



CONTRACT DOCUMENTS FOR THE CONSTRUCTION OF
ECHOWATER RESOURCE RECOVERY FACILITY

FOG Station System Repairs Project

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BID SET

PART A – CONTRACT REQUIREMENTS (DIV 00 AND DIV 01)
PART B – TECHNICAL SPECIFICATIONS (DIV 03, AND DIV 40)

August 2025



RFB 8514

CONTRACT NUMBER

SECTION 00 01 10

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SECTION 00 43 25

SUBSTITUTION REQUEST FORM (DURING PROCUREMENT)

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

- A. Prebid proposed substitutes and “or equal” items shall be submitted in accordance with the PROPOSED PRODUCTS FORM Section (00 43 33), and as specified herein.
- B. Whenever equipment/material items are indicated in the PROPOSED PRODUCTS FORM Section (00 43 33) and if the Technical Specification indicates that a prebid substitution is permitted, equipment or materials of other Manufacturers/Suppliers may be accepted if sufficient information is submitted to allow the District to determine that the equipment/material proposed is equivalent or equal to that named, subject to the following requirements:
 - 1. The burden of proof as to the type, function, and quality of any such substitution product, material or equipment shall be upon the submitting Manufacturer or Supplier.
 - 2. The District will be the sole judge as to the type, function, and quality of any such substitution and the District’s decision shall be final.
 - 3. The submitting Manufacturer or Supplier shall furnish technical information and data about the proposed substitution that will allow the District to evaluate conformance with the Contract Documents. In addition, if requested by the District, an installation list with references of comparable installations shall be provided.
 - 4. The District may require the submitting Manufacturer or Supplier to furnish a special performance guarantee or other surety with respect to any substitution.
 - 5. Acceptance by the District of a substitution item shall not relieve the submitting Manufacturer or Supplier of the responsibility for full compliance with the Contract Documents and for the adequacy of the substitution.
- C. The procedure for review by the District will include the following:
 - 1. If the submitting Manufacturer or Supplier wishes to provide a substitution of an “or-equal” item, they shall make written application to the District on the attached "Substitution Request Form" within 30 days of the Advertisement Date shown in the RFB document.
 - 2. Wherever a proposed substitution item has not been submitted within said 30-day period, or wherever the submission of a proposed substitution material or equipment has been judged to be unacceptable by the District, the proposed

substitution item will not be added to the Contract Documents via an Addendum and will not be allowed for use on the project.

3. The submitting Manufacturer or Supplier shall certify that the proposed substitution will perform adequately the functions and achieve the results called for by the general design, and be similar and of equal substance to that indicated, and be suited to the same use as that specified.
 4. The District will evaluate each proposed substitution prior to the Bid date. If a proposed substitution is acceptable to the District, the District will revise the affected Technical Specifications and the PROPOSED PRODUCTS FORM Section (00 43 33), by addendum.
- D. The submitting Manufacturer's or Supplier's application using the attached "Substitution Request Form" shall contain the following statements and information which shall be considered by the District in evaluating the proposed substitution:
1. The evaluation and acceptance of the proposed substitution will not prejudice the achievement of Field Acceptance within the Contract Time.
 2. Whether or not acceptance of the substitution for use in the Work will require a change in any Contract Documents to adopt the design to the proposed substitution.
 3. Whether or not incorporation or use of the substitution in connection with the Work is subject to payment of any license fee or royalty.
 4. All variations of the proposed substitution from the items originally specified will be identified.
 5. Available maintenance, repair, and replacement service will be indicated. The Manufacturer or Supplier shall have a local service agency (within 150 miles of the site) which maintains properly trained personnel and adequate spare parts and is able to respond and complete repairs within 24 hours.
 6. The proposed substitute item meets or exceeds the experience and/or equivalency requirements listed in the appropriate Technical Specifications section.

****END OF SECTION****

Substitution Request Form

To: _____

Project: _____
Sacramento Area Sewer District

Owner: _____

Specified Item: _____

Section	Page	Paragraph	Description
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The undersigned requests consideration of the following:

Proposed Substitution: _____

Attached data includes product description, specifications, drawings, photographs, performance data, and test data adequate for evaluation of the request. Applicable portions of the data are clearly identified.

The undersigned states that the following paragraphs, unless modified on attachments, are correct:

1. The proposed substitution does not affect the equipment layout or dimensions shown on the Plans and will not require a change in any of the Contract Documents.
2. The proposed substitution provides equipment and/or material that is equal to or better than the equipment and/or material specified in the Technical Specifications.
3. The proposed substitution will have no adverse effect on the construction schedule (specifically the date of all schedule Milestones), or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.
5. The incorporation or use of the substitute in connection with the work is not subject to payment of any license fee or royalty.

The undersigned further states that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified item.

Submitted by: _____ Reviewed by: _____

Signature _____	<input type="checkbox"/> Accepted	<input type="checkbox"/> Accepted as Noted
Firm _____	<input type="checkbox"/> Not Accepted	<input type="checkbox"/> Received too Late

By: _____

Title: _____

Date: _____ Date: _____

Telephone: _____ Remarks: _____

Attachments: _____

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SECTION 00 43 33

PROPOSED PRODUCTS FORM

Bidders shall designate the manufacturer or supplier of the equipment, materials and systems listed below. The listed manufacturers and suppliers have products which comply with the requirements of the specifications. Circle one manufacturer or supplier for each item. Failure to designate a manufacturer or source for any item may render the bid unresponsive to the invitation to bid and may be a basis for rejection of the bid. Other manufacturers may be proposed if a blank space is provided for that particular item. The circling of more than one for each item to be furnished shall not be permitted. Failure to comply with this requirement may render the bid non-responsive and may cause its rejection.

A manufacturer or supplier may request a proposed substitution in accordance with the SUBSTITUTION REQUEST FORM Section 00 43 25.

Item	Description	Section	Manufacturer/Supplier
1.	Top Opening Inline High Strength Waste Macerators	46 24 23	a. <u>Vogelsang</u> b. _____ c. _____
2.	Rock Trap	Dwg. G10	a. <u>Lakeside</u> b. _____ c. _____

****END OF SECTION****

SECTION 00 73 19

HEALTH AND SAFETY REQUIREMENTS

1.01 GENERAL

- A. All operations shall conform to applicable occupational safety and health standards, rules, regulations and orders which include, but are not limited to: Title 29 of the Code of Federal Regulations and the Electrical, Construction, Tunnel and General Industry Safety Orders issued by the Division of Industrial Safety (Cal/OSHA) of the State of California. In the event of a conflict between the requirements in the referenced standards, the most stringent standard shall prevail.
- B. The Contractor shall submit their Injury and Illness Prevention Program (IIPP) for review.
- C. All contractors, vendors and visitors will wear hardhats and safety vests at all times while in construction areas. In addition, if necessary, but not limited to: appropriate foot, eye and ear protection shall be worn.
- D. Contractor shall have a Site Specific Safety Plan that has been specifically prepared for the contemplated work. Site Specific Safety Plan shall comply with section 3203 of Cal/OSHA and shall be applicable to all individuals engaged in the Work, including the Contractor's subcontractors, suppliers and others.
- E. An Emergency Action Plan and a Fire Prevention Plan in accordance with sections 3220 and 3221 respectively of Cal/OSHA shall be included in Site Specific Safety Plan.
- F. The responsibility for safety rests with the Contractor who must provide a safe work site for workers and other individuals entering the area.
- G. District reserves the right to stop any work activity that creates a serious safety violation as defined by Cal/OSHA,

1.02 PROJECT SPECIFIC SAFETY PROGRAM

- A. Project Specific Safety Program shall include:
 - 1. Designation of Safety Manager. A resume shall be provided.
 - 2. Detailed description of Project Specific Safety Plan.
 - 3. Policies and procedures to ensure compliance with regulations.
 - 4. Staffing plan and organization chart for implementation of the safety program.
 - 5. Training program including new employee orientation.

6. List of equipment, supplies, materials and personal protective devices that will be available and utilized.
 7. Description of accountability for foreman and supervisors.
 8. Site Specific Emergency Response Plan for accidents/incidents and injuries.
 9. Description of accident investigation and reporting procedures.
 10. Description and frequency of tailgate and regular safety meetings.
 11. Participation of subcontractors, suppliers and others in Project Safety Program.
 12. Method of identifying, correcting, or remedying situations that are unsafe or not in compliance with Project Safety Program.
 13. Plans and procedures for confined space entries.
 14. Provisions for excavation safety.
 15. Procedure for preparation of Work Permits.
 16. Method to remedy nonconforming situations.
- B. Project Specific Safety Program and revisions shall be reviewed by a full time Safety Professional. The full time Safety Professional shall state that the Project Specific Safety Program is adequate and complies with the regulations applicable to the Work. The Project Specific Safety Program shall be submitted to the District Representative, for review, prior to commencement of work and shall remain in effect until the Work has been completed. Project Specific Safety Plan shall be reviewed, updated, and changes submitted as they occur.

1.03 SAFETY MANAGER

- A. A Safety Manager shall be designated who has responsibility for safety of the Work and who has the duty to implement and secure compliance with the Site Specific Safety Plan. This individual - shall have the authority to act and affect all aspects of the Project Specific Safety Program. Safety Manager shall have the authority to remedy or correct any unsafe or noncompliance situations or problems.
- B. Safety Manager or designated alternate individual shall be on site when Work is being pursued. Contractor will be permitted to designate an alternate individual to act on behalf of Safety Manager when Safety Manager is absent from the work site.
- C. Safety Manager shall have 5 years of industrial and heavy construction experience on projects similar to the Work. Three years of this experience shall involve full-time, construction site safety responsibilities. Safety Manager shall be knowledgeable of occupational health and safety rules and regulations.

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- D. Safety Manager shall prepare Work Permits for each confined space entry and shall organize and observe each entry.
- E. Safety Manager and a District Representative shall tour the site on a weekly basis to observe the Work.

1.04 PROTECTION OF WORKERS

- A. The EchoWater Facility receives sewage and industrial wastes. There is a possibility that solvents, fuels and hazardous material may be in the wastewater. The wastewater and the associated facilities should be considered contaminated. Individuals who contact wastewater, debris or existing facilities should take appropriate safety and health precautions such as personal protective equipment and inoculations for disease.
- B. Safety equipment and precautions shall be utilized to protect workers, District personnel, and the general public during the work.

C. NIGHTTIME LIGHTING CONTROL

- 1. If nighttime construction lighting is required, the construction contractor shall shield and orient lighting downward and directed away from any nearby biological receptors to minimize effects. Lighting shall be directed toward active construction areas only, and shall have the minimum brightness necessary to ensure worker safety.

1.05 WORK PERMITS

- A. There are areas and operations at the EchoWater Facility which are potentially hazardous or dangerous if the appropriate precautions are not taken. The Work Permit process is utilized to review proposed work activities and to ensure good work practices and appropriate safety measures are followed. Contractor is required to prepare Work Permits and comply with the stipulated conditions. A Work Permit shall provide a detailed description of the proposed activities and sequencing.
- B. The Work Permit procedure is described in the COORDINATION WITH OCCUPANTS Section (01 14 16). Examples of activities which require a Work Permit are:
 - 1. Operations that have open flames, the potential for sparks or activities that may result in high temperatures. Examples include welding, cutting, grinding and electrical work.
 - 2. The use of tools or electrical equipment in classified areas.
 - 3. Work on equipment or piping which contains, or has contained, a flammable or hazardous material, chemical or gas. Work on or in proximity to chemical or gas storage facilities.
 - 4. The use of hazardous materials.

5. Activities which involve electricity at greater than 500 volts.
6. Activities that involve pressures greater than 150 psi.
7. Activities that involve work in a confined space including the opening of vaults and manholes.
8. Activities that involve special precautions required by Cal/OSHA.

1.06 REPORTING

- A. Monthly, Safety Manager shall prepare and submit a narrative report describing actions, incidents, near-misses and topics related to safety. The report shall indicate past events and proposed future activities. A summary of events of weekly job site tours shall be included.
- B. All incidents that are reportable on OSHA Form 300 or that result in property damage in excess of \$1,000 shall be promptly reported to District. A detailed description of the incident including names and statements of witnesses shall be provided within 5 days of the occurrence.
- C. Contractor shall inform the District within 5 days of any claims, suits, or citations of violations that may arise from an incident or injury.

1.07 NON COMPLIANCE

- A. When a serious hazard is identified, the Contractor will receive a verbal notification of the problem and a request to rectify the situation. If the situation is not corrected in the allotted time or reoccurs, a written notification will be issued to the Contractor that will clearly describe the condition, date Contractor initially was notified, the recommended action and the expected date of compliance. If the situation is not corrected, the Contractor's worker's compensation insurance carrier will be notified.

****END OF SECTION****

SECTION 01 14 00

WORK RESTRICTIONS

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

- A. The work may be subdivided into one or more work items. A work item shall be completed as a unit or subproject in accordance with the Contract. The required completion of a work item by a certain deadline may be necessary due to other construction constraints.
- B. The details of each work item are in the specifications and on the drawings. The completion of a work item shall provide an operating system or facility that is substantially complete and available for utilization. All work shown on the plans and in the specifications is required, whether or not it is specifically addressed in the table of work items in this section.
- C. The work items listed below describe phases of work and their respective requirements. Substantial completion of a work item includes successful completion of all testing. The Work Items and the Contractor Requirements are listed below in Table 1 and Table 2, respectively. Table 1 is itemized numerically and Table 2 is cross-referenced alphabetically. Likewise, Table 2 is itemized alphabetically and Table 1 is cross-referenced numerically.
- D. The Contractor shall observe the following general requirements:
 1. The District will drain existing piping, equipment or structures to the level of the lowest existing drain line. The depth of water remaining in a given pipe, equipment, or structure will vary depending on the distance of the drain from the leakage source. The District will remove any large deposits of solids; however, there may be a solids residue remaining on any surface. Any subsequent cleaning or further draining and/or dewatering shall be provided by the Contractor.
 2. The Contractor shall provide all necessary temporary pumps, piping, electrical wiring, controls and labor during and subsequent to all shutdown activities as required. Pumps and upstream water levels shall be continuously monitored by the Contractor during all temporary pumping operations to insure against process upsets, flooding, and bypassing.
 3. The Contractor shall maintain adequate access to the plant facilities, utilities, and equipment during construction to allow continued operation and maintenance by plant personnel to take place.

4. Some shutdowns will have to take place during other than normal working hours, such as early mornings, nights, holidays, and weekends. Where these are foreseen, they have been identified in this section.
5. The Contractor shall limit shutdowns of existing substations, feeders, and motor control centers to periods when workers are actually performing work on the affected equipment. Only one of the two 12kV feeds to any area substation/double-ended switchgear may be shut down at any time, unless otherwise approved by the District. Entry into electrical manholes for cable work may be prohibited on weekends or restricted during wet weather depending on the criticality or redundancy of the affected system. All electrical shutdowns shall be returned to service on nights, weekends, and holidays, unless approved by the District.
6. The Contractor shall coordinate all crafts and subcontractors to minimize the number and duration of shutdowns. Non-coordinated shutdowns that result in a cost of manpower or materials to the District shall be back-charged to the Contractor and will be deducted from progress payments.
7. The Contractor shall note that all slide gates leak, and some sluice gates and valves leak. The Contractor is required to remove leakage of any liquids including wastewater and sludge from work areas and operating areas.
8. The discharge point and rate of drainage and/or dewatering operations is subject to District approval.
9. All existing equipment and processes shall remain under control of the District. New equipment which has been connected to existing processes may be operated by the Contractor only with prior approval of the District.
10. The Contractor shall design and provide all necessary bulkheads, cofferdams, and support structures to allow isolation from work areas of basins, tanks, and/or channels which are in service. Bulkheads, cofferdams, and support structures shall conform with applicable OSHA requirements.
11. Access requests are required in accordance with the COORDINATION WITH OCCUPANTS Section (01 14 16) for all activity that affects an existing facility or operation including testing and the movement of personnel and vehicles at the plant.

1.02 WORK ITEMS

Table 1. Work Items

Item Number	Work Item Description	Contractor Requirement Cross Reference
1	Grinder and control panel demolition.	A, B
2	Installation of new grinders and control panels.	C

Table 2. Contractor Requirements

Requirement Number	Requirement	Work Item Cross Reference
A	Demolition work shall not be started until the submittal for the replacement grinder and corresponding control panels are approved. Coordinate demolition work using the Access Request (AR) Process.	1
B	SacSewer staff will disconnect electrical and control panel wiring in order for contractor to perform demolition work. SacSewer staff will replace electrical and control wiring as necessary for the new grinders. Assume 15 working days for SacSewer to replace wiring.	1
C	Coordinate with SacSewer the placement of the new control panels. Contractor shall anchor the control panels in proximity of the grinders. SacSewer will install the new sections of conduits to connect to new control panels, run new wires and connect to new equipment. Contractor shall obtain the services of the equipment manufacturer's representative to verify mechanical, electrical installation and certify it.	2

1.03 SCHEDULE CONSTRAINTS

- A. As noted above, the Contractor may not proceed with Work Item No. 1 until the SacSewer authorizes such action.

**** END OF SECTION ****

SECTION 01 14 13

ACCESS TO SITE

1.01 PROJECT LOCATION

- A. The work specified under this Contract will be performed at the EchoWater Resource Recovery Facility (EchoWater Facility). The EchoWater Facility is located south of the Sacramento City limits, west of Franklin Boulevard and north of Sims Road at 8521 Laguna Station Road, Elk Grove, California 95758.

1.02 SITE ACCESS AND ACCESS ROADS

- A. Access to the Plant for construction related traffic shall be via either the Dwight Road Security Gate or the Laguna Station Road Security Gate. If special access is required coordinate with the District Representative.
- B. Contractor is required to submit an Access Request (AR) for District approval prior to mobilizing any equipment or facilities onto the construction site in accordance with the COORDINATION WITH OCCUPANTS Section (01 14 16). Contractor's AR for mobilization shall include but not limited to a site plan showing access routes, office location, sanitary facilities location, storage yard, parking areas, temporary construction fencing, and temporary walkways around construction site. Contractor shall coordinate with the District Representative prior to submitting the AR.
- C. Contractor shall be aware that Dwight Road and other roads within the site will be utilized by other contractors and EchoWater Facility personnel during the duration of this contract.
- D. The Contractor's personnel will be required to park personal vehicles in the approved or designated areas. Each Contractor shall be responsible for policing the common parking area for cleanliness and efficient parking procedures to ensure use by all. Existing parking in the process area may not be used by the Contractor's workers.
- E. The Contractor will maintain a visitor log to document the arrival and departure of all delivery personnel and periodic visitors. In the event that a staff member leaves the site before end of shift, this action will be recorded in the Contractor's visitor log.
- F. In the event of an evacuation, the contractor and all staff, subcontractors, delivery personnel and visitors will report to the congregation area with copies of the attendance sheets and visitor log for roll call. All personnel will remain at the congregation area until released by authorized District Management.

1.03 CONTRACTOR IDENTIFICATION BADGE POLICY AND PROCEDURES

- A. IDENTIFICATION:

1. All Contractor and subcontractor staff assigned to work at the EchoWater Facility shall obtain an identification badge after completion of safety training and shall carry their badges at all times while at the EchoWater Facility.

B. TRAINING:

1. All Contractor staff must attend EchoWater Facility Safety Orientation and badge use training at a minimum prior to issuance of badges. Training is anticipated to be 3 hours total in duration and can include the environmental and cultural education training.

C. BADGE SECURITY LEVELS:

1. Contractors and subcontractors will have different access authority levels through process security gates depending upon the time of day, and/or their assigned duties.
2. If access is denied, contact the District Representative.

