



City of Laredo
WATER TREATMENT PLANTS ASSESSMENT AND OPTIMIZATION STUDY
SCOPE OF SERVICES

BACKGROUND

Carollo Engineers Inc. (Consultant) was selected to perform an assessment and optimization study of the Jefferson Street and El Pico water treatment plants (WTPs) for the City of Laredo (City). This assessment will evaluate the performance, efficiency, and condition of each WTP, with a focus on filter assessments, process optimization, taste and odor control, reliability, and long-term capital planning for the City.

PURPOSE

This Exhibit establishes the Scope of Work as described herein. Engineering services during design and construction phases are not included and may be added following completion of the assessment. The engineering services will consist of the following:

1. Task 100 – Assessment and Optimization Report
2. Task 200 – Process Unit Evaluation and Jar Testing
3. Task 300 – Taste and Odor Assessment
4. Task 400 – Cost and Implementation Roadmap
5. Task 500 – Operations Assistance
6. Task 600 – Meetings
7. Task 700 – Project Management
8. Task 800 – Additional Services

SCOPE OF SERVICES

TASK 100 – ASSESSMENT AND OPTIMIZATION REPORT

101 Planning and data requests

101.1 Consultant will prepare a data request. The data request will include:

- Twenty-four to thirty-six months of historical water quality data at Jefferson Street WTP and El Pico WTP. Data requested will include typical water quality parameters currently collected by the City for raw water, settled water, filtered water, and finished water as well as operational data such as head loss, backwash logs including flow and duration, filter to waste times, chemical feed doses, and plant flow rates. Relevant distribution system water quality parameters may be requested.
- Instrument calibration records and City’s data quality assurance and quality control (QA/QC) procedures.
- Pertinent reports and construction documents of existing facilities such as record drawings, O&M manuals, TCEQ correspondence, and other relevant plant operational data and background information.

101.2 Consultant will review and compile historical water quality data and instrument calibration records and QA/QC procedures. Consultant will notify the City of potential data gaps or if additional information is needed.

101.3 Consultant will review instrument calibration records and QA/QC procedures and make recommendations for changes based on current regulatory requirements (TCEQ) and industry best practices.

102 Benchmarking and Diagnostics

102.1 Consultant will perform a desktop data analysis that includes analysis of the historical water quality data for both plants collected in Task 101.

102.2 Based on desktop data analysis in Task 102.1, Consultant will prepare optimization scorecards for process parameters such as settled water quality and filter performance, including post backwash turbidity criteria.

102.3 Consultant will assess filter performance data, including development of filter run length distributions, breakthrough analysis, and computing hydraulic loading rates and unit filter run volumes.

102.4 Consultant will identify treatment process data monitoring gaps and opportunities for upgrades.

102.5 Consultant will conduct one site visit for a Plant SCADA assessment at each WTP including up to three people from Consultant. The site visit will last 3 days including travel time. During the site visit, Consultant will identify instrumentation and SCADA system improvements, including one-minute logging for critical parameters where feasible.

102.6 Consultant will summarize instrument calibration and QA/QC procedure recommendations, desktop data analysis, optimization scorecards, filter performance data assessment, data monitoring gaps, and opportunities for instrumentation and SCADA upgrades in a draft Assessment and Optimization Technical Memorandum (TM). Results will be presented to the City in a TM review meeting (see Task 600 for meeting details). The City will review the draft TM and provide comments within 15 days of the TM review meeting.

102.7 Consultant will incorporate City comments and provide a final TM.

Task 100 Deliverables:

- Draft and final Assessment and Optimization TM.

TASK 200 – PROCESS UNIT EVALUATION AND JAR TESTING

201 – Process Unit Evaluation

201.1 Consultant will conduct one site visit at each WTP including up to five people from Consultant. Each site visit will last 2 days, for a total of 4 days including travel time. During the site visits, Consultant will assess process performance and improvement opportunities for raw water intake, pretreatment, rapid mix, flocculation, sedimentation, filtration, backwash systems,

disinfection, storage, and controls for Jefferson WTP and El Pico WTP. Consultant will identify structural and electrical concerns that may require further evaluation. Additional structural and electrical evaluation may be performed under Additional Services in Task 800.

202 – Jar Testing

202.1 Prior to testing, Consultant will prepare a jar testing protocol for City’s review. Consultant will incorporate City’s comments into final protocol prior to conducting the jar testing.

202.2 Consultant will perform jar testing at one of the City’s WTP laboratories. The City will assist Consultant in sampling raw water for testing. The City will provide a benchtop jar tester, turbidimeter, the WTP’s coagulation chemicals, pH meter, and alkalinity testing instrument (e.g. titrator). Consultant will provide any alternative coagulants or coagulant aid chemicals for evaluation. Laboratory fees for sampling required for the testing will be paid by the City. Consultant will conduct jar testing during one site visit. It is assumed that the testing will be completed by two Engineers over three days including travel time.

