

APPENDIX B  
SCOPE OF WORK  
FOR  
DESIGN AND CONSTRUCTION PHASE SERVICES FOR THE  
CARPTINERIA ADVANCED PURIFICATION PROJECT

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The proposal should provide a detailed scope to provide design and construction phase services for the Carpinteria Valley Water District's (District) Carpinteria Advanced Purification Project (Project). The work under this contract is divided into two phases: 1) the Final Design phase (Tasks 1 to 7); and 2) the Construction phase (Task 8). Scope for Final Design phase (Tasks 1 to 7) are detailed in this scope of work. Construction phase support will be negotiated with the Consultant during the bidding phase of the Project.

The Project will be procured by means of the traditional design-bid-build delivery method, split into the following three complete and independent construction bid packages:

**Bid Package 1 – Advanced Water Purification Facility** – This bid package will include complete set of plans and specifications for the construction of the full Advanced Water Purification Facility (AWPF) at the Carpinteria Sanitary District wastewater treatment plant (CSD WWTP) with the goal of meeting the treatment requirements for potable reuse through groundwater augmentation. The facilities in this bid package are anticipated to include:

- Equalization Basin
- Ultrafiltration (UF) and Backwash System
- Reverse Osmosis (RO) Equalization Tank and Cartridge Filters
- Reverse Osmosis
- RO Clean-in-Place
- Chemical Storage and Delivery Facilities
- UV/Advanced Oxidation Process
- AWPF Process Building
- Pure Water Clearwell and Post-Treatment Stabilization
- Pure Water Pump station and 12" Purified Water Pipeline to 6<sup>th</sup> Street and Olive Avenue
- Electrical feed and distribution to the AWPF
- Instrumentation and controls / SCADA integration
- Equipping of two (2) injection wells, drilled as part of Bid Package 3, and backwash disposal system.

**Bid Package 2 – Conveyance Pipelines** – This bid package will include complete set of plans and specifications for the construction of the:

- 12-inch purified water pipeline from: 1) connection point at 6<sup>th</sup> Street and Olive Avenue to the southern Linden Avenue bridge connection point; and 2) northern Linden Avenue bridge connection point to Injection Well Site #1 (St. Joseph's Church) and onto Injection Well Site #2 (Meadow View Ln).
- Depending on the scope of the backwash waste disposal system, this bid package may also include backwash waste disposal pipeline(s).

**Bid Package 3 – Injection and Monitoring Wells Drilling** – This bid package will include complete set of plans and specifications for the construction of two (2) injection wells and three (3) monitoring wells (St. Joseph’s Church, Franklin Park, and Memorial Park). Injection well equipping is included in Bid Package 1.

An overview of project scope is provided below and applies generally to all three bid packages, unless otherwise noted:

## **Task 1 – Project Management**

### **Task 1.1 General**

This task includes all basic project management activities, including managing the contract, invoicing and reporting, and project meetings.

### **Task 1.2 Meetings**

For each meeting, the Consultant shall submit an agenda at least 72 hours prior to the meeting and, withing 1 week of the meeting, prepare and submit a meeting summary, including the presentation and materials provided.

#### **Task 1.2.1 Kick Off Meeting**

Consultant shall include one (1) Kick-off meeting scheduled for at least four (4) hours.

#### **Task 1.2.2 Design Review Workshops**

Consultant shall lead design review workshops with the District after the preliminary, intermediate, and final design submittals for the AWPf. Consultant can assume design review workshops are required only after the intermediate submittals for Bid Package 2 and 3. It is expected that the design workshops will be scheduled following comments submitted by the District. The purpose of the workshops will be to review major comments, discuss important design considerations, review the schedule, discuss permitting status, and set action items.

#### **Task 1.2.3 Value Engineering Review Meeting**

Consultant shall attend VE review meeting to listen to presentation on value engineering concepts that could result in project optimization. VE review meeting is expected to last two hours. Consultant shall respond to project optimization alternatives as discussed further in Task 3.1.

