics and notes to the general contractor with goals and performance criteria. Actual construction is anticipated to occur from north to south with direction of stream flow, i.e. Project 1 would be constructed before Project 2 and would also occur grouped together within each stream, i.e. Projects 7, 8, and 9 would be grouped to occur together with Project 7 before Project 8 and Projects 7 and 8 before Project 9.

The PDT will undertake construction planning and develop 100% complete construction documents and appliable bid packages on behalf of the City. The City will undertake construction bidding, contractor selection, and construction contracting. Construction planning will develop a Construction Management Plan addressing the following:

- Sequencing
- General information
- Mobilization
- Demolition, as applicable
- Site protection, i.e. fencing and signage
- Specific restoration activities including clearing and grubbing, earthmoving and re-sculpting (rough and fine grading), elevation controls, no excavated soils intended to be hauled off, re-use of material such Grimm Hotel granite pavers, native plantings, possible soil amendments pending soil analyses, silt fencing, construction site fencing, and signage with emergency contact information
- Coordination requirements with City departments, other contractors
- General impacts and mitigation measures including noise control, traffic control, sediment and erosion control, construction waste management, and fugitive dust control
- Health and Safety Plan(s)
- Public safety
- Allowable working schedule relative to surrounding land uses/facilities
- Sustainable construction practices
- Equipment emissions
- Walk-through protocols and site visits
- Construction oversight
- Final inspections
- Payment conditions

- Project close out
- Demobilization

8.2.1 Construction Criteria

The PDT will provide oversight on behalf of the City to determine during and after construction that construction occurs according to plans and construction criteria is met prior to any final approvals of the construction. The PDT will provide recommendations to the City. The City will be responsible for final approvals of the construction under a construction contract with a general contractor. The City will submit construction plans to the NRDA Trustees for review and approval. The construction criteria are provided in Table 2 as quantities to be restored, created, enhanced and are as follows:

- Stream restoration 33,365 linear feet
- Wetland creation 32 acres
- Forest habitat restoration 25 ac
- Riparian enhancement 4 ac
- Forest enhancement 36 acres

8.2.2 Schedule

Anticipated to occurred during end of Year 2 and through Year 3, possibly portion of Year 4 for the overall project. Construction is applied to general earth moving, installation of bioengineering, as well as planting. Therefore, while work with heavy equipment may be completed, planting activities will follow based upon site conditions and establishment of site hydrology among other factors.

Individual projects may be constructed simultaneously given their proximity to other individual projects. Individual project construction will be completed at different times due to the differences in scale and complexity of each individual project and the weather. See Table 7 for anticipated schedule. A final schedule for construction is to be determined.

8.2.3 Budget

The overall construction budget and each individual project construction budget is provided in Table 3.

8.2.4 Cost Estimating

Construction cost estimating will refine a preliminary cost from Phase II 60% design and 80% design. The cost estimate for construction will provide probable costs for construction based on 100% design and construction documents, current RS Means data, ease of site access, and comparisons with similar stream restoration and wetland creation projects' costs at the time. Many factors affect cost estimates. The initial project budgets were developed two to three years ago as very preliminary to support the original proposal. If additional construction funds are needed, the City will provide written request with reasoning/documentation. Pending general contractor bids, the City again may provide written request for additional funds if warranted at that time.

9.0 Monitoring Plan with Performance Criteria

The City is responsible for monitoring. The PDT will undertake monitoring activities with the City's Project Partners. The PDT and Project Partners will use monitoring forms for reporting on restoration progress and any maintenance needs or adaptive site management. Purpose of the NRDA restoration project is to offset the resource injuries and ecological service losses that have occurred over time former Kerr-McGee Chemical Corporation Wood Treating Facility (Tronox LLC). The City of Texarkana, Texas' restoration plan, as part of the NRDA Trustees overall restoration plan, is to target 10 locations within the City that contain the tributaries and contribute runoff to Days Creek thereby improving stream bank stability, improving water quality, and increasing fish and benthic habitat. This comprehensive watershed approach targeted sites on Cowhorn, Waggoner, Swampoodle, Howards, and Days Creek to not only adequately compensate for past injuries and ecosystem service losses, it provides a restoration project that ensures long-term health and reduces future impacts to this aquatic ecosystem.

9.1 Annual Monitoring Reports' Components

Annual monitoring reports will be submitted for Trustees' approval. Approval criteria should follow checklist items below:

- Submitted on time
- Covers all elements to be monitored
- Contains photo log showing site conditions developing
- Identifies monitoring methods
- Contains applicable monitoring forms
- Documents performance criteria being met or provides recommended remedial actions
- Provides evidence of restoration outcomes
- Contains summary of monitoring results with recommendations

Post-construction monitoring funded by the Trustees should be limited to parameters needed to determine project success (e.g., demonstrating the accuracy of the as-builts, percent survival of native vegetation, percent invasive species), rather than extensive research, ambient water quality monitoring, or impairment monitoring (e.g., forest and understory structure, rapid bioassessment protocols, in-stream benthic and aquatic species presence/utilization, surface water quality use-attainability analysis, aquatic life monitoring) or public utilization of the project (e.g., safe conditions for access, trail use, ground condition, human disturbance). If Trustees require added monitoring work, the City will request additional funds to cover an increase in costs as per Interlocal Agreement. Trustees' approval on annual monitoring reports anticipated within 30 days of submittal. This work plan includes construction criteria for use in construction approvals and performance criteria for use in monitoring reviews and final project completion report approvals. Construction approvals and project complete approvals the City proposes for use as construction approvals should note a factor of time is required for various elements of wetland hydrology, hydric soils, plant establishment, and stream condition to develop.

This monitoring plan will be refined in Phase II following 60% designs and USACE permit requirements.

