CAMROSA WATER DISTRICT

REQUEST FOR EQUIPMENT PROPOSALS FOR GAC TREATMENT SYSTEM

Date: April 23, 2021

Prepared by:

NOTICE OF REQUEST FOR PROPOSALS

Proposals for the procurement of equipment for the "Conejo Wellfield – Equipment Procurement" for granulated activated carbon (GAC) treatment will be received by the Camrosa Water District (CWD or District) on Friday, May, 21, 2021. The proposals will be reviewed and scored by an evaluation team based on the criteria and requirements defined in the following Request for Proposals (RFP). The cost schedule should be included in a separate sealed envelope and will be opened as the last part of the evaluation and scoring criteria. The District reserves the right to retain all proposals for a period of sixty (60) days after the due date for examination and comparison and to delete any portion of the work from the contract. Submit Proposals to:

Camrosa Water District
Attention: Ian Prichard
Santa Rosa Road
Camarillo, CA 93012
(805) 482-8063
ianp@camrosa.com

The District reserves the right to determine and waive non substantial irregularities in any proposal, to reject any or all proposals, to reject one part of a proposal and accept the other.

The Project includes one complete GAC treatment system, pH adjustment system and appurtenances.

An electronic copy of the RFP can be obtained by contacting the Camrosa Water District at: 7385 Santa Rosa Road, Camarillo, CA 93012 or calling (805) 482-8063. In addition, a copy can be downloaded from the District's website at www.Camrosa.com

Conejo Wellfield

REQUEST FOR GAC TREATMENT FACILITY EQUIPMENT PROPOSALS

GENERAL CONDITIONS

1.0 GENERAL OVERVIEW

The District owns and operates the Conejo Wellfield in the Arroyo Santa Rosa Valley Groundwater Basin. The synthetic organic chemical (SOC) 1,2,3, -trichloropropane (TCP) has been detected in the wellfield at concentrations exceeding the state mandated minimum concentration level (MCL) causing the District to cease all water pumping activities at the wellfield. The District has completed pilot testing and determined that a GAC treatment system is their preferred method to reduce TCP concentrations from the source water.

The District is requesting proposals from Vendors to provide a GAC treatment system, pH adjustment system, and appurtenances for their Conejo Wellfield. The GAC treatment and pH adjustment systems will be procured by the District and installed by a contractor as part of a GAC treatment system integration project. The following includes several criteria for the District to evaluate, score, and determine a qualified manufacturer/vendor that best meets the District's needs.

1.1 DESIGN CRITERIA

A. The equipment shall be sized based on the specified performance ranges, various flow rates, and requirements of the facility footprint considering space efficiency by area and height restrictions as outlined in the contract specifications included in Appendix A.

1.2 DRAWINGS

A. The general layout exhibit and other relevant drawings for this RFP are included in Appendix B. Upon request of the Vendor, pumping information and more detailed preliminary drawings for the site are available. Each equipment vendor is expected to include equipment standard "cut sheets" and general layout drawings with their proposal.

1.3 TREATMENT SYSTEM SUBMITTALS

A. Once the evaluation is complete and a bid is awarded, the successful Vendor shall provide two (2) hard copies and one (1) electronic copy of detailed technical submittals for review by the Camrosa Water District and their consultant engineers.

B. Prior to completion of the project, two (2) (hard) copies and one (1) electronic copy of installation, operation, and maintenance manuals shall be supplied by vendor.

C. The proposal shall include a schedule detailing the lead time required to prepare submittals, approve submittals, and time to deliver the equipment to the District upon receipt of approved submittals. Schedule shall assume 14 days for the Owner to review the Vendors submittal and return comments.

D. In addition, the Vendor shall provide all additional information as outlined in the project specifications.

1.4 CONDITIONS OF AWARD

A. Camrosa reserves the right to reject any and all proposals that are considered incomplete or non-responsive.

B. Vendor shall honor the price quoted in the RFP for a minimum of 120 days after the full contract bid opening date.

C. Camrosa's Board of Directors has determined that this project is "substantially complex" and 10-percent retention will be withheld.

1.5 PROPOSAL

A. The Vendor shall submit an electronic copy to the contact listed in the Notice of Request for Proposals. Include in the proposal, the following items, as a minimum. Any additional information shall be included in a separate section titled, "supplemental information."

1. Name and address of vendor and its authorized agent.

2. Purchase price and complete Price Schedule in a separate sealed envelope.

3. Lead time to prepare technical submittals

4. Lead time to deliver equipment

5. General cut sheets of the equipment

6. Detailed itemized list of all materials and equipment included in the vendor's scope of supply and any exclusions.

7. Basis of design, process summary, and description of the process including estimated capacities and sizing of materials

and equipment.

8. Estimated O&M costs for a 20-year operating period.

9. Name and number of contact person to whom technical questions may be directed.

10. Description of the equipment, controls, and operation of the equipment.

11. Materials used in construction including coatings and special finished. Include relevant standards (ASME, AWWA, etc.)

12. Experience of Vendor and list of three (3) similar projects along with references and contact information.

13. Nearest service center.

14. Warranty information on all components including when warranty periods begin.

1.6 EVALUATION OF PROPOSALS

A. The District's evaluation team shall evaluate the proposals based on the following criteria:

1. **Equipment Operation and Maintenance** – This criterion addresses the relative ease of operating the system. Analysis will be based mainly on the equipment provided in the bid, operation and maintenance costs and time associated with the operating and maintaining the equipment, method of equipment operation, and scheduled preventative maintenance. The vendor shall detail equipment operation and routine maintenance in their respective proposals. Key items that will be considered for this criterion are as follows:

- Equipment that can be interpreted for operation and contains controls and alarms that are easy to navigate, program, and understand.
- Equipment which requires minimal preventative maintenance to maintain system performance.
- Proposed backwash volumes and duration.
- Equipment which allows for easy access for plant personnel to perform routine tasks without disrupting plant operation and without placing operation

personnel in danger.

- A lower cost for providing recommended spare parts.
- Control hardware and programing is compatible with Allen Bradley Compact logix PLC.
- The total estimated power draw of the system operating at maximum operating capacity.
- Estimated cost for maintenance/replacement parts for preventative and routine maintenance of all components associated with the Seller's equipment package. Include an estimate for operator 's time to effect said maintenance and routine and repairs.
- Annual or one-time software costs.

2. **Installed Capital Cost** – Compares the actual cost of the equipment as well as the facility footprint size and height restrictions and other factors that affect the total installation cost associated with the equipment. Each piece of equipment is inherentlydifferent, and the Vendor shall provide as much information as possible to assist the District in determining final installation cost.

3. **Quality of Components** – Compares various components and construction methods including comparison with regulatory standards, sizing, capacity, quality, and reputation of sub-vendor components, controls, coatings, fittings, valves, etc.

4. **Adherence to Technical Specification** – The Technical Specifications included as part of Appendix A are the standard guidelines for the equipment, performance, and overall functionality.

5. **Experience** - List experience of the vendor on facilities of similar size and complexity.Include how long vendor has been in business along with key personnel experience.

6. **Lead Time** - The lead time required to provide full submittals for review and to deliver equipment upon receipt of approved submittals. This is a critical element for this time-sensitive project.

7. **Local Service** - Addresses the location of the nearest service providers and their ability to assist with questions and technical issues.

8. **Warranties** - Evaluate the warranty provided and variations between vendor warranties. Favorable results will be given to vendors

that provide thefollowing:

- Warranties of extended duration.
- Warranties which are not limited by proration.
- Warranties that also include service.
- Warranties that cover all parts and components of a system.
- Warranties that provide on-line or phone support for a specified duration.

9. **Owner's Preference** - The Owner has investigated several package systems for GAC treatment and will evaluate the proposed vendor 's systems based on the below weighted scoring system and best overall fit that meets the District'sneeds.

The following table indicates the established, weighted rating system:

Evaluation Criteria	Weighted Value
Equipment Operation and Maintenance	6
Installed Capital Cost	5
Quality of Components	5
Adherence to Technical Specifications	5
Experience	3
Lead Time	6
Local Services	2
Warranties	3
Owner’s Preference	5

The evaluation team will evaluate each proposal using the above evaluation criteria. A rating score between 1 and 10 will be assigned for the evaluation and weighted accordingly for each proposed item. These will be totaled and the proposed item with the highest score will be recommended to the District for selection. In the event there is a tie, or additional clarification is needed, informal oral interviews may be conducted. Any information that will assist the evaluation committee in evaluating the proposals based on the criteria listed above is encouraged.

The technical proposal should address all the above items, or the proposal may be considered non-responsive.

A Price Schedule must be filled out as part of the technical proposal and included in a sealed envelope submitted with the proposal document.

1.7 ACCURANCY OF PROPOSALS

A. All proposals are expected to be true and accurate. District will rely on this information when evaluating each proposal.

1.8 WARRANTY

A. Vendor warrants to District that all equipment, materials and work covered by this Award will conform with the specifications, drawings, and other descriptions supplied for the purposes for which they are intended as evidenced in this Award and in the drawings and specifications referred to therein, of good material, design and workmanship, free from defects, and will fulfill satisfactorily the operating conditions specified herein.

B. At the request of District, Vendor shall promptly, at no cost to the District, either repair or replace (including prepayment of all packing and transportation costs) any equipment, materials or work covered by this Award which, within (minimum) one year after filing the "Notice of Completion "with the General Contractor and accepted in writing by District. Any extended warranties offered and accepted by the Owner shall be in force.

C. Extended warranties will be considered with regards to scoring criteria in the selection of the equipment.

1.9 CONTRACT

A. A sample agreement has been provided in Appendix C.

1.10 COST OF RESPONDING TO RFP

All expenses related to responding to this RFP, including but not limited to preparing, submitting, and presenting proposal, attending meetings, discussions, and travel expenses will be borne by the Vendor. Camrosa assumes no liability for any costs incurred by a proposer in responding to this RFP.

1.11 VENDOR'S QUESTIONS

Written questions or comments to the RFP must be received by the District at least ten (10) business days before the posted proposal due date deadline.