D. FORGOTTEN BADGE:

1. If a person forgets their badge, they will have to enter the EchoWater Facility as a visitor. This requires checking in and out of the EchoWater Facility with the security guard at the gate.
 - a. Use the inside entry lane (closest to the guard station).
 - b. Guard will ask visitor's name and other information.
 - a. Guard will require visitor to contact someone from their company or project to meet them at the gate and escort them onsite.
 - b. Visitor will need to report to reception to get a visitor's badge for the day. The visitor badge must be picked up and dropped off every day at reception until a replacement badge is received.
 - c. Leave facility using inside exit lane (closest to guard station).

E. LOST BADGE:

1. A badge categorized as forgotten will be considered lost after 72 hours. Lost badges shall be reported to the District Representative as soon as the loss is realized. A replacement badge will be issued and the lost badge will be deactivated and will no longer work in the security system. If found, the lost badge shall be turned into the District Representative.

1.04 MAIN GATE ENTRY/EXIT PROCEDURES

A. GENERAL:

1. Badges are required to enter or exit through the guard gate stations. Every vehicle must badge through the gates, no "piggy backing" of other vehicles is allowed.
2. There are three entrance and three exit lanes at the Dwight Road Security Gate:
 - a. The outside lanes are exclusively for persons with badges.
 - b. The **inner lanes** are to be used by
 - 1) Visitors;
 - 2) Deliveries; and
 - 3) Employees without badges
3. There are three "cell-phone pullout" areas outside of the Dwight Road Security Gate. For the ingress traffic, a single pullout area is provided on the east side of Dwight Road to allow visiting vehicles and trucks to park and obtain additional information from the receiving party, if needed prior to reaching the gate. Unexpected visitors who proceed to the gate without prior notification to receiving parties could be directed to use the reject route to turn around at the gate., They would then utilize either of the two pullout areas provided for the egress traffic on the west side of Dwight Road to contact a receiving party for permission to enter. If permission is granted, the receiving party shall notify the guard at the gate to allow entry of the visitor.

****END OF SECTION****

SECTION 01 14 16

COORDINATION WITH OCCUPANTS

1.01 GENERAL

- A. Contractor work activities that impact existing District operations, property or facilities (such as pipelines, ductbanks, manholes, treatment processes, environmental resources, and access roads to District facilities) require an approved, signed Access Request (AR) prior to commencement of work. Interruption of flow or connection to an existing system or interceptor requires a Shutdown Plan and Location Map to be included with the Access Request. In addition to the Shutdown Plan, any activity that requires special safety precautions to be taken will require a Safety Work Plan to be included with the Access Request.
- B. Access Request:
 - 1. Allows District Operations time to review the proposed work and to schedule and coordinate necessary process or equipment shutdowns,
 - 2. Allows District Safety office review of proposed work and contractors' safe work practices related to the specific work to be performed,
 - 3. Informs the contractor of any special hazards or exposures related to the specific work.
- C. The District maintains permits to collect, treat and discharge wastewater. These permits establish discharge limits for wastewater, storm water, and air emissions and establish spill reporting requirements and fines. Violation of District permits shall not result from the Contractor's work. Any unauthorized discharge or spill shall immediately be reported to the EchoWater Facility Plant Control Center (916-875-9400). The District will require the Contractor to stop or restrict any activity that has or could result in an unauthorized discharge or permit violation. The District will prevent or remedy the situation by the most expeditious means. The Contractor will be responsible for all costs incurred including fines.

1.02 REQUIREMENTS

A. COORDINATION AND ACCESS:

1. Activities that affect the operation of existing District equipment, including EchoWater Facility processes, Interceptor pipelines or facilities, or access to District property will require coordination between District and Contractor.
2. Access Requests are generally required based on impending work activities discussed at weekly construction coordination meetings, and approval is issued jointly by the District O&M Support office and District Safety Office.
3. Unrestricted access for District personnel and equipment shall be provided at all times to existing facilities, unless a reduced level of access is explicitly allowed in the approved Access Request.

1.03 SCOPE

- A. An Access Request provides notification of a Work Item or other activity proposed by the Contractor. An Access Request describes the contemplated work including when, where and how it will be accomplished. An Access Request shall be submitted by a qualified representative of the Contractor who is familiar with all aspects of the work and pertinent safety requirements. An Access Request may be required whenever any of the following conditions are contained in or will be affected by Contractor's work:
1. General Project mobilization or District property access,
 2. Work in, connection to, or removal of any pipeline, manhole, pump station, asset or wastewater process or equipment.
 3. Any work that may impact environmental resources on District property,
 4. Any work that may impact or disrupt other activities on District property such as leased agricultural operations, scientific studies, or concurrent construction projects,
 5. Excavation on District property by location, dewatering of any excavation, structure, tank, vessel, or piping system
 6. Installation or removal of bulkheads, cofferdams and isolation devices
- B. Depending on the activities within the project, multiple Access Requests may be required.
- C. A fully completed Access Request form shall be submitted in accordance with the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26) at least 10 working days prior to the date proposed for commencement of work. An Access

Request meeting may be required prior to the approval of the work or upon the District's request.

- D. Contractors are required to describe the proposed work activity, indicate the property, system or equipment that will be affected, list the labor and equipment to be utilized, indicate the date, time and duration of the work, describe measures that will be implemented to reduce impacts to District property and facilities, and describe safety precautions to be observed. Drawing and section numbers shall be indicated where appropriate. A Shutdown plan shall be included with the Access Request when the work affects an existing system or process.
- E. The Contractor shall plan and schedule Access Requests as early as possible. An Access Request will be reviewed and returned within 10 working days after submission of all necessary information. Sufficient information and detail shall be included with an Access Request to permit District to evaluate the proposed operation and the associated risks. Insufficient information on an Access Request may delay approval within 10 working days.
- F. Contractor shall not be allowed to proceed with any work, or any portion of the work, described in an Access Request without complying with all the conditions, in their entirety, of the Access Request approval. All conditions of approval, including additional safety precautions added by the District Safety Office, shall be complied with and effectively communicated to Contractor's personnel and subcontractors. If the Contractor does not agree with the additional safety requirements, work shall not start until resolution is attained. Changes in the proposed activities or field conditions of an Access Request, or delay of the work, will require the submission of a new or revised Access Request.

1.04 SHUTDOWN PLAN

- A. A Shutdown Plan shall be included with an Access Request whenever an existing operating system or facility such as a pipeline, basin, tank, channel, power supply, control circuit, instrumentation, equipment, pump, meter, or structure is affected. Shutdowns shall be planned and coordinated to minimize the number and duration of activities that affect existing operations.
- B. The District will limit the duration of shutdowns for critical systems. Stated durations are the total time period between when the system is made available to Contractor and when it is ready for return to service. If the Contractor cannot complete the work within the allowed time, Contractor shall immediately request an extension from the District. If the District does not approve the requested extension, Contractor shall complete the work or return the system to operable condition. The District will complete the work if

Contractor does not return the system to operable condition as directed. Contractor is responsible for extra costs or damages incurred by the Contractor or the District to meet these requirements.

C. Requirements:

1. Designate the equipment or system that will be affected or removed from service. Describe the work to be undertaken. Identify the portion of the system that will be isolated, dewatered, decommissioned, de-energized, depressurized, or drained.
2. List the labor, equipment, materials, tools, utilities and incidental items to be used.
3. Indicate measures to prevent discharge of wastewater, stormwater pollution, odor or disruption of treatment processes.
4. Indicate dewatering method and means for disposal of leakage water.
5. Provide details for bulkheads, cofferdams and isolation devices.
6. Describe safety precautions and equipment.
7. Describe recovery plan if the shutdown cannot be completed as planned
8. List activities to be done by the District.
9. Indicate the time estimated to complete the shutdown.

**** END OF SECTION ****

SACRAMENTO AREA SEWER DISTRICT

ACCESS REQUEST

This document shall remain at the work site until work/tasks listed are completed

Prime Contractor	Contract #	Date:
Sub-Contractor	AR #	Revision
Contact for Contractor	Work Item #	CPM Activity #
Phone	<input type="checkbox"/> Work Plan Attached	<input type="checkbox"/> Drawing Attached

PART 1 - CONTRACTOR WORK PERMIT

Start Date/Time	Completion Date/Time
-----------------	----------------------

Reference Contract Drawings/Specifications

Equipment or System to be Worked On

Location of Work

Provide Change Management Package (CMP) # if appropriate:

Type of Work (check all that apply)	<input type="checkbox"/> Civil	<input type="checkbox"/> Mechanical	<input type="checkbox"/> Electrical	<input type="checkbox"/> Instrumentation
	<input type="checkbox"/> Process	<input type="checkbox"/> Coating	<input type="checkbox"/> Hotwork	<input type="checkbox"/> Other (specify)
	<input type="checkbox"/> Mobilization	<input type="checkbox"/> Traffic/Ped, Access	<input type="checkbox"/> Shutdown	

Description of Work

Anticipated Hazards

Tools/Equipment to be used	<input type="checkbox"/> Cutting/Welding Torches	<input type="checkbox"/> Arc Welders	Jack Hammers
	<input type="checkbox"/> Power Saws	<input type="checkbox"/> Grinders	Pneumatic Tools
	<input type="checkbox"/> Backhoe	<input type="checkbox"/> Crane	Radioactive Test Device
	<input type="checkbox"/> Other		

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Access Request - Page 1 of 3

Access Request Instructions:

1. Follow processing instructions in Access Request Procedure for either Capitol Improvement Project (CIP) or non CIP.

PART 2- CONTRACTOR SAFETY PRECAUTIONS

All items checked will be complied with/used in accordance with applicable safety standards (CalOSHA, UFC, etc.) and requested contractor's safety program.

<p>HOT WORK PLAN</p> <p><input type="checkbox"/> Isolate Combustibles</p> <p><input type="checkbox"/> Fire Watch</p> <p><input type="checkbox"/> Fire Extinguishers</p> <p><input type="checkbox"/> Flash Protection</p>	<p>REVIEW EMERGENCY PROCEDURES/ALARMS</p> <p>Gas Management Areas</p> <p>Other _____</p> <p>_____</p>
<p>AIR MONITORING</p> <p>Continous</p> <p>Periodic</p> <p>Frequency _____</p>	<p>HOUSEKEEPING</p> <p><input type="checkbox"/> Debris Removal</p> <p><input type="checkbox"/> Dust Control</p> <p><input type="checkbox"/> Maintain access to/through worksite</p>
<p>POTENTIAL ATMOSPHERIC HAZARDS TO BE MONITORED</p> <p><input type="checkbox"/> Oxygen Deficiency</p> <p><input type="checkbox"/> Oxygen Enrichment</p> <p><input type="checkbox"/> Combustible Gases</p> <p><input type="checkbox"/> Toxic Gases</p> <p><input type="checkbox"/> Other _____</p>	<p>EXCAVATION/TRENCHES</p> <p>Shoring</p> <p>Sloping</p> <p>Benching</p> <p>Barricades</p> <p>Excavation Plan Submittal Number _____</p>
<p>HAZARDOUS MATERIALS TRAINING</p> <p><input type="checkbox"/> Substance(s) _____</p>	<p>ELEVATED AREAS</p> <p>Fall Protection</p> <p>Guardrails</p>
<p>ENERGY CONTROL PROCEDURES</p> <p>Lockout</p> <p>Blockout</p> <p><input type="checkbox"/> Tagout</p>	<p>PIPING/EQUIPMENT OPENING AND/OR ENTRY (ensure prior to opening)</p> <p>Effectively Isolated</p> <p>Depressurized</p> <p>Drained</p> <p>Purged/Flushed of Hazardous Substances</p>
<p>VENTILATION</p> <p>Natural Only</p> <p>Auxiliary, Continuous</p>	<p>ABATEMENT ACTIVITIES</p> <p>Asbestos (Article 4 § 1529)</p> <p>Lead (Article 4 § 1532.1)</p>
<p>CONFINED SPACE PROCEDURES</p> <p><input type="checkbox"/> Permit Required <input type="checkbox"/> Personnel Retrieval System</p> <p><input type="checkbox"/> Non-permit <input type="checkbox"/> Communication w/Entrant</p> <p><input type="checkbox"/> C-5 <input type="checkbox"/> Rescue personnel @ site</p> <p><input type="checkbox"/> Entry Permit @ site <input type="checkbox"/> Supplied Air</p>	<p>OTHER SAFETY PRECAUTIONS</p> <p>_____</p> <p>_____</p> <p>_____</p>

AR SUBMITTAL SIGNATURE BLOCK

Contractor signs below after page 1 and 2 are filled out with sufficient detail to allow AR to be reviewed. Contractor identifies all anticipated safety items prior to signing below. Safety Office will initial next to any additional safety items that have been checked off during the AR review process.

--	--

Contractor Representative	Date
---------------------------	------

RE Comments See Attachment

Reviewed by Resident Engineer Date

Part 3 - APPROVERS' REMARKS

Area Supervisor Comments See Attachment

Approved by Area Supervisor Date

Safety Office Comments See Attachment

Approved by: SacSewer Safety Office Date

District Representative, Ops Support, Engineering Comments See Attachment

Approved by: District Representative, Ops Support, Engineering Date

SIGNATURE BLOCK

The work described by this Access Request has been reviewed. The work methods described and identified in Parts 1 & 2, and the additional safety precautions identified in Parts 2 & 3 will be complied with and effectively communicated to personnel assigned this task. If the contractor does not agree with additional safety precautions, work shall not start until resolution is attained.

Contractor Representative Date

- Distribution:**
- Operation Support
 - Safety Office Representative
 - Resident Engineer
 - O&M Manager 1 / 2
 - Ptocess Team Leader
 - Qther _____
 - Electrical Supervisor
 - Facility Manager
 - Project Engineer

Contractor (supplied by RE/District Representative)

***Note - Provide copies of approved ARs to applicable sections, always include O&M Manager I's in the distribution.**

SECTION 01 14 19

USE OF SITE

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

- A. The District's operating personnel will be responsible for operating the existing treatment plant throughout the execution of this contract. Do not adjust or operate serviceable or functioning equipment or systems.
- B. Equipment presently installed in the treatment plant must be safely available to plant personnel at all times for use, maintenance, and repair.
- C. If it is necessary in the course of operating the plant for the Contractor to move its equipment, materials, or any material included in the work, it shall be done promptly. The equipment or material shall be placed in an area which does not interfere with the plant operation.
- D. Requirements of this section include, but are not limited to, requirements specified in the COORDINATION WITH OCCUPANTS Section (01 14 16).
- E. The existing treatment plant will remain in operation throughout the execution of this contract. Schedule and conduct work to minimize necessary shutdowns and interference with normal plant operations and maintenance. An Access Request Form included and described in the COORDINATION WITH OCCUPANTS Section (01 14 16) shall be submitted to the District Representative each time access to existing facilities is necessary.
- F. Comply with the safety requirements of the EchoWater Resource Recovery Facility (EchoWater Facility) Safety Manual as a minimum when working in the Plant process area. Provide additional safety considerations which are deemed necessary to protect Contractor and District employees during the conduct of the work.
- G. Provide notice to the District Representative, in accordance with the COORDINATION WITH OCCUPANTS Section (01 14 16), 2 weeks prior to taking out of service any existing tank, pipeline, channel, electrical circuit, equipment or structure. Provide whatever temporary piping, pumping, power, and control facilities as required to maintain continuous plant operation and complete treatment except as otherwise specified. The integrity of existing plant utilities shall be maintained at all times.
- H. Contractor laydown area within the project site is designated on the design drawings.
- I. The Contractor's work force shall not use existing washrooms during the conduct of the work. The Contractor shall be responsible for keeping areas in the existing treatment

plant where work is done clean and safely accessible for the District's operating personnel.

****END OF SECTION****

SECTION 01 26 13

REQUEST FOR INTERPRETATION

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

- A. Contractor shall prepare a Request for Interpretation (RFI) when additional information, clarification or interpretation of the Contract Documents is needed. RFIs may also be used for apparent conflicts, inconsistencies, ambiguities, or omissions. "Request for Interpretation" and "Request for Information" shall have the same meaning.
- B. RFIs shall be submitted to the District Representative sufficiently in advance of the work to permit time for investigation and preparation of a response. Any work undertaken prior to receipt of a RFI response shall be at the risk of Contractor.
- C. RFIs generated during submittal and shop drawing preparation must be submitted by the Contractor sufficiently in advance to not only allow for investigation and preparation of a response, but also for inclusion of the response into the submittal and shop drawing. Failure by the Contractor to provide sufficient time will not be cause for entitlement to a time extension.
- D. RFIs shall not be used for submittals or for substitute of material, equipment or for waiving of requirements.

1.02 SUBMITTAL

- A. RFIs shall be submitted via the District-furnished, web-based, document control system in accordance with the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26). Each RFI shall deal with only one topic, item, issue or system.
- B. RFIs shall clearly describe the problem and specifically state what is needed. Relevant portions of the Contract Documents shall be cited, marked-up and attached.
- C. The Contractor shall review each RFI before submitting and compare it with the Contract Documents to verify that a response is required. RFIs will only be accepted from the Contractor and not from subcontractors or suppliers.
- D. A recommendation or proposed solution may be included when appropriate or expedient.
- E. Known schedule or cost impacts shall be noted in the RFI.

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Repairs Project

01 26 13 - 1

1.03 RESPONSE

- A. The District Representative will normally respond within 10 days. The Contractor shall indicate a priority for responses if more than five (5) RFIs are pending at the same time.
- B. The Contractor shall reply within 10 days if there is disagreement concerning the RFI response.
- C. Subsequent resubmittals shall be identified with the same RFI number and a consecutive letter designation. Resubmittals shall clearly state the reason for resubmitting.

****END OF SECTION****

SECTION 01 31 26

ELECTRONIC COMMUNICATION PROTOCOLS

PART 1 -- GENERAL

1.01 PROJECT CONTROL SYSTEM DESCRIPTION

- A. Contractor shall have hardware and software to send and receive email correspondence from the District. The District will use Microsoft Office software and the internet as the primary means of communication related to the Contractor's Correspondence, Submittals, Requests for Information (RFI), Access Requests, Progress Payment Requests, Non-Compliance Issues, and Daily Attendance Sheets.
- B. The Resident Engineer will maintain the official records of the communication, however all communication to and from the Contractor shall be in electronic format (email, shared folders, or external media) in accordance with the SUBMITTAL PROCEDURES Section (01 33 00).

1.02 SUBMITTALS

- A. Provide a list of Contractor's key personnel during preconstruction. Include descriptions of key personnel's roles and responsibilities for this project.

1.03 EQUIPMENT

- A. In order to process formal correspondence and other required documentation, the Contractor must have in place the required basic components outlined below:
 - 1. **HARDWARE:** The Contractor shall use computer hardware that meets the requirements of large-file size editing and transmission. The Contractor will upgrade their system(s) to meet or exceed the recommendations. Upgrading of the Contractor's computer systems will not be justification for a cost or time modification to the Contract.
 - 2. **SOFTWARE:** Adobe Acrobat Professional Version 2022 or Bluebeam Revu 2020 or later, Microsoft Edge or Google Chrome internet browsers, Microsoft Office 2021 or higher, or Microsoft Office 365. Other software may be utilized if compatible with the District's standards and approved by the District.
 - 3. **FACILITIES:** The Contractor shall be responsible for providing all computers, printers, plotters, scanners or other hardware and software for his use. All networking equipment and associated cabling within the Contractor's office is the responsibility of the Contractor.

1.04 USER ACCESS LIMITATIONS (DELETED)

1.05 CONTRACTOR RESPONSIBILITY

- A. Users shall be knowledgeable in the use of computers, including Internet Browsers, email programs, CAD drawing applications, and Adobe Portable Document Format (PDF) document distribution programs.
- B. Adobe PDF documents will be created through electronic conversion rather than optically scanned whenever possible. The Contractor is responsible for the training of their own personnel in the use of other programs indicated above, as needed.
- C. Entry of information exchanged and transferred between the Contractor and its subcontractors and suppliers shall be the responsibility of the Contractor.

