

CITY OF LAREDO
AMENDMENT NO. 4: ZCWWTP WEST BANK STABILIZATION – ALTERNATIVE DESIGN APPROACH
CONSULTANT’S PROPOSAL & SCOPE OF WORK

AMENDMENT NO. 4 DESCRIPTION:

The City of Laredo and Ardurra met to review the proposed remediation design for the West Bank of Zacate Creek WWTP site. Following this meeting, Ardurra has outlined a scope of work to reevaluate the bank failure and explore additional stabilization strategies. The scope includes:

- **Additional Geotechnical Engineering**
 - Conduct additional boreholes to validate previously observed soil conditions and assess subsurface characteristics on the creek side.
 - Provide geotechnical recommendations for bank stabilization which may include:
 - Soil Nails/Tiebacks
 - Pile/Cantilevered Wall Systems
 - Bank Toe Protection (riprap, gabions, etc.)
- **Additional Topographic Survey**
 - Collection of additional topographic information across the full creek cross-section, extending approximately 100 feet upstream and 150 feet downstream of the existing retaining wall.
- **Additional Design Phase Services**
 - **Additional Structural Engineering Design**
 - Structural design will encapsulate the existing edge of escarpment and protect the existing tank.
 - Our team will provide additional Structural Design will consider limited access to the site and constructability of recommended improvements.
 - Structural design will include development of free body diagrams showing all forces imparted to the proposed retaining/shoring wall.
 - Structural design will include performance of L-Pile and/or DeepEX analyses.
 - **Hydraulic and Hydrological Analysis**
 - Our team will analyze the 2, 10-, 25-, 50- and 100-year storm events using existing models.
 - This analysis will provide recommendations to mitigate erosion and scour throughout the lifetime of the recommended bank stabilization system.
 - **Additional Civil Engineering Design**
 - Our team will provide updated survey control layout (to include additional survey information), existing site layout (to include additional survey information), demolition and construction phasing (to include creek side work), temporary drainage structure and sw3p design (for creek side work), updated grading and drainage plan based on new wall alignment, additional construction details.
- **Additional Construction Phase Services**
 - Anticipate increased involvement during construction phase due to the alternative remediation approach.

BASIC SERVICES

TASK 1: ADDITIONAL GEOTECHNICAL ENGINEERING

1.1. ADDITIONAL SUBSURFACE INVESTIGATION

1. Based on experience with soil stabilization projects, Ulrich Engineers (UEI), Ardurra's sub-consultant, proposes to perform a total of four borings to a termination depth of 100 feet below grade. Two of the bores will be located at the toe of the embankment, and the other two bores will be located on top of the embankment slope. (Total Number of Borings: 4, Total Linear Feet of Drilling: 400 LF).
2. Boring locations will be staked in the field prior to the field investigation.
3. Coordination with the Texas 811 System will be performed by UEI to identify underground utilities in the proximity of the boring locations. The borings will be relocated if necessary.
4. The Client shall perform due diligence to assure UEI that the boring locations are accessible and clear of private utilities and obstructions, such as fences, shrubs and trees. The Client shall notify UEI of any conflicts. The borings will be relocated if necessary.
5. An experienced technician will log the borings in the field full-time during the drilling operations.
6. The borings will be sampled at regular intervals to the termination depth of the boring locations using appropriate coring methods.
7. Upon completion of coring, the open boreholes will be grouted. Depending upon the actual subsurface conditions encountered, UEI's engineers will assign tests on selected samples, as necessary, to properly classify the soils and determine overall strength of the soil profile at the site.
8. All phases of the laboratory testing program will be performed in general accordance with applicable ASTM Specifications. All field and laboratory test results will be provided on the boring logs or in the report.

1.2. GEOTECHNICAL ENGINEERING REPORT

1. UEI shall review and analyze existing geotechnical information prior to preparation of any recommendations/report.
2. In addition to the field and laboratory testing, a geotechnical engineering report will be prepared that includes the following:
 - a. Site and project description,
 - b. Description of the field exploration and laboratory testing,
 - c. Discussion of the engineering properties of the subsurface materials encountered,
 - d. Discussion of stability analyses for minimum sheeting penetration and to assess shear,
 - e. Design recommendations for a cantilevered drilled pier or pile wall.