CAMROSA WATER DISTRICT
BUILDING WATER SELF-RELIANCE

PRICE SCHEDULE

Camrosa Water District - GAC TREATMENT FACILITY

Item No	Description	Quantity	Unit	Total
1	Fixed price for GAC Treatment Facility & Appurtenances per the RFP requirements and specifications	1	LS	$
2	CO2 skid & Appurtenances per the RFP requirements and specifications	1	LS	$
3	Fixed price for applicabletaxes	1	LS	$
4	Fixed price for shippingto job site	1	LS	$
Total all items				$

Total Item Nos 1-4_____

(Amount Written in Words)

VENDOR:_____

AUTHORIZED SIGNATURE:_____

TITLE: _____

Appendix A – Technical Specifications
Appendix B – Schematic Drawings
Appendix C – Sample Agreement

APPENDIX A

SECTION 43 32 82

GRANULAR ACTIVATED CARBON (GAC) VESSEL SYSTEMS

PART 1 GENERAL

1.1 DESCRIPTION

A. This section describes materials, fabrication, coating, testing, delivery and installation of complete pre-engineered granular activated carbon adsorption vessel systems (GAC systems) for the treatment of groundwater for potable use.

1.2 WORK TO BE INCLUDED

A. The GAC system supplier (Supplier) shall be responsible for design, fabrication, assembly, and delivery of complete GAC systems including all mechanical components, vessels, inter-vessel manifold piping, and instrumentation described in this specification section. Carbon media will be supplied by others.

B. Each GAC system shall be comprised of the following basic components:

1. Two downflow adsorber vessels interconnected with manifold piping that allows for either series or parallel flow operation of the vessels; and operation while carbon in one vessel is being changed out.

2. Interior lining and exterior prime and finish coating.

3. Process and utility piping, valves, and accessories integral to operation of the two-vessel system.

4. Independent GAC fill and discharge piping with flush nozzles.

5. Vent and pressure relief piping.

6. Pneumatic connections for GAC transfers.

7. Nozzles required for caustic/acid disinfection of the carbon media.

8. Pressure gauges.

9. Sample ports.

10. Spray nozzle for GAC vessel interior washdown.

11. Independent magnetic flow meters for each GAC vessel.

12. Initial load of virgin activated carbon

13. Seismic design of the vessel and manifold supports including definition of vessel anchorage requirements.

14. Technical submittals and operation and maintenance manuals as described herein.

15. Third party coating and lining inspection & certification at the Supplier's expense.

C. The following work will be completed by Others unless otherwise agreed between the Supplier and the Owner:

1. Concrete foundation.

2. System offloading from delivery truck.

3. Field assembly of system components and system installation.

4. Leak testing and disinfection of systems prior to GAC fill.

5. Supply and installation of anchor bolts for foundation.

6. Furnishing and installing carbon.

D. The following field work will be completed by the Supplier.

1. Delivery of the systems to the project site.

E. The bid price shall include sales tax (7.25% rate).

1.3 SUBMITTALS

A. Provide vessel specifications including design pressure, dimensions, capacity, underdrain and upper distributor configuration.

B. Provide GAC system process flow diagrams showing all valves, components, and instrumentation.

C. Provide GAC system general arrangement drawing showing dimensions, weights, elevations and all nozzle locations. Label all valves, sample taps, and lines.

D. Provide pressure drop information between influent and effluent manifold nozzles as designed for this project.

E. Exterior finish coating color charts.

F. Shop Drawings

1. Catalog cut sheets for purchased components and details for manufactured components. Identify materials, surface preparation, and finishes. Include calculations of wall thickness for adsorber vessel.

2. Structural and seismic calculations for adsorber vessels, piping, manifold supports, and appurtenances. Include calculations for reactions at anchor bolts and selection of the size and number of anchor bolts required.

Calculations shall be prepared, stamped, and signed by a Civil or Structural Engineer licensed in the state of California.

3. Shop inspection procedure and schedule.

G. Test Reports - The following test reports shall be provided:

1. Pressure test reports and certificates of inspection for each vessel in accordance with procedures for ASME pressure rating and ASME Boiler and Pressure Vessel Code. Reports shall be furnished not later than the time of delivery of the vessels.

2. Third-party inspection reports for all factory-applied linings and coatings for adsorber vessels and piping. Reports shall indicate that the linings and coatings have been applied in accordance with these specifications on surfaces receiving the specified preparation. Records of film thickness and holiday testing shall be included. Reports shall be furnished not later than the time of delivery of the vessels.

3. Owner may request factory inspections and/or visits during the manufacturing process at no additional cost to the Owner.

H. Supplier's Installation Instructions - Prior to shipment of systems, Supplier shall submit instructions for the field personnel on handling and installation of the systems.

1.4 REGULATORY REQUIREMENTS

A. The Supplier shall comply with all applicable regulatory requirements including, but not limited to, the following:

1. Occupational safety and health requirements of OSHA and Cal-OSHA.

2. U.S. Department of Transportation requirements for transportation of the GAC systems.

3. ANSI/NSF-61 certification of all components and coatings in contact with the potable water.

4. California lead-free requirements (AB 1953)

B. The Supplier shall obtain all necessary permits related to the manufacture, coating and delivery of the system at their own expense.

C. System components containing fluoropolymers, including Teflon, will not be accepted.

1.5 DESIGN CRITERIA

A. Seismic - The GAC systems shall be designed to meet current California Building Code seismic requirements.

B. Anchorage: Design the GAC systems and the associated supports and anchor bolts to support the equipment per CBC, Section 1613 and ASCE 7-10, Chapters 13 and 15

C. Seismic design criteria

1. Site Class: D

2. Seismic Design Category: D

3. S_s: 1.665

4. S_1: 0.613

5. S_{DS}: 1.110

6. S_{D1}: 0.695

7. S_{MS}: 1.665

8. F_a: 1.000

9. I_E: 1.5

D. Wind Design shall conform to the CBC:

1. Basic Wind Speed (3-second gust):105 mph

2. Exposure Category: C

3. Risk Category: IV

E. Functionality

1. The equipment and all components shall not undergo loss of their intended function after application of the Design Earthquake Motions.

2. The Design Earthquake Motions shall be represented by the Design Response Spectrum (Figure 16-3) of the UBC and modified by multiplying the spectral accelerations by the Importance Factor, I = 1.50.

F. Hydraulic Capacity – The GAC system shall be designed for a nominal flow rate of 1,000 gpm per vessel.

G. Carbon Capacity - Each vessel shall be designed to hold and operate with 714 cubic feet of activated carbon having an apparent density of between 0.40 and 0.62 g/cc. Where this specification makes reference to a full load of carbon it shall be understood to mean 714 cubic feet.

H. Each adsorber vessel shall allow for 25 percent minimum expansion of the GAC bed during backwashing.

I. Pressure Drop – Total pressure drop across the two vessels in series shall be limited to 5 psig (without carbon) at the design flow rate.

J. System Size - Adsorber vessel outside diameter shall be 12’ nominal.

K. Adsorber Vessel Support – Each adsorber vessel shall include four support legs coped to the bottom head. The manifold piping valve tree shall include an independent support stand. The systems shall be anchored to a concrete foundation constructed by others. Non-shrink grout, one-inch thick, will be placed between the system and the foundation slab.

L. System Design and Operating Pressure - Adsorber vessels, piping, valves, and appurtenances subject to internal pressure during normal operation, backwashing (reverse normal water flow direction), or GAC filling or removal shall be designed, rated, and constructed for a working pressure of not less than 125 psig at 65°C (150°F). Normal operating pressure on the inlet connection to the system is expected to be between 10 and 30 psig. The effluent connection of the GAC system will be connected to a 24-foot tall tank with a top inlet. Available pressure for backwashing will be at least 30 psig at the effluent nozzle.

M. System Design Orientation - The pair of adsorber vessels shall be aligned along a common centerline. The orientation of vessel appurtenances shall be as shown on the drawings. The maximum overall length from the outside of the first vessel to the outside of the last vessel shall be as shown in the drawings. The GAC system influent, effluent and backwash out valve tree nozzles shall be oriented as required to accommodate the site yard piping at the project site.

1.6 MODES OF OPERATION

A. Carbon Adsorption: The GAC systems shall be designed to allow operation in parallel or series, with one vessel out of service, and for the lead/lag order of the vessels to be reversed.

B. Carbon Backwashing: The vessels shall be capable of operating in a backwash mode using water from the distribution system and/or water treated by the remaining vessels in the system.

C. GAC Removal and Replacement: The GAC system shall be designed and constructed to allow each adsorber vessel to be isolated from the other vessel for removal of spent GAC while one vessel remains in operation. Removal shall be accomplished by pressurizing the vessel with compressed air to displace the spent GAC into an empty shipping container or trailer. The bottom of the adsorber vessel and GAC slurry piping shall be designed to allow complete removal of spent GAC from the adsorber vessel and piping.

PART 2 MATERIALS

2.1 ALLOWABLE SUPPLIERS

A. Allowable suppliers are AqueoUSVets, Calgon Carbon, and Evoqua.

2.2 SYSTEM COMPONENTS

A. The systems shall be shipped to the job site in the least number of pieces permissible for transportation.

2.3 ADSORBER VESSELS

A. Adsorber vessels shall be vertical, cylindrical pressure vessels with elliptical or flanged and dished top and bottom heads. Straight side lengths shall be sufficient to allow for expansion of the carbon bed during backwash. Vessel bottoms and appurtenances shall be designed for complete removal of spent GAC and even distribution of treated water. Vessels shall be designed, constructed, tested, certified, and stamped in accordance with the most recent revision of the ASME Boiler and Pressure Vessel Code, Section VIII. The vessel shell shall be constructed of SA-516 Grade 70 pressure vessel quality carbon steel plate. Vessels shall be provided with all necessary supports and accessories required to support and contain the GAC.

B. The vessels, system piping, and all other shop assembled appurtenances of the system shall be reinforced and supported with structural members as required such that the assembled components can be transported and off-loaded without distortion. The components shall be provided with lifting lugs to enable setting the equipment on a concrete foundation with a suitable capacity crane. System supports shall be designed and drilled for installation and anchoring to a concrete slab. Structural components shall conform to ASTM A 36 specifications.

C. Vessel Access: A minimum of two accessways shall be provided on each vessel. One accessway on the top head shall be 14-inch by 18-inch minimum elliptical, equipped with a stainless-steel chain to prevent the cover from falling. The second manway shall be located on the side shell near the bottom but above the underdrain system. The manway shall be a minimum of 30 inches in diameter, circular. The manways shall be sized to accommodate the repair and/or removal of the largest single internal component. Removable davits or hinge system shall be provided to support the 30-inch manway cover when opened or removed from the vessel.