9.2 Monitoring Timeframe

Figure 90 provides an overview of monitoring timeframes which coincide with Phase I data collection where data collection report(s) will serve as baseline conditions for monitoring. As shown in Table 8, there will be a staggered end to construction between individual projects and as a result, a staggered beginning to monitoring. It is anticipated that all construction should end by May 2022 and therefore the start of all projects being monitored. The first annual monitoring report should be May 2023. The second annual monitoring report should be May 2024. The third and final annual monitoring report should be May 2025.

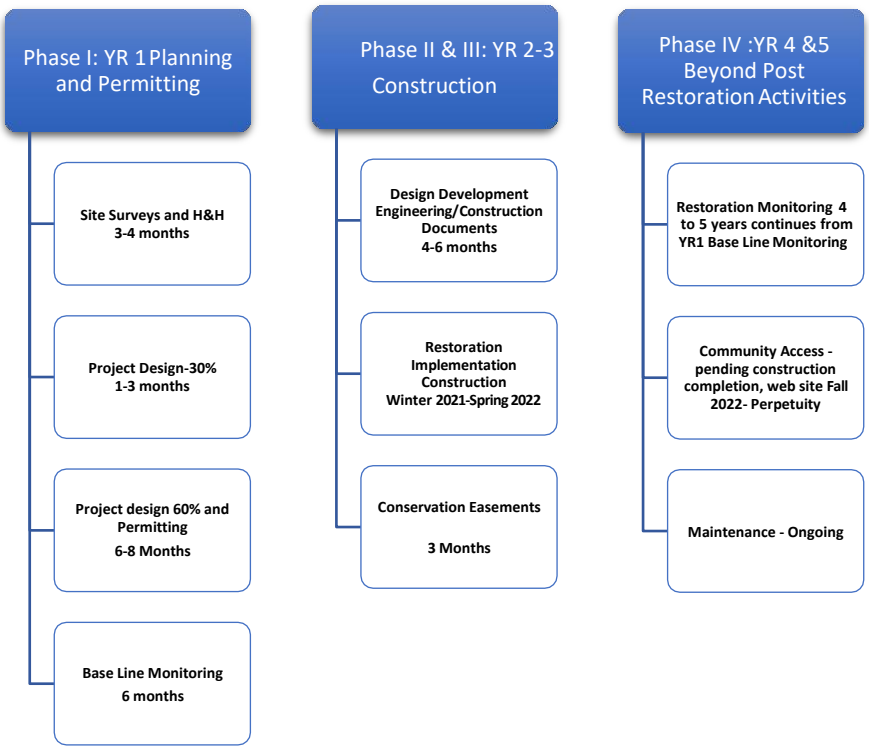


Figure 90. Monitoring Timeframes

9.3 Performance Criteria for Success

9.3.1 Forest Restoration and Enhancement

- Preserve and establish conservation easements on 135 acres in Year 1
- Enhance 32 acres that achieves plant community similar to natural stream and/or wetland habitat and provides for targeted species utilize, i.e. resident and migratory songbirds
- Follow W. Andy Kenney, Philip J.E. van Wassenaer, and Alexander L. Satel Arboriculture & Urban Forestry 2011. 37(3): 108–117 Criteria and Indicators for Strategic Urban Forest Planning and Management specified performance/success criteria for closed canopy cover; protection of existing desirable trees; lack of predominance of invasive species; safe conditions for the public; predominance of

healthy trees; healthy forest structure, i.e. some mid-level trees, shrubs, vines; and healthy and stable understory, i.e. no erosion, no litter, no camping, no hunting. Post-construction monitoring funded by the Trustees should be limited to parameters needed to determine project success rather than forest and understory structure, ground condition, or public utilization (e.g., safe conditions for access, trail use, and human disturbance). The City is required under Conservation Easement language provided by the trustees and incorporated into a Forest Management Plan that the conservation values of three project sites: Project 3B, 4A, and 5 are preserved and protected in perpetuity. These elements will be part of the City's annual monitoring of these sites.

9.3.2 Stream Restoration

- 33,365 linear feet stabilized, naturalized that show no indication of erosion
- Channel banks supporting predominance native vegetation
- Channel bottom providing aquatic habitat and lacks indications of incising
- Plan form reflects natural shape as applicable to project location
- Improved aquatic species presence/utilization (selected biological metrics to be used for biological integrity based upon baseline conditions surveys)
- Improved water quality
- No increase to urban flooding from the project
- Increased public utilization
- Meets USACE permit conditions in Year 5
- Minimal site and aquatic system impacts
- Post-construction monitoring funded by the Trustees is be limited to parameters needed to determine project success (e.g., demonstrating the accuracy of the as-builts, percent survival of native vegetation, percent invasive species), rather than extensive research, ambient water quality monitoring, or impairment monitoring (e.g., in-stream benthic and aquatic species presence/utilization, aquatic life monitoring).

9.3.3 Wetland Creation

- 32 acres wetlands created
- 25 acres forested bottomland restored
- 4 acres riparian habitat established
- Wetland hydrology established that meets wetland definition of 1987 Corps of Engineers Wetland Manual
- Hydric soils established that meets NRCS/SCS indicators of hydric soils
- 80% or greater cover by obligate and/or facultative wetland plant species;
- Less than 10% cover by nuisance plant species in Year 5
- Achieves plant community similar to natural stream and/or wetland habitat
- Provides for targeted species utilize

9.4 Anticipated Outcomes

Anticipated project outcomes that influence monitoring include:

- Cost savings by avoiding land acquisition/conservation easements for approximately 343 acres of forested riparian/wetland in the Days Creek/Howard Creek watersheds leading directly into and directly out of the actual source of the NRDA injuries – the Kerr-McGee Wood Treating Facility
- For every dollar spent within the Texarkana community, $3 to $6 dollars in benefits will accrue through cleaner water, enhanced environmental education, local fishing derbies, and economic revitalization.
- Local monetary benefits will accrue as a result of NRDA funds spent within this local economy as workers receive wages, spend funds in the local economy and pay taxes, resulting in a multiplier effect.
- The technically feasible and cost-effective restoration of approximately 100 acres of degraded stream and wetland habitat to re-establish the important ecological functions of wetlands directly upstream and downstream of the facility and maximize ecosystem services within these watersheds.
- The possibility that future tracts located on the Kerr McGee site could be added to the restoration areas after the Greenfield Environmental Trust successfully completes the TCEQ-directed cleanup of the site. This *possibility* is not a direct part of this NRDA project, but presents a distinct possibility to multiply the benefits of the City of Texarkana in the future and significantly leverage the benefit to City residents that will result from the NRDA restoration program, when combined with the benefits to be realized when the mandated site clean-up activities are completed and EPA anticipated Brownfields funds are applied to that project.
- Restoration activities are consistent with federal, state, and local laws and the restoration criteria established under 43 CFR 11.82(d).
- Provides the greatest scope of benefits to a community-wide population at the epicenter of the Tronox LLC damages
- Achieves environmental equity and justice

Tables 13 and 14 provide restoration outcomes by project and habitat types, respectively that dictate monitoring plans.

Table 13 Project Restoration Outcomes

Project Number	Project Name	Project Description/Restoration Actions	Restoration Outcome
1	Cowhorn Creek Convention Ctr	Stream restoration: Naturalize 2,600 Linear Ft	Restored stream in a naturalized condition provides improved aquatic species habitat and water quality enhancement.
2	Cowhorn Creek Bioengineering & Planting	Stream restoration: Bioengineering 11,000 Linear Ft & 9,200 Linear Ft Native Planting	Restored stream in a stabilized condition reduces erosion and provides improved aquatic species habitat and water quality enhancement with added bird riparian habitat
3	Cowhorn Creek Texarkana College	Stream restoration: 3,000 Linear Ft restoration, and Preservation 2.5 acres, & Creation 6 acres wetlands	Restored stream provides improved aquatic species habitat and water quality enhancement with added bird

Project Number	Project Name	Project Description/Restoration Actions	Restoration Outcome
			and other species riparian & forested wetland habitat
4	Days Creek South State Line	Preservation 32 forested acres Enhancement 32 ac forest	Reduces forest fragmentation and provides forest habitat functions and values in the Days Creek watershed slowing stormwater runoff
5	Days Creek South of Texas Viaduct	Preservation 100 forested acres	Reduces forest fragmentation and provides forest habitat functions and values in the Days Creek watershed slowing stormwater runoff
6	Days Creek/Howard Creek Confluence	Stream restoration 2,000 lf with 23 acres wetland restoration	Restored stream provides improved aquatic species habitat and water quality enhancement with added bird and other species riparian & forested wetland habitat
7	Swampoodle Creek Ferguson Park	Stream restoration 665 lf to 1,000 lf with 3 acres wetlands creation	Restored stream provides improved aquatic species habitat and water quality enhancement with added bird and other species riparian & emergent wetland habitat
8	Swampoodle Creek Naturalization & Stabilization	Stream restoration between Ferguson Park & Days Creek 11,000 lt	Restored stream provides improved aquatic species habitat and water quality enhancement with added bird and other species riparian habitat
9	Swampoodle Creek Stream Restoration & Re-Alignment	Stream restoration 1,100 lf	Restored stream provides additional meander length, additional and improved aquatic species habitat and water quality enhancement with added bird and other species riparian & emergent wetland habitat
10	Waggoner Creek Southwest Recreation Center	Stream restoration 2,000 lf	Restored stream provides improved aquatic species habitat and water quality enhancement with added bird and other species riparian & forested wetland habitat

Table 14 Restoration Outcomes by Habitat Type

Stream Channel/Project Number	Stream Restoration	Wetland Creation	Forest Preservation	Restoration Outcome
Cowhorn Creek				
Component 1	2,600			Restored stream in a naturalized condition provides improved aquatic species habitat and water quality enhancement.
Component 2	11,000			Restored stream in a stabilized condition reduces erosion and provides improved aquatic species habitat and water quality enhancement with added bird riparian habitat
Component 3	3,000	6	3	Restored stream provides improved aquatic species habitat and water quality enhancement with added bird and other species riparian & forested wetland habitat
Days Creek				
Component 4			32	Reduces forest fragmentation and provides forest habitat functions and values in the Days Creek watershed slowing stormwater runoff
Component 5			100	Reduces forest fragmentation and provides forest habitat functions and values in the Days Creek watershed slowing stormwater runoff
Howard Creek				
Component 6	2,000	23		Restored stream provides improved aquatic species habitat and water quality enhancement with added bird and other species riparian & forested wetland habitat
Swampoodle Creek				
Component 7	665	3		Restored stream provides improved aquatic species habitat and water quality enhancement with added bird and other species riparian & emergent wetland habitat
Component 8	11,000			Restored stream provides improved aquatic species habitat and water quality enhancement with added

Stream Channel/Project Number	Stream Restoration	Wetland Creation	Forest Preservation	Restoration Outcome
				bird and other species riparian habitat
Component 9	1,100			Restored stream provides additional meander length, additional and improved aquatic species habitat and water quality enhancement with added bird and other species riparian & emergent wetland habitat
Waggoner Creek				
Component 10	2,000	25 ac bottomland forest and 4 ac riparian		Restored stream provides improved aquatic species habitat and water quality enhancement with added bird and other species riparian & forested wetland habitat
Totals	**33,365**	**61 ac**	**135 plus 32 ac enhanced**	