203 Process Unit Evaluation and Jar Testing TM

203.1 Consultant will prepare a draft TM summarizing the process unit evaluations and jar testing results for City review. Results will be presented to the City in a TM review meeting (see Task 600 for meeting details). The City will review the draft TM and provide comments within 15 days of the TM review meeting.

203.2 Consultant will incorporate City comments and provide a final TM.

Task 200 Deliverables:

- Draft and final jar testing protocol.
- Draft and final Process Unit Evaluation and Jar Testing TM.

TASK 300 – TASTE AND ODOR ASSESSMENT

301 Seasonal Response Plans

301.1 Consultant will review available MIB and Geosmin data. If any data gaps are identified, additional sampling may be recommended. If required, it is assumed the City will collect MIB and Geosmin samples and coordinate analysis.

301.2 Based on the occurrence of MIB and Geosmin data and effectiveness of the control strategies tested, seasonal response plans will be prepared.

302 Alternative Evaluation

302.1 Consultant will evaluate up to three options for taste and odor control at the City’s WTPs. Potential options include chlorine dioxide, powdered activated carbon, granular activated carbon with or without biological activity, ion exchange, and ozone.

302.2 Based on preliminary evaluation, select options will be tested bench-scale at Carollo’s WaterARC laboratory. It is anticipated that PAC, chlorine dioxide, and ozone will be tested. Consultant will collect raw water samples and ship to Water ARC®. Consultant’s Taste and

Odor Technical Lead will attend bench-scale testing in-person to observe and provide data quality assurance/quality control. Based on bench testing, pilot testing may be recommended.

303 Taste and Odor Control Plan

303.1 Consultant will prepare a draft TM summarizing the results of the taste and odor evaluation. The TM will include a side-by-side comparison of evaluated technologies and a control plan. Results will be presented to the City in a TM review meeting (see Task 600 for meeting details). The City will review the draft TM and provide comments within 15 days of the TM review meeting.

303.2 Consultant will incorporate City comments and provide a final TM.

Task 300 Deliverables:

- Draft and final Taste and Odor Evaluation TM.

TASK 400 – COST AND IMPLEMENTATION ROADMAP

401 Cost Analysis

401.1 Consultant will prepare AACE Class 5 (planning level) cost estimates for recommended improvements. For example, should alternate filter backwash strategies be recommended, Consultant will estimate relative cost savings based on Consultant’s previous work experience.

402 Cost Estimate and Implementation Roadmap TM

402.1 Consultant will prepare a draft prioritized roadmap organized as quick wins (optimization strategies), short-term improvements (6 to 24 month project duration), and long-term capital needs for City review. The City will review the draft roadmap and provide comments within 15 days.

402.2 Consultant will incorporate City comments and provide a final TM.

Task 400 Deliverables:

- Draft and final Cost Estimate and Implementation Roadmap TM.

TASK 500 – OPERATIONS ASSISTANCE

501 Standard Operating Procedures (SOP) Updates

501.1 Consultant will conduct one site visit at each WTP including up to three people from Consultant to perform an initial field review of existing documents. The site visit will last 3 days including travel time. Consultant will conduct one meeting (on-site) at each WTP with City Staff to review existing SOPs and training materials. It is anticipated that the City will provide existing SOPs at least two weeks prior to the site visit for Consultant’s review.

501.2 Consultant will update up to 10 existing SOPs and training materials to reflect recommended optimization strategies and readily implementable improvements. It is assumed that only existing SOPs with recommended improvements will be reviewed and updated. SOPs will be updated to reflect any recommendations or improvements that are a part of this project.

The content development process will be designed for compliance with TCEQ and to meet stated City goals and objectives. The SOPs will contain a process description in sufficient detail to describe the process to operators in a direct format. It is anticipated that the existing SOPs will be provided by the City in Microsoft Word format to be edited by Consultant.

SOP outline:

1. Startup

- b) Startup and Safety Checks.
- c) Precautions against improper use.

2. Normal Operations

- b) Routine and normal operating instructions.

3. Shutdown

- b) Instructions on stopping.

4. Alternate Operations

- b) Seasonal and weekend operating procedures - Changes in schedules or setpoints for different seasons, days of the week, and times of day.

502 SOP Training Sessions and Deliverable

502.1 Consultant will conduct two in-person training sessions to review updated SOPs with the City. Training sessions will be conducted by two people from Consultant in a single trip over two consecutive days, for a total of 3 days including travel time.