1.06 TRAINING (DELETED)

****END OF SECTION****

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

- A. Submittals include, but are not limited to, product data, shop drawings, test procedures, test results, annotated PLC program listings, AutoCAD® generated drawings, samples, requests for substitutions, descriptive data, certificates, methods, schedules, marked contract drawings and specifications, manufacturer's installation and other instructions, and miscellaneous work related items. Submittals also include all other information as may reasonably be required, in the opinion of the District Representative, to demonstrate fully that the materials and equipment to be furnished and the methods of work comply with the provisions and intent of the contract documents. Additional submittal requirements are specified in each individual section of the specifications. Items to be submitted are specified in these individual technical specification sections.
- B. All submittals will be submitted via the Project Controls System (PCS) as described in the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26). Minimum size lettering height on all submittals shall be 12 point font for text documents, 1/16 inch height for 8-1/2 by 11 inch and 11 by 17 inch documents and 1/8-inch height for documents larger than 11 by 17.
- C. The review of the Contractor's drawings or other descriptive material shall not relieve the Contractor of responsibility for any error or of any obligation for accuracy of dimensions and details, for agreement and conformity with the contract drawings and specifications, or responsibility to fulfill the contract. If errors or omissions exist in the Contractor's submittals which are not noted by the District during the District's review, it shall be the Contractor's responsibility, at no additional cost to the District, to correct the errors and omissions, to correct field conditions, and to repair any damage inflicted to new or existing equipment and other improvements as a result of the errors or omissions.
- D. All submittals shall include all applicable District-assigned Equipment ID/Tag numbers on the transmittal cover.
- E. Where specified, the Contractor shall furnish submittals to the District Representative for information only. An electronic version shall be transmitted to the District Representative. Designation "For Information Only" does not preclude the District

Representative from reviewing or commenting on the submittal contents as specified in this section.

- F. All other submittals shall be submitted by the Contractor to the District Representative for review, comment, and approval. An electronic version shall be transmitted to the District Representative.
- G. All submittal data including shop drawings will become part of the and O&M data and project records furnished under the PROJECT RECORD DOCUMENTS Section (01 78 39) and the OPERATION AND MAINTENANCE DATA Section (01 78 23). All changes or modifications during construction to original equipment submittals must be recorded and become part of the project record and O&M process as outlined in their respective sections.

1.02 DEFINITIONS

A. GENERAL:

- 1. The definitions of types of drawings, diagrams and other forms of submittal documents shall include the terms used in the following paragraphs. Whenever the following terms for drawings or other forms of submittal documents are used in submittal requirements, the definitions in the following paragraphs shall apply. The following set of definitions is not comprehensive. They are included to help clarify the meanings of certain terms applicable to mechanical, electrical, instrumentation and control system documents.

B. PANEL FABRICATION DRAWINGS:

- 1. Panel fabrication drawings are scaled drawings that shall show the physical dimensions, materials, and construction of panels, cabinets, terminal boards, consoles, or other electrical or mechanical equipment enclosures. These drawings show the physical arrangement and mounting of all components in or on a panel, terminal board, cabinet, console, or enclosure. These drawings show the physical dimensions, and the space and mounting requirements of mechanical, electrical, control and instrumentation devices or pieces of equipment. Other information provided may include ventilation requirements, locations of connections, weight, and paint color, material and dry film thickness.

C. ELECTRONIC ASSEMBLY DRAWINGS:

- 1. Electronic assembly diagrams shall document circuit board assemblies, enclosures, and associated devices. They include circuit schematics, circuit board assembly drawings, and chassis layouts which show, locate, and identify all circuit assemblies, components, and component electrical connections and wiring.

D. BILL OF MATERIALS:

1. Materials identified on the drawing and listed by item number, a brief description, manufacturer, model number (and/or page number), serial number (if available), and quantity used. Associated equipment numbers must be shown. The items must match the field installation and the drawing.

1.03 STANDARD COMPLIANCE

- A. When materials or equipment are required to conform to the standards of organizations such as the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL), documents showing or proving conformance shall be submitted.
- B. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual sections. In lieu of the label or listing, the Contractor shall submit a certificate from an independent testing organization which is competent to perform acceptable tests and is approved by the District's Representative. The certificate shall state that the item has been tested and found to be in conformance with the specified organization's standard. For materials and equipment whose compliance with organizational standards or specifications is not regulated by an organization using its own listing or label as proof of compliance, a certificate of compliance from the manufacturer shall be submitted for approval. The certificate shall identify the manufacturer, the product and the referenced standard and shall state that the manufacturer certifies that the product conforms to all requirements of the project specification and of the referenced standards listed.

1.04 SUBMITTAL REVIEW

- A. When review and comment is required of any drawing or information regarding materials and equipment, the Contractor shall post the submittal information to the Project Control System in accordance with the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26). Within a reasonable time as specified in this section after receipt of said submittal, the District Representative will return electronically one copy of the submittal documents indicating one of the following four actions by item number:
 1. If review and comment indicates no exceptions, copies will be returned marked "NO EXCEPTIONS TAKEN". Work may begin immediately on incorporating the material and equipment covered by the submittal into the work.
 2. If review and comment indicates limited corrections are required, copies will be returned marked "MAKE CORRECTIONS NOTED". Work may begin immediately on incorporating the material and equipment covered by the submittal document into the work.

- a. If the District Representative determines that follow-up documentation needs to be submitted to demonstrate that the corrections have been incorporated, the District Representative will indicate as such in the submittal comments. The Contractor may submit the additional documentation at a later date and not delay the work.
 3. If review and comment indicates insufficient or incorrect data has been submitted, copies will be returned marked "AMEND AND RESUBMIT." The Contractor is not authorized to begin incorporating the material and equipment covered by this submittal document into the work until the submittal document is revised, resubmitted and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".
 4. If review and comment indicates the material and equipment submittal is unacceptable, copies will be returned marked "REJECTED - SEE REMARKS". The Contractor is not authorized to begin incorporating the material and equipment covered by this submittal into the work until a new submittal is made, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".
- B. When submittal documents are referred to in these specifications as "approved," "reviewed" or "accepted," this means that they are stamped as in case 1 or 2 above.
- C. Designation of submittal documents "for information only," does not preclude the District's Representative from reviewing or commenting on the submittal contents. Information only submittals returned to the Contractor marked "AMEND AND RESUBMIT" or "REJECTED - SEE REMARKS" shall be revised and resubmitted by the Contractor.

PART 2 -- PRODUCTS

2.01 SHOP DRAWINGS

A. GENERAL:

1. Shop drawings shall include data of all forms which have been custom prepared for this project. This includes detail drawings for structural, architectural, mechanical, piping, HVAC, electrical, logic diagrams, software programs, electronic, instrumentation, control, and communication equipment, assemblies, and systems which are installed or fabricated as a part of this project. All shop drawings shall be drawn in CAD format, as specified in this section, at an approved drawing scale. Also included are drawings and data which show fabrication, layout, setting or erection details. This includes any data which is prepared by the Contractor, subcontractors, vendors, suppliers, manufacturers or their representatives, specifically for this project.

2. Shop drawings shall have drawing numbers, scale, revision date and number, Contractor name, subcontractor name, supplier name, name of detailer or engineer who prepared the document, relation to adjacent structures, materials, drawing cross references, standards references, Contractor's certification stamp, and registered engineer's stamp, if required, shown on them. Maximum sheet size shall be 22 inches by 34 inches. Minimum sheet size for drawings shall be 11 inches by 17 inches, except as allowed by the District Representative.
3. All final shop drawings shall incorporate the Equipment ID/Tag numbers where assigned by the District and not contractor-assigned or vendor-assigned equipment identification numbers.

B. CAD DRAWINGS: (DELETED)

C. ELECTRICAL AND CONTROL DOCUMENT REQUIREMENTS:

1. GENERAL:

- a. For each piece of mechanical equipment and for each process instrumentation and control loop, all applicable electrical and control documents specified herein shall be submitted as a package.
- b.

2. PANEL FABRICATION AND LAYOUT DRAWINGS:

- a. As a minimum, panel fabrication and layout drawings shall include a bill of materials; front, back, and section views; the locations of all components to be mounted in or on the panel, terminal boards, cabinet, console, enclosure or assembly; drawing scale; nameplate engraving schedule; and structural materials and supports. All drawings shall be drawn to an approved scale. Overall dimensions and minimum clearances shall be shown. Sufficient detail shall be included to demonstrate material choices, construction methods, and seismic force resistance. Panel drawings will show drawing references to appropriate connection diagrams, interconnects, and control and logic drawings.
- b. Panel fabrication and layout drawings shall be submitted for all assemblies, panels, terminal boards, cabinets and consoles which contain mechanical, electrical, and electronic devices and equipment and for the systems which contain these assemblies, panels, cabinets, and consoles. Outline drawings for mechanical and electrical equipment (sometimes referred to as "dimension drawings") shall be drawn to an approved scale and include, as a minimum, overall dimensions in front, back and section view, complete mounting frame details and dimensions, the location and size of all conduit entrances, the location and dimensions of any mechanical connections, and the weight of the device or equipment.

2.02 MANUFACTURER'S PRODUCT DATA

- A. Product data shall include data of all forms which define design, performance and function of manufactured products or materials. This includes all preprinted literature, performance specifications, drawings, instruction manuals, and data which are available from the original equipment manufacturer and/or supplier. Product data shall also include all software and firmware encoded on programmable device readable media. Specific Asset Attribute data related to the product data shall be submitted separately and is specified in the DESIGN DATA Section (01 33 16). Product data shall be submitted for all manufactured products and material as specified in this section and in the Technical Specifications, Divisions 03 through 50.

2.03 MISCELLANEOUS SUBMITTALS

- A. These include, but are not limited to, stormwater BMP plans and descriptions, warranties, guarantees, certifications, maintenance agreements, quality testing reports and similar information, devices and materials.

2.04 PROJECT RECORD DRAWINGS AND DATA

- A. Refer to the PROJECT RECORD DOCUMENTS Section (01 78 39) for the submittal requirements of as-built drawings and data.

2.05 OPERATION AND MAINTENANCE INSTRUCTIONS

- A. Refer to the OPERATION AND MAINTENANCE DATA Section (01 78 23) for the submittal requirements of operation and maintenance instructions. Operation and maintenance instructions will not be submitted until approved equipment or material submittals are received.

2.06 BURIED UTILITIES

- A. Plan and profile drawing shall be supplied for all outside underground utilities including, but not limited to, piping, electrical duct banks and cables. All plan and profile drawings

shall be submitted for as-built review in accordance with the PROJECT RECORD DOCUMENTS Section (01 78 39).

2.07 SCHEDULE

- A. Refer to the CONSTRUCTION PROGRESS SCHEDULE per Standard Sacramento County Specifications Section 7-5.01, .

PART 3 -- EXECUTION

3.01 SUBMITTAL REQUIREMENTS

A. GENERAL:

- 1. Submittals shall be reviewed and coordinated by the Contractor before transmittal to the District Representative. Submittals shall be complete and fully identified by the Contractor.

B. PREPARATION:

- 1. Each submittal shall contain documents which are related to only one material, product or system. Normally, a separate transmittal form shall be used for each specific item or class of material, equipment or system. Exceptions may be allowed only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates checking or review of the group or "package" as a whole. The Contractor shall mark each submittal document with the submittal number, letter suffix and item number.

C. TRANSMITTAL FORM:

- 1. The District Representative will define a submittal numbering scheme which the Contractor shall use. Items omitted, or incorrectly or ambiguously listed on the transmittal form will be deemed to be not included in the submittal. Where items listed in the transmittal by equipment number conflicts with other descriptions contained in the submittal, the listed equipment numbers shall be deemed to be the intended scope. The Contractor shall bear all costs and damages sustained to the District attributable to omitted, or incorrectly or ambiguously listed submitted items.
- 2. Submittals shall be transmitted by utilizing the District-furnished web based Project Controls System. Prior to the first submittal, the Contractor shall attend a submittal transmittal meeting to work out all compatibility requirements. Each transmittal shall contain the following information as a minimum:
 - a. Date
 - b. Submittal or re-submittal number

- c. Contract title and number
- d. Contractor's name and address
- e. List of documents being submitted, by preparer, number and version
- f. Contract documents references (including specific specification section and drawing numbers) for each submittal document
- g. EchoWater Facility system references for each submittal document
- h. Previous submittal number and item number for each submittal document
- i. Notification of deviation(s) from contract documents for each submittal document
- j. Complete list of equipment numbers and auxiliaries included with each submittal document
- k. Contractor's certification of having reviewed and coordinated the submittal
- l. Description of intended use in this contract

D. DOCUMENT IDENTIFICATION:

- 1. If multiple items are included within a single submittal, each separate document within the submittal shall contain the following information:
 - a. Document (Item) number within this submittal
 - b. Identification of product or material
 - c. Manufacturer's name
 - d. Equipment number

E. RESUBMITTALS:

- 1. Revise returned submittal documents as indicated and as required. Resubmit using the same submittal procedure as for an initial submittal. All resubmittals shall use the previous submittal number with a letter suffix and shall refer to the previous item number.
- 2. Resubmittals shall address all comments from the District Representative. Partial re-submittals may be returned "REJECTED." The Contractor will be responsible for the District Representative's review costs for each re-submittal in excess of the first resubmittal. These costs will be back charged to the Contractor and will be deducted from progress payments.

3. Time extensions will not be granted for delays resulting from the necessity for the Contractor to provide resubmittals due to inaccurate, incomplete or rejected submittals.

F. COORDINATION AND SEQUENCING:

1. Review priority will be based on the schedule unless otherwise requested in writing by the Contractor. The Contractor in scheduling submittals shall submit no more than 10 per week. In the event the Contractor submits more than 10 per week, the District Representative's review time may exceed the review time outlined.
2. The Contractor shall coordinate submittals with the work so that work will not be delayed. Submittals shall be coordinated and scheduled into different categories, so that one will not be delayed for lack of coordination with another. No extension of time will be allowed because of failure to properly schedule submittals. The Contractor shall not proceed with work related to a submittal until the submittal process is complete and the submittal document has been returned to the Contractor stamped "No Exceptions Taken" or "Make Corrections Noted."
3. All submittals, including shop drawings, shall be submitted in sufficient time to allow the District Representative not less than 30 days for review of such submittals.
4. These review periods do not include any time that the District Representative cannot proceed further with the review because of having to wait for further information of clarification from the Contractor.
5. Normally, initial submittals will be returned to the Contractor within 30 days, and resubmittals will be returned within 20 days, exclusive of any time awaiting clarification or further information, and exclusive of "major submittals" as described above. However, the time for return will necessarily vary and may exceed the time described above depending upon the complexity of the submittal, the number of submittals, and the express needs of the Contractor.
6. Submittals for material or equipment which are not specified by name, and which are being submitted as an "or equal" to that specified and submittals for material or equipment with arrangements or requirements that are different than that shown in the contract documents, will normally require 42 days for the review process.

G. CONTRACTOR'S RESPONSIBILITIES:

1. The Contractor shall review submittals before they are transmitted to the District Representative to ensure that there are no conflicts with other submittals. The Contractor shall coordinate submittals from subcontractors and suppliers to ensure that they are complete and that there are no conflicts.
2. The Contractor is responsible for errors and omissions in submittals even though the District's Representative reviews the submittal.

3. The District Representative shall be notified in writing at the time the submittal is transmitted of deviations from the requirements of the contract documents. The Contractor is responsible for correcting deviations from the contract documents even though the District Representative has reviewed the submittal, unless the deviations are clearly described in writing in the submittal transmittal form.
4. The Contractor shall be responsible for distributing submittals which have been returned with the District's Representative's action to subcontractors and suppliers. Installation shall not be started until the submittal data with the "No Exceptions Taken" or "Make Corrections Noted" stamp is in the possession of the installer.
5. No changes shall be made by the Contractor in any submittal after it has been approved. The equipment or materials provided shall not deviate from the submittal documents which are stamped with the "No Exceptions Taken" or "Make Corrections Noted" stamp in any way except with written approval by the District Representative.
6. The Contractor shall certify on each submittal document that the submittal has been reviewed, field conditions have been verified and contract documents have been complied with.
7. The Contractor may authorize a material or equipment supplier to deal directly with the District Representative with regard to such submittals; however, ultimate responsibility for the accuracy and completeness of the information contained in the submittal shall remain with the Contractor.

H. REQUESTS FOR SUBSTITUTION:

1. The Contractor may offer to substitute material or equipment if permitted by the technical specifications. Post-bid the District will not acknowledge or consider such offers from suppliers, distributors, manufacturers, or subcontractors.
2. The Contractor's offers of substitution shall be made in writing to the District Representative in ample time to permit review without delaying the work. Until and unless such substitutions are approved by the District Representative, no deviations from the specifications shall be allowed. Time extensions will not be granted for requests for substitution which are subsequently denied by the District Representative. Time extensions will not be granted for substitutions which are not submitted in a timely manner. Any request for substitutions shall include sufficient data to enable the District Representative to assess the acceptability of the material or equipment for the particular application and requirements.
3. The Contractor shall submit a brief description of the proposed substitution prior to preparing a detailed submittal. The brief description shall be submitted on a Request for Substitution/Construction Incentive Change Proposal (CICP) form. Within 15 working days, the District Representative will review the proposal in concept and respond. If the District Representative accepts the concept of the substitution, the

Contractor may prepare a detailed submittal conforming to the requirements of this section.

4. Any cost differential associated with a request for substitution must be negotiated with the District Representative. These costs or savings must be covered by a change order which modifies the contract documents.

I. DRAWINGS FOR MODIFIED PANELS AND OTHER CONTROL SYSTEM COMPONENTS: (DELETED)

3.02 MANAGEMENT OF THE SUBMITTAL PROCESS

- A. The Contractor shall develop with assistance of the District Representative and Design Engineer a comprehensive management plan for all submittals required for the project. The intent of the management plan shall be to provide an orderly and timely process for the submission and review of submittals. The submittal management plan shall be developed and implemented within 60 days following Notice to Proceed. The submittal management plan shall incorporate the following elements:
 1. The Contractor shall submit a list of submittals which require review within the first 120 days of the project, within 10 days following the Notice to Proceed.
 2. The Contractor shall develop a comprehensive Master Submittal List of all specified submittals. The list shall be serially numbered in accordance with the appropriate specification section. The list shall be developed and submitted to the District Representative for review within 21 days following the Notice to Proceed. The District Representative will conduct a meeting to review the Master Submittal List with the Contractor within 3 working days following receipt of the list.
 3. The Contractor shall develop a schedule for the submission and review of all specified submittals for the project. The schedule shall be developed in accordance with the CONSTRUCTION PROGRESS SCHEDULE Section (01 32 16). The schedule shall include individual activities for submission and review (and fabrication and delivery for equipment and material) for each submittal. The submittal schedule shall be a separate subnet of the master CPM construction schedule with each submittal activity linked to the appropriate construction activity. Every projected submittal shall be listed and incorporated into the schedule.
 4. The Contractor shall meet at least once per month with the District Representative to review the status of all submittals. In addition, the Contractor shall develop and transmit monthly, a written list of the submittals which require review within the following 90 days. The list of projected submittals shall include the estimated date of submission for each submittal and a reference Master Submittal List for each item to be included in the submittal.

- B. This section shall not supersede or modify any specific requirements for submittals or the submittal process described elsewhere in these specifications, but shall be a supplement to the existing requirements.