D. Vessel Nozzles: Each vessel shall be provided with a minimum of the following nozzles:

1. Minimum 8-inch-diameter raw water inlet.

2. Minimum 8-inch-diameter treated water outlet.

3. Minimum 8-inch diameter backwash water outlet.

4. Minimum 4-inch-diameter inlet for loading GAC.

5. Minimum 4-inch-diameter outlet for removing spent GAC.

6. A 2-inch-diameter potable water connection above the carbon bed with spray nozzle for carbon wash-down during exchange.

7. Three 2-inch-diameter sample ports through the vessel shell for intermediate bed sampling.

8. A combination air valve installed at the high point of the vessel inlet piping.

9. A pressure-relief valve to prevent the vessel from exceeding maximum operational pressure.

10. Pneumatic connections for carbon loading and unloading.

11. Nozzles in the underdrain and carbon fill line suitable for use during caustic/acid disinfection of loaded carbon.

E. Sample Taps: Three intermediate bed sample taps shall be provided along the vertical shell of each adsorber vessel. Taps shall consist of 2-inch flanged nozzles with 1/2-inch or larger diameter Type 316L stainless-steel probes extending 1 foot inside the vessels. At the end of the probes shall be 4 inches of Type 316L stainless-steel wound 0.01-inch opening well screens or slots designed to allow withdrawal of water and retainage of carbon. The probes shall be removable from outside the vessel. In each vessel there shall be three taps located at 25, 50, and 75 percent of the carbon bed depth (based on an assumed carbon load of 714 cubic feet). Sample outlets, without probes, shall be located in the inlet and outlet piping of each vessel.

F. Underdrain System

1. The underdrain shall be of the external header / septa type. Internal cone and header-lateral underdrains will not be accepted.

2. The underdrain system shall comply with the following performance, design, and materials criteria:

a. A design flow rate of 1,000 gpm per vessel in normal operating mode.

b. A design backwash rate of 400 to 1,500 gpm.

c. The minimum screened area of the underdrain shall be 7.85 ft^2.

d. All stainless-steel threaded connections shall be made with PTFE-Free tape or paste to facilitate future removal.

e. Design shall facilitate carbon change-out.

f. The underdrain shall be designed such that, following initial backwashing to remove fines, the GAC will be retained by the bottom underdrain screens when the vessel is in normal operation.

g. Underdrain designs utilizing plastic or FRP pipe, plastic distributors, sand, gravel, and concrete will not be accepted.

h. All underdrain material internal to the adsorber vessel or in contact with GAC (including septa) shall be 316L stainless steel.

i. Underdrains shall be designed to withstand the weight of the GAC bed in a flooded state.

j. External header shall be 8-inch carbon steel Sch 40 pipe and fittings.

k. Eight externally removable vertical septas shall be equally spaced in the bottom head of the GAC vessel.

3. Upper Distributor: The upper distributor shall meet the following criteria:

a. The upper distributor shall be designed to distribute the water flow evenly across the GAC bed and to allow for the free passage of accumulated carbon fines to waste while not plugging during backwash. The upper distributor open area shall be at least 1.5 times that of the underdrain system.

b. All upper distributor material internal to the adsorber vessel shall be 316L stainless steel.

c. The distribution point(s) shall be located near, but not closer than 3 inches to the upper head.

d. All support structures shall be fabricated of 316L stainless steel, use bolting rather than "band-it" banding, and shall support the weight of any additional attached internal fixture such as the spray nozzle.

2.4 LINING

A. The interior of the vessel and all interior carbon steel internals shall be properly coated with: Plasite 4110 to a minimum/maximum dry film thickness of 35/45 mils respectively and per Plasite Bulletins PA-3 and PA-4,000 and instructions; or Enviroline 230 NSF to a minimum/maximum dry film thickness of 35/45 mils respectively and per Industrial Environmental Coatings Corporation guidelines and instructions; or an approved equal. Interior lining must be certified to ANSI/NSF Standard 61 for direct potable water contact.

B. The surface preparation (after grinding all welds and sharp edges smooth/radiused), coating application, and lining application including testing shall be certified by an independent third-party Inspector selected and paid for by the Supplier. The third-party inspector shall provide a written test report, which the Supplier shall submit to the Owner.

C. Surface Preparation:

1. Degrease surfaces prior to sandblasting to completely remove dirt, grease, oil, etc.

2. Sandblast to SSPC-SP5 White Metal using a venturi blast nozzle at 100 psi minimum.

3. The degree of blast profile shall be a minimum of 4 mils.

4. Remove all traces of grit and dust and imbedded abrasives with a vacuum cleaner.

D. Lining inspection shall include:

1. General Appearance: film shall be free of runs, sags, orange peel, pin-holing, fish-eyes, over-spray, trash in the film, and voids.

2. Film thickness shall be determined using a Micro test thickness gauge as manufactured by KTA-Tater, Inc. or functionally equivalent non-destructive dry film thickness gauge for use on protective coatings with an accuracy of ±5%, and which has been properly calibrated.

3. Discontinuity void testing shall be performed using a voltage detector Midel AP-W as manufactured by Tinker and Rasor (San Gabriel, CA). Void testing shall only be performed after all interior manifold piping and other internal equipment has been completely installed.

4. The Supplier shall pay for all of the above coating testing and any required re-testing of the lining prior to shipment.

5. Detailed requirements for lining inspection shall be as further described in Carboline Bulletin PA-3.

6. Film thickness and void testing shall be certified by a qualified third-party inspector.

E. At the Owner's cost and discretion, additional void testing may be conducted at the project site after delivery. Any voids or cracks found will be repaired and retested by the Supplier, at their expense.

2.5 PROCESS AND UTILITY PIPING

A. General

1. All pipe which will operate under pressure shall be properly tied or blocked, restrained, and supported at all fittings where the pipe changes direction, changes size, or ends, using suitable anchors. Exposed pipe shall be installed in straight runs parallel to the axis of the structures or equipment. Pipe runs shall be horizontal and vertical except that gravity drain lines shall be pitched down in the direction of flow not less than 1/8 inch per foot.

2. Piping shall be made up with a sufficient number of unions, flanged joints, grooved end joints, or flexible couplings to permit ready breaking of lines as necessary for inspection and maintenance and to allow for expansion and contraction and general flexibility.

3. Pipe and fittings shall be assembled so there will be no distortion or springing of the pipelines. Flanges, unions, flexible couplings, and other connections shall come together at the proper orientation. The fit shall not

be made by springing any piping nor shall orientation or alignment be corrected by taking up on any flange bolts. Flange bolts, union halves, flexible connectors, etc., shall slip freely into place. If the proper fit is not obtained, the piping shall be altered to fit.

4. Piping shall be designed for a maximum liquid velocity of 6.5 fps unless otherwise noted. Supplier shall submit calculations to verify that requirements for maximum headloss and velocity are met with the proposed piping design. Noise generation shall be a consideration in the selection of size for pipe and valves.

5. Exceptions to the maximum velocity requirement may be permitted on relatively short piping runs where the treated water line can serve as the backwash inlet and where the raw water line serves as the backwash outlet.

6. Unless otherwise noted, manifold pipe shall be fusion-bonded epoxy coated and lined or liquid epoxy coated and lined as described below unless otherwise indicated in this specification. The coating material shall be compliant with ANSI/NSF-61.

   a. For fusion epoxy-lined and coated steel pipe, the coating material shall be a 100 percent powder epoxy applied in accordance with ANSI/AWWA C213. The coating shall be applied using the fluidized bed or electrostatic spray process. Coating DFT = 16 mils, Scotchkote 134 (electrostatic) or 206N (fluidized bed), or equal, applied in one coat.

   b. For liquid epoxy-lined and coated steel pipe, the coating material shall be liquid epoxy applied in accordance with ANSI/AWWA C210. The coating system shall consist of one coat of a two-part chemically cured inhibitive epoxy primer, and one or more coats of a two-part chemically cured epoxy finish coat for a total DFT = 16 mil. TNEMEC Epoxoline Series 141, Carboline Carboguard 891, or equal.

7. Apply topcoat to exterior of fusion epoxy-lined and coated steel pipe to match color of vessel.

B. Piping 4 Inches and Smaller

1. Unless otherwise specified, piping shall be stainless steel or copper. Stainless steel tubing shall be made of Type 305 or 316 stainless steel to the requirements of ASTM A269, of minimum 1/4-inch inside diameter, or as indicated, for the test pressure required. Copper tubing shall be Type L or K conforming to ASTM B88.

2. Fittings shall be flanged, screwed, or grooved-end.

C. Piping Larger Than 4 Inches

1. Unless otherwise specified, piping shall be Schedule 40 black carbon steel conforming to ASTM A 53, Grade B, Type E or S.

2. Fittings shall be flanged or grooved-end.

D. Air Piping 2 Inches and Smaller

1. Unless otherwise specified, piping shall be Schedule 40 black carbon steel, hot dip galvanized conforming to ASTM A 53, Grade B, Type E or S.

2. Fittings shall be screwed, welded, or flanged.

E. GAC Exchange piping shall be 4 inches in diameter and constructed of one of the following:

1. Piping shall be Schedule 10 316L stainless-steel pipe conforming to ASTM A 312 with 316 fittings.

2. Fusion bonded epoxy lined and coated schedule 40 carbon steel conforming to ASTM A 53, Grade B, Type E or S.

F. Vessel influent and media fill piping shall be side or top entry.

2.6 FITTINGS

A. Flanges and flanged fittings shall conform to ANSI B16.5.

1. All fasteners shall include washers under both bolt head and nut.

2. Bolts, nuts and washers for joining hardware and flanges constructed of materials other than stainless steel shall be carbon steel conforming to ASTM A307, Grade B with ASTM A563A nuts and ASTM F436 washers. Hardware shall be hot dip galvanized in accordance with ASTM F2329.

3. Fasteners for joining stainless steel hardware and flanges shall be Type 304 or 316 stainless steel per ASTM A320 or ASTM A193; nuts shall be 304 or 316 stainless steel per ASTM A194 and washers shall be ASTM F436 Type 3.

4. Gaskets shall be full face, 1/16- to 1/8-inch thick for piping shall be one of the following nonasbestos materials:

a. Cloth-inserted rubber. Products: Manville 109, John Crane Co. Style 777, or equal. Gaskets shall be suitable for a pressure of 350 psi at a temperature of 82°C (180°F).

b. Acrylic or aramid fiber bound with nitrile. Products: Garlock "Bluegard," Klinger "Klingersil C4400," or equal. Gaskets shall be suitable for a water pressure of 500 psi at a temperature of 204°C (400°F).

c. EPDM/EPT elastomer gasket material in accordance with ASTM D 2000, SAE J-200, BA-CA-DA. Gaskets shall be suitable for a pressure of 350 psi at a temperature of 82°C (180°F).