502.2 The updated SOPs will be submitted as a Microsoft Word (native) file and also as a PDF file.

Task 500 Assumptions:

- Field verification review will be a combination of desktop review and on-site review with City staff.
- Revised and new procedures will be developed to the extent information is available including:
 - Equipment O&M manuals.
 - Control strategies.
 - As-built drawings.

Task 500 Deliverables:

- Draft and final SOPs. Final SOPs will be delivered to City as a Microsoft Word file and PDF file.

TASK 600 - MEETINGS

Consultant will conduct the following meetings. An agenda will be prepared in advance of each meeting. Consultant will prepare draft meeting minutes summarizing each meeting that will be distributed within one week of the meeting date for City review. Any comments received within 10 days will be incorporated into final meeting minutes. In-person meetings will be held at a City facility. Remote meetings will be scheduled and facilitated by Consultant via Microsoft Teams.

- 601 **Kickoff Meeting** (in-person) – Consultant will conduct a kickoff meeting with the City to discuss project objectives, Consultant’s team, roles and responsibilities, and background information that will be required from the City. Up to 5 people from Consultant will attend the meeting.
- 602 **Monthly project progress meetings** (remote) – Consultant will conduct regular progress meetings with the City to discuss the previous month’s progress, activities for the next month, and any information needs from the City. Up to 5 people from Consultant will attend each meeting.
- 603 **Assessment and Optimization TM Review Meeting** (in-person) – Consultant will review Assessment and Optimization Report with the City. Up to 5 people from Consultant will attend the meeting.
- 604 **Process Unit Evaluation and Jar Test Results Review Meeting** (in-person) – Consultant will review process unit evaluation and jar testing results and recommendations for coagulation improvements. Up to 4 people from Consultant will attend the meeting.
- 605 **Taste and Odor Control Plan Review Meeting** (in-person) – Consultant will present Taste and Odor Control Plan to City. Up to 4 people from Consultant will attend the meeting.
- 606 **Executive Summary Presentation** (in-person) – Consultant will provide a high-level summary presentation to City leadership summarizing findings, benefits, and the recommended procurement pathway. Up to 5 people from Consultant will attend the meeting.

Task 600 Deliverables:

- Meeting agenda, presentation, draft meeting minutes, and final meeting minutes.

TASK 700 PROJECT MANAGEMENT

Consultant will conduct project management activities, including:

- a. Prepare and submit a brief Project Status with each monthly invoice. The status will summarize accomplishments from the previous month, outstanding action items, and significant issues or concerns. A total project duration of 12 months has been assumed.
- b. Provide ongoing documentation of decisions and coordinate with the project team and designated City staff as needed.

TASK 800 - ADDITIONAL SERVICES

The following additional services may be authorized on a case-by-case basis as requested by the City. These tasks have been identified as potential miscellaneous and supplemental technical support tasks that may be required under this scope. Prior to authorization, a scope and budget will be developed for each additional service task requested by the City.

801 Additional Site Visits and Assessments

801.1 Consultant will conduct up to 2 additional site visits and make assessments based on observations during the process unit evaluations. These may include specialized assessments from engineering disciplines such as structural or electrical.

During each site visit, Consultant will perform an in-person multi-disciplinary field assessment at one WTP. Consultant's team performing the field assessments will include experienced engineers for the above-listed disciplines. It is anticipated that each site visit will include up to three people from Consultant and last two days each including travel time.

Consultant will complete the field assessment and note deficiencies. The City will accompany the Consultant's team during the field assessments and provide access to facilities and areas as needed.

801.2 Consultant will present the findings of the field assessment in a hybrid workshop held at the City. Each meeting will include up to three people in-person and two people remote from Consultant.

801.3 Consultant will draft a TM summarizing each field assessment activity and findings. The City will review the document and provide comments within 15 days.

801.4 Consultant will incorporate City comments and provide a final TM.

Task 801 Assumptions:

- City staff with knowledge of the assets being evaluated will accompany and assist the Consultant's team, providing information on the condition, maintenance history, and performance of the assets being evaluated.
- City staff will inform the Consultant of any areas that should not be accessed, for safety or other reasons.
- Consultant will not operate any machinery, enter confined spaces, or evaluate high-voltage equipment.
- Hybrid workshops will allow up to four members of the Consultant's team to attend in-person, with remaining team members attending virtually.

Task 801 Deliverables:

- Field Assessment Findings Workshop agenda, presentation, and draft and final meeting minutes.
- Draft and final field assessment TM.

Assumptions

- Consultant shall be entitled to use and reasonably rely upon all such information and services provided by the City or others in performing the Consultant's services hereunder.
- The Consultant makes no warranty that the City's actual project costs, financial aspects, economic feasibility, schedules, and/or quantities or quality realized will not vary from the Consultant's opinions, analyses, projections, or estimates.