#### **Task 1.2.4 Progress Review Meetings**

Consultant shall lead regular progress review meetings of up to 90 minutes each. These progress review meetings are expected to occur monthly, but not during months the design review workshops are scheduled.

#### *Deliverables:*

- *Draft meeting agenda. Meeting summary, including presentation and materials provided.*

## **Task 2 – Preliminary Engineering**

### **Task 2.1 Data Collection**

Consultant will be allowed access to Project files via file share site. Consultant shall develop a data request list and submit to the District.

### **Task 2.2 Geotechnical Engineering Report**

The Consultant shall prepare a complete geotechnical report necessary to complete the objectives of the Project, including but not limited to, locating and performing testing borings and preparing boring logs for the AWP and Conveyance Pipeline; report results of all laboratory tests; make recommendations regarding site preparation, backfilling and grading; discuss foundation conditions under each existing and new structural evaluation; perform chemical analysis to determine corrosivity of soils; determine depth of groundwater; discuss proposed dewatering methods; perform R-value testing; and pavement sections. This document shall be a stand-alone document and will be made available for construction bidders.

*Deliverables:*

- Geotechnical Report (Draft and Final)

### **Task 2.3 Utility Investigation**

Consultant will coordinate with utility providers in the project area to determine locations of existing subsurface utilities that could impact the final design of the project. After overlaying the subsurface utilities with proposed facilities, Consultant shall develop a pothole plan to further investigate key utilities that may alter the design if located differently than shown from utility providers.

The District will provide the potholing plan to Contractors to solicit potholing services. The resulting potholing information will be provided to the Consultant. The District reserves their rights to limit the number of potholes performed, as needed. These services are expected to occur between the Intermediate and Final design sets.

*Deliverables:*

- Pothole Plan (Draft and Final)

### **Task 2.4 Basis of Design Validation Memorandum**

Prior to starting detailed design, Consultant will review the existing AWP and Conveyance Systems Preliminary Design Reports (PDR) prepared by Woodard & Curran dated June and August 2019, respectively, as well as "SRF 50%" drawings prepared by Woodard & Curran dated December 2019. Consultant shall incorporate the findings of Task 2 subtasks and present the District a technical memorandum that validates the recommendations of the existing two PDR's or recommends changes to the design. Should changes be recommended, Consultant shall provide a detailed explanation of the change, the justification for the change, and the impacts to the Project to allow the District to make an informed decision. Basis of Design Validation Memorandum shall include injection well backwash disposal option optimization analysis and provide a recommendation to the District.

*Deliverables:*

- Basis of Design Validation Technical Memorandum (Draft and Final)

## **Task 3 Detailed Design**

### **Task 3.1 Advanced Water Purification Facility**

Consultant shall prepare, provide comprehensive QA/QC, and submit design plans and specifications for the AWP, broken into the following deliverables:

- **Preliminary** – Builds upon the PDR, “SRF 50%” drawings, and Basis of Design Validation Memorandum and provides preliminary drawings from all disciplines, including civil, structural, mechanical, process, electrical and instrumentation. No technical specifications are required with this submittal.
- **Intermediate** – Incorporate comments received by the District on the Preliminary submittal and advance the design. All critical drawings that define the size, configuration, process control and key features of the Project components shall be developed to a high level of completion. Other drawings showing details and refinements shall be in progress. Technical specifications shall be developed to a “first draft” level. Comments received on the Preliminary Design shall be addressed in the Intermediate Design.
- **Final** – Incorporate comments received by the District on the Intermediate submittal and advance the design to completion. All drawings should be submitted and developed to completion for a final review. Provide a complete final design report describing the criteria and choices made for each process area.
- **Bid Set** – Incorporate any final comments from the District on the Final submittal and prepare a set of sealed plans and specifications for the purposes of issuing them to Contractors to obtain construction bids.

The complete sheet and specification lists shall be provided with Consultant’s proposal. Consultant shall identify the development of each sheet by deliverable. The Project plans should be developed using 3D design software (Revit or MicroStation). Consultant shall provide the 3D design file with each submittal that’s viewable using free viewer software.