****END OF SECTION****

SECTION 01 57 23

TEMPORARY STORM WATER POLLUTION CONTROL

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

- A. This section specifies the requirements for Stormwater Pollution Prevention which includes a Water Pollution Control Plan (WPCP) for a project resulting in less than one acre of soil disturbance, any size project fully within the EchoWater Resource Recovery Facility (EchoWater Facility) process area, or any project that is not otherwise subject to the requirements of the State Water Resources Control Board (SWRCB), Water Quality Order No. 2022-0057-DWQ, National Pollutant Discharge Elimination System (NPDES), General Permit No. CAS000002, General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) to control storm water discharges from construction and other land disturbance sites.
- B. Contractor may opt to implement a more restrictive program than that which is required. The Contractor must then conform to all requirements of both the minimum applicable program and the more restrictive program.
- C. Contractor will avoid and minimize permanent and temporary impacts to habitats and land cover types used by sensitive species potentially occurring in the Project Area. Avoidance and minimization of habitat areas will be accomplished during construction by implementing best management practices, including establishment of buffer zones, and implementation of a WPCP to reduce the potential for sediments or contaminants to enter sensitive habitats.
- D. Contractor shall implement Best Management Practices (BMPs) including good housekeeping practices and erosion and sediment control, to prevent the direct and indirect contribution of any contaminants into the storm drain system or waters of the United States.
- E. BMPs shall be implemented according to the California Stormwater Quality Association BMP Handbook – Construction (2023) BMP fact sheets. Non-structural and structural BMPs shall be acceptable to the District Representative and instituted or placed, as appropriate, before commencement of each phase of clearing, grading, excavation, trenching, or staging of materials that may be potential pollutants.
- F. Furnish all labor, materials, equipment, and incidentals necessary to perform all installation, maintenance, removal, and area cleanup related to erosion and sediment control BMPs necessary to prevent the movement of sediment from the construction site

to off-site areas including roadways, surface waters, storm drains, disposal locations, and flood control facilities.

- G. Contractor shall be responsible and fully bear costs incurred by the District as a result of violations under the Federal Clean Water Act, the State Porter-Cologne Water Quality Control Act, or for unauthorized release or discharge from the work including but not limited to penalties assessed or levied, third party claims, citizen suits, labor, materials, analytical analyses, and handling of waste. Fines shall be deducted from contract payments.

1.02 REFERENCES

- A. The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of the referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed references, the requirements of this section shall govern.

<u>Reference</u>	<u>Title</u>
California Stormwater Quality Association (CASQA)	California Stormwater BMP Handbook – Construction 2023

1.03 SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with the SUBMITTAL PROCEDURES Section (01 33 00):
 1. A copy of this specification section, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviation.
 2. The Contractor shall designate a Storm Water Pollution Prevention Coordinator. This person shall have previous experience in erosion and sediment control with similar type and size projects and shall submit a resume to the District Representative for approval. This person will be responsible for preparing and implementing the WPCP.
 3. The WPCP shall be submitted to the District within 10 days of the NTP and prior to the commencement of the Work.
 4. Completed inspection and maintenance reports within 3 working days of preparation.
 5. Upon completion of the project, submit the complete WPCP and relevant documents and amendments to the District Representative.

PART 2 -- PRODUCTS

2.01 EROSION CONTROL MATERIAL

- A. All fiber rolls, straw wattles, and/or hay bales utilized within and adjacent to the project site shall be free of non-native plant materials. Fiber rolls or erosion control mesh shall be made of loose-weave mesh that is not fused at the intersections of the weave, such as jute, or coconut (coir) fiber, or other products without welded weaves. Coconut coir matting and fiber rolls with burlap are examples of acceptable erosion control materials. Products with plastic monofilament or cross joints in the netting that are bound/stitched (such as found in straw wattles/fiber rolls and some erosion control blankets), which may cause entrapment of wildlife, shall not be allowed.

PART 3 -- EXECUTION

3.01 GENERAL

- A. The Contractor shall assume responsibility for stormwater runoff management and erosion and sediment control at the project site during construction. Fully comply with all applicable state and local regulations, and requirements related to stormwater management, erosion and sediment control.
- B. Prior to commencement of any land disturbing activity, the contractor shall submit the WPCP to the District Representative. No activity having the potential to cause water pollution, as determined by the District Representative, shall be performed until the District Representative has approved the WPCP and appropriate BMPs have been installed by the Contractor.

3.02 WATER POLLUTION CONTROL PLAN

- A. Develop a Water Pollution Control Plan (WPCP) to identify potential pollutants associated with each phase of construction activity and non-structural and structural BMPs appropriate to each phase of the work. The WPCP shall detail the following, if applicable:
 - Schedule
 - Location of soil stockpiles
 - Location of solid waste containers
 - Vehicle and equipment fueling, servicing, cleaning and storage areas
 - Material storage areas
 - Chemicals, potential pollutants and hazardous materials to be used and methods for safekeeping

- Site drainage during execution of the Work
 - Stabilization of vehicle access to site
 - De-watering operations
 - Methods for spill prevention and control
 - Secondary containment
 - Handling and disposal of solid waste
 - Storage and dispensing of fuel and lubricants
 - Clean out and disposal of ready mix concrete
 - Sanitation provisions
 - Disposal location for excess excavated material
 - Haul Routes
- B. The WPCP shall include BMPs to prevent an unauthorized release or discharge of pollutants, contaminants, chemicals, hazardous substances or materials. The BMPs will be described in both narrative form and proper placement illustrated on figures.
1. Stockpiled soil shall be stored in a clear area of the construction site where it would not have the potential to affect agricultural or biological resources. Stockpiled soil shall be covered with a tarp at all times to prevent generation of fugitive dust.
- C. Maintain one copy of the WPCP and amendments at the project site. The WPCP shall be made available upon request by a representative of the Regional Water Quality Control Board (RWQCB), State Water Resources Control Board (SWRCB), United States Environmental Protection Agency (USEPA), or the local stormwater management agency. Requests by the public shall be directed to the District Representative. At completion of construction, submit the complete WPCP, amendments, inspection and maintenance records, and any other relevant documents to the District's Representative.

3.03 INSPECTIONS AND MAINTENANCE

- A. Make a visual inspection of all BMPs as necessary to ensure proper operation but not less than once per week. For rain events predicted at a 50 percent (50%) chance or higher (as reported at <https://www.weather.gov/sto/>), inspections are to be conducted within 48 hours before. For rain events measuring 0.50 inches or greater (as reported at <https://www.weather.gov/sto/>), inspections are to be conducted at least every 48 hours during and within 48 hours after. If such inspection reveals that existing measures are damaged or that additional measures are needed to prevent movement of sediment to off-

site areas, promptly repair, replace or install additional devices as needed within 24 hours of notification. Sediment controls in need of maintenance shall be repaired within 24 hours of notification.

- B. Maintenance of BMPs shall be per the Construction BMP Handbook. Perform routine maintenance consisting of debris removal, silt/sediment removal, clearing of vegetation around flow control devices to prevent clogging, and maintenance of healthy vegetative cover.
- C. The Contractor shall be responsible for preparing and maintaining inspection and maintenance records. Inspection and maintenance reports are to be submitted to the District Representative within 3 working days.

3.04 DISPOSAL OF EXCESS EXCAVATED MATERIAL

- A. Excess excavated material is defined as material from onsite excavations that are beyond the volumes necessary to meet the finish grades shown on the Contract Documents.
- B. The Contractor shall be responsible for the disposal of excess excavated material. The Contractor shall be responsible for hauling excess excavated material offsite in accordance with laws and regulations regarding disposal of such material.

3.05 NOTIFICATION AND REPORTING

- A. The Contractor is responsible for identifying and bringing to the attention of the District's Representative all activities that may result in a non-stormwater discharge prior to commencing with such work. Any uncontrolled non-stormwater discharge shall be reported to the District Representative immediately.

3.06 REMOVAL AND FINAL CLEANUP

- A. Once the site has been fully stabilized against erosion, remove sediment control devices and all accumulated silt. Dispose of silt and waste materials in proper manner.
- B. Provide post-construction erosion controls, including soil stabilization, in accordance with the Contract Documents. Materials subject to degradability shall have a minimal functional longevity of 12-months.

****END OF SECTION****

SECTION 01 65 00

PRODUCT DELIVERY REQUIREMENTS

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

- A. Equipment, products and materials shall be shipped, handled, stored, maintained and installed in ways which will prevent damage to the items. Damaged items will not be permitted as part of the work except in cases of minor damage that have been satisfactorily repaired and are acceptable to the District Representative.
- B. Failure of Contractor to properly store and maintain equipment and materials will result in rejection of the equipment or material or a withholding from the progress payment.
- C. Deliveries to the EchoWater Facility must include the contract number and name of the project on all delivery manifests.

1.02 MATERIALS

- A. Materials shall be handled, stored, and installed as recommended by the manufacturer. Pipes with paint, tape coatings, linings or the like shall be stored to protect the coating or lining from physical damage or other deterioration. Plastic pipes including PVC conduit shall be stored with UV protection until placed or installed. Pipes shipped with interior bracing shall have the bracing removed only when recommended by the pipe manufacturer.

1.03 EQUIPMENT

A. PACKAGE AND MARKING:

- 1. All equipment shall be protected against damage from moisture, dust, handling, or other cause during transport from manufacturer's premises to site. Each item or package shall be marked with the number unique to the specification reference covering the item.
- 2. Stiffeners shall be used where necessary to maintain shapes and to give rigidity. Parts of equipment shall be delivered in assembled or subassembled units where possible.

B. IDENTIFICATION:

1. Each item of equipment and valve shall have permanently affixed to it a label or tag with its equipment or valve number designated in this contract. Label or tag shall be of stainless steel. Location of label will be easily visible.

C. SHIPPING:

1. Bearing housings, vents and other types of openings shall be wrapped or otherwise sealed to prevent contamination by grit, dirt and water vapor.
2. Damage shall be corrected to conform to the requirements of the contract before the assembly is incorporated into the work. Contractor shall bear the costs arising out of dismantling, inspection, repair and reassembly.

D. FACTORY APPLIED COATINGS:

1. Unless otherwise specified, each item of equipment shall be shipped to the site of the work with the manufacturer's shop applied prime coating .

E. STORAGE:

1. During the interval between the delivery of equipment to the site and installation, all equipment, unless otherwise specified, shall be stored in an enclosed space affording protection from weather, dust and mechanical damage and providing favorable temperature, humidity and ventilation conditions to ensure against equipment deterioration. Manufacturer's recommendations shall be adhered to in addition to these requirements.
2. Equipment and materials to be located outdoors may be stored outdoors if protected against moisture condensation. Equipment shall be stored at least 6 inches above ground. Temporary power shall be provided to energize space heaters or other heat sources for control of moisture condensation. Space heaters or other heat sources shall be energized without disturbing the sealed enclosure.

F. PROTECTION OF EQUIPMENT AFTER INSTALLATION:

1. After installation, all equipment shall be protected from damage from, including but not limited to, dust, abrasive particles, debris and dirt generated by the placement, chipping, sandblasting, cutting, finishing and grinding of new or existing concrete, terrazzo and metal; and from the fumes, particulate matter, and splatter from welding, brazing and painting of new or existing piping and equipment. As a minimum, vacuum cleaning, blowers with filters, protective shieldings, and other dust suppression methods will be required at all times to adequately protect all equipment. The protection of equipment shall also apply to disassembled equipment. During concreting, including finishing, all equipment that may be affected by cement dust must be completely covered. During painting operations, all equipment nameplates,

grease fittings, and similar openings shall be covered to prevent the entry of paint. Electrical switchgear, unit substation, and motor load centers shall not be installed until after all concrete work and sandblasting in those areas have been completed and accepted and the ventilation systems installed.

G. PREVENTIVE MAINTENANCE:

1. All equipment in storage and during and after installation shall be maintained by qualified Contractor personnel. Contractor shall set up a preventive maintenance program for all equipment. This program shall include as a minimum all manufacturer's recommendations and operation and maintenance manual requirements for the preventive maintenance of each piece of equipment including environmental, lubrication and rotation procedures. Record sheets of the preventive maintenance program shall be submitted to the District Representative monthly in accordance with the SUBMITTAL PROCEDURES Section (01 33 00).

1.04 SUBMITTALS

- A. Prior to equipment delivery, Contractor shall submit pre and post installation preventive maintenance (PM) instructions recommended by the manufacturers for Major Equipment. Contractor shall conduct an ongoing monthly PM program during construction on all Major Equipment and any minor equipment requiring PM per the manufacturer's recommendations. The PM program shall be witnessed by the District Representative. Contractor shall monthly submit information in accordance with the SUBMITTAL PROCEDURES Section (01 33 00) on the status of all equipment in the PM program. Failure of Contractor to properly maintain the equipment shall result in rejection of the equipment or a withholding from the progress payment.

****END OF SECTION****

SECTION 01 73 33

RESTORATION OF IMPROVEMENTS

PART 1 -- GENERAL

1.01 STRUCTURES

- A. Contractor shall remove existing facilities, including curbs, gutters, pipelines and utilities, as may be necessary for the work and shall replace the structures as good a condition as found. Existing facilities which may be damaged as a result of the work shall be repaired and restored.

1.02 ROADS

- A. Unless otherwise specified, roads in which the surface is removed, broken, or damaged, or in which the ground has caved or settled shall be restored to the original grade and section. Roads used by Contractor shall be cleaned and repaired. Before pavement is placed, edges of pavements shall be sawcut to provide clean, solid, vertical faces, and shall be free of loose material. Repair work shall conform to the paving specifications.

1.03 CULTIVATED AREAS AND OTHER SURFACE IMPROVEMENTS

- A. Cultivated or planted areas and other improvements which are damaged by Contractor shall be restored as nearly as possible to their original condition.
- B. Existing guard posts, barricades, fences, and signs shall be protected and replaced if damaged.

1.04 RAILROAD TRACKS

- A. Damage to railroad tracks, gates, switches or other equipment shall be repaired or replaced to the satisfaction of Union Pacific Railroad. Contractor shall document the existing condition before beginning work.

1.05 PROTECTION OF EXISTING INSTALLATIONS

- A. Contractor shall immediately correct or replace existing equipment, controls or systems which are damaged.

1.06 REMOVAL OF EXISTING PIPING AND EQUIPMENT

- A. Material designated as salvage shall be flushed and stored on pallets at the plant site as directed by the District Representative. All other piping, equipment, fixtures, conduit, wiring and other appurtenances not specified or indicated to be salvaged shall become

the property of Contractor and shall be removed from the site and properly disposed of at the expense of Contractor.

1.07 MODIFICATION OF STRUCTURES

- A. Contractor shall alter or rework existing concrete structures as shown and specified. Generally, when items of equipment and piping are removed, the areas and surfaces from which items were removed shall be left with a neat appearance and finish compatible with surrounding areas, colors and surfaces. Holes and pipe and conduit penetrations in walls and slabs shall be filled with grout. Contractor shall do all painting, sanding, grouting, sacking, resurfacing, and other work as necessary. Prior to structural modifications, all surfaces shall be inspected by the District Representative. Colors shall match existing.
- B. Contractor shall take care when handling materials to prevent dropping them into an operating tank, channel, conduit, pipeline or the like. Contractor shall notify the District Representative immediately if anything is added to any tank, channel, conduit, or pipeline.

1.08 CONNECTIONS TO HYDRAULIC STRUCTURES

- A. Connections to existing hydraulic structures, for the purpose of transferring flow to completed portions of the work, shall be as specified.

****END OF SECTION****

SECTION 01 74 23

FINAL CLEANING

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

- A. As a condition precedent to final acceptance or release of a structure, space or process unit for use by District, Contractor shall thoroughly clean all floors, ceilings, roofs, walls, woodwork, counters, sinks, fixtures and windows to leave same in first-class condition.
- B. All pits and sumps shall be cleared of silt, sand, debris and construction materials. Ductwork, air intakes, and exhaust grilles shall be inspected and cleared of extraneous dust and material. All filters shall be replaced or cleaned to like new condition. All grounds shall be cleared of all debris and reseeded and restored to its original condition. Finish floors shall be thoroughly cleaned, sealed and given a final coat of wax. Blinds, all furniture and cabinets shall be dusted. Replace all burned out lamps.
- C. Contractor shall not proceed with this work until authorized in writing by the District Representative.

****END OF SECTION****

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 -- GENERAL

1.01 WORK DESCRIPTION

- A. The work consists of providing equipment operation and maintenance (O&M) data in conformance with the requirements of this specification.
- B. The Contractor shall submit O&M data after the subject equipment or material submittal has been approved. The O&M data submittal will be returned if it is included with the equipment or material submittal.
- C. O&M data submittals shall be prepared and submitted in accordance with this specification and the SUBMITTAL PROCEDURES Section (01 33 00).

1.02 PAYMENT

- A. Payment for any system, equipment, or material for which O&M data are required shall be as specified in the Sacramento County Standard Specifications Section 8.

PART 2 -- PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Each document in the O&M data shall include the Equipment Tag Number/Location ID and associated auxiliary Equipment Tag Number that it represents.
- B. The O&M data submittals and appurtenant materials shall be written entirely in English and all dimensions shall be in English units.
- C. The manufacturer's standard documents shall be neatly marked with arrows or boxes to indicate the specific information that is applicable to the equipment, assembly, subassembly, or material supplied.
 - 1. Non applicable items shall be crossed out.
 - 2. Highlighting is not acceptable.
- D. All O&M data materials shall be made from either original materials or a first generation photocopy. Original materials shall be published literature or computer printouts with resolution of at least 600 dots per inch (dpi). Photo copies, scanned copies, and FAX transmittals are not acceptable.

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- E. O&M data shall be organized into one electronic document bookmarked using an Adobe Acrobat PDF format and submitted to the project controls website in accordance with the SUBMITTAL PROCEDURES Section (01 33 00).
- F. The District reserves the right to be the sole authority on quality and legibility of O&M data materials.
- G. The District reserves the right to delay commissioning if the O&M data submittals are incomplete, inaccurate, or otherwise unsuitable for use by the District's O&M staff. No contract extensions or extra costs will be allowed for delays in commissioning due to O&M data submittal delays.

2.02 SUBMITTALS

- A. The following information shall be submitted for review in accordance with the SUBMITTAL PROCEDURES Section (01 33 00):
 - 1. A copy of this specification section (with addenda updates) with each paragraph check marked to show specification compliance or marked to show deviations.
 - a. Mark "NA" for requirements that do not apply, and if the submittal does not conform to a requirement, explain the exception.
 - b. A check mark shall denote full compliance with a paragraph as a whole.
 - c. If deviations from the specification are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph referenced to a detailed written explanation for requesting the deviation.
 - d. The District shall be the final authority for determining acceptability of requested deviations.
 - e. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specification.
 - f. Failure to include a copy of the marked-up specification section, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

B. DELIVERABLES

1. EQUIPMENT SUBMITTAL

- a. Initial shop drawing equipment submittals for individual pieces of equipment should contain adequate storage, installation, operation, and maintenance information from the manufacturer. This information must be sufficient to allow the District to confirm compliance with the manufacturer's

recommendations during the storage, installation, and initial startup and testing of the equipment. Such O&M data information in initial equipment submittals will be checked only to verify that the appropriate documents for these purposes are provided. The O&M data submittals required below are in addition to the initial equipment submittal, even though it contained O&M information. Furthermore, the O&M data submittal requires that approved equipment submittal information be incorporated.

2. O&M DATA DRAFT SUBMITTAL

- a. The draft O&M manual shall be submitted electronically to the Project Control System (PCS) in accordance with the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26). The O&M data draft submittal shall reflect the resolution of all comments from the initial submittal review, training sessions, and from any completed testing and commissioning. District review will be completed within 15 calendar days after receipt of each draft submittal.

