

CITY OF HERCULES
SYCAMORE AVENUE TRUNK SEWER REPLACEMENT PROJECT
SCOPE OF WORK

TASK 1 – PROJECT MANAGEMENT

The purpose of this task is to establish and maintain effective project management and communication for the duration of the project.

Task 1.1 – Project Administration

Monitor project progress and prepare and submit monthly invoices and progress reports.

DELIVERABLES:

- Monthly progress reports.
- Schedule and updates.

Task 1.2 – Project Meetings and Workshops

Conduct monthly meetings and conference calls, as needed for project coordination. Key meetings and workshop to be conducted include:

- Kickoff Meeting.
- Design Criteria Workshop.
- Alignment Evaluation Workshop.
- 30% Review Meeting.
- 90% Review Meeting.

DELIVERABLES:

- Meeting agendas/presentations and minutes.

TASK 2 – ENVIRONMENTAL DOCUMENTATION

The purpose of this task is to evaluate and develop documentation to meet the requirements of the CEQA process. This scope of work assumes an Initial Study/Mitigated Negative Declaration (IS/MND) will be prepared.

Task 2.1 - Prepare Project Description.

Based on the engineering information provided, prepare a Project Description that will be suitable for effective environmental analyses. As required by CEQA, the Project Description will be complete with the precise location and boundaries of the Proposed Project; a statement of the objectives of the Proposed Project; and a general description of the Proposed Project's technical, economic, environmental, engineering, and/or construction aspects.

Task 2.2 – Prepare Administrative Draft IS/MND

Prepare an Administrative Draft CEQA IS/MND pursuant to CEQA requirements to determine if the Proposed Project may have a significant effect on the environment and if so, to what extent. Based on our initial assessment, it is likely that the Proposed Project will satisfy the CEQA requirements through the preparation of a Mitigated Negative Declaration. Most, if not all, of the potential impacts appear to be short-term/temporary impacts due to construction activities which can be avoided and/or mitigated to less than significant levels.

In addition, the following specific environmental studies will be conducted to meet the CEQA requirements:

- Biological Resources Assessment Report. Prepare a Biological Resources Assessment (BA) Report on the potential impacts of state and federally listed species as a result of the construction and operation of the Proposed Project. The BA will address the species listed under the California and Federal Endangered Species Acts (ESA) that could be

within the Proposed Project Area and the ability or likelihood of the Proposed Project to adversely affect those resources.

- AB 52 Tribal Cultural Resources and Section 106 Cultural Resources Report. Prepare a Cultural Resources Inventory Report to comply with AB 52 Tribal Cultural Resources requirements and Section 106 of the National Historic Preservation Act of 1966, as amended. This study will consist of an archeological inventory of cultural surveys and archeological reports, contacts with Native Americans, as well as a cursory reconnaissance survey of the Proposed Action Area.
- For any potentially significant impact(s) identified through the CEQA Checklist, appropriate mitigation measures will be developed to attempt to avoid and/or reduce those impacts to less than significant levels. The Administrative Draft IS/MND will be provided to the City for review.

Task 2.3 – Prepare Public Draft IS/MND.

Based on comments from the City, the Administrative Draft IS/MND will be revised and a Public Draft IS/MND document will be prepared to undergo the required 30-day public review. Twenty-five (25) copies of the Public Draft IS/MND will be provided for the required 30-day public review. A Notice of Completion will be completed and fifteen (15) of the copies of the Public Draft IS/MND will be delivered to the State Clearinghouse. In addition, a Notice of Intent to Adopt a Mitigated Negative Declaration will be prepared and sent to the Contra Costa County Clerk-Recorder. This task assumes that the City will send this or a similar notice to any other responsible/trustee agencies with jurisdiction by law, and to other interested or affected parties.