Front end specifications will be tailored for this project by the District to meet grant requirements. District will seek input and guidance from Consultant and Consultant will make changes to their standard technical specifications to meet grant requirements as applicable.

Upon submission of each deliverable, the District will endeavor to review and provide a consolidated set of comments to the Consultant within three (3) weeks. Review comments may be generated by the District, Carpinteria Sanitary District (CSD), or it’s representatives. The District plans on conducting a Value Engineering workshop following the Intermediate design. The Workshop is anticipated to last one (1) week and result in a summary of changes that the District and Consultant may elect to implement into the design. The Consultant will address all VE concepts in the final design report. Consultant will provide responses to why VE concepts should or should not be incorporated into the final design.

*Deliverables:*

- Preliminary, Intermediate, Final, Bid Set:
  - Plans – one (1) electronic copy (PDF format)
  - Specifications –one (1) electronic copy (PDF format) (Not Required with Preliminary)
  - Design calculations (PDF format)
  - Engineer’s Estimate of Probable Cost (EEOPC) (PDF format)
  - Projected construction schedule (MS Project or equivalent)
  - VE Response
  - 3D model suitable for free viewer software
  - Comment response log, as applicable (PDF format)
- In addition, with the Bid Set submittal:
  - Electronic Drawing files (DWG format)

- One (1) list of anticipated Construction Contractor Submittals (PDF format)
- One (1) list of potential bidders (PDF format)

### **Task 3.2 Conveyance Pipeline**

Consultant shall prepare, provide comprehensive QA/QC, and submit design plans and specifications for the Conveyance Pipeline, broken into the following deliverables:

- **Intermediate** – Builds upon the PDR, “SRF 50%” drawings, and Basis of Design Validation Memorandum and provides a final alignment in plan view with existing utilities shown. Profiles shall be developed for the entire pipeline and connection details shown. A surge analysis shall be completed as part of the Intermediate design submittal to size the surge tank at the pump station and to develop design criteria for valve closing times & pump shut down. Technical specifications shall be developed to a “first draft” level.
- **Final** – Incorporate comments received by the District on the Intermediate submittal and advance the design. All drawings should be submitted and developed to a high level of completion for a final review. Provide a complete final design report describing the criteria and choices made during the design process.
- **Bid Set** – Incorporate any final comments from the District on the Final submittal and prepare a set of plans and specifications for the purposes of issuing them to Contractors to obtain construction bids.

The complete sheet list and specification lists shall be provided with Consultant’s proposal. Consultant shall identify the development of each sheet by deliverable.

Front end specifications will be tailored for this project by the District to meet grant requirements. District will seek input and guidance from Consultant and Consultant will make changes to their standard technical specifications to meet grant requirements as applicable.

Upon submission of each deliverable, the District will endeavor to review and provide a consolidated set of comments to the Consultant within two (2) weeks.

#### *Deliverables:*

- Intermediate, Final, Bid Set:
  - Plans – one (1) electronic copy (PDF format)
  - Specifications –one (1) electronic copy (PDF format)
  - Design calculations (PDF format)
  - Engineer’s Estimate of Probable Cost (EEOPC) (PDF format)
  - Projected construction schedule (MS Project or equivalent)
  - Comment response log, as applicable (PDF format)
- In addition, with the Bid Set submittal:
  - Electronic Drawing files (DWG format)
  - One (1) list of anticipated Construction Contractor Submittals (PDF format)
  - One (1) list of potential bidders (PDF format)

### **Task 3.3 Injection and Monitoring Well Drilling**

Consultant shall prepare, provide comprehensive QA/QC, and submit design plans specifications for the Injection and Monitoring Well Drilling, broken into the following deliverables:

- **Intermediate** – – Builds upon the PDR, “SRF 50%” drawings, and Basis of Design Validation Memorandum to provide a set of technical specifications and plans for the drilling of two injection wells and drilling and construction of three monitoring wells.
- **Final** – Incorporate comments received by the District on the Intermediate submittal and advance the design. All specifications and drawings should be submitted and developed to a high level of completion for a final review.
- **Bid Set** – Incorporate any final comments from the District on the Final submittal and prepare a set of plans and specifications for the purposes of issuing them to Contractors to obtain construction bids.