Deliverables:

- Subsurface Investigations
- Geotechnical Engineering Report

TASK 2: ADDITIONAL TOPOGRAPHIC SURVEY

1. Our team will collect additional topographic information for the entire cross section of the creek approximately 100 ft upstream and 150 ft downstream.
2. Tie in with GPS to control network at project site in State Plane Coordinates on vertical datum NAVD88. Set aerial targets and checkpoints for quality assessment/quality control. Calibrate project control network to local vertical benchmarks.
3. Capture aerial LiDAR and photogrammetric imagery to be used for topo, low-confidence area delineation, and aerial mapping of visible above ground features and terrain within the project area. (Image below.)
4. Process aerial imagery & LiDAR for the entire subject parcel.
5. Calibrate LiDAR and imagery to the project control.
6. Develop a topographic map for the subject parcel (0.5' contours)
 - Includes a minimum of 50' grid for the DTM surface.
 - 3D surface and mass points
7. Low-confidence areas (if any) will be identified for additional field support, which is to be provided by others.

Deliverables:

- Digital files in NAD 83 coordinate in .dwg, and/or. dgn format

TASK 3: ADDITIONAL DESIGN PHASE SERVICES

3.1. ADDITIONAL STRUCTURAL ENGINEERING DESIGN

1. Review existing information pertaining to the project such as existing facility drawings and geotechnical engineering reports.
2. Conduct site visit (if necessary) to obtain pertinent space requirements, field notes, and coordinate with sub-consultants.
3. Coordinate with survey team for additional topographic information required.
4. Coordinate with environmental engineers for development of scope/description of work necessary for permit applications.
5. Coordinate with geotechnical engineer for:
 - a. Development of cross sections based on existing conditions, surveys, and geotechnical information.
 - b. Development of design parameters for L-Pile and/or DeepEX analyses.
 - c. Development of retaining/shoring wall design recommendations.
 - d. Perform stability analyses of proposed design.
 - i. *If preliminary stability analyses results indicate the soil formations lack suitable strength for the proposed system, Ardurra will notify the Client to discuss remaining path forward.*
6. Provide structural design of the recommended bank stabilization method for the West Bank of Zacate Creek WWTP.
 - a. Structural Design will consider limited access to the site and constructability of recommended improvements.
 - b. Structural design will encapsulate the existing edge of escarpment and protect the existing tank.
 - c. Structural design will include development of free body diagrams showing all forces imparted to the proposed retaining/shoring wall.

- d. Structural design will include performance of L-Pile and/or DeepEX analyses.
7. Prepare structural drawings to include plans, sections, and details required to adequately depict the items listed above.
 - a. Prepare construction plans in compliance with CPPS using English units on 11"x17".
8. Prepare required project structural technical specifications, general notes, and design criteria.
9. Submit review drawings and technical specifications for simultaneous AGI internal QA/QC and Client review/comments.
 - a. Submittal and review process to take place at the following intervals.
 - i. Design Alternatives
 - ii. 60% Design
 - iii. 100% Design
 - b. Submit two (2) sets of the interim plans in half-size (11" x 17") hard copies and electronic format using City Standards as applicable to City staff for review and approval purposes with estimates of probable construction costs.

Deliverables:

- Design Alternative(s)
- 60% Design
 - Preliminary drawings
 - Technical Specifications Table of Contents (TOC)
 - 60% OPCC
- 100% Design
 - 100% Construction Plan Set and Technical Specifications
 - 100% OPCC
 - 60% Comment Response Form

3.2. HYDRAULIC & HYDROLOGY ANALYSIS

1. Conduct Hydrologic and Hydraulic analyses to assess existing drainage conditions and provide recommendations as needed. This analysis will include the scour analysis at the toe of the bank to provide recommendations to mitigate scour. *No Topographic Survey for the entire watershed has been included as part of these services. Additional topographic survey needs may arise and will be coordinated with the City.*
2. Prepare Hydrologic & Hydraulic models of existing and proposed conditions consistent with USACE guidance for scour and sediment transport.
3. Review Effective Floodplain data available through FEMA's online database. *If an Effective Floodplain Model needs to be requested from FEMA/IBWC. The Time of Performance shall be paused and shall be resume when Ardurra receives the Model from FEMA/IBWC.*
4. Provide design recommendations for temporary and permanent bank stabilization to compliment the geotechnical and structural recommendations. The report will contain, at minimum:
 - Introduction
 - Existing Condition Analysis
 - Drainage Analysis
 - i. Hydrologic and Hydraulic models.

- ii. Data acquisition, as-builts, and GIS processing
 - iii. Watershed delineation and TC Calculations
 - iv. Hydrologic and hydraulic analysis and modeling - Existing Conditions
 - v. Hydrologic and hydraulic analysis and modeling - Proposed Conditions
- Design Alternative Analysis
- Conclusion and Recommendations
- 5. Prepare and Submit DRAFT Drainage Analysis Report for the City's review.
- 6. Address City's comments and revise Drainage Analysis Report.
- 7. Prepare and submit FINAL Drainage Analysis Report to City.