Task 2.4 – Prepare Final IS/MND

Upon completion of the 30-day public review period, we will assist the City in considering any comments received. As appropriate, we will prepare the Final IS/MND to present to the City for approval of the Proposed Project. The City is obligated to notify (in writing) any commenting agencies of the date of the public hearing on the Project for which a Negative Declaration or a Mitigated Negative Declaration is prepared and being considered for approval. We will prepare a draft of the Notice of Determination for the City to sign after and upon Project approval. The City will be responsible for all filing fees with the Contra Costa County Clerk-Recorder, the State Clearinghouse, and/or any other agency(s) as required. Attendance at two City Council meetings has been included.

ASSUMPTIONS:

- An IS/MND will be sufficient for the project.
- The City will send the Public Draft IS/MND notice to agencies with jurisdiction by law, and to other interested or affected parties, beyond those listed in the scope.
- The City will be responsible for all filing fees.

DELIVERABLES:

- Project Description.
- Administrative Draft IS/MND.
- Public Draft IS/MND.
- Final IS/MND including draft of the Notice of Determination for the City to sign upon approval.

TASK 3 – PERMITTING

Identify required environmental and construction permits. Coordinate with permitting agencies and develop and submit permit applications. A Region-wide Permit #2 will be required for the Pinole Creek crossing. This is an expedited BCDC process that will require a 30 day permit package completion check and 14 day permit review. All other permits must be obtained before a BCDC permit will be issued. Some permitting will be dependent on the construction method selected.

For construction permits, jurisdictional requirements will be identified up front and provided in the specifications as the basis of bid.

Permits may be required from the following agencies: SFBCDC, California Fish & Wildlife SAA, Army Corps, Contra Costa County Public Works Department, City of Hercules, City of Pinole, Contra Costa County Flood Control, Union Pacific Railroad, and CalOSHA for Tunnel Classification.

ASSUMPTIONS:

- For budgeting purposes, all of the permit listed above were assumed to be needed.
- The City will pay all permit fees.

DELIVERABLES:

- Draft/Final permit application.

TASK 4 – RIGHT-OF-WAY SERVICES

If the need for property acquisition is identified as part of Task 6, AR/WS will provide appraisal services, lead negotiations with property owners, and develop easement documents for approval by the City.

Legal descriptions and plat maps to support the easement document will be provided by our surveyor, LCC, Inc.

ASSUMPTIONS:

- One appraisal has been included.
- Negotiation and development of one easement document has been included.
- One legal description and plat has been included.

DELIVERABLES:

- Legal descriptions and plats (if needed).
- Appraisal (if needed).
- Easement Documents (if needed).

TASK 5 – FIELD INVESTIGATION

This task includes the fieldwork to support preliminary and final design tasks.

Task 5.1 – Topographic Survey

The purpose of this task is to establish control provide a basemap to be used to develop the project design documents.

Task 5.1a – Ground Control Surveys

Establish control points in order to perform field surveys, based on Control monuments of record provided by the City. The coordinate system will be based on the City's preferred horizontal and vertical control monuments. If there is no preference, we will use NGS Published County GPS Control monuments of record (based on CCS Zone III, NAD83, with NAVD 88 elevations).

Task 5.1b – Aerial Survey and Mapping

Planimetric mapping will be performed centered along the existing pipeline with a width of mapping of 100 feet, at 1"=20' scale mapping with 1-ft contours. An aerial orthophoto image (scalable) centered along the same strip with a width of 300 feet will also be included. Orthophotography will be delivered in tif/tfw format with a pixel resolution of 0.5 feet.

Task 5.1c – Supplemental Survey

Supplemental ground level surveys will be conducted within the project limits to locate above ground utility structures, (e.g. valve boxes, vaults, manholes, inlets, lights, traffic poles, misc. boxes, drain inlets, exposed conduits and pipes, utility poles, fire hydrants, overhead wires, etc.) which are associated with above and below ground utilities. We will also located valve vaults, pot-hole locations, fences/gates, along with other easily accessible / visible utilities, as described above. Survey work will include opening and "dipping" sewer and storm drain structures in order to obtain invert elevations, and approximate pipe sizes and general directions will be noted.