The complete sheet list and specification lists shall be provided with Consultant’s proposal. Consultant shall identify the development of each sheet by deliverable.

Front end specifications will be tailored for this project by the District to meet grant requirements. District will seek input and guidance from Consultant and Consultant will make changes to their standard technical specifications to meet grant requirements as applicable.

Upon submission of each deliverable, the District will endeavor to review and provide a consolidated set of comments to the Consultant within two (2) weeks.

*Deliverables:*

- Intermediate, Final, Bid Set:
  - Plans – one (1) electronic copy (PDF format)
  - Specifications –one (1) electronic copy (PDF format)
  - Design calculations (PDF format)
  - Engineer’s Estimate of Probable Cost (EEOPC) (PDF format)
  - Projected construction schedule (MS Project or equivalent)
  - Comment response log, as applicable (PDF format)
- In addition, with the Bid Set submittal:
  - Electronic Drawing files (DWG format)
  - One (1) list of anticipated Construction Contractor Submittals (PDF format)
  - One (1) list of potential bidders (PDF format)

## **Task 4 – Permitting**

### **Task 4.1 Permit Support**

Provide permit support to the permits being led by the District. Consultant may be requested to provide engineering documents to support the permit applications. The permits that will be led by the District include:

- Coastal Development Permit
- Title 22 Engineering Report
- Waste Discharge requirements / Water Recycling Requirements (WDR/WRR) Permit
- CSD WWTP NPDES Permit update

#### **Task 4.2 Lead Permit Development**

Lead permit efforts as required for the construction of the project. The anticipated permits and/or the anticipated agencies requiring permits include:

- City Encroachment Permit
- County Well Construction Permit
- Backwash Water Disposal (as required)
- Regional Water Quality Control Board (RWQCB) NPDES Construction General Permit
- RWQCB General Construction Activity Stormwater Permit
- Santa Barbara County Air Pollution Control District (APCD) - Authority to construct & permit to operate

*The following permits can be assumed to not be needed: United States Army Corps of Engineers Section 404 permit, Regional Water Quality Control Board Section 401 Water Quality Certification, and California Department of Fish and Wildlife 1600 Streambed Alteration Agreement.*

#### **Task 5 Geophysical Analysis**

The purpose of this task is to conduct batch leaching tests for each of the three aquifers (A, B, C) planned for injection. The goal is to determine the risk of arsenic or other contaminant mobilization in the aquifer during injection of purified water. The testing will include:

- 1) Test the purified recycled and groundwater from each aquifer for background water concentrations
- 2) Test the soil from each aquifer for background soil concentrations.
- 3) For each aquifer, combine groundwater and soil from the aquifer with purified recycled water. Test supernatant water after prolonged exposure and mixing for leachate concentrations.

Document the methodology, results and analysis in a technical memorandum. Submit Admin Draft TM for District review. Submit Draft TM to District for Regional Board review. Conduct meeting with the Regional Board to address comments. Complete Final TM that will be included with Report of Waste Discharge for CAPP WDR/WRR permit application. (ROWD to be prepared / submitted by the District).

The District will collect soil samples from each aquifer during construction of the El Carro Park monitoring wells, which is planned for Fall 2022. The District will collect groundwater samples from each aquifer from each of the new monitoring wells in coordination with the Consultant. Consultant will collect purified recycled water sample with similar advanced oxidation methods as planned for CAPP.

*Deliverables:*

- Geophysical Analysis TM (Draft and Final)

#### **Task 6 Equipment Pre-Selection**

Consultant shall provide recommendations for pre-selection of equipment/materials, and prepare appropriate pre-selection procurement packages. List other recommended equipment for pre-selection in the Consultants detailed scope of work. District expects, at the minimum, to pre-select the following equipment/materials:

- UF
- RO system
- UV-AOP

*Deliverables:*

- Equipment Pre-Selection Package(s) (Draft and Final)

**Task 7 Bidding Assistance**

Consultant shall attend the pre-bid meeting. Consultant shall prepare required responses for any addenda, letters of clarification, etc. issued to respond to design questions during the bidding period. Consultant shall prepare Conformed Plans and Specifications to incorporate addenda issued during the bid phase.