9.5 Monitoring Elements

Variables or elements to be monitored are selected because they: (1) relate to the ecological condition of the habitat type, i.e. forest, stream and wetlands in a way that can be quantified and interpreted, (2) applies to a range of habitat types, and (3) as an indicator of stream and wetland and forest function that is quantifiable in a standardized manner with a high degree of repeatability to provide information of existing conditions as well as trends or biological development over time. Monitoring form will be used to collect consistent data over time and used as a checklist to collect and assess data on the following elements to be monitored:

9.5.1 Projects 3B, 4A, and 5.

- plant community
- closed canopy cover;
- tree inventory-protection of existing desirable trees;
- invasive species-lack of predominance of invasive species;
- safe conditions for access, signage, trails
- tree type/condition -predominance of healthy trees;
- forest structure, -healthy i.e. some mid-level trees, shrubs, vines; and healthy and stable understory
- soil movements/condition-no erosion,
- ground condition-no litter,
- human disturbances-no camping, no hunting

9.5.2 Projects 1, 2, 3A, 4B, 6, 7, 8, 9, and 10.

9.5.2.1 Streams

- linear feet stabilized
- linear feet naturalized
- no indication of erosion
- stable bank condition supporting native vegetation
- channel bottom/bed condition providing aquatic habitat
- no indication of incising
- plan form shape/condition naturalized
- aquatic species presence/utilization (selected biological metrics to be used for biological integrity based upon baseline conditions surveys)
- improved water quality
- no urban flooding from the project
- safe public utilization
- meets USACE permit conditions in Year 5
- site and aquatic system impacts
- functions provided

9.5.2.2 Wetlands

- acres created
- wetland hydrology
- hydric soils
- plant presence/coverage/type, i.e. obligate, facultative, upland plant species;
- nuisance/invasive plant species in Year 5 presence/coverage
- plant community type/character/condition
- targeted species utilization
- functions provided

9.5.2.3 Vegetation Assessment Method

Vegetation monitoring is an essential method of evaluating stream and wetland development. The objectives are to assess plant presence, plant health, and to map the extent of the plant community. Vegetation monitoring, as a means of determining a level of function, will primarily focus on physical attributes of plant species presence, health, abundance, distribution or amount of cover, and diversity. Vegetation present at each Project Site will be inventoried/documented. The plant community attributes of plant species present, density, relative abundance, and percent cover will be determined using field observation. From this assessment, plant health, community composition, diversity, and habitat types will be mapped. Monitoring methods involve setting up a transect across the vegetation area to be investigated. This can be in the field or on a detailed high-resolution aerial photograph. Visual estimation from the field or photo digitizing is used to estimate or measure the percent cover. Determining the plant density is performed by counting the number of plants in a representative, yet small area, and then multiplying that number by the unit area to extrapolate for the larger area to determine percent cover. All vegetation monitoring using interpretation and analysis from aerial photographs and computer images must be ground-truthed to check the results. General procedures for ground-truthing require locating

sampling sites on the aerial photograph or computer image, obtaining the classified information from the interpretation, then checking in the field if that classified information is correct.

9.5.2.4 Fauna Utilization Method

The fauna species most likely to be observed fall into five categories: benthic invertebrates, birds, reptiles, amphibians, and mammals. Particularly note the occurrence of any species of concern. During quarterly routine site visits, the field biologist will use random sampling of hand-held dip net, binoculars, and visual observations to record the actual presence of some of species.

Table 15 Summary of Goals, Objectives, Performance Standards, Monitoring Methods, and Remedial Action

Category	Goals	Objectives	Performance Standards	Monitoring Methods	Remedial Action	Schedule	Cost
Stabilize Channels	Minimize erosion.	Minimize loss of material *during* construction.	No visible erosion.	Conduct onsite inspections during periods of MLLW for visible appearance. Conduct aerial photography within 60 days of post-construction. Topographic/bathymetric surveys may be required.	Consider and correct design flaws.	One time 60 days post construction	
		Minimize loss of material *after* construction.	Fringe wetland loss should not be more than 10% of the initially constructed area for the life of the project.	Annually assess the structural integrity.	Erosion problem to be arrested by repairing or altering structures as needed or by installation of additional structures.	Annually	
				Conduct a GIS analysis of Digital Ortho Quarter Quadrangles (DOQQs) or equivalent photography at least every 5 years to establish changes in restoration area.	Consider additional placement of material on eroding site. Consider follow-up planting.	Annually	
Hydrology/Water Quality	Use material to create streams that have similar water depths, volumes and velocities, circulation, and water quality to that found in nearby reference streams.	Create streams and fringe wetlands with water depths similar to those found in nearby natural habitats..	The depth, width, and lengths will be at least 80% of the average depth of those found in a nearby natural streams within 5 years or when target elevation achieved.	Survey annually water depths of stream channels of the created and natural reference sites. Survey wetlands bottom elevations and overflow elevations relative to local benchmarks in the created and natural reference sites.	Excavate channels and floodplain to comparable depths as reference areas. Consider lowering target elevations of later restoration sites, as applicable.	Monitor annually Implement site management annually until YR5	
	Achieve a target elevation necessary to permit natural flows and fluctuations.	Create wetlands with water quality similar to that found in nearby natural habitats.	Measurements of water temperature, dissolved oxygen and salinity of restored habitats in the project should be within 10% of the mean values measured in a nearby natural habitats.	Annually utilize continuous monitoring and recording devices quarterly or spring and fall for 1-week duration simultaneously within similar habitats and the reference sites.	Increase water exchange by enlarging channels and/or by excavating additional floodplain area as applicable to greater depths. Consider lowering the target elevations of future/later sites.	Monitor annually or a quarterly basis. Implement remedial action annually until YR5	
		Create streams with similar flow volumes and rates to that found in nearby natural streams.	Create adequate volume of water exchanged in the restored sites that should be within 30% of that observed in a nearby natural channels of a similar size within 5 years.	Flow meters should be deployed during the spring or the fall when the watershed is experiencing high rainfalls.	Increase water and oxygen exchange by various means including wind powered circulation, and/or by excavating additional ponds and side channels to greater depths. Consider lowering the target elevations of later restoration sites, as applicable to construction schedule.		
Vegetation	Use material to create wetlands and forested and/or riparian areas similar to nearby natural areas while minimizing impacts to other ecological important habitats.	Support vegetation communities similar to those typical of nearby natural *Spartina alterniflora* marshes.	Created marshes will not support undesirable plant species.	Site visits to observe occurrence of undesirable species once per year after initial planting. Determine other ecologically important habitats.	Removal or herbiciding of undesirable vegetation.	Annually	
			80% of the total vegetative cover will be low edge forested riparian floodplain adjacent to restored streams supporting native plant species.	Conduct a ground-truthed GIS evaluation of DOQQs or equivalent photography to determine vegetative cover at least once every year.	Consider re-contouring to support appropriate vegetation communities.	Every year until performance standards met	
			No more than 20% of total vegetative cover, exclusive of bare ground, will be high/upland species.	Site visit annually to determine species presence and extent of coverage	Consider additional material and planting. Consider excavation and planting if too high. Consider enhancing water holding/flooding options.	Annually	
		Create instream, fringe wetlands, and floodplain riparian and forested habitats with four plant community zones to increase biotic diversity.	Up to 80% of a restoration site vegetated.		If invasives expand beyond performance standard, consider maintenance.		
Habitat	Use material to create wetlands and forest in ratios of vegetation to open water similar to nearby natural wetlands with emphasis on low edge, while minimizing impacts to other ecologically important habitats.	Develop nursery habitat for native finfish and shellfish.	Within 20 years of initial marsh construction, edge-to-area ratio is equal to or greater than the median edge-to-area ratios of nearby natural marshes. The created marsh should have at least 40% of the natural marsh edge-to-area ratio by Year 5 and at least 20% additional edge for each 5-year cycle.	Conduct a GIS analysis of DOQQs or equivalent photography at least every 5 years after initial marsh construction to determine edge-to-area ratios compared to that typical of a nearby natural marsh.	Recontouring should be used to establish additional marsh edge to meet the performance standard goal and tidal flushing.	Every 5 years for 20 years	