3. O&M DATA FINAL SUBMITTAL

- a. Within 21 calendar days after substantial completion, the District will notify the Contractor of deficiencies in the draft submittal. The Contractor shall revise and replace, remove, or add documents to correct any such deficiencies. Such revisions will include whatever changes are necessary to reflect “as-built” conditions, such as instrument settings, field changes of panels, electrical equipment, etc. Such revisions shall include resolution of any comments from commissioning and follow up training sessions. Submission of the O&M data final submittal shall be submitted and District approved prior to Field Acceptance. The District shall be allowed a review period of 14 calendar days after receipt of each final submittal.
- b. Deficiencies corrected in paper copies may be made piecemeal in all District copies by the Contractor, or complete sets may be returned one at a time for corrections, at the Contractor’s option. Electronic versions of the O&M data shall be corrected by submitting the document, in its entirety, to the project controls website.
- c. Standard “off the shelf” vendor O&M manuals that are NOT customized for the project will not require a draft submittal and may be submitted as a final O&M manual in accordance with the minimum general requirements set forth in Paragraph 2.01 of this section.

PART 3 -- EXECUTION

3.01 O&M DATA REQUIREMENTS

A. GENERAL:

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1. Standard “off the shelf” manuals may be submitted as received from the vendor and will only require a Cover Sheet as described below as they are assumed to generally conform to the information described below and meet the minimum general requirements in Paragraph 2.01 above. The remaining specific requirements in subsequent paragraphs pertain to manuals that are custom-created for the project equipment.

B. COVER SHEET:

1. The cover sheet shall show a functional title of the system, equipment or material; list of the Equipment Tag Number(s), including all associated auxiliary Equipment Tag Number(s), and corresponding functional description(s); revision date; and specification reference.

C. TABLE OF CONTENTS:

1. The table of contents shall give a detailed description of what is in each tab, including applicable Equipment Tag Number.

D. WARRANTIES & GUARANTEES:

1. A copy of the manufacturer’s warranty and/or guarantee certificate shall be provided with the O&M data. The original certificate shall separately accompany the O&M data.
2. List and explain the various warranties and include the servicing and technical precautions prescribed by the manufacturers or contract documents to keep warranties in force. Where warranty is conditional on the manufacturer’s approval of the installer, submit the manufacturer’s approval of the installing firm.

E. TECHNICAL DATA:

1. Manufacturer's technical specification and engineering data sheets for each component, part, device and auxiliary equipment which make up the equipment or assembly shall be supplied. Include the manufacture’s vibration, temperature, and sound data when specified in the technical specifications. All documents contained in this section shall provide a table of contents of the documents, referencing Equip. Tag No., the manufacturer's name, model numbers, and product numbers. Each document shall be cross-referenced to the items, components and parts described above. Label all documents with appropriate Equip. Tag No.
2. Certified performance curve(s) marked to show the operating conditions specified in the technical specification section.
3. Provide protective device settings and safety information.

F. STANDARD O&M MANUAL

1. The O&M manuals must explain and illustrate clearly and simply the principles and theory of operation, operating instructions, and preventive and corrective maintenance precautions and procedures to be followed. The O&M manuals and appurtenant materials shall be written entirely in English and all dimensions shall be in English units. The manuals shall include the following information, as applicable:

- a. OPERATING INSTRUCTIONS:

Specific instructions, procedures, and illustrations shall be provided for the following:

- 1) SAFETY PRECAUTIONS: List personnel hazards for equipment and list safety precautions for all operating conditions/modes.
- 2) INSTALLATION AND PRE-OPERATIONAL CHECKOUTS: Provide recommendations and checklists for installation, adjustment, calibration, and troubleshooting to prepare each equipment/system for operation.
- 3) START-UP, SHUTDOWN, AND POSTSHUTDOWN PROCEDURES: Provide step-by-step equipment-specific procedures for each of these operations.
- 4) NORMAL OPERATIONS: Provide control diagrams with data and step-by-step procedures to explain operation and control of systems and specific equipment.
- 5) EMERGENCY OPERATIONS: Provide emergency procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include emergency shutdown instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance on emergency operations of all utility systems including valve locations and portions of systems controlled.
- 6) ENVIRONMENTAL CONDITIONS: Provide a list of environmental conditions (temperature, humidity, dust, indoor/outdoor, and other relevant data) which are best suited for each product or piece of equipment and describe conditions under which equipment should not be allowed to run due to applicable industry and regulatory standards and codes.

- b. PREVENTIVE MAINTENANCE (PM):

The following information shall be provided for PM:

- 1) LUBRICATION DATA: Provide the following:

- Manufacturer's recommended lubrication schedules showing service interval and frequency;
 - Diagrams illustrating equipment lubrication points;
 - A table identifying recommended types and grades of lubricants for specific temperature ranges and applications; and
 - A table identifying equipment lubrication capacities and an estimate of yearly lubricant quantities required for all equipment supplied.
- 2) PM PLAN AND SCHEDULE: Provide the following in a tabular format for each PM:
- The manufacturer's recommended preventative maintenance task;
 - Recommended steps or procedures to complete the PM;
 - Recommended scheduled interval and frequency for performing the PM;
 - The craft responsible and the person's skill level for performing the PM (i.e., operator, mechanic, electrician, or control systems technician);
 - The estimated amount of labor required to perform the PM;
 - Required materials or parts; and identify the equipment's energy source(s) (i.e., water, heat, light, electrical, etc.).

c. CORRECTIVE MAINTENANCE:

Manufacturer's recommendations shall be provided on procedures and instructions for correcting problems and making repairs.

- 1) TROUBLESHOOTING GUIDES AND DIAGNOSTIC TECHNIQUES: Provide step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or requires replacement.
- 2) MAINTENANCE AND REPAIR PROCEDURES: Provide instructions and a list of specialized tools required to restore product or equipment to proper conditions or operating standards. Include the specialized tool's part number and/or detailed fabrication drawing.

- 3) REMOVAL AND REPLACEMENT INSTRUCTIONS: Provide step-by-step procedures and a list with part numbers and/or fabrication drawings for all required specialized tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide safety precautions, recommended tolerances, dimensions, settings, critical bolt torques, and adjustments required. Instructions shall include a combination of text and illustrations.
- 4) PARTS LIST: Provide a complete list of components and parts which make up the equipment or assembly. All parts and components listed shall be identified using arrows or boxes by the original manufacturer's name, part number, and a purchase order number. Enough information shall be provided to allow purchasing of parts from any supplier who may stock them. If listed components or parts are themselves repairable and made up of components and parts, parts lists shall be provided for them to all repairable levels. The parts list shall have the generic title, identification number, and material of construction of each component part of equipment. Include the bearing manufacturer for every bearing.
- 5) DRAWING: Disassembly and assembly drawings in Adobe PDF format shall be provided which identify and cross reference all components and parts listed in the parts lists. Exploded or cut views of equipment shall be provided if available as a standard item of the manufacturer's information. When exploded or cut views are not available, plan and section views shall be provided as a minimum.
- 6) SPARE PARTS AND SUPPLY LISTS: Provide recommended list of spare parts (with quantities) and supplies required for maintenance and repair to ensure continued service or operation without unreasonably delays. Included with the list shall be any special storage precautions. In addition, list spare parts and supplies that have a long lead time to obtain (provide estimated lead time). If no spare parts are recommended by the manufacturer, provide a statement to that effect. Spare parts data shall be provided in a table as shown in Attachment A and is available upon request.
- 7) PARTS SUPPLIER LIST: Provide the manufacturer's or supplier's name, address, and telephone number of the nearest supplier and spare parts warehouse for all parts. Each part's purchase order number shall also be provided.
- 8) SPECIAL TOOLS LIST: Provide recommended special tools, including description and use, for all equipment supplied. Special tools are defined as needed tools that are not generally commercially available except from the manufacturer.

G. SHOP/REPAIR MANUAL

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1. Provide a Shop or Repair Manual written by the manufacturer specifically for the equipment or assembly. The manual shall include additional troubleshooting tips, routine maintenance hints, and specific repair information not found in a standard O&M manual, includes references to specialized tools and other information uniquely known by the manufacturer.

H. SUPPLEMENTAL DRAWINGS AND INSTRUCTIONS

1. Drawings shall be provided which completely document the equipment, assembly, subassembly or material. As applicable and at a minimum, the following drawings shall be provided:
 - a. Fabrication details
 - b. Shop and vendor drawings
 - c. Layout and dimension drawings
 - d. Piping schematics for all equipment supplied
 - e. Installation drawings
 - f. Electrical equipment:
 - 1) Schematics for all electrical equipment supplied
 - 2) Electrical component fabrication drawings
 - 3) Panel fabrication layout drawings with Bill of Materials
 - 4) Panel schedules
 - 5) Elevations and cross-sections
 - 6) One-line and three-line diagrams
 - 7) Wiring and connection diagrams
 - 8) Interconnection diagrams from approved shop drawings and vendor's documentation
 - g. Instrumentation and Controls:
 - 1) Panel elevations
 - 2) Panel fabrication layout drawings with Bill of Materials
 - 3) Wiring diagrams for control panels

I. SUBMITTAL DATA

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1. This section includes approved shop drawings submittal information such as catalog cuts, sales brochures, supplemental drawings, product data, equipment data, system data, or material data not already contained in other sections of the O&M data submittal. Approved shop drawings not related to the operation or maintenance of equipment or processes shall not be included.

****END OF SECTION****

ATTACHMENT A

SPARE PARTS RECORD

Equipment Tag No.						SPARE PARTS AND INTERCHANGEABILITY RECORD							P/O No.									
													P/O Disc.									
													Equipment Disc.									
													Sub Supplier									
Manufacturers Model of Type						MANUFACTURERS' / SUPPLIERS' DATA																
Manufacturers Serial Number						Total Qty.	Supplier's Rec Qty.	Description of Parts	Drawing No.	Drawing Item No.	Manufacturer's Name	Part No.	Supplier's Part No.	Material Specification	Unit Price	Delivery Lead Time Weeks						
No. of Units																						
NUMBER OF PARTS PER UNIT (CONTINUED ON SHEET 2 IF NECESSARY)																						
						PROJECT: CATS TERMINAL PROJECT						PRIME SUPPLIER:						Rev				
												ADDRESS:						Date				
						TEL:						Sign										
COMPANY: AMOCO (UK) EXPLORATION COMPANY						FAX:						Sheet No. of										

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

- A. Project record documents (commonly known as “as-builts”) shall show the actual as-constructed conditions of installed or modified systems, equipment and material at the time of field acceptance of the related portions of work. The purpose of as-built documents is to provide accurate information for the future modification, expansion, operation and maintenance of the plant.
- B. The project record documents are especially important for recording field conditions of embedded or concealed material and equipment. These embedded or concealed items shall include, but are not limited to, buried structures, thrust restraints, backfill material, piping, cables and raceways.
- C. Work related to Field Instructions (FI), Contract Change Orders (CCO), Clarifications or other agreements between Contractor and the District Representative shall be considered part of the project record process. Contractor shall record conditions and/or changes relating to this work on the project record documents.
- D. Project record documents shall clearly be shown as part of the CPM activity schedule.

1.02 VALUES

- A. Project record documents shall have a value of not less than one percent (1%) of the contract value.

PART 2 -- PRODUCTS

2.01 DISTRICT-SUPPLIED DRAWINGS AND CONTRACT DOCUMENTS (DELETED)

2.02 CONTRACTOR-SUPPLIED DRAWINGS AND OTHER DOCUMENTS

- A. The following Contractor supplied drawings, other contract documents, and AutoCAD files shall be submitted in project record condition for review by the District Representative:
 - 1. Shop drawings generated by Contractor, sub-contractors, vendors or suppliers as defined in the SUBMITTAL PROCEDURES Section (01 33 00).

2. Operation and maintenance manual documents, drawings, and schedules supplied by Contractor, subcontractors, vendors, or suppliers.

PART 3 -- EXECUTION

3.01 GENERAL

- A. Contractor shall immediately start recording project record information upon doing any work.
- B. Contractor shall keep those documents current with changes reflecting as-built status as construction proceeds.
- C. Although some drawings are considered diagrammatic with respect to placement of conduit, piping, etc., Contractor must closely follow the routing shown. If there are deviations, Contractor must show the as-built conditions as work progresses and provide all changes to the project record documents with dimensions as outlined below:
 1. Buried or embedded items within buildings, tunnels and other structures including but not limited to, piping, thrust restraints, electrical raceways, cables, duct banks, or other related appurtenances, in or under concrete, asphalt or soil, which are not placed as shown on the drawings, shall show as-built dimensions horizontally and vertically from a wall, formed footing, finish floor, ceiling or finish top of curb. Items placed in the center of concrete slabs do not need to have vertical dimensions.
 2. All buried or embedded items as described above which are outside of buildings shall be tied to the plant survey grid system both horizontally and vertically with proper stationing, invert elevations and/or top of buried item. Survey data shall show all transition points (changes in direction, change in elevation, etc.). All items which are installed by horizontal or vertical curves shall show as-built curve data.

3.02 PROJECT RECORD KEEPING

- A. All project record documents shall be marked-up copies, with erasable colored pencils using the following color coding:
 1. Red - Additions including notes and dimensions.
 2. Green - Deletions (By hash marks or appropriate lines through the deletion.)
 3. Graphite - General comments and notes used by Contractor or District's Representative and not required on the as-built.

4. Yellow - Work completed as shown and used by District's Representative in field review of the as-built, during the submittal phase.
 5. Blue - District's Representative's office verification and notes required to be added and noted by District's Representative in review of the as-built, during submittal phase.
- B. All work shall be neatly organized and legible using the same standards and symbols as the original drawing.

3.03 MAINTAINING PROJECT RECORD DOCUMENTS

- A. Contractor shall maintain a neatly marked set of project record documents. All District-supplied documents shall have shop drawing references clearly marked with clouds around the areas which are detailed on the shop drawing. Shop drawings referenced to other associated shop drawings shall have drawing references clearly marked with clouds around the area representing the shop drawing.
- B. Abbreviation of the drawing Originator (Contractor, subcontractors, vendors or suppliers) referenced on the contract documents is unacceptable.
- C. In areas where detail does not permit showing as-built conditions clearly on contract drawings but a shop drawing depicts actual as-built condition of the area, a cloud with shop drawing reference may be accepted at the District Representative's discretion. Otherwise all as-built conditions shall be shown on the contract drawings.
- D. The project record documents shall be kept current using the mark-up procedures described herein. These documents shall be available for inspection by the District Representative at all times.

3.04 PROJECT RECORD SUBMITTAL PROCESS

A. GENERAL:

1. All project record documents shall be submitted electronically in accordance with the SUBMITTAL PROCEDURES Section (01 33 00) and the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26).
2. Project record submittals shall be rejected without any part being reviewed for any of the following reasons:
 - a. Work has not been completed, including work related to Field Instructions, Change Orders, clarifications, or other agreements pending.
 - b. Not all components and equipment have been properly labeled on the drawings. All equipment numbers (device and equipment number labeling codes) shall be shown on all drawings depicting the equipment. Equipment numbers must be coordinated with the plans and drawings and shown on all District-supplied and

all contractor supplied drawings that depict equipment. The Contractor shall request equipment numbers from the District for all new equipment installed.

- c. Actual field conditions are not substantially shown on the documents.
- d. Drawing cross references are incomplete. District supplied drawings must be cross referenced to Contractor-supplied drawings and Contractor-supplied drawings must be cross referenced back to the District-supplied drawings.

B. PRELIMINARY REVIEW PROCESS:

1. In order to minimize the number of re-submittals, the following procedure shall be used:
 - a. Upon assembly of a project record submittal, Contractor shall notify the District Representative that the submittal is ready for review. Prior to review, a list of project record documents with all drawing numbers, descriptions and originators listed shall be submitted to District's Representative for review. The District Representative will review the list of project record documents and meet with Contractor to review the submittal for completeness and accuracy. Contractor may be required to add or subtract some documents as directed by the District Representative to ensure a complete and reviewable package.
 - b. Some drawings may show work in several areas or systems. When this occurs, the list shall indicate this type of drawing. The area on this type of drawing which is to be reviewed as part of this submittal shall be clearly outlined by Contractor.
 - c. Documents that represent more than one area of work must be submitted for each area of work it represents and must receive approval for each area of work.
 - d. After the preliminary review, Contractor shall submit the as-built package with the necessary corrections for as-built review.

C. PROJECT RECORD SUBMITTALS FOR REVIEW AND COMMENTS

1. Contractor shall submit the original full size markups, one (1) set of full size copies of all District-supplied documents and two (2) sets of Contractor-supplied as-built record documents for each submittal or re-submittal as outlined in this section. One (1) set of Contractor supplied as-built documents shall be returned after each submittal review.
2. Contractor shall correct the original hard copy drawings and AutoCAD drawings once the District Representative has returned the marked up Contractor supplied documents "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED". Contractor shall then supply the mark-ups, and the AutoCAD drawing files

electronically as part of the resubmittal package, along with a hard copy of the drawing files.

D. DOCUMENT IDENTIFICATION:

1. Each separately bound document within a submittal shall have the following information shown on it:
 - a. Submittal number.
 - b. Document item number within this submittal.
 - c. Identification of product or material.
 - d. Manufacturer's name.

E. COORDINATION AND SEQUENCE:

1. Contractor shall coordinate the submittals with the work as outlined in this section. No extension of time will be allowed because of failure to properly schedule as-built submittals as outlined in this section. The submittal will be returned to Contractor within forty (40) working days of receipt by the District Representative, exclusive of any time waiting for clarification or further information from Contractor. The time for return will vary and may exceed 40 days depending on the complexity of the submittal and the number of submittals.

F. PROJECT RECORD RE-SUBMITTALS:

1. Returned project record submittal documents shall be revised as indicated by the District Representative's comments as required. Re-submittal shall be done by using the same submittal number with an alpha suffix after the submittal number. Reference to the previous submittal number and item number is required when resubmitting. Re-submittals shall address all comments from the District Representative. Partial re-submittals will not be reviewed and will be returned in their entirety REJECTED. Contractor will be responsible for the District Representative's review cost for each re-submittal in excess of the first re-submittal. These costs will be back-charged to Contractor and will be deducted from the progress payment.

G. SUBMITTAL REVIEW:

1. GENERAL: The following are the four (4) possible Review Codes each document item can receive:
 - a. "A" - NO EXCEPTIONS TAKEN: the as-built document is approved as is.
 - b. "B" - MAKE CORRECTIONS NOTED: limited corrections are required. Copies will be returned with remarks as to corrections required.

- c. "C" - AMEND AND RESUBMIT: insufficient or incorrect data has been submitted or data is missing to complete the review. Copies will be returned with remarks requiring re-submittal with deficiencies corrected.
 - d. "D" - REJECTED: Submittal is unacceptable and does not meet the requirements of these specifications, the document will be returned with remarks. A complete submittal may be REJECTED for excessive errors.
2. The Review Status and approval of District supplied drawings and documents shall be as follows:
- a. As-built drawings and documents which receive an "A" Review Status are approved as, as-built. District's Representative will stamp the document As-Built, sign and date it. The document will not be returned to Contractor unless it is a partial or tied to a related document which has not received an "A" status in the submittal.
 - b. As-built drawings and documents which receive a "B," "C" or "D" Review Status will be returned with comments indicating corrections needed.
 - c. Submittals of as-built AutoCAD drawings shall be subject to the same submittal requirements as other as-built documents.
3. The Review Status and approval of Contractor supplied drawings and documents shall be as follows:
- a. As-built drawings and documents receiving an "A" Review Status are approved as, as-built. District's Representative will stamp the document As-built, sign and date it. This document will be returned for AutoCAD update, as required.
 - b. As-built drawings and documents receiving an "B", "C", or "D" will be returned with comments directed at corrections needed.
 - c. Submittals of as-built AutoCAD drawings shall be subject to the same submittal requirements as other as-built documents.

3.05 PAYMENT

- A. Payment shall be part of the progress payment schedule as outlined in the Sacramento County Standard Specifications Section 8.
- B. No partial payments shall be made for project record documents.
- C. Only after all the project record documents for a work activity area have been submitted, received, reviewed and approved, will a progress payment be made.
- D. Project record documents that include more than one area of work activity will only receive payment upon submittal and approval at the final area of work they represent.