*Deliverables:*

- Responses for Addenda, Letters of Clarification, etc.
- Conformed Construction Documents

**Task 8 Construction Phase Services**

This task for engineering services during construction includes the following services to be performed by the Consultant and associated specialty subconsultants:

**Task 8.1 Meetings**

Consultant shall attend the meetings as outlined below. Consultant can assume meetings will be held virtually, unless otherwise stated. Meeting agendas and minutes to be prepared for by the District or District's representatives.

**Task 8.1.1 Pre-construction meetings** – Participate in three in-person pre-construction progress meetings, corresponding to each construction bid package. Attendees should include pertinent team members. Consultant can assume the AWPf pre-construction meeting will be two (2) hours in length, and the conveyance pipelines and injection and monitoring wells will be one (1) hour each.

**Task 8.1.2 Construction Progress meetings** – Participate in weekly construction progress meetings for the APWF and biweekly construction progress meetings for the conveyance pipelines and injection and monitoring wells projects. Consultant can assume meetings will be held virtually. Consultant shall assume 18-month duration for the APWF, 9-months for the conveyance pipelines, and 6-months for the injection and monitoring well drilling.

**Task 8.1.3 Special Meetings**

- **Submittal Review Meetings** – Participate in up to ten (10) review meetings to focus on reviewing consultant's responses to submittals in effort to facilitate approval.
- **Vendor Coordination Meetings** - Participate in up to five (5) vendor coordination meetings. The purpose of the meetings may be to resolve issues related to their vendor provided issues.
- **Process and Instrumentation Control System Meetings** – Participate in routine monthly meetings with the Contractor and their integrator to review schedule, process control narratives, graphical displays, and discuss other topics to ensure the process control systems are progressing on schedule to not delay facility start-up. Consultant shall assume there will be twelve (12) monthly PICS meetings.
- **Start-up and Commissioning Meetings** – Participate in routine bi-weekly start-up and commissioning meetings to review various topics related to starting and commissioning the AWPf. Consultant shall assume twelve (12) bi-weekly start-up and commissioning meetings.



- **Other Miscellaneous Meetings** – Participate in other miscellaneous special meetings that may cover other topics not included above. Consultant shall assume up to ten (10) special meetings.

#### **Task 8.2 Submittal Review**

Consultant will review shop drawings and submittals for conformance with the requirements of the contract documents and return submittal review comments to the contractor within 21 calendar days after receipt of submittal. Consultant is expected to accommodate occasional expedited reviews for time sensitive submittals.

*Consultant should assume up to 400 original contractor submittals and up to 200 resubmittals.*

#### **Task 8.3 Requests for Information (RFI) Responses**

Consultant will return written responses to RFIs as soon as possible, or within 7 calendar days of receipt of RFI, clarifying the requirements of the contract documents. Consultant will generate necessary sketches, figures, and modifications to the drawings for clarifications. When required to avoid schedule delay or additional constructed-related costs, consultant will expedite the review of time sensitive RFIs.

*Consultant shall assume up to 400 RFI's.*

#### **Task 8.4 Prepare Design Changes or Contract Document Modifications**

If the contract documents require modifications due to changed or unanticipated conditions or District-requested changes, Consultant to prepare design change documents, as needed. The District will issue change order documentation to the contractor to request pricing to incorporate the work. Changes shown on drawings will be clearly marked and “clouded” for accurate identification of the scope of change. Consultant will maintain up-to-date contract documents. This change documentation will include plan drawings, schematics, details, schedules and specifications, as required. Consultant shall prepare cost estimates for the changes when requested by the District.