Deliverables:

- DRAFT Drainage Analysis Report
- FINAL Drainage Analysis Report

3.3. *ADDITIONAL CIVIL ENGINEERING DESIGN*

1. Ardurra will provide the detailed design of any erosion and scour prevention measures recommended following the completion of the Hydraulic and Hydrological Analysis of Zacate Creek.
2. Ardurra will provide the following updated construction plan sheets:
 - Updated Survey Control Layout (to include additional survey information)
 - Existing Site Layout (to include additional survey information)
 - Demolition and Construction Phasing (to include creek side work)
 - Temporary Drainage Structure and SW3P Design (for creek side work)
 - Updated Grading and Drainage Plan based on new wall alignment
 - Additional Construction Details

Deliverables:

- Refer to Task 3.1

TASK 4: ADDITIONAL ENVIRONMENTAL PERMITTING

4.1. *REGULATORY AGENCY COORDINATION*

1. Ardurra will coordinate and communicate with the city and regulatory agencies throughout the additional permitting process. Ardurra anticipates completing additional coordination with TCEQ, IBWC, USACE, Texas Parks and Wildlife and the Texas Historical Commission.

4.2. *TPWD RELOCATION PERMIT ARRP, AND GROUP 5 STREAM SURVEY*

1. Ardurra's Subconsultant, ERG, will conduct a mussel survey. The mussel survey should occur 60 to 90 days prior to the start of in-water impacts. The mussel recovery process begins by coordinating with TPWD to develop a TPWD-approved aquatic resource recovery plan (ARRP). The plan details how the mussel recovery will be conducted according to the 2024 Texas Freshwater Mussel Survey Protocol. Zacate Creek is considered a Group 5 stream by default, therefore Group 5 stream survey protocols are expected to be used. After the CLIENT approves the draft ARRP, it will be submitted to TPWD for approval. ERG assumes one ARRP, one TPWD relocation permit, and one

- survey will be sufficient to satisfy TPWD's requirements. The survey area would be identified in the ARRP and would consist of the area of impacts and appropriate buffers.
2. An application for a permit to introduce species from TPWD Inland Fisheries will be prepared and submitted to the TPWD Inland Fisheries permit coordinator along with the CLIENT approved ARRP. TPWD approval of the ARRP and issuance of the permit to introduce species must be received before field work can begin. TPWD requests 30 days to conduct the review and approval of both documents although the review is frequently completed in less than 30 days.
 3. Following procedures in the approved ARRP, ERG will conduct a mussel recovery and relocation within the impact areas and designated buffer zones in Zacate Creek. Mussel sampling is to be conducted during the months of April through November, or when water temperatures are greater than or equal to 50° Fahrenheit. If the start of in-water construction activities are proposed to occur in December through March, ERG recommends that the mussel survey occurs in November prior to the start of in-water construction. ERG will contact the CLIENT and all necessary TPWD personnel before and after the surveys. A qualitative timed survey of a minimum of five person-hours will be requested within the survey area as described in Appendix A of the 2024 Texas Freshwater Mussel Survey Protocol. The timed search should be broken up into one person-hour search periods. If no new species are encountered during the 5th person-hour, the survey is complete. If a new species is encountered in the 5th person-hour, additional one-person hour searches would be necessary until no new species are encountered. If at any point during the timed search a state-listed species is encountered, ERG will stop the survey and Acquire Texas Parks and Wildlife (TPWD) Relocation Permit ARRP (Aquatic Resource Recovery Plan), and Group 5 Stream Survey. contact the CLIENT. *A supplemental work authorization may be necessary to complete the next required step, a mussel salvage survey. If federally listed mussel species are observed during sampling, the project proponent will need to cease the survey and immediately contact the CLIENT, then USFWS to determine next steps. ERG assumes that this segment of Zacate Creek is considered, by default, a Group 5 Stream regardless of the sites proximity to the Rio Grande, a Group 2 Stream.*
 4. In areas that are considered non-wadeable (depths greater than 3 feet), SCUBA or surface supplied air will be utilized to efficiently sample these areas. The survey area will be the area identified in the ARRP and will not exceed the designated survey area. Native mussels, except for federally listed species, will be recovered from the footprint of the proposed construction areas and approved buffers and relocated at a safe distance (usually upstream) from aquatic impacts from construction.
 5. ERG will prepare ONE draft and final report of the Mussel Survey and Relocation. The report will include:
 - Map(s) of the recovery and relocation area,
 - Description of sample methods, including Zebra Mussel decontamination,
 - Description of habitats sampled and water quality data,
 - List of species of live mussels recovered and dead mussels encountered, and lengths of live mussels,
 - Any other notes relevant to interpreting the information collected,
 - Photographs of recovery and relocation areas, and
 - Voucher photographs of mussel species encountered.