5. Flanges at site piping interface connection points shall be AWWA C207, Class D, flat face flanges.

B. Threaded fittings shall be Class 300, malleable iron conforming to ANSI B16.3 or forged steel fittings conforming to ANSI 16.11.

C. Flexible couplings (if used) shall be as follows:

1. Fusion bonded epoxy coated ductile iron, long body couplings with stainless steel bolts, Dresser Style 40, Smith-Blair Type 442, or equal.

2. Bellows-type flexible expansion joints shall be Proco Style 240 with EPDM liner and cover or equal. Bellows-type joints shall incorporate stainless steel flanges to provide reliable sealing at the system design pressure.

D. Grooved-end couplings, if used, shall be flexible type, square cut groove, per AWWA C606. Couplings shall be Victaulic Style 77, Gustin-Bacon Figure 100 or equal. Grooved-end coupling shall not be used within the adsorber vessels. Bolts and nuts shall be Type 316 stainless steel.

E. Butt-welded steel fittings shall be carbon steel pipe of the same wall thickness as adjoining pipes conforming to ASTM 234 WPB and ANSI B16.9. Welds shall be in conformance with AWWA C206.

2.7 PROCESS VALVES

A. General

1. The Supplier shall furnish all valves as called for in these specifications, or as required for proper operation of the equipment in general. Valves shall be manufactured by a supplier whose valves have had successful operational experience in comparable service.

2. Wherever stainless steel is specified in this section, it shall be Type 316 or Type 304 unless otherwise specified. Where dissimilar metals are being bolted, stainless-steel bolts shall be used.

3. The Supplier shall furnish all incidental materials necessary for installation of the valves such as flange gaskets, flange bolts, nuts and washers, and all other materials required for the complete installation.

4. The centerline of manually operated valves shall be located not more than 5 feet above the foundation level and shall be provided with handwheels. Valves over 5 feet to centerline shall be rolled toward the operating side to make the handwheel more accessible to an operator of average height. Valves shall be installed in all cases so that handles clear all obstructions when moved from full-open to full-closed position. All aboveground valves shall have a valve position indicator arrow to determine if the valve is open or closed.

B. Butterfly Valves

1. Butterfly valves shall be one-piece wafer type or short body, flanged type, conforming to AWWA C504, Class 150B. Minimum working differential pressure across the valve disc shall be 150 psi. Flanged ends shall be Class 125, ANSI B16.1. Valve shafts shall be Type 304 or 316 stainless-steel journals and static seals. Valve shafts shall be stub shaft or one-piece units extending completely through the valve disc. Materials of construction shall be as follows:

Component	Material	Specification
Body	Cast iron or ductile iron	ASTM A 48, Class 40, ASTM A 126, Class B; or ASTM A 536, Grade 65-45-12
Exposed body capscrews and bolts and nuts	Stainless steel	ASTM A 276, Type 304 or 316
Discs	Stainless steel or EPDM coated cast iron	ASTM A 276, Type 304 or 316 B
Disc fasteners, seat retention segments, and seat fastening devices	Stainless steel	ASTM A 276, Type 304 or 316
Seat material	EDPM	--

2. Where the seat is applied to the disc, it shall be vulcanized to a stainless-steel seat retaining ring which is clamped to the disc by Type 304 or 316 stainless-steel screw fasteners. The valve seat shall be secured to or retained in the valve body.

3. Valves shall be Pratt, DeZurik, or pre-approved equal.

4. Manual actuators on valves 6 inches and larger shall be gear actuators with handwheels. Manual operators shall be designed in accordance with AWWA C504 and shall have a disk position indicator designating the opened and closed position of the valve.

C. Ball Valves

1. Valves in carbon exchange piping and sample probe lines shall be full-bore stainless steel. Bodies, balls, and stems shall be Type 304 or 316 stainless steel. Seats shall be of a non-fluoropolymer material.

2. Valves for carbon steel piping, including flush connections, pressure gauges, and compressed air connections shall be stainless steel, bronze, forged brass, or barstock brass body rated for 500 psi at 38°C (100°F). Seats and seals shall be EPDM. Fluoropolymer (including Teflon) seats and seals will not be accepted.

D. Check Valves: Check valves 2.5 inches and smaller shall be Class 200, wye pattern, bronze body, swing check valves with screw ends. Valves shall be Crane, Kennedy, Milwaukee, or equal.

E. Combination Air Valves: Valves shall have an operating pressure of 200 psi, with 2-inch screwed or flanged fitting. Valves shall be of all-metal construction; plastic valves will not be allowed. Valves shall be APCO, Val-Matic, or equal.

F. Adsorber Pressure Relief: Adsorber vessel pressure relief shall be designed to protect against overtemperature expansion while isolated from the system and from extreme system pressure excursions. The pressure relief system shall consist of one or more pressure-relief valves sized to maintain a pressure less than the maximum allowable working pressure at a flow rate of 1,000 gpm. Valve shall be Class 125, cast iron body, and bronze main valve trim. Valve shall be Cla-Val 50-01 or equal. Burst discs will not be accepted.

G. Valve Tags – All valves shall include a corrosion and UV resistant tag securely wired to the operating handle. The tag shall include a unique valve tag number corresponding to the Supplier's process flow diagram.

2.8 FLOW METERS

A. Each vessel shall be equipped with a flow meter consisting of a sensor and transmitter capable of measuring flow in the forward direction and backwash flow in the reverse direction.

B. Flow meters shall be ABB Watermaster, full or reduced bore (Model FEWXX1XXXH1S4A1D1A1AXAXX3A1). Sensor and transmitter enclosures shall have a NEMA 4X environmental rating.

C. Flow meters shall be mounted in a location that provides the instrument manufacturer's recommended lengths of straight pipe upstream and downstream of the instrument.

D. Flow indicators shall be mounted in a location visible to operators from ground level and shall include a sun-cap or sun-shade designed for continuous exposure to direct sunlight, durable, and sufficient to protect the indicator screen from sunlight.

2.9 MISCELLANEOUS

A. Spray Nozzle: Spray water piping for washdown of the vessel during and after spent GAC transfer shall extend to a spray wash nozzle in the top dish of each vessel. This line shall be provided with a 2-inch ball valve and 2-inch cam-lock adapter located at an operable elevation. A full cone spray nozzle shall be installed in the top dish. The spray water piping shall include a tee and a second ball valve

located downstream of the check valve to facilitate manual air release from the vessel.

B. Flush Connections: Stainless steel flush connections shall be provided on each spent and fresh GAC line downstream of the ball valve and at the spray nozzle supply line. Flush connections shall consist of a short section of 3/4-inch pipe, and a 3/4-inch full port ball valve and 3/4-inch quick disconnect adapter (Chicago Fitting) to match water hose fittings.

C. Pressure Gauges: The vessel manifold piping shall be equipped with pressure gauges to indicate the pressure of water entering and exiting each vessel. Connection size shall be ½ inch. Range shall be 0-60 psi with an accuracy of 1 percent of full range. Gauges shall not be less than 4-1/2 inches in diameter, liquid filled, and designed for outdoor, uncovered service. Pressure gauge assemblies shall be isolated from process piping with a 1/2-inch bronze or stainless steel ball valve. Gauges shall have stainless steel or bronze bourdon tube, be glycerin filled, and be fitted with shatterproof glass. Gauges shall be manufactured by Ashcroft, Crosby, Marshalltown, Marsh, or equal.

D. Transfer Hose Connectors: The GAC slurry piping shall be fitted with hose connectors, such that carbon transfer to and from the adsorber vessels can be facilitated with transfer hoses. These connectors shall be 4-inch quick disconnect (cam-lock) adapters constructed of 304 stainless or aluminum as manufactured by OPW Division of Dover Corporation as Kamlok Part No. 633-F or equal equipped with dust caps.

E. Sample Piping

1. The following sample taps shall be provided as a minimum:

a. Influent water to each adsorber vessel.

b. Treated Water from each adsorber vessel.

c. GAC intermediate taps at the 25, 50, and 75 percent bed depth point on each vessel.

2. The sample piping shall be 1/2-inch-diameter stainless steel tubing with 1/2-inch diameter stainless steel ball valves.

2.10 PAINTING AND COATING

A. The exterior of the vessel, supports, piping (including air vent piping, if not galvanized) and appurtenances shall be coated with a 2-part catalyzed epoxy primer followed by a urethane top coat.

B. All surfaces shall be prepared for coating in accordance with SSPC SP-6

C. Prime Coat: Apply 4 – 6 mils dry film thickness of a rust inhibitive 2-component epoxy coating with a minimum solids content of 66 percent by volume. Products shall be Ameron 385, Carboline 893, Tnemec 69, or equal.

D. Finish Coat: Apply 2 – 4 mils dry film thickness of a two-component aliphatic acrylic polyurethane coating with a minimum solids content of 58 percent. Products shall be Ameron Amerishield, Carboline 134 HS, Tnemec 74, or equal.

E. Surfaces Not to be Coated: Aluminum, brass, bronze, copper, plastic, rubber, or stainless steel. Grease fitting, nameplates, or serial numbers.

F. The color shall be selected by the Owner. No supplier logo shall appear on the vessels without approval of the Owner.

PART 3 EXECUTION

3.1 OWNER OVERSIGHT

A. The Owner reserves the right to visit all fabrication facilities and perform independent inspections of materials and coatings at any time during the fabrication period. Such visits and inspections shall be at the Owner's expense but will not result in any additional compensation to the Supplier.

3.2 DELIVERY

A. The Supplier's bid price shall include all costs associated with shipping of the systems to the Owner's facility location indicated and sales tax.

B. All vessel openings, including manways and nozzles, shall be securely covered in the factory prior to shipment to prevent the entrance of debris and animals.

C. Vessel delivery shall be during normal business hours.

3.3 INSPECTION

A. The Owner may retain the services of an independent, third-party testing entity to inspect the linings and coatings of the vessels once they arrive on-site. The supplier shall provide all materials, labor and equipment necessary and bear all costs associated with repair of the linings and coatings if holidays or other defects are identified during the inspection.

3.4 INSTALLATION

A. Installation of the GAC systems and related appurtenances shall be performed by others unless otherwise agreed between the Supplier and the Owner, and will be in accordance with the Supplier's drawings, instructions, and recommendations.