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- E. Progress payments for Contractor supplied project record documents (including shop drawings) shall only be made for approved original documents and plotted AutoCAD drawings together with the electronic copy of the documents.
- F. Progress payments for District-supplied documents shall be given for approved submittal only.

****END OF SECTION****

SECTION 03 60 00

GROUTING

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies grout for uses other than masonry.

1.02 REFERENCES

- A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed references, the requirements of this section shall govern.

<u>Reference</u>	<u>Title</u>
ASTM C33	Concrete Aggregates
ASTM C40	Test Method for Organic Impurities in Fine Aggregates for Concrete
ASTM C88	Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Test Method for Materials Finer Than 75-Micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136	Method for Sieve Analysis of Fine and Coarse Aggregates
ASTMC150	Portland Cement
ASTMC289	Test Method for Potential Reactivity of Aggregates (Chemical Method)
ASTMC494	Chemical Admixtures for Concrete
ASTM C881	Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C1107	Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTMD2419	Test Method for Sand Equivalent Value of Soils And Fine Aggregate
ASTME329	Practice for Use in the Evaluation of Testing and Inspection Agencies as Used in Construction

B. DEFINITIONS: (Not Used)

1.03 SUBMITTALS

A. The following information shall be submitted for review in accordance with the SUBMITTAL PROCEDURES Section (01 33 00):

1. A copy of this specification section, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviation.
2. MANUFACTURER'S DATA:
 - a. Dry pack grout
 - b. Cement grout
 - c. Nonshrink grout
 - d. Epoxy grout
 - e. Epoxy injection system and installer certification
 - f. Admixtures (if used)
 - g. Bonding compounds
 - h. Current ICC Evaluation Report for adhesives used for dowel and anchor setting.

B. LABORATORY TEST REPORTS:

1. Before delivery of materials, the reports of the tests specified herein shall be submitted. Test reports on previously tested materials shall be accompanied by the manufacturer's statement that the previously tested material is the same type, quality, manufacture, and make as that proposed for use in this project. Test reports are required for the following:
 - a. Cement
 - b. Aggregates
 - c. Admixtures
 - d. Bonding compounds
 - e. Epoxy Resin

2. To demonstrate conformance with the specified requirements for grout, the Contractor shall provide the services of an independent testing laboratory which complies with the requirements of ASTM E329. The testing laboratory shall sample and test grout materials as required in this section. Costs of testing laboratory services shall be borne by the Contractor.

C. EVIDENCE OF TESTING LABORATORY COMPETENCE:

1. The Contractor shall require that the laboratory provide directly to the District Representative evidence of the most recent inspection of its facilities by the Cement and Concrete Reference Laboratory of the National Bureau of Standards. The evidences shall show that deficiencies mentioned in the report of that inspection have been corrected. The evidence of inspection shall be submitted and approved prior to delivery of materials to the job site.

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS (NOT USED)

PART 2 -- PRODUCTS

2.01 MATERIALS

A. CEMENT:

1. Portland cement shall be ASTM C150, Type II or Type V, low alkali, containing less than 0.60 percent by weight of alkalies.

B. AGGREGATE:

1. GENERAL: Aggregate shall be nonreactive and shall be washed before use.
 - a. When sources of aggregate are changed, test reports shall be provided for the new material. The tests specified shall be performed submitted and approved prior to commencing grout work.
2. FINE AGGREGATE: Fine aggregate shall be hard, dense, durable particles of either sand or crushed stone regularly graded from coarse to fine and shall conform to ASTM C33 as modified herein. When tested in accordance with ASTM C136, gradation shall be such that 100 percent by weight will pass a standard No. 8 mesh sieve and no less than 45 percent by weight will pass a standard No. 40 mesh sieve.
 - a. Variation from the specified gradations in individual tests will be acceptable if the average of three consecutive tests is within the specified limits and the variation is within the permissible variation listed below:

U.S. standard sieve size	Permissible variation in individual test, percent
30 or coarser	2
50 or finer	0.5

3. Other tests shall be in accordance with the following specifications:

Test	Test Method	Requirements
Organic Impurities	ASTM C40	Color lighter than standard
Amount of Material Passing No. 200 Sieve	ASTM C117	3% maximum by weight
Soundness	ASTM C88	10% maximum loss with sodium sulfate
Reactivity	ASTM C289	Innocuous aggregate
Sand Equivalent	ASTM D2419	Minimum 80

C. ADMIXTURES:

1. **GENERAL:** Admixtures shall be compatible with the grout. Calcium chloride or admixtures containing calcium chloride are not acceptable. Admixtures shall be used in accordance with the manufacturer's recommendations and shall be added separately to the grout mix.
2. **WATER REDUCING RETARDER:** Water reducing retarder shall be ASTM C494, Type D and shall be BASF Pozzolith 322-N, Sika Corporation Plastocrete 161, or equal.
3. **LUBRICANT FOR CEMENT PRESSURE GROUTING:** Lubricant additive for cement pressure grouting shall be Specrete Intrusion Aid, Sika Intraplast N, or equal.

D. WATER:

1. Water for washing aggregate, for mixing and for curing shall be free from oil and deleterious amounts of acids, alkalis, and organic materials; shall not contain more than 1000 mg/l of chlorides as Cl, nor more than 1300 mg/l of sulfates as SO₄; and shall not contain an amount of impurities that may cause a change of more than 25 percent in the setting time of the cement nor a reduction of more than 5 percent in the compressive strength of the grout at 14 days when compared with the result obtained with distilled water. Additionally, water used for curing shall not contain an amount of impurities sufficient to discolor the grout.

2.02 GROUT

A. DRYPACK GROUT:

1. Drypack grout shall be a mixture of approximately one part cement, 1-1/2 to 2 parts sand, water reducing retarder, and sufficient water to make a stiff workable mix.

B. CEMENT GROUT:

1. Cement grout shall be a mixture of one part cement, two parts sand, proportioned by volume, admixtures for pressure grouting, and sufficient water to form a workable mix.

C. NONSHRINK NONMETALLIC GROUT:

1. Nonshrink grout shall be factory premixed requiring only water addition in the field. Nonmetallic aggregate grout shall be Five Star Products Inc. Five Star grout, Burke Company Non-Ferrous, Non-Shrink Grout, BASF Masterflow 928, or equal.
2. Metallic aggregate grout is not acceptable.

D. EPOXY GROUT FOR EQUIPMENT MOUNTING:

1. Epoxy grout shall be a three-component epoxy resin system, consisting of two liquid epoxy components and an optional inert aggregate component. Each component shall be in separate bags in the correct ratio for job site mixing.
2. Epoxy grout shall be Euclid Chemical Company E3-G, Sika Corporation Sikadur 42, or equal.

E. ADHESIVE FOR DOWEL AND ANCHOR SETTING:

1. Adhesive for setting dowels and anchoring connection/base plate bolts shall be an injectable two-component epoxy adhesive. Adhesive shall be approved for the intended use per the product ICC Report.

Adhesive shall be HIT-RE-500-SD by Hilti; SET-XP by Simpson Strong-Tie; or equal (equivalent product must have ICC approval for use in cracked concrete).

2.03 EPOXY INJECTION SYSTEM

- A. Epoxy for pressure grouting/crack injection shall be a two-component, moisture insensitive, high modulus, injection grade, 100 percent solids, blend of epoxy-resin compounds. The consistency shall be as required to achieve complete penetration in hairline cracks and larger. Material shall conform to ASTM C881, Type 1, Grade 1. Candidate manufacturers include Sika Corporation Sikadur 52, BASF SCB Concrete 1300 series, and Adhesive Technology Corporation SLV 300 series, or equal.

PART 3 -- EXECUTION

3.01 GENERAL

- A. Holes required for grouting shall be blown clean. Horizontal holes for grouting shall be drilled at a slight downward angle to facilitate holding the grout until setting is complete. Bolts or reinforcing steel installed in horizontal grout holes shall be bent slightly accordingly. Bonding compound for use with grout is specified in the CAST-IN-PLACE CONCRETE Section (03 30 00). Mechanically mix the grout materials with or without fillers in strict accordance with the manufacturer's instruction. All application of the mixed materials shall be performed within the working life or pot life of the grout system. Unused mixed materials which have reached the end of the working or pot life shall be removed from the job site.

3.02 INSTALLATION

A. DRYPACK GROUT:

- 1. Drypack grout shall be used for built-up surfaces, setting miscellaneous metal items and minor repairs.
 - a. Surfaces required to be built up with drypack grout shall be roughened by brushing, cleaned, and coated with the bonding compound specified in the CAST-IN-PLACE CONCRETE Section (03 30 00) before the application of the grout. The drypack grout shall be applied immediately following the application of the bonding compound in bands or strips to form a covering of the required thickness. The covering shall be smooth. Construction joints in the grout shall be sloped and shall be cleaned and wetted before application is resumed. Drypack grout shall be cured in accordance with the CAST-IN-PLACE CONCRETE Section (03 30 00).

B. CEMENT GROUT:

- 1. Cement grout shall be used for filling nonbearing portions of equipment pads.
- 2. Mixing and placing apparatus shall be similar to that normally used for cast-in-place concrete. Grout shall be mixed for a period of at least 1 minute. Diluted grout shall be agitated to keep ingredients mixed.

C. NONSHRINK NONMETALLIC GROUT:

- 1. Nonshrink nonmetallic aggregate grout shall be used for the bearing surfaces of machinery and equipment bases, column base plates and bearing plates and for built-up surfaces.

D. EPOXY ADHESIVE:

1. Epoxy Adhesive shall be used for setting anchor bolts and grouting reinforcing steel holes, and setting reinforcing dowels. Concrete shall be primed in accordance with the grout manufacturer's instructions.

E. EPOXY INJECTION SYSTEM:

1. Epoxy injection system shall be used for repairing cracks by pressure in structural concrete. Installer shall be certified by the system supplier. Prior to starting, cracks and holes to be injected shall be washed clean. Washing is not required for grouting soil voids outside pipe cylinders or casing pipes. Injection once commenced, shall be completed without stoppage. In case of breakdown of equipment, the Contractor shall wash out the epoxy system sufficiently to ensure fresh epoxy and adequate bond and penetration will occur upon restarting the injection operation. Pressure shall be maintained until grout has set.
2. Pressure grouting equipment shall include a mixer and holdover agitator tanks and shall be designed to place grout at pressures up to 50 psi. Gages shall be provided to indicate pressure used. The mixer shall be provided with a meter capable of indicating to one-tenth of a cubic foot the volume of grout used.

F. WEATHER LIMITATIONS:

1. Work shall not proceed when weather conditions detrimentally affect the quality of patching or bonding concrete. Apply grout materials only when the contact surfaces are prepared and if the atmospheric temperature range and contact surfaces are suitable for the specified type of epoxy adhesive or grout material.

G. CLEANUP:

1. Leave finished work and work area in a neat, clean condition. Remove all spillovers onto adjacent areas to the satisfaction of the District Representative. For epoxy injection system, after the epoxy resin adhesive has cured, the epoxy resin adhesive for sealing cracks and porting devices shall be removed. Clean the substrate in a manner to produce a finish appearance acceptable to the District Representative.

3.03 TESTING (NOT USED)

3.04 TRAINING (NOT USED)

****END OF SECTION****

SECTION 40 05 03

FOG PIPING SYSTEM SPECIFICATION

PIPING SYSTEM SPECIFICATION				
SERVICE: Fats, Oils, and Grease			SYMBOL: FOG	
FLUID: FOG and Food Processing Waste				
PRESSURE – PSIG			TEMPERATURE - °F	
MAX:	TEST: Visual inspection of joints	TEST TYPE:	NORMAL:	MAX:
TEST MEDIUM: Water	TEST DURATION: 12 Hours	CLEANING TYPE:		
PIPE AND FITTING SPECIFICATION				
SIZE	EXPOSURE	PIPE	FITTINGS	
> = 4	All	Schedule 40 Steel, ASTM A53 per Spec 40 05 24-3 2.02A, with glass lining per SS 40 05 24, 2.06 D.	ASTM A536 ductile iron grooved or flanged fittings, grooved mechanical flange adapters for valves. Glass lining to match pipe.	
All	All	Flange Gaskets: PTFE-bonded EPDM, Asahi America or equal.		
		Grooved End Gaskets: Viton		
GENERAL VALVE SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED IN VALVE SCHEDULE				
SIZE	EXPOSURE	DUTY	SPECIFICATION	OPERATOR
REMARKS:				

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SECTION 40 05 24

STEEL PROCESS PIPE

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies steel pipe, fittings, flanges, connections, linings, and coatings.

1.02 REFERENCES

- A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed references, the requirements of this section shall prevail.

<u>Reference</u>	<u>Title</u>
ASME B1.1	Unified Inch Screw Threads
ASME B1.20.1	Pipe Threads, General Purpose
ASME B16.1	Cast Iron Pipe Flanges and Flanged Fittings
ASME B16.3	Malleable Iron Threaded Fittings
ASME B16.4	Gray Iron Threaded Fittings
ASME B16.5	Pipe Flanges and Flanged Fittings
ASME B16.9	Factory-Made Wrought Steel Buttwelding Fittings
ASME B16.11	Forged Fittings, Socket-Welding and Threaded
ASME B16.12	Cast Iron Threaded Drainage Fittings
ASME B16.14	Ferrous Pipe Plugs, Bushings, and Locknuts with Pipe Threads
ASME B16.39	Malleable Iron Threaded Pipe Unions Classes 150, 250 and 300
ASME B16.42	Ductile Iron Pipe Flanges and Flanged Fittings Classes 150 and 300
ASME B31.1	Power Piping
ASME B31.3	Chemical Plant and Petroleum Refinery Piping

<u>Reference</u>	<u>Title</u>
ASME Section IX	Certification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators
ASTM A53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A105	Forgings, Carbon Steel, for Piping Components
ASTM A106	Seamless Carbon Steel Pipe for High- Temperature Service
ASTM A126	Gray Iron Castings for Valves, Fittings, and Pipe Fittings
ASTM A193	Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
ASTM A197	Cupola Malleable Iron
ASTM A234	Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures
ASTM A395	Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures
ASTM A536	Ductile Iron Castings
ASTM F593	Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
AWWA C200	Steel Water Pipe--6 Inches (150 mm) and Larger
AWWA C205	Cement-Mortar Protective Lining and Coating for Steel Water Pipe 4-In. and Larger, Shop Applied
AWWA C207	Steel Pipe Flanges for Waterworks Services Sizes 4-In. Through 144-In.
AWWA C208	Dimensions for Fabricated Steel Water Pipe Fittings
AWWA C213	Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines
AWWA M11	Steel Pipe A Guide for Design and Installation
NSF 61	National Sanitation Foundation, Drinking Water System Components – Health Effects
SAE J429	Mechanical and Material Requirements for Externally Threaded Fasteners, Standard
SSPC-SP 10	Near-White Blast Cleaning

B. DEFINITIONS: (Not Used)

1.03 SUBMITTALS

- A. The following information shall be submitted for review in accordance with the SUBMITTAL PROCEDURES Section (01 33 00):
1. A copy of this specification section, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviations.
 2. Manufacturer's information and catalog data showing compliance with this specification and a full description of the item.
 3. A copy of the ASME Certification of Welders and current work history.
 4. Contractor's shop drawings including fabrication and spool section drawings.

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS (NOT USED)

PART 2 -- PRODUCTS

2.01 GENERAL (NOT USED)

2.02 PIPE MATERIAL

A. ASTM A53:

1. **SIZE RANGE:** 1/8 to 26 inches. Unless otherwise specified, ASTM A53 pipe shall be Grade B, Type E, electric resistance welded or Type S, seamless pipe. The minimum wall thickness for ASTM A53 pipe shall be Schedule 40 for pipe 10 inch diameter and less and 3/8 inch for pipe 12 inch through 26 inch diameter. Increased shell thickness shall be provided where specified.

B. ASTM A106:

1. **SIZE RANGE:** 1/8 to 48 inches. Unless otherwise specified, ASTM A106 pipe shall be Grade B, Schedule 40 for pipe 10 inch diameter and less and 3/8 inch wall thickness for pipe 12 inch through 48 inch diameter. Increased wall thickness shall be provided where specified.

C. AWWA C200:

1. **SIZE RANGE:** 6 inches and larger. AWWA C200 pipe shall be straight or spiral seam. The minimum wall thickness shall be 7 gage for pipe 6 inch through 24 inch diameter and 1/4 inch for pipe 26 inch diameter and larger. Increased shell thickness shall be provided where specified. Yield strength \geq 35,000 psi. Tensile strength \geq 60,000 psi.

2.03 FITTING MATERIAL

A. ASTM A105:

1. Class 3000 forged steel fittings shall conform to ASTM A105 and ASME B16.11. Fittings shall be threaded or socket weld.

B. ASTM A126:

1. Class 125 cast iron fittings shall conform to ASTM A126 Class B; and ASME B16.1, ASME B16.4, ASME B16.12, or ASME B16.14. Tensile strength \geq 31,000 psi. Fittings shall be threaded or flanged.

C. ASTM A197:

1. Class 150 malleable iron fittings shall conform to ASTM A197; and ASME B16.3 or B16.39. Yield strength \geq 30,000 psi. Tensile strength \geq 40,000 psi. Fittings shall be threaded.

D. ASTM A234:

1. Wrought steel butt weld fittings shall conform to ASTM A234 Grade WPB or WPB-W; and ASME B16.9. Fitting wall thickness shall match pipe wall thickness.
2. Wrought steel grooved fittings shall conform to ASTM A234 Grade WPB. Fitting wall thickness shall match pipe wall thickness.

E. ASTM A395:

1. Class 150 ductile iron fittings shall conform to ASTM A395 and ASME B16.1. Fittings shall be flanged.

F. ASTM A536:

1. Ductile iron fittings shall conform to ASTM A536. Fittings shall be threaded, grooved or flanged.

G. AWWA C208:

1. Fabricated steel fittings shall conform to AWWA C208.

2.04 FLANGE MATERIAL

A. ASTM A126:

1. Class 125 cast iron flanges shall conform to ASTM A126 class B and ASME B16.1. Tensile strength \geq 31,000 psi. Flanges shall be threaded with flat face.

B. ASTM A234:

1. Class 150 forged steel flanges shall conform to ASTM A235; and ASME B16.5.
2. Class 300 forged steel flanges shall conform to ASTM A235; and ASME B16.5.
3. Flanges shall be threaded, weld neck, slip-on, or socket weld.
4. Flanges shall be raised face with continuous spiral groove.

C. ASTM A395:

1. Class 150 ductile iron flanges shall conform to ASTM A395 and ASME B16.5. Flanges shall be threaded with flat face.

D. AWWA C207:

1. Class B (86 psi); Class D (150 psi); and Class E (275 psi) steel flange thickness shall conform to AWWA C207.
2. Class B bolt-circle diameter shall conform to AWWA C207.
3. Class D and Class E bolt-circle diameter shall conform to ASME B16.1 Class 125.
4. Flanges shall be slip-on with flat face.

2.05 CONNECTION MATERIAL

A. THREADED CONNECTIONS:

1. Pipe thread dimensions and size limits shall conform to ASME B1.20.1.

B. FLANGED CONNECTIONS:

1. Gaskets shall be as designated in the FOG PIPING SYSTEM SPECIFICATION (40 05 03).

C. FASTENERS:

1. Fasteners for buried, submerged, or gas exposures subject to temperatures less than 200°F shall be ASTM F593 Type 316 stainless steel cap screws with matching washers and nuts, coarse thread.
2. Fasteners for other exposure subject to temperatures less than 200°F shall be SAE J429 Grade 5 hex head zinc-plated carbon steel cap screws with matching washers and nuts, coarse thread.

3. Fasteners for all exposures subject to temperatures greater than or equal to 200°F shall be ASTM A193 Grade B7, with matching washers and nuts.