For areas where aerial mapping will be obstructed, and for any minor added topo requests, additional supplemental surveys will be performed. In addition to the utility information described above, we will also include surveying above ground structures, buildings, fences, walls, sidewalks, curbs, edge of travelled ways or pavement areas, geotechnical boreholes (if present), grade breaks, top and toe of slopes, contours and spot elevations which are sufficient for design purposes.

The field work will include establishing semi-permanent survey control points along the route (semi-permanent control points will be magnetic nails in pavement areas or scribed "+" in concrete surface) to be used by the Client or future Contractor for construction purposes.

Property and easement lines will be included in the basemap and will be based on record maps and existing monuments of record.

ASSUMPTIONS:

- Preparing records of survey is not included.
- Pulling preliminary title reports is not included.
- Any title reports to be reviewed for purposes of establishing property boundaries or existing easement lines will be provided by the City.
- ROW mapping will be limited to record mapping obtained from the County and a search for existing monumentation.
- We will coordinate with the WWTP for access, if needed.
- City will provide access to any locked/gated areas.

DELIVERABLES:

- Topographic Mapping with property boundaries and easements (where information is available).

Task 5.2 – Geotechnical Investigation

5.2a – Data Compilation/Review and Site Reconnaissance

Review available geologic maps and groundwater data in advance of field investigation. In addition, reconnaissance of the site will be performed consisting of determining drill rig access, photo documentation of the site, visually identifying key geologic and geomorphic features, marking preliminary boring locations in the field, and contacting Underground Service Alert (USA) for utility marking.

A Drilling permit will be obtained from the Contra Costa County Environmental Health Department and encroachment permits will be obtained from the City of Hercules and Pinole, as needed.

Task 5.2b – Field Investigation

Subsurface exploration will be performed along the proposed sewer line replacement alignment and at the location of the proposed trenchless crossing along Tennent Avenue under the existing railroad tracks. An estimated 11 borings are to be performed every 500 to 800 feet along the proposed sewer alignment, two of which will be in the vicinity of the proposed railroad trenchless crossing. The two borings near the Tennent Avenue crossing will be advanced to depths of approximately 30 feet below grade as well as the two Pinole Creek Crossings. The other 7 borings along the proposed sewer alignment will be advanced to approximately 15 feet below grade. The field explorations are anticipated to be completed over 3 days. It is anticipated borings will be drilled using 8-inch hollow stem augers. Soil samples will be collected utilizing Standard Penetration Test Split Spoon Sampler and/or California Modified Sampler methods. Approximately two additional undisturbed soil samples will be collected by driving Shelby Tubes into the soil at the desired depth at the trenchless crossings. Soil samples will be taken generally at 3- to 5-foot intervals. Groundwater levels will be measured in the borings, if encountered. At the completion of the borings, soil cuttings will be drummed and removed from the site for proper disposal. The borings will be backfilled with neat cement grout in accordance with Contra Costa County Environmental Health requirements. The upper 12-inches are to be backfilled with quick-setting concrete and troweled smooth on the surface. If contaminated materials are encountered, testing and disposal charges will be additional to our estimate.

Dave Mathy will evaluate the geotechnical data and provide recommendations and design parameters for trenchless construction methods being considered. Recommendations and design parameters will be summarized in a technical memorandum.

Task 5.2c – Laboratory Testing

Laboratory testing will be performed on selected soil samples retrieved from the borings to determine engineering properties and to confirm field classifications. Laboratory testing is anticipated to include, but not limited to, moisture content, dry soil density, sieve analysis, Atterberg Limits, R-value, consolidation, triaxial, and corrosion.

Task 5.2d – Engineering Analysis

We will analyze boring logs to determine geotechnical engineering properties from the laboratory testing. Engineering analysis will include calculations and analysis for liquefaction susceptibility, lateral earth pressures for shoring, pipeline design loads, and pavement design. Engineering analysis performed will be incorporated into our geotechnical design recommendations.

Task 5.2e – Report Preparation

The results from the data review, subsurface exploration, laboratory testing, and engineering analysis will be used as the basis for development of geotechnical recommendations to be presented in a Geotechnical Design Report, with supporting graphics and data. This report will include the following:

Introduction including site location, description, and purpose of the investigation.