3.5 START-UP SERVICES AND TESTING

A. The Supplier shall include one (1) 8-hour site visit trip (travel time shall be included in bid, but not counted towards 4 hours) to verify proper installation of the vessels. Field visit shall be by a person knowledgeable about the design, construction, and proper installation of the systems.

3.6 VESSEL CLEANING

A. The interior of the vessels and manifold piping shall be free of debris when received at the job site. The equipment shall be in a condition to be immediately pressure tested and disinfected without cleaning or extensive flushing required.

END OF SECTION

SECTION 46 31 43

CARBON DIOXIDE STORAGE AND FEED SYSTEM

PART 1 GENERAL

1.1 DESCRIPTION

A. This section describes the furnishing and installation of a complete, fully operable, carbon dioxide storage and carbonic acid feed system for pH reduction of high hardness groundwater at a water treatment plant.

B. The carbon dioxide storage and carbonic acid feed system shall use a side stream of carrier water to fully dissolve the required amount of carbon dioxide (CO2) and automatically feed the fully dissolved CO2 solution to the injection point.

1.2 WORK TO BE INCLUDED

A. The carbon dioxide system supplier (Supplier) shall be responsible for design, fabrication, assembly, and delivery of a complete carbon dioxide system including all mechanical components, carbon dioxide storage, carrier water system, and instrumentation described in this specification section.

B. The bid price shall include sales tax (7.25% rate).

C. Major components of the carbon dioxide system to be supplied under this section shall include, but not limited to the following:

1. A 14-ton capacity carbon dioxide storage tank system.

2. Refrigeration unit.

3. Vaporizer.

4. Carbon dioxide dissolution system.

5. Carrier water system including booster pump and appurtenances.

6. Carbonic acid solution diffusion system for installation at the main process pipeline.

7. Initial load of 14 tons of CO2.

8. All other components, instrumentation, and controls required for a fully operable system exclusive of the items specifically excluded as described below.

D. The following construction work will be completed by Others unless otherwise agreed between the Supplier and the Owner:

1. Concrete foundation.

2. System offloading from delivery truck.

3. Field assembly of system components and system installation.

4. Supply and installation of anchor bolts for foundation. Design of vessel anchorage shall be by Supplier

5. Carrier water piping between the carbon dioxide system and the main process pipeline.

6. Bringing power wiring to the system and bringing control wiring to the system from the treatment plant SCADA system.

E. The following field work will be completed by the Supplier.

1. Delivery of the systems to the project site.

2. Arranging for delivery of the initial load of carbon dioxide.

1.3 SUBMITTALS

A. Provide carbon dioxide system process flow diagrams showing all valves, components, and instrumentation.

B. Provide carbon dioxide system general arrangement drawing showing dimensions, weights, and elevations.

C. Description of external interfaces (foundation size, anchor bolts, pipes, valves, and electrical) and external appurtenances required to support installation and operation of the carbon dioxide system.

D. Shop Drawings: Catalog cuts for purchased components and details for manufactured components. Identify materials, surface preparation, and finishes. Include calculations of wall thickness for storage and dissolution vessel.

E. Provide O&M Manuals containing Supplier’s recommended operating procedures, safety requirements, suggested maintenance, and warranty information. Manuals shall be of sufficient detail to allow for successful operation of the equipment and shall include specific information regarding the equipment’s control system, including but not limited to: operational description, detailed explanations of HMI screens and resulting equipment response, and troubleshooting guides.

F. Supplier's Installation Instructions - Prior to shipment of systems, Supplier shall submit instructions for the field personnel on handling and installation of the system.

G. Following the Supplier’s post-installation site visit, the Supplier shall provide written certification that the system will operate as designed and specified herein.

1.4 QUALIFICATION/ EXPERIENCE

A. The supplier shall have at least 10 years’ experience supplying carbon dioxide systems of the type specified.

B. The Supplier shall have full unit responsibility for the complete system specified herein.

1.5 REGULATORY REQUIREMENTS

A. Safety Devices: the CO2 System shall include all necessary permanent safety devices, such as machinery guards, emergency stops, pressure relief valves, insulation, etc. required by OSHA, Cal/OSHA, ASME Boiler and Pressure Vessel Code and other federal, state, and local health and safety regulations.

B. Materials in contact with the carbon dioxide and carbonic acid solution shall be certified to ANSI/NSF Standard 61.

1.6 DESIGN CRITERIA

A. The complete system will be located outdoors, uncovered, near Camarillo, California.

B. The carbon dioxide storage and feed system design conditions are as follows:

Parameter	**System Requirement**
Storage Volume	14 Tons
Maximum Feed Rate	40 lbs/hr
Minimum Feed Rate	5 lbs/hr

C. Water quality conditions for the four wells supplying the treatment plant are attached. Any combination of one or more of the four wells may be operating at any given time.

D. The primary process stream flows through GAC pressure vessels into an atmospheric storage tank and will operate at a pressure between 10 and 20 psig.

1.7 WARRANTY

A. The system shall include a warranty for a period of 12 months from the date of filing of the Notice of Completion. The warranty shall stipulate that the equipment furnished is suitable for the purpose intended and free from defects of design, material, and workmanship for the duration of the warranty.

B. In the event of equipment failure resulting from normal operation or service, the Supplier shall promptly repair or replace the defective equipment without additional cost to the Owner.

1.8 ALLOWABLE SUPPLIERS

A. BlueInGreen

B. TOMCO

C. Pre-approved equal

PART 2 MATERIALS

2.1 SYSTEM COMPONENTS

A. The CO2 system shall be furnished complete, pre-wired and pre-piped, skid mounted, factory tested, with all accessories and appurtenances specified herein.

B. All stainless steel components shall be 304 or 316 stainless steel unless otherwise noted.

C. Skid shall be fabricated from epoxy coated A-36 steel or stainless steel, 16 mils minimum total dft, or stainless steel.

2.2 LIQUID CARBON DIOXIDE STORAGE TANK

A. One liquid carbon dioxide storage tank shall be provided, designed specifically for carbon dioxide service.

B. The storage tank shall consist of a welded SA-612 normalized carbon steel pressure vessel designed and constructed in accordance with Section VIII, Division 1 of the ASME “Code for Unfired Pressure Vessels” with a maximum allowable working pressure of 350 psig.

C. The storage tank shall be horizontal with l-beam frame and capable of holding 28,000 pounds of liquid carbon dioxide at 300 psig and 0°F. The tank shall have a 12 x 16 inch elliptical manway installed on the rear head for cleaning access and inspection of the pressure vessel as required. A 30-inch circular manway shall be provided if there are any internal tank features that require internal access for maintenance. A grounding lug shall be provided for release of static electricity to ground.

D. The tank shall be insulated with a minimum of 4 inches of urethane foam insulation, which shall be covered with a 0.063” factory painted white aluminum shell. The ends are to be covered with aluminum preformed flanged and dished heads. The thermal conductivity (overall U-factor) for the insulated tank wall shall not be greater than 0.04 Btu per hour per square foot per °F.

E. The tank shall be complete with a level indicator calibrated to read in thousand pounds and a 0 to 600 psig pressure gauge, both with 6-inch dials.

F. All necessary schedule 80 pipe connections for filling and withdrawal of CO2 from the storage tank shall be provided. Truck unloading capability consisting of CGA forged brass fill and vapor balance fittings, and isolation valves extending through the front of the tank cabinet shall be provided.

G. A complete environmentally safe refrigeration system utilizing refrigerant R-404A shall be provided that will automatically maintain the storage tank at 0°F and 300 psig. The evaporator coil of the refrigeration unit shall be located inside of the top

portion of the storage tank, with the compressor and air-cooled condensing coil mounted on the frame at the end of the tank. The refrigeration unit shall be equipped with a condensing unit driven by a 2 HP, 480-volt, 60 cycle, 3-phase scroll compressor and provided with a circuit breaker disconnect switch, motor starter, and a 120-volt control voltage transformer mounted in a NEMA 4X type 304 stainless steel electrical enclosure. A fused disconnect shall not be accepted. The control panel shall be equipped to provide loss of phase, short circuit and ground fault protection. The condensing unit will include a sight glass, refrigerant line, solenoid valve, expansion valve and a refrigeration coil mounted internally in the storage tank. Automatic controls shall be provided to start and stop the compressor, thereby controlling the pressure of the CO2 in order to maintain the proper operating pressure.

H. The storage tank shall be protected from being subjected to pressures greater than the maximum allowable working pressure by means of two ASME approved safety relief valves operating in conjunction with a three-way switching valve and two bleeder type relief valves.

I. The tank shall be provided with a pressure switch to sound an alarm automatically in the event of excessive high or low pressure in the tank. The alarm horn and indicating lights shall be mounted on the refrigeration control panel located on the storage tank. The panel shall be complete with an alarm silence circuit to shut off the audible alarm. Contacts shall be provided for remote indication of high and low tank pressure alarms.

J. All nozzles penetrating the vessel shall be schedule 80, type 304 stainless steel. All piping and fittings provided internal to the storage tank system shall be Schedule 80 carbon steel. All piping and fittings provided external to the vessel and supplied as part of the storage system shall be Schedule 80 type 304 stainless steel, with 2,000 psi rated threaded fittings. Stainless steel ball valves shall be provided where the connections for the liquid fill, vapor return, process connect to the tank, and where needed to remove and service the vaporizer, without emptying the tank. 1-1/2” liquid CO2 and 1” vapor balance fill couplings shall be standard CGA brass threaded connections for CO2 service and piped to the outside of the enclosure. Fill connection blow down valves and pressure relief valves will be provided for the fill connections.

K. The storage tank shall be provided with an enclosure at one end, which shall provide weather protection for the refrigeration unit, vaporizer, vapor heater, pressure regulator, electrical panels, fill valves and other accessories. The enclosure shall consist of a structural frame, which shall be covered with aluminum sheet, minimum thickness of 0.04 inch (1 mm). The storage tank, enclosure, frame, and other exposed ferrous metal surfaces shall be surface prepped and painted. All stainless steel surfaces shall be left unpainted.

L. Adequate vent area shall be provided to allow cooling air circulation for the refrigeration system. Lockable, hinged doors to provide access to the enclosure shall be provided.