Category	Goals	Objectives	Performance Standards	Monitoring Methods	Remedial Action	Schedule	Cost
Species Utilization	Use material to create stream/wetland/forest ecologically similar to nearby natural habitats that provide habitat for birds and other biotic components typically found in Days Creek watershed, while minimizing impacts to other ecologically important habitats.	Develop habitat for native fish and wildlife.	Mean overall density of transient and resident fish and crustaceans are not significantly different from nearby streams. Compare to watershed-wide annual survey data for status. Comparison.	Census fish with appropriate sampling design used to compare to 5-year mean densities collected by natural resource agencies annual fish monitoring data.	Investigations should be undertaken to determine why differences exist between the restoration sites and corrective measures should be implemented according to findings.	Twice, within 5 years	
	Achieve a level of function similar to existing natural streams in the watershed.		Mean overall density and diversity of birds observed foraging should be at least 60% of that found in nearby natural areas during the same season and water condition within 5 years after restoration.	Use a canoe as applicable to traverse streams created and natural reference streams for a standard distance (minimum 500 meters) during the early morning hours in early April, late June, late September and late January. Identify to species and count all birds observed foraging and roosting in the restoration sites.	Investigations should be undertaken to determine why differences exist between the restored areas and reference sites and corrective measures should be implemented.		
Birds	Use material to create streams/wetlands/forest similar to nearby natural habitats, while minimizing impacts to other ecologically important habitats.	Develop habitat for native birds and other wildlife.	At least 6 species of birds representing at least 2 of the 3 nesting guilds (bare ground; low brush; high brush and tree nesters) and at least 3% of the watershed wide nesting population (based on 5-year average) should actively nest on created restoration sites each year.	Census yearly during annual	Replant proper vegetation, control unwanted vegetation, or replace substrate as appropriate to create optimum nesting habitat for under-represented nesting guild(s). Determine what is the problem. Address erosion, if necessary. Address predators, if necessary. Address human disturbance, if necessary. Address fire ants, if necessary. Add nesting material, if necessary.	Annually	
Public	Provide environmental conservation values as well as other benefits to the watershed, which would include accommodating recreational fishing.	Develop areas conducive to recreational fishing. Create instream features that are wide enough and deep enough to promote fishing • Identify and describe these areas on the physical attributes plan for each site. • Notify public through PR program	Water depth should be at least 24 inches deep on an average tide to allow shallow boat access. The standard must be achieved within one year of construction.	Conduct depth soundings and drag the area with a grappling hook to search for debris.	inspect areas to provide sufficient depth. Remove debris.	As needed based on monitoring and/or storm events	
	Accommodate recreational birding. Provide public environmental education opportunities about the project and restoration sites.	Develop amenities, such as walkways, and bird observatories. • Solicit other non-NRDA funds to assist with public access • Public Information program • Volunteer participation program	• Quarterly newsletters • Interactive web site • Teacher training • Public information products				

9.6 Monitoring Templates

MONITORING

City of Texarkana, Texas
Forest Preservation and Enhancement Site-Visit Summary
and
Routine Monitoring Report Form Template

Project Site:_____
Date: _____
Time: _____
Temperature: _____
Weather Condition:_____
Attendees: _____
_____

Site visit summary ….

The monitoring activities involved visual observation of vegetation, tree healthy, site protection, and fauna species usage; and photographic documentation of existing conditions. If biotic species, such as birds, mammals, reptiles, insects were observed, these observations were recorded on Routine Monitoring forms. Circle what applies and/or provide brief response with photos.