Summary of the subsurface conditions and geology.

Boring logs and test results from the subsurface exploration and lab testing.

Conclusions regarding liquefaction susceptibility to the depths explored.

Geotechnical design recommendations including shoring, pipeline design loads, pavement section, earthwork, and other geotechnical design criteria required by the project structural engineer.

Task 5.2f – Trenchless Evaluation

Review existing information prepared by CEG in the vicinity of proposed trenchless undercrossings. Perform site reconnaissance at each trenchless undercrossing to observe surface conditions and site constraints. Evaluate trenchless alternatives at each of the undercrossings based on soil and groundwater conditions, as well as site constraints. Provide a technical memorandum summarizing the soil and groundwater profile at each trenchless undercrossing, including Tunnelman's Ground Classification, feasibility of trenchless alternatives, constructability issues, impacts on existing improvements and utilities, trenchless risks including systematic settlement estimates and shaft excavation, shoring, dewatering, and ground improvement criteria.

ASSUMPTIONS:

- If contaminated materials are encountered, testing and disposal charges will be additional to our estimate.
- City of Hercules and Pinole encroachment permit fees will be waived.
- Barricades currently blocking Railroad Ave will be temporarily removed to allow drill rig access.
- No drilling will occur within Chelsea Wetlands.
- A railroad encroachment permit will not be required to drill along Railroad Avenue.

DELIVERABLES:

- Draft/Final Geotechnical Report.
- Draft/Final Trenchless Recommendations Technical Memorandum.

Task 5.3 – Potholing

After the alignment has been established, a potholing plan will be developed. The pothole plan will focus on existing utilities that are near or crossing the new alignment where depth is not known. The potholing data will be incorporated into the plans to avoid utility conflicts.

ASSUMPTIONS:

- 2 days of potholing (6-10 potholes) has been budgeted.

DELIVERABLES:

- Pothole logs with information incorporated into the plans.

TASK 6 – PRELIMINARY DESIGN

Task 6.1 – Review Existing Information

Carollo will submit an information request to the City and review all available data including CCTV, flow monitoring data, existing plans, flow data from the City and the Pinole/Hercules WWTP, and the existing master plan.

Task 6.2 - Establish Design Criteria

Carollo will work closely with the City to develop design criteria, including depth of flow to pipeline diameter, d/D, velocity, minimum slope, etc to determine trunk sewer size for design. A workshop with the City will be used to develop the design criteria.

Task 6.3 – Trunk Capacity Assessment

The purpose of this task is to establish the design flows to be used in sizing the new trunk sewer. The analysis will be based on existing information as well as the flow monitoring data collected in Task 9.

Task 6.3a - Model Development

Carollo will use the City's existing modeling files, and/or the City's GIS data to construct a model of the Sycamore Trunk sewer system. Carollo will use Innovyze's InfoSWMM hydraulic modeling software to build the hydraulic model. Flows collected during the flow monitoring program will be used to allocate dry weather base flows. The infiltration and inflow (I/I) analysis will be used to develop the wet weather flow parameters and generate the collection systems repose to I/I, and ultimately peak wet weather flows. The model will incorporate the boundary conditions at the wastewater treatment plant, as well as other locations to simulate the hydraulic grade in the trunk sewer during peak wet weather design flows.

ASSUMPTIONS:

- If a new model is constructed it will only include the pipelines associated with the Sycamore Trunk Sewer. A model of the City's entire collection system is not included as part of this scope of work.
- It is assumed that the model will contain up to nine scenarios including the following:
 1. Average Dry Weather Flow (ADWF)
 2. ADWF Calibration
 3. Peak Wet Weather Flow
 4. Peak Wet Weather Flow Calibration
 5. Model Verification (Jan-April 2019)
 6. Peak Hour Wet Weather Flow (10-Year 24-Hour event)
 7. Routing Alternative 1
 8. Routing Alternative 2
 9. Routing Alternative 3

Task 6.3b - Model Calibration:

Carollo will calibrate the hydraulic model to the flows measured during the flow monitoring program for both dry weather and wet weather scenarios. The model flows will be calibrated for flow, level, and velocity. Flow calibration will be based on the Wastewater Planner's Users Group (WaPug) Standards. The wet weather calibration will include measured flows from multiple rainfall events. Wet weather simulations will be verified with historical rainfall events that are to be determined by the project team and City Staff. Carollo will develop model calibration spreadsheets that provide a summary of the calibration site locations, comparisons of modeled versus measured flow, velocity and level. Carollo will also compare simulated flows to influent flows at the WWTP.