M. The approximate overall tank dimensions shall be 20’ long x 8’ wide x 10’ high.

2.3 VAPORIZER

A. The tank shall be provided with one complete electric vaporizer unit, capable of vaporizing no less than 100 lbs of liquid carbon dioxide per hour at 300 psig. Automatic controls shall be provided to control the vaporizer to maintain the tank pressure. An adjustable differential pressure switch shall activate and deactivate the vaporizer. Liquid carbon dioxide shall be drawn off of the bottom tank, with the resulting vapor returning to the top of the tank. A purging valve for easy removal of accumulated impurities, safety controls consisting of a safety relief valve, a thermostat for overheat protection and a fused control circuit for coil protection shall be provided. Power shall be 480-volt, 3-phase, 60-Hz, and shall be provided with a circuit breaker with operating handle in a NEMA 4X type 304 stainless steel electrical enclosure pre-wired from the Refrigeration panel. The vaporizer shall be supplied as an integral part of the storage tank; pre-piped, pre-wired and pre-insulated and located in the equipment enclosure.

2.4 VAPOR HEATER

A. The tank shall be provided with a carbon dioxide vapor heater to heat the 0°F CO_2 gas to near room temperature. The vapor heater shall be rated for operation at 480 volts single phase, 60 Hz., pre-wired from the Refrigeration panel. The vapor heater shall be supplied complete with electronic temperature control. Operating control range shall be adjustable from 30° to 110°F. Solid high conductivity aluminum pressure castings containing the electrical resistance heaters and aluminum castings containing the stainless steel tubing for the CO_2 vapor shall be provided. An overheat device shall be supplied to shut off the heating element should the temperature reach 200°F. A manual reset button shall be supplied for restarting the heater after the overheat temperature controller has tripped out. The vapor heater shall be pre-piped and pre-wired with a thru-the-door disconnect switch and NEMA 12 type 304 stainless steel cover inside the storage tank aluminum control house.

2.5 PRIMARY PRESSURE REGULATOR

A. One (1) carbon dioxide pressure reducing regulator will be supplied, pre-installed in the CO_2 pipeline after the carbon dioxide vapor heater inside the storage tank equipment enclosure. The regulator shall be used to reduce the pressure from approximately 300 psig to the operating pressure of the dissolution system. The regulator shall have a malleable iron body, aluminum spring case and lower case, nitrile and aluminum valve disc and holder, nylon fabric coated with nitrile diaphragm, stainless steel valve stem and valve stem guide. The outlet pressure of the regulator shall be easily adjusted through the use of an adjustment screw.

B. One (1) pressure gauge, 2-1/2" dial, 0 to 600 psig range, complete with isolation valve, shall be provided for indication of the CO_2 pressure downstream of the regulator.

C. One (1) pressure relief valve shall be provided installed in the pipeline prior to the pressure regulator.

2.6 DISSOLUTION AND FEED SYSTEM

A. The dissolution and feed system shall be of the saturation vessel or pressure solution feed (PSF) system type.

B. Both types of systems shall include:

1. Stainless steel “Y” strainer provided on the inlet side of the CO2 feed panel to remove any debris that might pass through the CO2 vapor line from the storage tank and piping system.

2. Thermal mass type indicating electronic CO2 flow meter to monitor the flow of CO2 gas. The sensor shall be stainless steel with stainless steel end fittings. An LCD display will be utilized with a 4-20 mA output representing CO2 gas flow rate in lb/hr. Accuracy of the meter shall be two percent of full scale or better. The flow meter shall be sized to correspond with the design rate of carbon dioxide per hour. Flow meter shall be ST-100 by FCI or equal.

3. Pressure gauges, 2-1/2" dial, complete with isolation valves, shall be provided for indication of the CO2 pressure upstream and downstream of any pressure regulator and for indication of water pressure upstream and downstream of the dissolution / CO2 feed system.

4. Solenoid valve for initiating or stopping CO2 flow. The valve shall have a brass body and 120-volt AC coil. The valve shall be normally closed (energize to open - fail closed). In case of loss of power, the CO2 solenoid will stop CO2 flow to the panel. A manual by-pass isolation valve shall be provided to by-pass flow around the solenoid valve for manual operation.

5. An electric panel heater shall be provided for minimizing moisture condensation on the panel components. Heater shall be Hoffman Series, 400 Watts, 120 volts, or equal.

6. Manually operated by-pass CO2 flow control valve. The valve shall be stainless steel construction and designed for positive control of CO2 flow.

C. Saturation Vessel System

1. The saturation vessel shall be stainless steel, rated for at least 110% of the maximum anticipated working pressure.

2. The saturation vessel shall be designed and constructed in accordance with the latest revision of the ASME Code and shall bear the stamp of certification from a registered inspector. ASME vessels shall be fabricated from stainless steel, meeting all requirements specified herein.

3. Electric actuated CO2 flow control valve assembly. The electrically operated, spring opposed diaphragm actuator shall be controlled via a microprocessor controlled linear stepper motor with a position accuracy of 1% of full scale or better. The enclosure shall be constructed of aluminum

alloy with stainless steel fasteners. The valve shall accept a proportional 4-20 mA D.C. signal from SCADA.

D. Pressure Solution Feed System

1. One PSF Carbonic Acid feed panel shall be provided to diffuse CO2 into the carrier water stream. The enclosed panel shall be free-standing and constructed of type 304 stainless steel.

2. Electrical supply to the panel shall be 120 volts, 60 Hertz. The feed panel will contain the following:

a. Second stage pressure reducing valve. The regulator will reduce the CO2 pressure from the first stage regulator to the desired operating pressure. The regulator will have a malleable iron body, aluminum spring case and lower case, nitrile and aluminum valve disc and holder, nylon fabric coated with nitrile diaphragm, stainless steel valve stem and valve stem guide. The outlet pressure of the regulator will be easily adjusted through the use of an adjustment screw.

b. Gas actuated CO2 flow control valve assembly. The pneumatically operated, spring opposed diaphragm actuator shall be controlled via an electronic signal from an electro-pneumatic transducer. The transducer shall convert a DC current input signal to a directly proportional pneumatic output. The transducer shall accept a proportional 4-20 mA D.C. signal from SCADA. The valve actuator will be supplied complete with a CO2 gas regulator for utilizing the CO2 gas at the panel as the pneumatic source. The valve body shall be 316 stainless steel.

c. Two (2) in-line mixers designed to continuously mix carbon dioxide with the water. The CO2 vapor will be injected upstream of the mixers though a stainless steel injector. The mixers shall be constructed of PVC.

3. Three (3) pressure relief valves shall be provided for protection of the PSF panel components. The valves shall have a brass body and stainless steel spring.

2.7 CARRIER WATER SYSTEM

A. The carrier water system shall consist of two pumps (duty and standby), Y-strainers, check valves, isolation valves, drain valve, air release valves, supply and discharge pressure gauges, and other appurtenances required for a fully functional system.

B. The carrier water duty and standby booster pumps shall be of the centrifugal horizontal end suction or vertical in-line type. Pentair/Aurora 380 series, Goulds e-SV, Grundfos CR, or equal. Pump head condition shall account for approximately 300 feet of pipe to and/from process pipeline connection.

C. Carrier Water Flow Meter:

1. The carrier water loop shall be equipped with a flow meter consisting of a sensor and transmitter.

2. Flow meters shall be ABB Watermaster (Model FEWXX1XXXH1S4A1D1A1AXAXX3A1). Sensor and transmitter enclosures shall have a NEMA 4X environmental rating.

3. Flow indicators shall be mounted in a location visible to operators from ground level and shall include a sun-cap or sun-shade designed for continuous exposure to direct sunlight, durable, and sufficient to protect the indicator screen from sunlight.

2.8 CONTROLS

A. The system shall be designed to permit two modes of operation:

1. "AUTO" Control Mode: In AUTO control mode, the treatment plant SCADA system pH control loop shall have primary control over the CO2 feed rate. The carbon dioxide system shall adjust the carbon dioxide feed rate based on a 4-20mA signal from the treatment plant SCADA system. Once adequate carrier water pressure to the feeder has been verified, the carbon dioxide system will initiate CO2 gas injection into the carrier water stream.

2. "MANUAL" Control Mode: In manual control mode, the carbon dioxide system controller will have primary control over the feed rate. The feed rate shall be adjustable at the local HMI or via the treatment plant SCADA system. The feed rate shall be controlled based on an operator adjustable CO2 flow rate in pounds per hour.

B. The system control panel shall include:

1. A Hand/Off/Auto switch and power light. The switch shall provide 120V AC power to the electronics in the panel.

2. Alarm lights, CO2 gas flow rate value, and carrier water flow rate value.

3. PID controller or PLC and HMI to accommodate remote control via SCADA and local control by the operator.

C. At a minimum, the following control signals shall be integrated with the treatment plant SCADA system:

1. Control panel HOA status

2. Storage tank high and low pressure alarm status

3. CO2 flow rate (4-20 mA)

4. Carrier water low pressure alarm

5. Carrier water flow rate (4-20 mA)

2.9 CARBONIC ACID DIFFUSER

A. One (1) Carbonic Acid solution diffuser shall be supplied to inject carbonic acid into the treatment plant influent manifold. The diffuser will be constructed of type 304 stainless steel and provided with 2-inch and 3-inch 150# flanged connections. The diffuser shall be designed for the full flow of carrier water. The diffuser is to be field installed by the contractor.

B. One (1) Pressure gauge, 2-1/2" dial, complete with isolation valve, shall be provided for indication of the water pressure just prior to the solution diffuser. The pressure gauge is to be field installed by the contractor.

C. The carrier water system, including the carbonic acid diffuser shall be designed to provide the backpressure necessary for proper operation of the system.

2.10 PROCESS AND UTILITY PIPING

A. General

1. All pipe which will operate under pressure shall be properly tied or blocked, restrained, and supported at all fittings where the pipe changes direction, changes size, or ends, using suitable anchors. Exposed pipe shall be installed in straight runs parallel to the axis of the structures or equipment. Pipe runs shall be horizontal and vertical except that gravity drain lines shall be pitched down in the direction of flow not less than 1/8 inch per foot.

2. Piping shall be made up with a sufficient number of unions, flanged joints, grooved end joints, or flexible couplings to permit ready breaking of lines as necessary for inspection and maintenance and to allow for expansion and contraction and general flexibility.

3. Pipe and fittings shall be assembled so there will be no distortion or springing of the pipelines. Flanges, unions, flexible couplings, and other connections shall come together at the proper orientation. The fit shall not be made by springing any piping nor shall orientation or alignment be corrected by taking up on any flange bolts. Flange bolts, union halves, flexible connectors, etc., shall slip freely into place. If the proper fit is not obtained, the piping shall be altered to fit.