_____
_____
_____
_____
_____

Photograph taken yes/no
PhotoLog_____

<u>Section I - Plant Health/Community Health</u>

Tree canopy open/closed

Forest canopy cover- total shade partial shade patches of sunlight gaps for total sunlight

Desirable tree inventory map- note health issues on map

tree type/condition -predominance of healthy trees

Section II – Erosion Control & Site Protection

soil movements/condition-erosion yes/no

ground condition-litter yes/no

evidence of human disturbances- yes/ no camping, no hunting

Section III - Avian Monitoring and Other Biota

Monitoring Methods

_____
_____

Results

_____
_____

Discussion

_____
_____

Section IV – Forest Quality Parameters recorded during this visit

forest structure: healthy- some mid-level trees, shrubs, vines; and healthy and stable understory yes/no

invasive species: -absent present yet lacks of predominance of invasive species dominant

Section V - Maintenance Needs

_____
_____
_____
_____
_____
_____

Section VI - Other

_____
_____
_____

MONITORING

City of Texarkana, Texas
Stream and Wetland Site-Visit Summary
and
Routine Monitoring Report Form Template

Site:_____
Date: _____
Time:_____
Temperature:_____
Weather:_____
Water Levels: _____
Attendees:_____

Site visit summary ….

The monitoring activities involved visual observation of vegetation, bank protection, and biotic species usage; photographic documentation of existing conditions; and water quality sampling. If biotic species, such as mammals, reptiles, fish, crustaceans, or mollusks, were observed, these observations were recorded on Routine Monitoring forms.

Section I - Plant Health

Section II – Erosion Control & Site Protection

Section III - Avian Monitoring and Other Biota including Nekton/Other

Monitoring Methods

Results

Discussion

Section IV - Water Quality Parameters recorded during this visit

Section V - Maintenance Needs

Section VI - Other

10.0 Maintenance Plan

10.1 Forest Preservation Project Sites: 3B, 4A, and 5.

To be completed end of Phase I with Conservation Easement documents

10.2 Stream and Wetland Restoration Project Sites: 1, 2, 3A, 4B, 6, 7, 8, 9, and 10.

To be completed end of Phase II

10.3 Adaptative Management

To be completed end of Phase III

11.0 Reporting Plan

11.1 On three project components: 3B, 4A, and 5.

Due Diligence Survey/Phase I Report at end Phase I with Conservation easement Documents

11.2 On the stream and wetland project components: 1, 2, 3A, 4B, 6, 7, 8, 9, and 10.

The PDT will prepare all draft reports for the City. The City is responsible for review, approval, and submittal to the NRDA Trustees. On behalf of the City, the PDT will upload all reports to a TCEQ share site. Multiple reports will be prepared at various Phases of the work. These reports include:

- Quarterly Report 1
- 30% Plans and Data Collection Results
- Quarterly Report 2
- Phase I Completion Report
- 60% Plans and H&H Results
- Quarterly Report 3
- Quarterly Report 4 with permit copies and preliminary cost estimate
- 80% Plans and Monitoring Plan
- Quarterly Report 5
- Phase II Completion Report
- Construction Plans with construction cost estimate
- Reporting and Maintenance Plans
- Quarterly Reports 6 -10
- Phase III Completion Report with financial accounting
- Quarterly Reports 11, 12, and 13
- 1st Annual Monitoring Report
- Quarterly Reports 11, 15, and 16
- 2nd Annual Monitoring Report
- Quarterly Reports 17, 18, and 19
- 3rd Annual Monitoring Report
- Final Project Report and Close Out

See Table 6 for submittal schedule to the NRDA Trustees. Quarterly reports will be submitted as indicated in the Interlocal Agreement: for work during January – March submit April 30, submit July 31 for work undertaken April-June, October 31 for work in July through September, and January 31 for work in October-December. Example of Quarterly Report form is provided in Appendix A.

Quarterly Reports will be brief, have a standard and consistent format and address, by individual project, work undertaken, next steps/activities to be undertaken, any issues to be resolved, and may include budget tracking status, as applicable.

Monitoring Annual Reports will have a standard and consist format and address, by individual project, monitoring results to date, next steps/recommended activities to be undertaken, any issues to be resolved, and include monitoring forms, site maps, with georeferenced photographs.

Phase Completion Reports and Final Project Close Out Report will include contents as directed in the Interlocal Agreement. All reports will be prepared as drafts for City review and approval and then finalized for submission to NRDA Trustees. Submissions will be via TCEQ share-website.

12.0 Logistics

12.1 Health and Safety and Access

The City understands the NRDA trustees are not providing review and approval of a health and safety plan. The City is responsible for health and safety. See Appendix C for standalone Plan as a separate document.

Sites access will be coordinated with the City and applicable adjacent property owners. Check on access both sides of bank from convention center and school for survey/construction/monitoring activities as well as all other site. The PDT Project Manager will obtain permissions prior to any site access.

Any site work will require checking in with the PDT Project Manager at the start and end of all work to confirm 1) what is to be undertaken and 2) successful completion of the daily activity.

The PDT will maintain constant communications with the PMT throughout all phases of the work. The PMT will be integral to design development, construction, monitoring and reporting.

12.2 Staffing

The City is responsible for staffing. The City may have 12 staff working on the project part-time at any given time over the course of 5 years and different phases of the project. The staff may include Project Director, Project Manager, Planner, Accountant, Attorney, Real Estate Appraiser, Property Manager, Public Works Director, Parks Director, City Engineer, Park Associate, Public Relations Coordinator, and GIS technician(s).

The Project Delivery Team (PDT) may have as many as 24 staff working either full time or part time on various aspects of the NRDA Project. The PDT staff may include Project Principal, Project Manager, Restoration Specialist(s), Wetland Scientist, Forester, Hydrologist, Principal Engineer, Water Resource Engineer, Civil Engineer, Modeler, Senior Planner, Landscape Architect, Land Surveyor, Senior Consultants including Geologist, Biologist and Environmental Compliance Specialist and Quality Manager, Environmental Scientist Level III, Environmental Scientist Level II, Environmental Scientist Level I, Environmental Scientist, Environmental Field Technician, GIS Mapping Technicians, and Administrative Assistants.