Task 4.2 Assumptions:

- Field work will be complete in one day.
- Mussels listed as threatened or endangered by the State of Texas or the U. S. Fish and Wildlife service will not be observed.
- All documents will go through one round of review.
- There are no revisions to mussel recovery protocols between the time this agreement takes effect and the time of the mussel recovery.
- There will not be revisions of the ARRP after ARRP approval by TPWD and receipt of the permits to introduce species. If there are CLIENT-driven design or schedule changes which necessitate revising the ARRP or reapplying for the permit to introduce species, the additional effort may not be included in this fee.
- The surveys will take place when the water conditions at the site are safe.
- ERG will follow the 2024 Texas Freshwater Mussel Survey Protocol without any special changes.
- One mobilization to the site.
- SCUBA and/or surface supplied air will be required to survey.
- ERG assumes there will be no relocation monitoring and tracking of mussels after the relocation.
- ERG assumes there will be no survey in places that may be dangerous for surveyors.

Deliverables:

- DRAFT report of the Mussel Survey and Relocation
- FINAL report of the Mussel Survey and Relocation

4.3. *WATERS OF THE U.S. AND WETLAND DELINEATION*

1. ERG will evaluate water features within the project area to determine whether they fall under the jurisdiction of Section 404 of the Clean Water Act (CWA) and, if so, what permitting requirements would apply to discharges into those jurisdictional waters of the U.S. (WOTUS). Any wetlands in the project area will be delineated by a qualified wetlands specialist in accordance with the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual and the Great Plains Regional Supplement to the manual.
2. ERG will produce ONE Wetland and WOTUS Delineation Report identifying jurisdictional WOTUS, including any wetlands delineated, and addressing potential permitting of discharges into these jurisdictional waters. The Delineation Report will include maps and photographs of any such jurisdictional waters identified. A geospatial file (.kmz or .shp) of the delineation results will also be provided.

Deliverables:

- Wetland and WOTUS Delineation Report

4.4. *THREATENED AND ENDANGERED SPECIES HABITAT ASSESSMENT*

1. ERG will conduct a site visit to view the habitat conditions within the project area. Field work will be conducted concurrently with Task 2. The likely presence or absence of Threatened and Endangered (T&E) Species will be assessed by comparison of site

characteristics to habitats for such species described on Texas Parks and Wildlife Department's (TPWD) Rare, Threatened, and Endangered Species of Texas List (RTEST) for Webb County. Habitat descriptions for Federally-listed T&E species will be obtained from the United States Fish and Wildlife Service (USFWS). Known occurrences of T&E species will be obtained through the TPWD's Natural Diversity Database.

2. ERG will produce a T&E Species Habitat Assessment Report identifying T&E Species listed by TPWD and USFWS for Webb County and describing their habitats. Any area in which activities may impact potential habitat for any such species will be identified. The report will include maps and photographs of any habitats identified.

Deliverables:

- T&E Species Habitat Assessment Report

TASK 5: ADDITIONAL CONSTRUCTION PHASE SERVICES

1. Client/Owner in construction contract preparation, review submittals and address up to six (6) requests for information.
2. Conduct up to two (2) site visits per month during construction for an additional twelve (12) site visits. In total, Ardurra has anticipated twenty-four site visits throughout the span of the construction. This includes twelve originally scoped site visits. *Additional site visits can be performed, at the City's request. Additional site visits will be considered an additional service and will be billed on an hourly basis.*
3. Attend six (6) monthly construction progress meetings and provide meeting minutes (two staff members).
4. Prepare and provide project closeout documentation to City of Laredo such as the contractor's

Deliverables:

- Attendance to an additional 6 Monthly Progress Meetings and provide meeting minutes
- Up to 12 additional site visits
- Submittal and RFI review and responses

ADDITIONAL SERVICES

This section defines the scope of additional services that may only be included as part of this contract if authorized by the City. There are no additional services identified as part of this amendment. The Consultant shall prepare a proposal when the need for any additional services arises.