4. All CO_2 piping and fittings will be Type 304 stainless steel, threaded. All water piping and fittings will be 2 inch Schedule 10 Type 304 stainless steel, welded.

5. CO_2 isolation ball valves: valve bodies will be of Type-316 stainless steel construction with stainless steel trim. The ball valves will be designed specifically for CO_2 service.

PART 3 EXECUTION

3.1 GENERAL

A. The CO2 System shall be completely skid mounted, assembled in the factory, and operated to test the pre-programmed parameters and the functionality of the protection devices before shipment to the job site.

3.2 DELIVERY

A. The Supplier's bid price shall include all costs associated with shipping of the system to the Owner's facility location indicated.

B. Delivery shall be during normal business hours.

3.3 INSTALLATION

A. Installation of the carbon dioxide system and related appurtenances shall be performed by others unless otherwise agreed between the Supplier and the Owner, and will be in accordance with the Supplier's drawings, instructions, and recommendations.

3.4 START-UP SERVICES AND TESTING

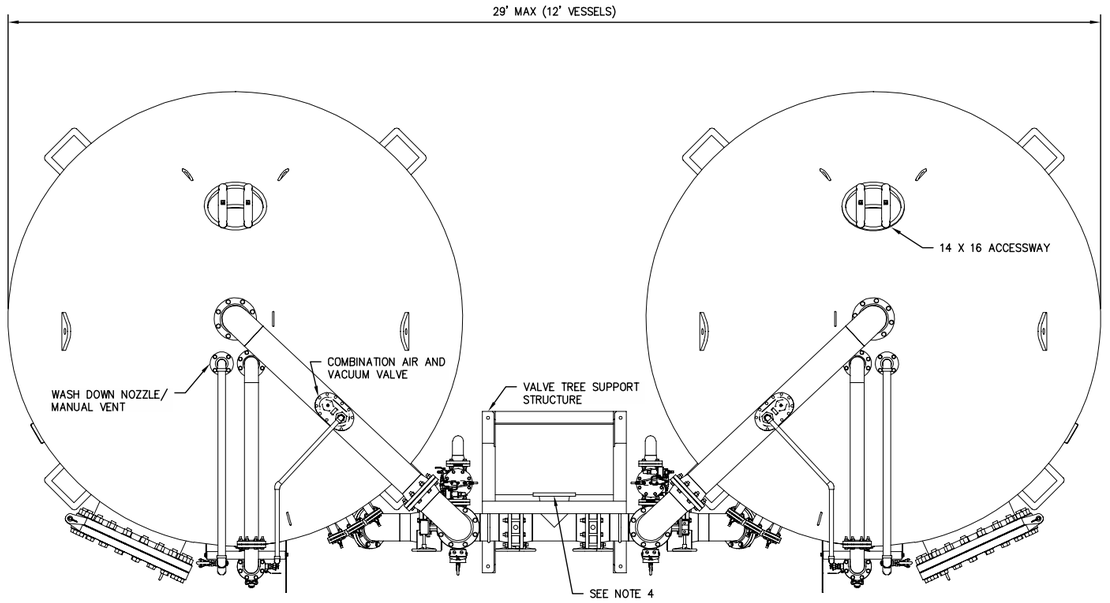
A. The Supplier shall include three (3) 8-hour site visit trips (travel time shall be included in bid, but not counted towards 8 hour visit time). The first trip shall be just prior to installation of the system to coordinate system installation requirements and layouts. The second trip will be scheduled to verify proper installation of the equipment. The third trip will be scheduled during startup for startup assistance and training. Field visits shall be by a person knowledgeable about the design, construction, and proper installation of the system.

3.5 DELIVERY AND INSTALLATION OF CARBON DIOXIDE

A. The Supplier shall furnish the initial 14-ton load of carbon dioxide.

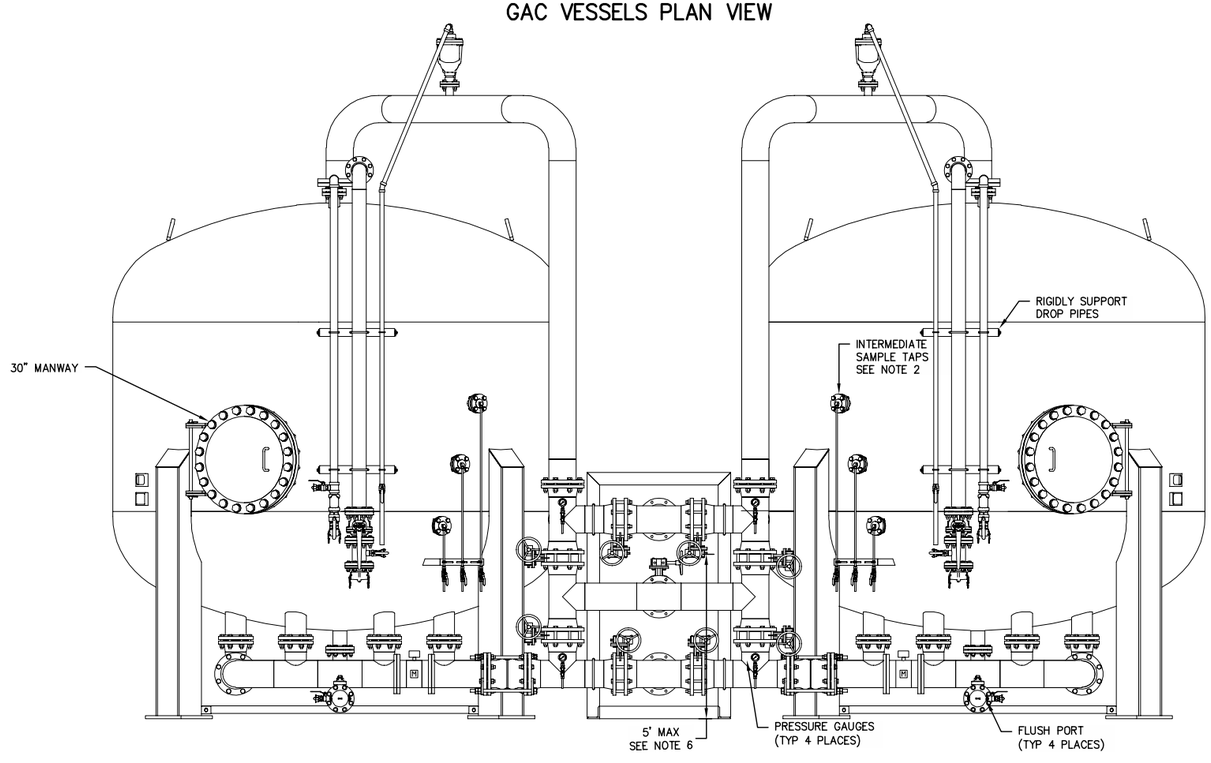
END OF SECTION

APPENDIX B



NOT TO SCALE

GAC VESSELS PLAN VIEW



NOT TO SCALE

GAC VESSELS PROFILE VIEW

NOTES

1. STRUCTURAL DESIGN OF VESSELS, VALVE TREE STAND AND ANCHOR BOLTS BY SUPPLIER. ANCHOR BOLTS WILL BE INSTALLED BY OTHERS.
2. LOCATION OF INTERMEDIATE SAMPLE TAPS SHALL BE SELECTED TO SAMPLE THE 25%, 50%, AND 75% BED DEPTHS BASED ON AN ASSUMED CARBON FILL VOLUME OF 714 CUBIC FEET FOR 12' VESSELS.
3. THE USE OF FLEXIBLE COUPLINGS TO FACILITATE FIELD ASSEMBLY OF MAJOR PIECES OF THE SKID WILL BE CONSIDERED. THE SUPPLIERS PROPOSAL SHALL SHOW THE PROPOSED LOCATION OF ALL SUCH FLEXIBLE COUPLINGS AND INDICATE WHETHER OR NOT THE SUPPLIER PROPOSES TO FACTORY ASSEMBLE THE ENTIRE SKID PRIOR TO SHIPPING TO THE JOB SITE.
4. THE SKID SHALL BE DESIGNED TO PERMIT EACH OF THE THREE VESSEL EXTERNAL NOZZLES (INFLUENT, EFFLUENT, AND BACKWASH OUT) TO BE ORIENTED EITHER TOWARDS THE FRONT OR TOWARDS THE BACK OF THE VESSEL SKID. THE OWNER WILL DICTATE THE ORIENTATION OF EACH NOZZLE FOR EACH SKID DURING THE SUBMITTAL PROCESS. NOZZLES SHALL UTILIZE FLAT FACE FLANGES.
5. EQUIP EACH PRESSURE GAUGE CONNECTION WITH A TEE AND A SAMPLE TAP.
6. ALL VALVE OPERATORS SHALL BE LOCATED NO HIGHER THAN 5 FEET FROM THE BOTTOM OF THE SKID.
7. INDIVIDUAL VESSEL FLOW METERS SHALL BE INSTALLED IN EITHER THE VESSEL INFLUENT OR EFFLUENT PIPING WITH ENOUGH STRAIGHT PIPE UPSTREAM AND DOWNSTREAM TO PROVIDE 99% ACCURACY BASED ON THE FLOW METER MANUFACTURER'S INSTALLATION GUIDELINES. MANIFOLD PIPING SHALL BE MODIFIED TO ACCOMMODATE THESE FLOW METER REQUIREMENTS.

CAMROSA WATER DISTRICT

VENTURA COUNTY, CA

EXHIBIT

GAC VESSEL SKID PROCUREMENT

PROVOST& PRITCHARD
CONSULTING GROUP
An Employee Owned Company
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6162
559/449-2700 FAX 559/449-2715
www.ppeng.com

DESIGN ENGINEER:

LICENSE NO:

DRAFTED BY: | CHECKED BY:

DATE:

JOB NO:

PROJECT NO:

PHASE:

0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET

OF

4/21/2021 11:54 AM G:\Camrosa Water District-2958\2958Z0002-Camrosa GAC Design Project\300 CAD\340 Sheet Sets\99_Exhibits\GAC VESSEL SKID PROCUREMENT.dwg - Jennifer Bonilla

APPENDIX C

Camrosa Water District
7385 Santa Rosa Rd.
Camarillo, CA 93012
Telephone (805) 482-4677 - FAX (805) 987-4797

Some of the important terms of this agreement are printed on pages 2 through 5. For your protection, make sure that you read and understand all provisions before signing. The terms on pages 2 through XX are incorporated in this document and will constitute a part of the agreement between the parties when signed.