ASSUMPTIONS:

- Model calibration will be evaluation based on WaPug standards.

DELIVERABLES:

- Average Dry Weather Flow calibration summary sheets.
- Wet Weather Flow calibration summary sheets.

Task 6.3c – Design Flow and Trunk Sewer Sizing Determination:

Carollo will use the calibrated hydraulic model to simulate design flow conditions. Carollo will work closely with City staff to determine the design storm intensity, duration, and hyetograph pattern and intensity distribution. Carollo will present options for synthetic distributions as well as distributions based on historical rainfall events. The model will be run with two design storm options to determine the City's preferred option for the design flow simulations. Carollo will use the design criteria established in Task 6.2 (specifically depth of flow to pipeline diameter, d/D) to determine trunk sewer size for design. Carollo will conduct a sensitivity analysis with up to three d/D alternatives (i.e. 0.85, surcharge to three feet below manhole rim, etc) to allow the City to determine the appropriate size based on an acceptable level of risk.

ASSUMPTIONS:

- Two design storm options will be simulated for selection of design flow conditions.

- Three criteria alternatives will be simulated for the evaluations sensitivity analysis.

DELIVERABLES:

- Criteria and evaluation summary sheets documenting criteria and design storm selection.

Tasks 6.4 – Alignment Alternatives Development

We will identify alternative alignments (horizontal and vertical, where appropriate) that may decrease capital cost, reduce permitting or easement acquisition needs, or enhance constructability. This scope of work assumes the pipeline across Pinole Creek will be replaced using horizontal directional drilling below Pinole Creek. Alternatives will be developed for relocating the pipe out from underneath the development near Santa Fe.

We have included a site walk with City staff and subconsultants to discuss the challenges with each reach of the existing alignment.

Alternative routing for other portions will be developed as needed to develop a constructible project. Alignment alternatives for various reaches will be presented to the City for discussion.

Tasks 6.5 – Alignment Alternatives Analysis

We will establish, with the City, evaluation criteria. Evaluation criteria will be weighted according to its importance to City. Each alternative developed in Task 6.4 will be evaluated against the weighted criteria to develop a score. The scores for each alternative will then be compared to determine the highest scoring alternative; the alternative that best meets the City's criteria. The evaluation process will be conducted in a workshop so that City can provide input on the scoring. The preferred alignment will be used to develop the cost estimate and 30 percent design documents.

Task 6.6 – Preliminary Cost Estimate.

A preliminary cost estimate (Class 4) will be developed using Carollo's unit price database, vendor/manufacturer quotes, and recent bid tabs for similar projects. The estimate will be based on the level of detail we have in the 30 percent design and will include appropriate contingencies.

Tasks 6.7 – 30% Design:

We will develop 30 percent drawings for the selected alignment. 30 percent drawings will include the horizontal alignment, preliminary profile, and general sheets.

Tasks 6.8 – Preliminary Design Report

The preliminary design report will summarize the efforts of Task 6 as well as identify needed right-of-way acquisition and permits. The PDR will serve as the basis for final design and will document the design criteria selection, alternatives analysis and scoring as well as the 30 percent design drawings based on the selected alignment.

DELIVERABLES:

- Draft and Final PDR including 30% design drawings.

TASK 7 – FINAL DESIGN

Carollo will develop 90 percent and Final plans, specifications, and cost estimates for the project as described in the PDR. Plans will be developed for half size (11x17) and full size (22x34) and will be developed using Carollo's CAD standards. Technical and front end specifications will be developed using CSI format.