D. INSULATING FLANGE SET:

1. Flange insulation sets shall be suitable for 225°F continuous operating temperature.
2. Insulating sleeves and washers shall be either one-piece or two-piece type. Sleeves and washers shall be phenolic or spiral-wound Mylar.
3. Metallic flat washer shall be steel or stainless steel to match the cap screw material.
4. Flange insulation sets shall be manufactured by PSI, or equal.

E. SLEEVE-TYPE COUPLINGS: (Deleted)

F. PLAIN END COUPLINGS:

1. ACCEPTABLE PRODUCTS: Gruvlok 7005; Victaulic Style 99; or equal.
2. Plain end couplings shall be ASTM A536 Grade 65-45-12 ductile iron. Size range: 1½ to 14”.
3. Bolts, washers and nuts for buried and submerged exposure locations, or severe exposure severity shall be Type 316 stainless steel regardless of any other protective coatings.
4. Gaskets shall be as specified in the FOG PIPING SYSTEM SPECIFICATION Section (40 05 03).

G. GROOVED END COUPLINGS:

1. FLEXIBLE-TYPE COUPLINGS:

- a. ACCEPTABLE PRODUCTS: Gruvlok 7001; Victaulic Style 77; or equal.
- b. Flexible-type couplings shall be ASTM A536 Grade 65-45-12 ductile iron. Size range: ¾ to 24”.

2. RIGID-TYPE COUPLINGS:

- a. ACCEPTABLE PRODUCTS: Gruvlok 7004HPR; Victaulic Style HP-70; or equal.
- b. Rigid-type couplings shall be ASTM A536 Grade 65-45-12 ductile iron. Size range: ¾ to 24”.

3. FLANGED COUPLING ADAPTERS:

- a. ACCEPTABLE PRODUCTS: Gruvlok 7012; SPF model F-3; or equal.
 - b. Flanged coupling adapters shall be ASTM A536 Grade 65-45-12 ductile iron. Size range: 2 to 24”.
4. STEEL TO DUCTILE IRON TRANSITION COUPLING:
- a. ACCEPTABLE PRODUCTS: Victaulic Style 307, or equal.
 - b. Grooved steel to grooved ductile iron pipe transition couplings shall be ASTM A536 Grade 65-45-12 ductile iron. Size range: 3 to 12”.
5. Bolts, washers and nuts for buried, submerged, and gas exposures shall be Type 316 stainless steel regardless of any other protective coatings.
6. Gaskets shall be as specified in FOG PIPING SYSTEM SPECIFICATION Section (40 05 03).

H. PUSH-ON JOINTS: (Deleted)

I. RESTRAINT DEVICES:

- 1. Restraint devices shall be welded steel harness assemblies. Unless restrained joints on the drawings are excluded, joints using sleeve-type couplings shall be provided with tie bolts and harness lugs. The harnessing system shall be in accordance with Chapter 13 of the AWWA Manual M11 and shall be designed for 150 psi.

2.06 LINING MATERIAL

A. EPOXY LINING: (Deleted)

B. FUSION EPOXY LINING: (Deleted)

C. CEMENT MORTAR LINING: (Deleted)

D. GLASS LINING:

- 1. ACCEPTABLE PRODUCTS: US Pipe Fabrication Ferrolock MEH-32; Vitco SG-14; or equal.
- 2. Where specified in the FOG PIPING SYSTEM SPECIFICATION Section (40 05 03), pipe and fittings shall be glass lined with a vitreous material to a minimum thickness of 10 mils. Thickness to be measured in using a magnetic-type film thickness gage such as Mikrotest Model FM, Elcometer Model 211/1E, or equal. Glass lining shall provide continuous coverage as tested by a Tinker and Rasor Model M1 nondestructive type holiday detector, K-D Bird Dog, or equal low voltage holiday detector. The unit shall operate at less than 75 volts. Voids shall be

cause for rejection. Glass-lined pipe shall be prefabricated. Field cut pieces will only be allowed if no damage occurs to the glass lining. Pipe ends shall be coated.

3. Pipe shall be bored, machined, or grit blasted to remove any voids, protrusions or surface irregularities to obtain a smooth continuous surface for glass lining. Fittings shall be ground or grit blasted to remove any voids, protrusions or surface irregularities.

2.07 COATING MATERIAL

A. EPOXY COATING:

1. Refer to the PAINTING AND COATING Section (09 90 00) for epoxy coating of pipes.

B. FUSION EPOXY COATING: (Deleted)

PART 3 -- EXECUTION

3.01 GENERAL (NOT USED)

3.02 INSTALLATION

A. PIPE INSTALLATION:

1. Install pipe in accordance with the drawings, the manufacturer's instructions and recommendations and AWWA M11, Chapter 16. Pipe shall be installed in accordance with AWWA M11, Chapter 16.

B. FITTING INSTALLATION:

1. Install fittings in accordance with the manufacturer's instructions and recommendations.

C. CONNECTION INSTALLATION:

1. THREADED CONNECTIONS:

- a. Cut, thread and join in accordance with the fitting manufacturer's instructions and recommendations, and ASME B31.1.

2. FLANGED CONNECTIONS:

- a. Cut, thread and join in accordance with the fitting manufacturer's instructions and recommendations, and ASME B31.1.

3. MECHANICAL COUPLING CONNECTIONS:

- a. Install in accordance with the coupling manufacturer's instructions and recommendations.
4. PUSH-ON CONNECTIONS:
- a. Install in accordance with the fitting manufacturer's instructions and recommendations.
5. WELDED CONNECTIONS:
- a. Weld in accordance with ASME Section IX, ASME B31.1, or ASME B31.3. Welders shall be ASME-certified.
6. TAKEDOWN COUPLINGS:
- a. Install screwed unions, flanged or grooved end mechanical coupling type joints where indicated on the drawings. Use flanged or grooved end joints on pipelines 2-1/2 inches in diameter and larger.
7. RESTRAINT DEVICES:
- a. Install in accordance with the manufacturer's instructions and recommendations to prevent joint separation.
8. DIELECTRIC CONNECTIONS:
- a. Provide dielectric connections for dissimilar metal pipe connections.
- D. LINING INSTALLATION:
- 1. Linings shall be applied and patched in accordance with the manufacturer's recommendations and instructions.
- E. COATING INSTALLATION:
- 1. Coatings shall be applied and patched in accordance with the manufacturer's instructions and as specified in the PAINTING AND COATING Section (09 90 00).

F. CLEANING AND FLUSHING: (Deleted)

3.03 TESTING

A. FACTORY TESTING:

1. Factory testing shall conform to the requirements of ASTM A53, ASTM A106, or AWWA C200 as applicable.

B. PRE- OPERATIONAL TESTING:

1. Testing pipe shall be as specified in the FOG PIPING SYSTEM SPECIFICATION Section (40 05 03).

3.04 TRAINING - (NOT USED)

****END OF SECTION****

SECTION 40 05 93

COMMON MOTOR REQUIREMENTS FOR PROCESS EQUIPMENT

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies three-phase motors provided with the driven equipment, rated 1/4 horsepower up to 250 horsepower. Motors shall be totally enclosed fan cooled (TEFC), severe duty, three phase, energy efficient, alternating current induction type. This section does not specify medium voltage (2300 volts and greater) motors and specialty motors such as submersible motors, hermetically sealed motors, hoist motors, valve operator motors or torque rated motors.

1.02 REFERENCES

- A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed references, the requirements of this section shall prevail.

<u>Reference</u>	<u>Title</u>
ABMA 9	Load Ratings and Fatigue Life for Ball Bearings
ABMA 11	Load Ratings and Fatigue Life for Roller Bearings
IEEE 112	Test Procedure for Polyphase Induction Motors and Generators
IEEE 519	Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems
NEMA ICS 6	Enclosures for Industrial Controls and Systems
NEMA MG 1	Motors and Generators
UL 674	Electric Motors and Generators for Use in Hazardous Locations, Class I, Groups C and D, Class II, Groups E, F, and G.
UL 1004	Electric Motors

- B. DEFINITIONS: (Not Used)

1.03 SUBMITTALS

- A. The following information shall be submitted for review in accordance with SUBMITTAL PROCEDURES Section (01 33 00):
1. A copy of this specification section, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviations.
 2. MANUFACTURER'S DATA:
 - a. Motor outline, dimensions, and weight.
 - b. Manufacturer's recommended storage, installation, and start-up procedures.
 - c. Motor sound power level.
 - d. Motor factory tests and warranty information.
 - e. Space heaters, if furnished.
 - f. Winding over temperature device response curve, if furnished.
 - g. Recommended size of capacitors for power factor correction for motors 50 HP and above.
 - h. Motor heating curve for motors 100 horsepower and above.
 - i. Inverter duty motor blower wiring details.
 3. CERTIFICATES:
 - a. For variable speed drive systems, motor manufacturer shall submit a letter of certification. The certification shall state that the selected motor meets all specification requirements, is capable of driving the intended load, and is suitable for operation with the proposed variable speed drive.

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS

- A. Submit operation and maintenance (O&M) instructions in accordance with the OPERATION AND MAINTENANCE DATA Section (01 78 23) by submitting a copy of the OPERATION AND MAINTENANCE DATA Section (01 78 23) with each paragraph check marked to show compliance. O&M instructions shall be submitted after all submittals specified above have been returned marked "No Exceptions Taken" or "Make Corrections Noted." O&M instructions shall reflect the approved materials and equipment.

PART 2 -- PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Motors shall be suitable for continuous operation in a -15 through +40 degree C ambient temperature at sea level. Motors shall be suitable for both indoor and outdoor installations in a severe duty environment.
- B. Motors shall be suitable for use on a nominal 480 volt, 3 phase, 60 hertz power system. The electrical power system has a regulation of ± 10 percent of rated voltage at 60 hertz and a maximum unbalance of 1 percent at the motor terminals. Motors shall be designed to operate from an electrical system that may have a maximum of 5 percent voltage distortion per IEEE 519 without exceeding the service factor temperature rise.
- C. Two pole motors will not be accepted unless specifically called for in the specific equipment specifications.

2.02 CONSTRUCTION

- A. All motors provided under this specification shall have the following severe duty features of construction:
 - 1. Cast iron frame, end shields, oversized conduit box, and fan guard.
 - 2. Cast phenolic or cast iron fan blades.
 - 3. Stainless steel hardware.
 - 4. Conduit box lead seal, gaskets and ground lug.
 - 5. Low point condensation drain weep holes.
 - 6. Copper windings with polyester varnish and nonhygroscopic leads.
 - 7. Motor shaft slinger.

2.03 ELECTRICAL REQUIREMENTS

- A. Motors 1/4 horsepower through 250 horsepower shall be severe duty, 3 phase, squirrel cage in the particular equipment section, full voltage start induction type. Motors shall have a NEMA MG 1-1.16 design letter B or C torque characteristic as required by the driven equipment's starting torque requirements.
- B. Unless otherwise specified in the particular equipment section, motors shall be rated for operation at 460 volts, 3 phase, 60 Hz, and shall be continuous time rated in accordance with NEMA MG 1. Dual voltage (200-230/460) rated motors are acceptable if all leads are brought out to the conduit box. Motors shall not be required

to exceed their nominal horsepower nameplate rating under any condition imposed by the characteristics of the driven equipment.

- C. Motors shall deliver full load power with a NEMA MG 1 Class B temperature rise. Motors shall be rated with a 1.15 service factor in a maximum 40 degree C ambient. Motors shall have a NEMA MG 1 Class F insulation system.
- D. Motor performance shall be as follows with a rated voltage and frequency applied at the terminals. Motors shall meet or exceed the locked rotor (starting) and minimum breakdown torques specified in NEMA MG 1 for Design B or C for the ratings specified. Locked rotor (starting) currents shall not exceed NEMA MG 1 Design B or C maximum values for the specified rating. Motors shall be capable of a 20-second stall at six times full load current without injurious heating to motor components.
- E. The full load power factor for all motors 10 horsepower and above shall be a minimum of 0.73. All motors 50 horsepower and above shall be provided with capacitors to correct the full load power factor to a minimum of 0.90 through a maximum of 0.95. Motor manufacturer shall submit a recommended capacitor size for motors 50 horsepower and above.
- F. Current imbalance, based upon the lowest measured value, shall not exceed those tabulated below when the motor is operating at any load within its service factor rating and is supplied by a balanced voltage system:
 - 1. Under 5 horsepower: 10 percent
 - 2. 5 horsepower and above: 5 percent
 - 3. Motors shall have a nameplate nominal efficiency at full load as listed in paragraph 11 05 13-2.05, Table 1. Motors shall be prototype tested in accordance with NEMA MG 1-12.54, 12.55, 12.56 and IEEE 112 Method B, using accuracy improvement by segregated loss determination including stray load loss measurements.

2.04 MECHANICAL REQUIREMENTS

- A. The horsepower to frame relationship shall conform to NEMA MG 1 T frame for horizontal motors and P frame for vertical motors. Universal position motors are not acceptable. Direct connected motors shall have a face or flange specifically designed to mate with the driven equipment. Adaptor flanges are not acceptable.
- B. All motors shall have standard anti-friction bearings, sized to provide an ABMA 9 or 11 L-10 life of at least 50,000 hours under maximum belt loading conditions or 125,000 hours of an ABMA 9 or 11 L-10 life for a direct connected load. For horizontal motors the drive end and opposite drive end bearing shall be the same size except for motors having specified mechanical modifications.

- C. Vertical motors 30 horsepower and above the thrust bearings shall be oil lubricated. Thrust bearing shall be selected to carry the total load consisting of the weight of the motor rotor plus combined dead weight and hydraulic thrust load imposed on motor by the pump. The lower guide bearing shall be sized to withstand both up and down thrust. Vertical motors shall have hollow shafts with a bolted coupling at the top of the motor.
- D. Bearings smaller than #207 are permitted to be the sealed type. All bearing #207 and larger shall be the shielded regreasable or oiled type. The grease reservoir shall be located above the bearings to insure proper seepage of lubrication. Regreasing shall purge the grease cavity above the bearings to insure an adequate supply of fresh grease. Motor designs employing cartridge type bearings will not be accepted.
- E. All motors shall be fitted with lubricant fill, drain and relief fittings. Oil lubricated bearings shall have a visual level indicator, accessible drain plug and accessible filling plug designed to prevent over filling. Oil lubrication system shall be so designed as to provide the correct quantity of lubricant with minimum foaming or aeration.
- F. All motors shall be furnished with breather/drains. For explosionproof motors, the drain shall be a stainless steel, UL listed device.
- G. Conduit boxes shall be cast iron, split construction with threaded bosses. Conduit boxes shall be designed for rotation to permit installation in four positions at 90 degrees apart.
- H. Motors weighing more than 50 pounds shall be fitted with at least one lifting eye positioned on the center of gravity.
- I. Motors 10 horsepower and above shall be dynamically balanced to NEMA MG 1-12.06 and vibration shall be measured per NEMA MG 1-12.07.
- J. For vertical motors the motor manufacturer shall submit reed critical frequency data to the pump manufacturer including the motor weight and the height of the center of gravity above p base and the displacement of the center of gravity in mils and the frequency in cycles per minute. The reed critical frequency data shall be based on reliable tests conducted on an infinite mass of at least a ratio of 15:1 with respect to the motor weight. The critical speed of the shaft and rotor assembly shall always be above the operating speed of the motor by at least 10 percent.
- K. Motors shall not exceed maximum noise sound pressure levels at full load as listed in paragraph 11060-2.05, Table 1. Sound pressure dBA shall be measured in a free field with a reference pressure of 0.000002 pascals average reading at 3 feet.

2.05 EFFICIENCY AND SOUND PRESSURE

- A. Motors shall have efficiency equal to or greater than those listed in Table 1 and sound pressure equal to or less than those listed in Table 1.

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Table 1 - Three Phase Motor Efficiency (Full Load) and Sound Pressure (No Load)

Horsepower	1800 RPM (4 Pole)		1200 RPM (6 POLE)		900 RPM (8 POLE)	
	% Nominal	dBA	% Nominal	dBA	% Nominal	dBA
	Efficiency	Sound Pressure	Efficiency	Sound Pressure	Efficiency	Sound Pressure
0.25	68.5	65	62.5	60	-	-
0.33	72.5	65	66.5	60	-	-
0.50	74.0	65	72.5	60		
0.75	74.5	65	76.5	60		
1	78.5	65	78.5	60	75.5	60
1.5	83.5	65	87.5	51	80.0	60
2	85.5	65	87.5	51	85.5	60
3	89.5	59	89.5	57	86.5	60
5	90.2	59	89.5	57	89.5	62
7.5	91.7	65	91.7	58	89.5	62
10	91.7	65	91.7	58	91.0	63
15	92.4	69	91.7	60	91.0	63
20	93.0	69	92.4	63	91.7	64
25	93.6	64	92.4	64	91.7	64
30	93.6	64	93.0	66	93.6	66
40	94.1	74	93.6	66	93.0	66
50	94.1	74	93.6	66	93.6	68
60	95.0	80	94.1	68	93.6	68
75	95.4	80	95.0	68	94.1	74
100	95.4	80	95.0	74	94.1	74
125	95.4	80	95.0	74	94.5	80
150	95.8	80	95.8	74	94.5	80
200	95.8	80	95.4	80		
250	96.2	80				

2.06 CLASSIFICATION AND TYPES

A. GENERAL

1. Motors shall be classified as Type 1 (Indoor), Type 2 (Outdoor), and Type 3 (Explosionproof). Enclosure systems shall be as specified in the following para-

graphs. Aluminum or rolled steel frame motors are not acceptable. Motors shall conform to UL 1004.

B. TYPE 1 MOTORS (INDOOR): NOT USED

C. TYPE 2 MOTORS (OUTDOOR):

1. Enclosure Enclosure shall be totally enclosed fan cooled construction for severe environments. Motor shall be furnished with vacuum pressure impregnated insulation of high solids epoxy.

D. TYPE 3 MOTORS (EXPLOSION PROOF): NOT USED

2.07 SPECIAL FEATURES

A. WINDING OVERTEMPERATURE THERMISTORS:

1. Stator winding overtemperature thermistors shall be provided on all motors rated 100 horsepower and larger.
2. Thermistors shall conform to NEMA MG 1-12.53, Type 1, winding running protection. Two detectors shall be provided per phase. Detectors shall be positive thermal protection (PTC) thermistors type, with leads brought out to a terminal strip in a separate NEMA ICS 6 type 4 enclosure in Type 1 and 2 motors and a NEMA ICS 6 type 7C or 9 enclosure for Type 3 motors. A 120V AC PTC monitoring relay shall be provided for mounting in the motor controller enclosure. This relay shall provide a normally closed contact which opens on high temperature. The relay shall be manually reset.

B. HEATERS:

1. Heaters shall be provided in all 10 HP and larger Type 2 motors and Type 3 motors installed outdoors to guard against condensation after shutdown. Heaters shall be cartridge or flexible wraparound type. Heaters shall be rated 120 volts, single phase, 60 Hz. The heater rating in watts and volts shall be noted on the motor nameplate or on a second nameplate. Space heater terminals shall be brought to a separate terminal box.

2.08 MOTORS DRIVEN BY VARIABLE FREQUENCY CONTROLLERS

- A. Motors driven by variable speed controllers (VFCs) shall conform to all the requirements specified herein.
- B. Motors intended for use with VFC systems shall be inverter duty motors specifically designed for inverter operation and shall be applied in accordance with NEMA, ANSI, IEEE, AFBMA and NEC for the duty services imposed by the driven equipment. Motors shall be Totally Enclosed Fan Cooled (TEFC) or Totally Enclosed Non-Ventilated (TENV) Vector Duty and meet the operating characteristics and load

requirements of the driven equipment as specified in the specifications. Selected motor rating and type shall match the Variable Frequency Controller. Motor insulation shall be Class H with Class F temperature rise when operated continuously at all speed and load conditions throughout the operating range. Motors shall be energy efficient type as specified in paragraph 11 05 13-2.05, Table 1. Insulation system shall be capable of withstanding a change in voltage (dv/dt) of 1200 volts per microsecond without damage. Two normally closed thermal protectors in the stator winding wired in series shall be set to open when the temperature reaches 155 degrees C.