TO: DATE:

Agreement No.

The undersigned Contractor offers to furnish the following:

Contract price $:

Contract Term:

Instructions: Sign and return original. Upon acceptance by Camrosa Water District, a copy will be signed by its authorized representative and promptly returned to you.

Accepted: Camrosa Water District	Contractor:
By: _____	By: _____
Title: _____	Title: _____
Other authorized representative(s):	Other authorized representative(s):
_____	_____

Workers' Compensation Insurance - By his/her signature hereunder, Contractor certifies that he/she is aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and he/she will comply with such provisions before commencing the performance of the work of this agreement.

Indemnification - To the fullest extent permitted by law, Contractor shall indemnify and hold harmless and immediately defend Camrosa Water District, its directors, officers, employees, or authorized volunteers, and each of them from and against:

a. Any and all claims, demands, causes of action, damages, costs, expenses, losses or liabilities, in law or in equity, of every kind or nature whatsoever for, but not limited to, injury to or death of any person including Camrosa Water District and/or Contractor, or any directors, officers, employees, or authorized volunteers of Camrosa Water District or Contractor, and damages to or destruction of property of any person, including but not limited to, Camrosa Water District and/or Contractor or their directors, officers, employees, or authorized volunteers, arising out of or in any manner directly or indirectly connected with the work to be performed under this agreement, however caused, regardless of any negligence of Camrosa Water District or its directors, officers, employees, or authorized volunteers, except the sole negligence or willful misconduct of Camrosa Water District or its directors, officers, employees, or authorized volunteers; and

b. Any and all actions, proceedings, damages, costs, expenses, penalties or liabilities, in law or equity, of every kind or nature whatsoever, arising out of, resulting from, or on account of the violation of any governmental law or regulation, compliance with which is the responsibility of Contractor; and

c. Any and all losses, expenses, damages (including damages to the work itself), attorneys' fees, and other costs, including all costs of defense, which any of them may incur with respect to the failure, neglect, or refusal of Contractor to faithfully perform the work and all of the Contractor's obligations under the agreement. Such costs, expenses, and damages shall include all costs, including attorneys' fees, incurred by the indemnified parties in any lawsuit to which they are a party; and

d. Contractor shall immediately defend, at Contractor's own cost, expense and risk, any and all such aforesaid suits, actions, or other legal proceedings of every kind that may be brought or instituted against Camrosa Water District or its directors, officers, employees, or authorized volunteers, notwithstanding whether Contractor's liability is or can be established Contractor's obligation to indemnify shall not be restricted to insurance proceeds, if any received by Camrosa Water District, or its directors, officers, employees, or authorized volunteers.

Contractor shall pay and satisfy any judgment, award or decree that may be rendered against Camrosa Water District or its directors, officers, employees, or authorized volunteers, in any and all such suits, actions, or other legal proceedings.

Contractor shall reimburse Camrosa Water District or its directors, officers, employees, or authorized volunteers, for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided.

GENERAL CONDITIONS

Laws, Regulations and Permits - The Contractor shall give all notices required by law and comply with all laws, ordinances, rules and regulations pertaining to the conduct of the work. The Contractor shall be liable for all violations of the law in connection with work furnished by the Contractor. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules or regulations and without giving notice to Camrosa Water District engineer, the Contractor shall bear all costs arising therefrom. If Contractor is required to register with the State of California Department of Industrial Relations (DIR), Contractor must comply with all DIR requirements during the entire term of this agreement.

Safety - The Contractor shall execute and maintain his/her work so as to avoid injury or damage to any person or property. The Contractor shall comply with the requirements of the specifications relating to safety measures applicable in particular operations or kinds of work.

In carrying out his/her work, the Contractor shall at all times exercise all necessary precautions for the safety of employees appropriate to the nature of the work and the conditions under which the work is to be performed, and be in compliance with all applicable federal, state and local statutory and regulatory requirements including, but not limited to, California Department of Industrial Relations (Cal/OSHA) regulations; and the U.S. Department of Transportation Omnibus Transportation Employee Testing Act.

Commercial General Liability and Automobile Liability Insurance - The Contractor shall provide and maintain the following commercial general liability and automobile liability insurance:

Coverage - Coverage for commercial general liability and automobile liability insurance shall be at least as broad as the following:

1. Insurance Services Office (ISO) Commercial General Liability Coverage (Occurrence Form CG 0001)
2. Insurance Services Office (ISO) Business Auto Coverage (Form CA 0001), covering Symbol 1 (any auto)
3. Insurance Service Office (ISO) Excess Liability (if necessary)

Limits - The Contractor shall maintain limits no less than the following:

1. General Liability - Two million dollars ($2,000,000) per occurrence or the full per occurrence limits of the policies available, whichever is greater for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit or products-completed operations aggregate limit is used, either the general aggregate limit shall apply separately to the project/location (with the ISO CG 2503, or ISO CG 2504, or insurer's equivalent endorsement provided to Camrosa Water District) or the general aggregate limit and products-completed operations aggregate limit shall be twice the required occurrence limit.
2. Automobile Liability - One million dollars ($1,000,000) for bodily injury and property damage each accident limit.
3. Excess Liability (if necessary) - The limits of Insurance required in this agreement may be satisfied by a combination of primary and umbrella or excess Insurance. Any umbrella or excess Insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and non contributory basis for the benefit of the District (if agreed to in a written contract or agreement) before the District's own primary or self Insurance shall be called upon to protect it as a named insured.

Required Provisions - The general liability, auto liability and excess liability policies are to contain, or be endorsed to contain, the following provisions:

1. Camrosa Water District, its directors, officers, employees, and authorized volunteers are to be given insured status at least as broad as ISO endorsement CG 2010 11 85; or both CG 20 10 10 01 and CG 20 37 04 13, specifically naming all of the District parties required in this agreement, or using language that states "as required by contract". All subcontractors hired by Contractor must also have the same forms or coverage at least as broad; as respects (via CG 20 38 04 13): liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor; premises owned, occupied or used by the Contractor; and automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to Camrosa Water District, its directors, officers, employees, or authorized volunteers.
2. It is understood and agreed to by the parties hereto and the insurance company(s), that the Certificate(s) of Insurance and policies shall so covenant and shall be construed as primary,

and Camrosa Water District insurance and/or deductibles and/or self-insured retentions or self-insured programs shall not be construed as contributory using the ISO endorsement CG 20 01 04 13 or coverage at least as broad.

3. Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to Camrosa Water District, its directors, officers, employees, or authorized volunteers.
4. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.
5. Each insurance policy required above shall provide that coverage shall not be canceled, except with notice to the Camrosa Water District.
6. Such liability insurance shall indemnify the Contractor and his/her subcontractors against loss from liability imposed by law upon, or assumed under contract by, the Contractor or his/her subcontractors for damages on account of such bodily injury (including death), property damage, personal injury, completed operations, and products liability.
7. The general liability policy shall cover bodily injury and property damage liability, owned and non-owned equipment, blanket contractual liability, completed operations liability, explosion, collapse, underground excavation, and removal of lateral support.
8. The automobile liability policy shall cover all owned, non-owned, and hired automobiles.

All of the insurance shall be provided on policy forms and through companies satisfactory to Camrosa Water District.

Deductibles and Self-Insured Retentions - Any deductible or self-insured retention must be declared to and approved by Camrosa Water District. At the option of Camrosa Water District, the insurer shall either reduce or eliminate such deductibles or self-insured retentions. Policies containing any self-insured retention (SIR) provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named or additional insureds, co-insurers, and/or insureds other than the First Named Insured.

Acceptability of Insurers - Insurance is to be placed with insurers having a current A.M. Best rating of no less than A-:VII or equivalent or as otherwise approved by Camrosa Water District.

Workers' Compensation and Employer's Liability Insurance - The Contractor and all subcontractors shall insure (or be a qualified self-insured) under the applicable laws relating to workers' compensation insurance, all of their employees working on or about the construction site, in accordance with the "Workers' Compensation and Insurance Act", Division IV of the Labor Code of the State of California and any Acts amendatory thereof. The Contractor shall provide employer's liability insurance with limits of no less than $1,000,000 each accident, $1,000,000 disease policy limit, and $1,000,000 disease each employee.

Contractor shall assume the immediate defense of and indemnify and save harmless Camrosa Water District and its officers and employees, agents, and consultants from all claims, loss, damage, injury, and liability of every kind, nature, and description brought by any person employed or used by Contractor, or any subcontractor, to perform the Work under this contract regardless of responsibility or negligence. Contractor hereby agrees to waive rights of subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation. The Workers' Compensation Policy shall be endorsed with a waiver of subrogation in the favor of the Camrosa Water District for all work performed by the Contractor, its employees, agents and subcontractors.

Evidences of Insurance - Prior to execution of the agreement, the Contractor shall file with Camrosa Water District a certificate of insurance (Acord Form 25-S or equivalent) signed by the insurer's representative evidencing the coverage required by this agreement. Such evidence shall also include (1) attached additional insured endorsements with primary & non-contributory wording, (2) Workers' Compensation waiver of subrogation, and (3) a copy of the CGL declarations or endorsement page listing all policy endorsements, and confirmation that coverage includes or has

been modified to include Required Provisions 1-8 above. The District reserves the right to obtain complete, certified copies of all required insurance policies, at any time. Failure to continually satisfy the Insurance requirements is a material breach of contract.

The Contractor shall, upon demand of Camrosa Water District, deliver to Camrosa Water District such policy or policies of insurance and the receipts for payment of premiums thereon.

Continuation of Coverage - If any of the required coverages expire during the term of this agreement, the Contractor shall deliver the renewal certificate(s) including the general liability additional insured endorsement to Camrosa Water District at least ten (10) days prior to the expiration date.

Subcontractors - In the event that the Contractor employs other contractors (subcontractors) as part of the work covered by this agreement, it shall be the Contractor's responsibility to require and confirm that each subcontractor meets the minimum insurance requirements specified above.

Camrosa Water District reserves the right to modify these insurance requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage or other circumstances.

Payment, unless otherwise specified on Page 1, is to be 30 days after acceptance by Camrosa Water District.

The District may terminate this Agreement at any time, with or without cause, giving written notice to Contractor, specifying the effective date of termination.