SCHEDULE

The CONSULTANT agrees to complete the various phases of work under this contract in accordance with the schedule set forth as follows:

BASIC SERVICES		COMPLETION DATE
TASK 1	ADDITIONAL GEOTECHNICAL ENGINEERING	3 MONTHS FROM NTP
TASK 2	ADDITIONAL TOPOGRAPHIC SURVEY	1 MONTH FROM NTP
TASK 3	ADDITIONAL DESIGN PHASE SERVICES	3 MONTHS FROM TASK 1
TASK 4	ADDITIONAL ENVIRONMENTAL PERMITTING	PRIOR TO TASK 6*
TASK 5	ADDITIONAL CONSTRUCTION PHASE SERVICES	12 MONTHS AFTER BIDDING**
ADDITIONAL SERVICES		

*Permitting Timeline could vary based on Regulatory Agency Review and comment type

** Bidding phase included Amendment no. 3

FEES

A. Fee for Basic Services

The City will pay Ardurra Group, Inc. a fixed fee for providing all “Basic Services” authorized as per the table below. The fees for Basic Services will not exceed those identified and will be full and total compensation for all services outlined above, and for all expenses incurred in performing these services. Ardurra Group, Inc. will submit monthly statements for basic services rendered. The monthly statements will be based upon Engineer’s estimate (and City Concurrence) of the proportion of the total services actually completed at the time of billing. City will make prompt monthly payments in response to Engineer’s monthly statements.

B. Fee for Additional Services

For services authorized by the City under the “Additional Services” section, the City will pay the Ardurra Group, Inc. a not-to-exceed fee as per the table below or as negotiated and approved at a later date.

C. Summary of Fees

BASIC SERVICES		
TASK 1	ADDITIONAL GEOTECHNICAL ENGINEERING	\$ 154,500.00
1.1	ADDITIONAL SUBSURFACE INVESTIGATION (ALLOWANCE)	\$ 50,000.00
1.2	GEOTECHNICAL ENGINEERING REPORT	\$ 104,500.00
TASK 2	ADDITIONAL TOPOGRAPHIC SURVEY	\$ 14,460.00
TASK 3	ADDITIONAL DESIGN PHASE SERVICES	\$ 537,360.00
3.1	ADDITIONAL STRUCTURAL ENGINEERING DESIGN	\$ 464,640.00
3.2	HYDRAULIC & HYDROLOGICAL ANALYSIS	\$ 42,540.00
3.3	ADDITIONAL CIVIL ENGINEERING DESIGN	\$ 30,180.00
TASK 4	ADDITIONAL ENVIRONMENTAL PERMITTING	\$ 45,480.00
4.1	REGULATORY AGENCY COORDINATION	\$ 7,280.00
4.2	TPWD RELOCATION PERMIT ARRP & GROUP 5 STREAM SURVEY	\$ 18,900.00
4.3	WATERS OF THE U.S. AND WETLAND DELINEATION	\$ 11,500.00
4.4	THREATENED AND ENDANGERED SPECIES HABITAT ASSESSMENT	\$ 7,800.00
TASK 5	ADDITIONAL CONSTRUCTION PHASE SERVICES	\$ 18,150.00
<i>SUBTOTAL BASIC SERVICES:</i>		\$ 769,950.00
ADDITIONAL SERVICES		
		-
<i>SUBTOTAL ADDITIONAL SERVICES:</i>		TBD
<i>TOTAL:</i>		\$ 769,950.00

Method of Payment:

Payment shall be made to Ardurra Group, Inc. based upon the several phases as described heretofore and in accordance with the following:

D. Fee and Scope Assumptions:

Our proposal is based on the following assumptions and exclusions:

- Engineering fees included in this proposal only apply to items specifically listed in this proposal.
- Agency review fees, impact fees, permitting fees and platting fees are not included herein.
- No field surveys or SUE Level A services are included as part of this work to verify utility depths or other information.
- This proposal does not include a fee to prepare easements for drainage, construction, water, sewer, electrical, or gas services.
- Platting of the property and/or recordation of any drainage and utility easements or replatting of the development are not included in this scope of work.
- Assistance with contractor's one-year warranty review.
- Any additional services required by the **CLIENT** which may arise and are not outlined above shall be compensated for on an hourly basis or negotiated to a lump sum fee.
- Significant schematic design or land use changes requested by the **CLIENT** during preparation of the construction plans shall be conducted as an Additional Service at an hourly rate.

Any additional work not listed in the above Scope of Work will be performed on a time and material basis.

Invoicing will be submitted on a monthly basis based on percent of completion. *Payments not received within thirty (30) days of the date of invoice will cause interest at the rate of 1.5% per month to accrue on any outstanding balance.*