*Consultant shall assume up to 300 hours of time to prepare design change documents, inclusive of the project manager, technical discipline needs, and CAD.*

#### **Task 8.5 Field Visits**

The consultant shall coordinate monthly visits to the site by design team members. The purpose of the visits shall be to observe the general progress of the work and review any specific items of work that are brought to the attention of the design team members by the District or the Contractor. The design team shall prepare field trip reports and submit to the District within one (1) week of the visit.

#### **Task 8.6 Structural Observations**

The structural engineer of record or designated engineer shall perform structural observations during construction, as needed. Consultant can assume specialty inspection will be performed by the District or the District’s representatives.

#### **Task 8.7 Commissioning Support**

- Task 8.7.1 Commissioning Support** – Consultant shall provide process assistance to the District’s/CSD’s operations team during startup of process area pumps, pressure filters, RO system, and networks. Consultant efforts will consist of a series of on-site visits to participate in the development of stable

process systems. Consultant shall witness Functional Acceptance Testing (FAT) and document any deviations from the prepared procedures, failures and anomalies during the testing.

Consultant shall attend factory witness testing of SCADA programming, and HMI panels and document any deviations from the prepared procedures, failures, and anomalies during the testing.

*Consultant shall assume up to 500 hours of time to provide commissioning support*

**Task 8.7.2 Operations and Maintenance Manual** – Consultant shall develop the operations and maintenance manual (O&M) describing the operation of the facilities and systems. The manual will explain the purpose and basic concept of the various processes that are incorporated into the overall plant. Where appropriate, reference will be made to the manufacturer’s detailed O&M submittals. It will include instructions for process operations and test or laboratory procedures that may be required to monitor the performance of the facilities. The manual will be suitable for use as an operational tool and to facilitate operator training. The manual will be produced in a computerized format using commercially available software. The O&M manual will be revised at the end of one-year of operations based on actual operating and maintenance experience and input from the District’s staff.

### **Task 8.8 Closeout Activities**

**Task 8.8.1 Final Inspection and Punch List** - The Consultant’s project manager, design manager, and pertinent technical discipline leads will attend the final inspection job walk with the contractor and the District and/or CSD. Consultant will make recommendations on the completion of the work including, but not limited to, completion of punch list items, site cleanup, leakage, and overall system operations. Each discipline lead will be involved in the final inspection job walk.

**Task 8.8.2 Prepare Record Drawings** - The District’s construction manager will be responsible for continuous auditing of the contractor’s as-built set to verify accurate reflection of the information included in the approved shop drawings, RFIs, approved FCOs, plan clarifications, plan changes, and other deviations from the conformed drawings, and that the information in the set is complete. After completion of construction, the District will transmit to the Consultant the final field markup set of drawings (one compiled set only).

The Consultant shall prepare the final record drawings and submit them along with the contractor’s field markup set to the District. The format and quantities for delivery of the final record drawings will be as listed below:

- One (1) set of 22-inch by 34-inch mylar prints
- All related electronic files provided on one flash drive, including Revit and CAD files and completed .pdfs

**DESIGN SCHEDULE**

The following design schedule outlines the milestones to complete the final design phase of the Project by July 2024. The District will look to the Consultant to offer a revised schedule that will accelerate final delivery of the design packages.

<b>Due Date</b>	<b>Duration</b>	<b>Task</b>
2/8/23		Award Contract to Consultant
Mar-23		Kickoff Meeting
May-23	12 weeks	Draft Basis of Design Validation TM
Jul-23		Draft Equipment and Pre-Procurement Bid Package(s)
Aug-23		Final Equipment and Pre-Procurement Bid Package(s)
Aug-23	12 weeks	Preliminary AWPf Design Package
Dec-23	16 weeks	Intermediate AWPf, Conveyance Pipeline, and Well Drilling Packages
Apr-24	20 Weeks <sup>1</sup>	Final AWPf, Conveyance Pipeline, and Well Drilling Packages
May-24	4 weeks	Bid Set AWPf, Conveyance Pipeline, and Well Drilling Packages
Aug-24	12 weeks	Bid Phase End

**Note:**

1. Duration assumes some rework stemming from integration of VE concepts. Should additional time be needed, the District will evaluate extending the design schedule.