Field crews for data collection/site survey work will include 2-person teams. Multiple teams may be deployed simultaneously for time efficiency. Teams will be briefed on Health and Safety Plan, have daily site safety meetings, be directed by the PDT project manager for site access and site-specific survey activities.

12.3 Equipment/Materials

All site work will require personal safety gear: waterproof jacket, hat, boots, safety utility vest, cell phone, water, emergency medical kit. Other equipment and materials used during the project may include, but not limited to the following noted in Sections 12.3.1 through 12.3.3:

12.3.1 Data Collection

Land and boundary survey work: transit, theodolite, measuring tape, laser measuring device, measuring wheel, total station, 3D scanners, GPS/GNSS units, digital/laser level and rod, poles/tripods/mounts, prism/reflector system, and magnetic locators. Drones may be used.

Environmental assessment work: compass, ATV, soil geoprobe, shovel, hand held GPS units, water sampling equipment, camera, field log book.

Stream work: canoe, kayak, and/or small John boat and trailers, Go-Pro camera and FishView/Earthview camera with software for GIS location sync, water depth probes, flow meter, measuring rod, dip net.

12.3.2 Construction

Construction work: Proper protective gear, hard hat, safety vest, boots, ear plugs, camera, plans. Daily work sheet and logs, field log book.

12.3 3 Monitoring

Camera, binoculars, water sampling equipment, ATV, monitoring forms.

Signage

It is expressly noted that public outreach and education are not part of the Interlocal Agreement and not funded by the NRDA Trustees. The City of Texarkana, Texas finds as supplement to addressing comprehensive watershed protection and individual site protection, public awareness and education may include “Days Creek Watershed” signs outside at various locations as shown in two examples below:

Figure 91. Examples of Watershed Protection Signage.

Other materials may include outdoor EPA approved spray paint for marking stormwater inlets at various locations noting drainage to Days Creek and its tributaries as shown in the example below:

Figure 92. Stormwater Inlet Protection Signage.

Community/school art project at stormwater inlets may be an activities of project partners from the various schools and Texarkana Regional Arts and Humanities Council.

Other signs, as shown in the example below, may include environmental awareness of each forest preservation site about conservation value, allowable activities, and contact information for reporting.

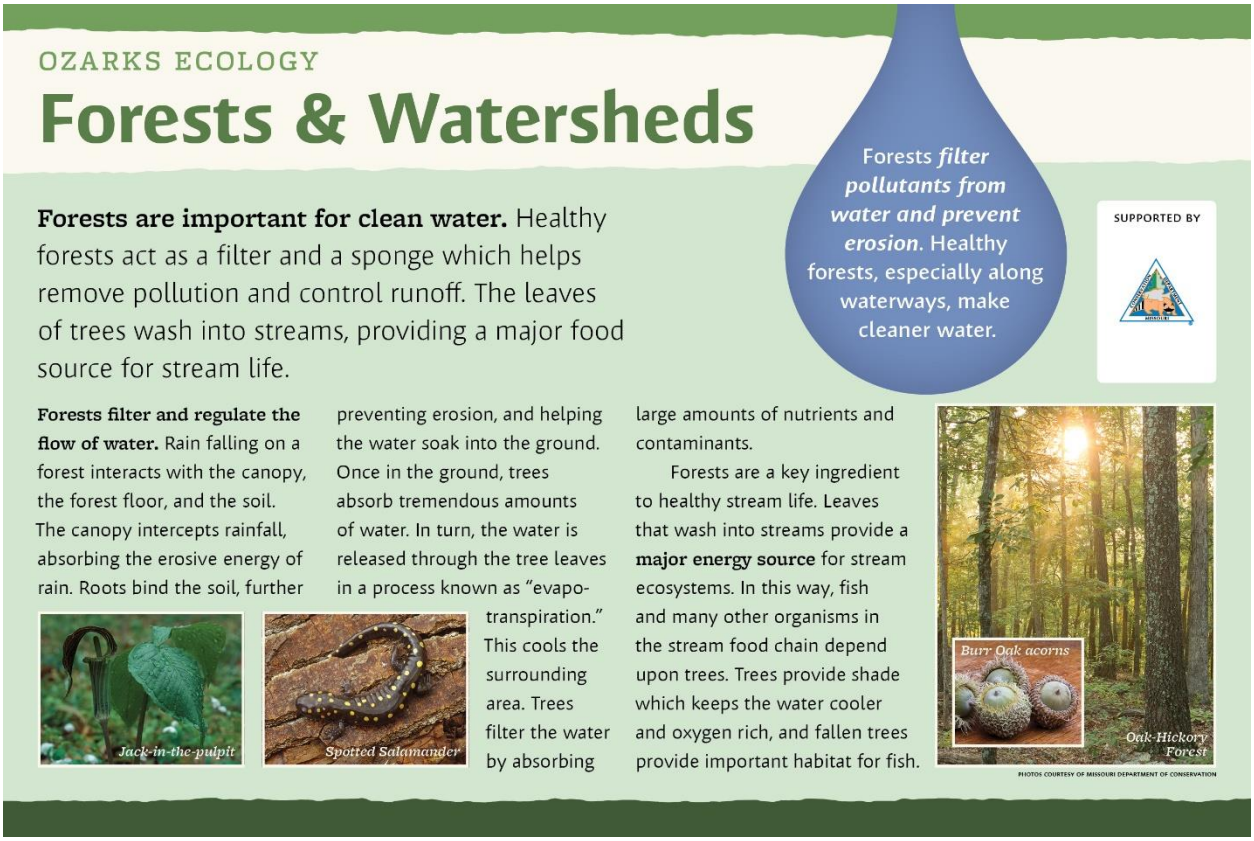


Figure 93. Example of Public Awareness and Protection Signage.