We will conduct a review meeting after the 90 percent submittal and will incorporate City comments into the Final submittal. Carollo will provide written responses to the City's comments on the 90 percent submittal.

ASSUMPTIONS:

- Carollo CAD Standards will be used.
- Carollo front end specifications will be used.
- Deliverables will be electronic PDF format.

DELIVERABLES:

- 90 percent and Final plans, specifications, and cost estimate (pdf).
- Written responses to City's 90 percent comments.

TASK 8 – BID SUPPORT

8.1 Pre-Bid Meeting

Carollo will conduct one on-site Pre-Bid Conference meeting during the bidding phase of the project and will prepare addenda and clarifications, if necessary.

DELIVERABLES:

- Agenda and meeting minutes (electronic file in PDF format).

8.2 Bidding Period Assistance

Carollo will assist the City during bidding by answering bidding Contractors' questions during the bid period, and preparing up to two addenda, if needed.

DELIVERABLES:

- Addenda and associated re-issued drawings and specifications (electronic file in PDF format).

8.3 Bid Opening

Carollo will assist the City during bidding by attending the bid opening.

8.4 Bid Evaluation Assistance

Carollo will tabulate bid results and Contractor qualifications and make a recommendation to the City for award.

DELIVERABLES:

- Bid Evaluation Memorandum (electronic file in PDF format).

8.5 Conformed Contract Documents

Carollo will incorporate addenda items into the plans and specifications and provide the City and selected Contractor with conformed documents.

DELIVERABLES:

- Conformed Plans and Specifications (electronic file in PDF format).

ASSUMPTIONS:

- City will be responsible for distribution of contract documents, maintaining the plan holders list, etc.
- City will be responsible for distribution of addenda.

TASK 9 – FLOW MONITORING

Carollo will develop a temporary flow monitoring program to capture system flows during wet weather. The program will consist of up to 11 meters throughout the City of Hercules' conveyance system (not limited to the Sycamore Trunk) for a three month period. Carollo will contract the services of V&A Consulting engineers to perform the flow monitoring program. The flow monitoring will include depth and velocity measurements and results will be represented in electronic format as well as a hard copy report. The report will document the flow monitoring equipment used, location of meters (including pipe size, manhole number, flow channel condition and site schematics and photographs), flow monitoring data with tabular outputs of depth, velocity, and flow rate and hydrographs of depth, velocity, and flow rates for each flow meter, and an electronic copy of monitoring data provided in 15-minute time intervals.

ASSUMPTIONS:

- Up to 11 flow monitors for a three month period.
- V&A will provide electronic (MS Excel) deliverable, as well as a hard copy of the flow monitoring report (three copies).

- The flow monitoring schedule will be determined by the project team in conjunction with City staff. It is anticipated that the monitoring program would commence in the January time frame depending on weather forecasts

DELIVERABLES:

- Electronic and hard copies of the flow data, as well as three copies of the flow monitoring report.

ADDITIONAL ASSUMPTIONS APPLICABLE TO ALL TASKS:

- City shall furnish Consultant available studies, reports and other data pertinent to Consultant's services; obtain or authorize Consultant to obtain or provide additional reports and data as required; furnish to Consultant services of others required for the performance of Consultant's services hereunder, and Consultant shall be entitled to use and rely upon all such information and services provided by City or others in performing Consultant's services under this Agreement.
- City shall arrange for access to and make all provisions for Consultant to enter upon public and private property as required for Consultant to perform services hereunder.
- In providing opinions of cost, financial analyses, economic feasibility projections, and schedules for potential projects, Consultant has no control over cost or price of labor and material; unknown or latent conditions of existing equipment or structures that may affect operation and maintenance costs; competitive bidding procedures and market conditions; time or quality of performance of third parties; quality, type, management, or direction of operating personnel; and other economic and operational factors that may materially affect the ultimate project cost or schedule. Therefore, Consultant makes no warranty that City's actual project costs, financial aspects, economic feasibility, or schedules will not vary from Consultant's opinions, analyses, projections, or estimates.