Example of a sign at Conservation and Restoration sites, shown in Figure 93, may have Project specific information and Sponsors/Partners/Trustee members logos.

12.4 Record Keeping

The City will maintain financial records for project related costs using an accounting system in accordance with generally accepted accounting standards and principles. Project cost records will provide for the identification and segregation of project costs between the individual projects and budget categories as per Table 3, Project Budget Breakdown by Activity. Records will contain information pertaining to disbursements and payment authorizations, obligations, unobligated balances, assets, liabilities, outlays or expenditures.

A project budget tracking template (Appendix A) will be used to allow financial information, i.e. expenditures to be related to project activity, i.e. performance and productivity data. Performance and productivity within the tracking template will reflect project status in percent complete with budget balances remaining. Supporting documentation will be keep in a manner with source documentation, including cancelled checks, paid invoices, payrolls, time and attendance records, and subcontract documents, construction contract payment requests, and receipts for equipment, supplies, and materials purchased for the project in accordance with the Interlocal Agreement Section 11.

Financial records and supporting documentation will be available for Trustee review and approval of financial expenditures pursuant to Interlocal Agreement Section 13.3. Financial records will be maintained by the City for three (3) years after the Project Close Out.

Other project documents, i.e. data collection reports, plans, permits, engineer drawings and specifications, shop drawings, original construction drawings signed and sealed, applicable construction field orders, certain construction decisions documentation, change orders, work directives, subcontracts with supporting billings/invoices/expenses, construction work acceptance notifications, and other deliverables listed in Section 4.3 Submittals will be kept in a project file organized and indexed for ease of access. Record keeping will use a standard project management system approach for maintenance, storage, retrieval, and archiving. Index organization will be by individual project, work phases, internal communications, i.e weekly status reports, external communications, i.e.submittals such as reports and plans, approval notifications, subcontracting/agreements related information. Project records will be kept up-to-date and relevant. Project documents will be retained by the Aqua Strategies, Inc. for five (5) years beyond project close out.

Appendix A. Project Management Budget/Expenditures Tracking Template and Quarterly Reporting Template

Insert template

Appendix B. Due Diligence Phase I Report Content

Baseline Conditions/Phase I Report prepared by Aqua Strategies and the Project Delivery Team may contain:

- Cover Letter
- Cover Page
- Environmental Certification Page
- Executive Summary
- Owner Acknowledgement Statement
    - Landowner, Holder/Land Trust Contact Information
    - Purpose of Baseline Documentation Report
    - Easement Property Name
    - Easement Property Description and Location
    - Date of easement Conveyance
    - Signature Page
- Introduction and Summary Information
    - Definitions
    - Reliance on the Report
    - Any Specific Exceptions and Limitations to the Assessment
- Property Description
    - Legal Description
    - Location and Access Information
    - Property Size
    - Current Use and Zoning
    - Site and Area Features
    - Adjoining and Near-by Properties Ownership
    - Hydrogeologic Conditions
    - Surficial Geology and Soils
    - Regional Groundwater Conditions
    - Topography
    - Hydrology, Surface Water Bodies, And Drainage
    - Infrastructure
        - Roads/trails
        - Buildings/structures
        - Utilities/water systems
- Records Review and Historical Information
    - Historical Information Sources
    - Review of Aerial Photographs
    - Street Directories
    - Fire Insurance or Other Historic Maps
    - Site and Area Descriptive Chain-Of-Use
    - Provided Documents
    - Ownership History
    - Archeological Resources/Historic Summary
    - Cultural Resources
- Site Reconnaissance
    - Methods: Survey/Photo-documentation/Mapping
    - Description of Site Processes
    - General Bio-Physical Characteristics
    - Vegetative Communities
    - Wildlife
    - Hazardous Substances Usage/Storage
    - Petroleum Products Usage/Storage

    - Underground and Above Ground Storage Tanks
    - Drums and Containers
    - PCB Usage
    - Stains, Corrosion, Strained Vegetation
    - Fill/Solid Waste Disposal
    - Wastewater
    - Wells
    - Sewage Disposal Systems
    - Drains and Sumps
    - Pits, Ponds and Lagoons
    - Non-Scope Issues
- Regulatory Information
    - Background
    - Federal NPL and Delisted NPL Sites
    - Federal CERCLIS and NFRAP Sites
    - Federal RCRIS TSD and CORRACTS Facilities
    - Federal RCRIS Generators
    - Federal, State, & Tribal Institutional Control/Engineering Control
    - Federal ERNS List
    - State and Tribal Hazardous Waste Sites
    - State and Tribal Landfill/Solid Waste Disposal Sites
    - State and Tribal Leaking Underground Storage Tank Sites
    - State and Tribal Underground Storage Tank Sites
    - State and Tribal Voluntary Clean-up Sites and Brownfield Sites
    - Additional Record Sources - Petroleum/Hazardous Materials Spill Sites
- Interviews
    - Conservation Easement Holder
    - Owners/Operators
    - Federal and State Agencies
    - Local Officials
- Conservation Values
    - Natural Habitat and Wildlife Values
    - Open Space/Agricultural Values
    - Public Recreation and Education Values
    - Cultural and Historic Values
- Conclusions, Recommendations and Findings
    - Recognized Environmental Conditions
    - Recommendations
    - Findings
    - Additional Record Sources - Petroleum/Hazardous Materials Spill Sites
- Environmental Professional Statement

APPENDICES

A. Drawings and Maps
B. Limitations
C. Site Photographic Documentation
D. Regulatory Databases/References
E. Support Documentation
F. Preparer Credentials and Contact Information

Appendix C Health and Safety Plan