- C. Motors for VFC systems shall not be required to deliver more than 80 percent of the motor's nameplate horsepower rating by any load imposed by the driven machine at any specified operating condition or any load condition indicated by the driven machine's performance curve at all operating speeds. The motor's service factor shall not be considered in the calculation. Power factor correction capacitors on VFC systems are not required or allowed.

2.09 FACTORY TESTS AND WARRANTY

A. TESTING:

1. Testing shall be performed on each design to assure compliance with all criteria specified herein. In addition to design tests, each motor shall be given the following standard factory tests (which shall include but not be limited to the following) to determine that it is free from electrical and mechanical defects:
 - a. Running current
 - b. Locked rotor current (reduced voltage)
 - c. Winding resistance
 - d. High potential
 - e. Bearing inspection (running noise)
 - f. Efficiency (full load dynamometer)

B. WARRANTY:

1. Motor mechanical components shall have a full three year performance warranty.

2.10 NAMEPLATES

- A. Nameplates shall be engraved or stamped stainless steel. Information shall include those items enumerated in NEMA MG 1- 10.39 or -10.40, as applicable. Dual voltage or part winding motors shall have a connection nameplate which shall indicate the motor connection diagram. Additionally, nameplates for motors 1/2 horsepower and larger shall indicate the ABMA L-10 rated life for the motor bearings and shall list the

nominal efficiency. Nameplates for explosionproof motors shall also indicate UL frame temperature limit code. Lubrication nameplates shall include bearing numbers, lubrication type and viscosity. Nameplates shall be permanently fastened to the motor frame and shall be positioned to be easily visible for inspection after installation.

2.11 ACCEPTABLE MANUFACTURERS

A. GENERAL:

1. The following manufacturer's motors generally meet the class and performance requirements of this specification when furnished with appropriate modifications and additional features. All motors furnished shall be as specified on or accepted equals.

B. FRACTIONAL HORSEPOWER MOTORS:

1. Types 1 and 2 – Sterling Electric, Inc., Cast FeMax., or equal.

C. INTEGRAL HORSEPOWER HORIZONTAL MOTORS:

1. Types 1 and 2 - General Electric, Inc., Type KS, ESD; Reliance Electric Co. Duty Master premium XE/XT; Emerson US Motors, Type TCE premium efficiency corroduty; Toshiba, EQP III, XS.; or equal.
2. Type 3 - General Electric, Inc. Type KS, ESD, Class I, Group D; Emerson US Motors, Type LCE premium efficiency explosion proof; or equal.

D. INTEGRAL HORSEPOWR VERTICAL MOTORS:

1. Types 1 and 2 - General Electric Inc., Type KS, ESD, Emerson US Motors, Type TUCE premium efficiency corroduty; or equal.
2. Type 3 - General Electric, Inc., Type KS ESD, Class I, Group D; Emerson US Motors, Type LUCE premium efficiency, explosion proof; or equal.

PART 3 -- EXECUTION

3.01 GENERAL

- A. Submit and obtain acceptance of all motor data prior to fabrication. Submittals shall list all motor options and shall include the completed motor data sheet.
- B. Shipping and Handling: The motor manufacturer shall prepare the motor for shipment to the driven equipment manufacturer. Bearings shall have an oil film and machine parts shall be flushed to prevent corrosion. Motor shall be packaged to prevent moisture entering the enclosure. The motor shall be handled by the lifting eye.

3.02 INSTALLATION

- A. The driven equipment manufacturer shall install the motor on the equipment in accordance with the motor manufacturer's instruction books. All bolted connections shall be torqued to the value recommended by the equipment supplier.
- B. Field installation shall be in accordance with the driven equipment manufacturer's instruction books.

3.03 TESTING (DELETED)

3.04 TRAINING (NOT USED)

****END OF SECTION****

SECTION 46 24 23

TOP OPENING INLINE HIGH STRENGTH WASTE MACERATORS

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies top opening in-line macerators for high strength organic wastes (HSW) including but not limited to liquid food processing waste; food processing sludge; biological solids from the activated sludge process; and fats, oil and grease (FOG), industrial and food waste sludges, and other high strength wastes. The top opening inline grinders shall be furnished complete with controls and appurtenances.
2. The grinder shall be motor driven single shaft with all cutting elements mounted on the drive unit shaft. The grinder design shall be of the type that provides access to all cutting elements by a single hinged cover. Grinders using dual shaft cutting elements or cutting elements mounted on separate frames shall not be considered.
3. Equipment furnished shall be suitable for operation in a wastewater treatment plant. The grinders shall collect rocks and debris from the high strength waste that may contain up to 10 percent solids by weight. The grinder shall be designed for continuous maceration.
4. Each grinder will be located on the suction side of a positive displacement pump supplied by 480 volt, 60 cycle, AC power.
5. Grinders shall operate without an external source of water for flushing seals or cutter faces. The design shall permit removal and replacement of internal rotating parts without removing the grinder side housing from the piping system.
6. Grinders shall fit at the existing FOG receiving station at the EchoWater Facility. The distance from the concrete slab to the center line of the 6" FOG line is approximately 33". Contractor shall field verify.
7. Refer to existing PLC control narratives (CN1420 and CN1421) for detailed operation of the grinder and FOG unloading system.

B. Related sections:

1. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to

excuse or otherwise diminish the duty of the CONTRACTOR to see that the completed Work complies accurately with the Contract Documents.

<u>Section</u>	<u>Title</u>
Section 01 33 00	SUBMITTAL PROCEDURES
Section 01 65 00	PRODUCT DELIVERY REQUIREMENTS
Section 01 78 23	OPERATION AND MAINTENANCE DATA
Section 40 05 93	COMMON MOTOR REQUIREMENTS FOR PROCESS EQUIPMENT

1.02 REFERENCES

- A. American Iron and Steel Institute (AISI):
 - 1. 4130 - Heat Treated Alloy Steel.
 - 2. 4140 - Heat Treated Hexagon Steel.
- B. American Society of Mechanical Engineers (ASME).
 - 1. B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
- C. National Electrical Manufacturers Association (NEMA):
 - 1. 250 - Enclosures for Electrical Equipment (1,000 V Maximum).
- D. Underwriters Laboratories, Inc. (UL).

1.03 SYSTEM DESCRIPTION

- A. Type: Macerator:
 - 1. Motor-driven single shaft type with all cutting elements mounted on the drive unit shaft.
 - 2. Design:
 - a. Provides access to all cutting elements by a single, hinged cover.
 - b. Do not use dual shaft cutting elements or cutting elements mounted on separate frames.
 - c. Install in a process pipeline, as indicated in the Drawings, to continuously macerate fats, oils, and grease (FOG), and food processing waste (FPW).
 - d. Interior design shall use a cyclone effect to remove metal and other heavy solids that may cause damage to the cutting blades.

- B. Operating conditions: Equipment furnished under this Section will be used to reduce the size of solids contained in FOG, Food Processing Waste, Biological Solids, Food Waste Sludges and High Strength Waste.
1. Ambient temperature: 20 to 110 degrees Fahrenheit.
 2. Relative humidity: 10 to 100 percent.
 3. Fluid: Fats, oils, and grease (FOG), and food processing waste (FPW).
 4. Solids: Up to 10 percent solids.
 5. Location: Outdoors, suction side of a rotary lobe pump.
 6. FOG/FPW temperature: 50 to 90 degrees Fahrenheit.
- C. Design requirements:
1. General:
 - a. The equipment shall be capable of operation with or without liquid in the pipeline, and shall operate without an external source of water for flushing seals or cutter faces.
 - b. The design shall permit removal and replacement of internal rotating parts without removing the rock trap/grinder side housings from the piping system.
 2. Controller:
 - a. The macerator shall be provided with a dedicated controller to control operation of the equipment.
 - b. The controller shall have sensors designed to detect motor overload, initiate momentary reversal of cutter operation to cure the condition, and then resume normal operation.
 - c. If the overload clears, normal operation shall be maintained.
 - d. If the overload reoccurs, the process shall be repeated.
 - e. If overload remains after 3 attempts within 30 seconds, the controller shall lock out the rock trap/grinder's control circuits and initiate alarm through dry contacts to an external circuit.
 3. Equipment shall meet the requirements in the Macerator Schedule, section 3.03.

1.04 SUBMITTALS

- A. Copy of this specification section, with addendum updates included, and all referenced applicable sections with each paragraph check marked to indicate specification compliance or marked to indicate deviations.
 - 1. Manufacturer’s information and catalog data sheets showing compliance with this specification, copy of standard O&M Manual and Warranty certificate.
- B. Submit motor data and include motor data sheet per Section 40 05 93.
- C. Provide written manufacturer’s installation, checkout requirements, and startup procedures.
- D. Provide seismic and wind anchorage calculations stamped by a California licensed civil or structural engineer.
- E. Control panel wiring diagrams, internal and external layouts, cut sheets, and complete bill of material list.
- F. Provide manufacturer qualifications per 1.05 A.

1.05 QUALITY ASSURANCE

- A. Manufacturer qualifications: Manufacturer shall have at least 5 years’ experience in the design, application, and supply of macerators for high strength wastes and FOG, and provide a list of not less than three operating installations in the United States as evidence of meeting the experience requirement.

	Location	Contact Name and Phone No.
Installation No. 1		
Installation No. 2		
Installation No. 3		

- B. Modifications: Modify standard equipment to meet, as a minimum, the values specified for dimension, design, and intent of this Section.

1.06 PRODUCT DELIVERY REQUIREMENTS

- A. Equipment, products and materials shall be shipped, handled, stored, maintained and installed in ways which will prevent damage to the items. Damaged items will not be permitted as part of the work except in cases of minor damage that have been satisfactorily repaired and are acceptable to the District Representative.
- B. Failure of Contractor to properly store and maintain equipment and materials will result in rejection of the equipment or material or a withholding from the progress payment.
- C. Deliveries to the EchoWater Facility must include the contract number and name of the project on all delivery manifests.

1.07 WARRANTY

- A. Grinders shall be warranted free from defects in workmanship, design and materials for a period of 1 year from the date of acceptance of the equipment or 18 months from delivery to the EchoWater Facility, whichever comes first.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: The following or equal:
 - 1. Vogelsang USA, Rota-Cut, Model RCQ-43G Pro Inline.

2.02 IDENTIFICATION

- A. Each unit of equipment shall be identified with a corrosion resistant nameplate, securely affixed in a conspicuous place.
 - 1. Nameplate information shall include equipment model number, serial number, manufacturer's name, and location.

2.03 MATERIALS

- A. General equipment construction:
 - 1. Macerators shall consist of the following four main components:

- a. Body.
 - b. Cutting assembly.
 - c. Drive unit.
 - d. Control panel.
- B. Body (including cleanout cover): Steel, SAE Type 1015, hot dip galvanized.
- C. Cutter screen and cutting blade shall be 304 or 316 stainless steel.
- D. Shaft: Hardened alloy steel, AISI 4140, with a tensile strength of 150,000 pounds per square inch.
- E. Seals:
- 1. Mechanical seal shall be Duronite.
 - 2. O-ring seal shall be Buna-N.
- F. Fasteners (including bolts, nuts, washers, and keys): Type 316 stainless steel.

2.04 BODY

- A. One-piece flanged body to be capable of remaining in-line if removal of the cutting assembly and drive assembly is required for service.
- 1. The rock trap/grinder body shall consist of a drum with flanged piping connections, flanged cleanout and hinged top cover plate.
- B. Cover plate and top opening:
- 1. The cover plate shall be reinforced to bear the weight of the drive and cutter assembly and shall be held in place by quick-opening latches.
 - 2. The top opening shall be sealed with an O-ring seal to sustain a minimum internal pressure of 29 pounds per square inch.
- C. Top cover hinge:
- 1. The top cover hinge mechanism shall be reinforced and of sufficient strength to, when the cover has been opened, hold the drive unit, cover plate, and cutter assembly firmly in position, with the cutter shaft in essentially a horizontal position and the cutter assembly exposed for maintenance.
 - 2. The hinge assembly shall also provide sufficient strength to allow removal and reassembly of the drive and cutter assembly.

- a. A heavy duty hydraulic mechanism shall provide both assist and shock dampening action during the opening and closing process.
 - b. A 24 V NEMA proximity switch shall be provided with contacts set to open when the cover latch is not in the engaged position.
- D. Piping connections:
- 1. Piping connections shall be 125 pounds per square inch ASME B16.1 shall be positioned 180 degrees (in plan view) from each other, and shall be concentric with each other.
 - 2. The flanges shall be located in the upper half of the drum to permit storage for periodic removal of heavier objects in the flow processed by the machine.
- E. Mounting frame: A mounting frame shall be provided to permit anchor bolting of the macerator to the equipment pad indicated on the Drawings.

2.05 CUTTING ASSEMBLY

- A. Cutting assembly shall consist of a minimum of 4 independent stainless steel cutter blades, mounted in a solid cast headstock, rotating on a reversible abrasion resistant stainless steel wearplate.
- B. Cutter blades shall be connected to the headstock through a re-usable system of knockout pins.
 - 1. Screw or bolt connections will not be accepted.
- C. Wear plate shall provide the particle passing size specified in the macerator schedule.
- D. Cutter shall mount the blades such that efficient cutting occurs in both the forward and reverse directions.
- E. Cutter shall rotate on the drive shaft.
- F. Grid plate shall be designed such that it allows for constant blade support through the entire range of motion.
- G. Blades shall be designed such that they could be reversed by maintenance personnel to provide extended life before they must be replaced.

2.06 DRIVE UNIT

- A. Vertical electric motor with planetary gear reducer to achieve an operating speed of 185 revolutions per minute.

- B. Motor:
 - 1. Squirrel cage induction type meeting a minimum NEMA design B speed torque class.
 - 2. Breakdown torque shall be 200 percent or more of the maximum torque load placed on the motor shaft.
 - 3. Motor shall meet the requirements of Type 2 in Section 40 05 93 and in the macerator schedule.
- C. Planetary gear reducer:
 - 1. Designed for continuous heavy-duty shock loading.
 - 2. Sealed in grease.
 - 3. Concentric shaft.
- D. Drive motor and gear reducer shall be isolated by a double sealing system consisting of a primary oil-lubricated mechanical seal and a secondary lip seal.
- E. Mechanical seal shall be suitable for 29-pounds per square inch operation.
- F. Mechanical seal on the gear output shaft shall be a non-metallic design using an O-ring seal in a bath of hydraulic fluid to protect the gear motor from contact with product fluid in the gear motor enclosure.

2.07 CONTROL PANEL

- A. Each macerator shall be furnished with a separate Macerator Control Panel (MCP). The MCP will be mounted remote from the rock trap/grinder equipment. All panels shall be furnished with all internal wiring completed and tested, requiring only mounting and connection to external wiring.
- B. Macerator Control Panel (MCP):
 - 1. The MCP shall contain all power and control devices for an individual unit and shall be custom fabricated.
 - 2. The MCP shall be a Type C (NEMA 4X stainless steel) floor mount enclosure. The MCP enclosure shall be sized as required to house all equipment requires, but shall be a minimum of 36" W x 36" H x 12" D.
 - 3. Each MCP shall contain the following major components:
 - a. Externally operable 480-volt circuit breaker type switch.

- b. 480-volt control power transformer with primary and secondary fusing.
 - 1) The control transformers shall meet the requirements of NEMA ST-1. The control transformer shall be protected by two 600V AC fuses on the primary side and one 250V AC fuse on the secondary side.
- c. DIN rail mounted terminal blocks for all power and control wiring.
- d. Internal panel connection wiring, with wire marking sleeves:
 - 1) Lettering shall be resistant to smudging, fading, chemical and harsh environment deterioration.
 - 2) Sleeves shall be sized to fit the conductor insulation and shrunk to fit the conductor with hot air after installation.
 - 3) Cable and wire markers shall be heat shrinkable irradiated polyolefin, conforming to UL 224.
 - 4) The letters and numbers that identify each cable or wire shall be machine printed with 1/8 inch high characters on 2 inch sleeves with permanent black ink.
 - 5) The wire marking system shall be Brady Perma-sleeve PS XXX-2W series and Brady PS Printer, or equal
- e. Provide push-to-test, LED type indicator lights (Allen-Bradley 800T Series, or equal) for the following status and alarms:
 - 1) OVERLOAD (Red)
 - 2) EMERGENCY STOP (Red)
 - 3) COVER LATCH DISENGAGED (Red)
 - 4) FAULT (Red)
 - 5) CHECK ACC OPERATION (Red)
 - 6) REPLACE BLADES (Red)
 - 7) FORWARD (Green)
 - 8) REVERSE (Green)
 - 9) READY (Green)
- f. Provide the following operating controls (Allen-Bradley 800T Series, or equal):
 - 1) EMERGENCY STOP mushroom head type pushbutton
 - 2) START-OFF-READY selector switch
- g. Electrical components shall be UL approved for use in the enclosure.
- h. Panels shall be fabricated by a UL-508A recognized facility and shall bear the appropriate UL 508A Industrial Control Panel label. Control panel shall have a short circuit current rating of 65 kA.

- i. Full-voltage reversing motor starter with motor circuit protector disconnect.
 - 1) The full voltage starter shall consist of two 600 volt AC contactors, two overload relays, and a transient surge suppressor.
 - 2) The starter shall be NEMA Size 1 minimum.
 - 3) The contactors shall be in compliance with NEMA ICS2 and shall be NEMA rated for the horsepower as specified.
 - 4) Overload relays shall be electronic type with monitory and control.
 - a) Eaton Cutler-Hammer C440 type, or equal.

- j. Status signals:
 - 1) Provide contacts rated 10A at 120 VAC for remote monitoring of the following:
 - a) START-OFF-READY in READY status.
 - b) RUNNING status.
 - c) FAULT alarm.

- k. Control signals:
 - 1) Accept a remote contact closure signal to run the macerator when the START-OFF-READY switch is in the READY position.

C. Additional features:

- 1. Safety switch shall be provided on the macerator cover to automatically shut down and lockout the motor, when the cover is open.
- 2. Macerator motor shall cycle between reverse and forward every 30 minutes and shall be operator adjustable.

D. Nameplates

- 1. Identify external door-mounted components and the panel description with nameplates. Nameplates shall be machine engraved laminated plastic. Color shall be black with white lettering. Warning nameplates shall be red with white lettering.
- 2. Nameplate engraving shall include the panel title, panel tag number and power source(s) in 3/32-inch minimum size lettering.
- 3. Attach nameplates to the panel with a minimum of two self-tapping 316 stainless steel screws. Provide RTV sealant for nameplates. Nameplates shall have sufficient fastening so as to not bow away from the panel.

2.08 SOURCE QUALITY CONTROL

- A. The macerator shall be hydrostatically tested at the factory.
 - 1. Each grinder shall be factory testing to conform performance. Test results shall be signed and certified by a manufacturer representative.
 - 2. Test pressure shall be 29 pounds per square inch gauge, which shall be held for a period of not less than 60 minutes. Leakage throughout the test period shall be zero.

PART 3 -- EXECUTION

3.01 INSTALLATION AND TRAINING

- A. Install macerator and control panel in accordance with manufacturer's instructions. SacSewer electrical staff shall perform electrical connections inside control panel.
- B. Provide the services of the manufacturer's equipment representative to come to the site and confirm proper macerator installation (including verification of electrical connections) in accordance with the manufacturer's recommendations. Provide a letter confirming proper equipment installation.
- C. Once installation certification is obtained, run each unit for at least 12 hrs.
- D. A minimum of three days (8-hrs each) shall be included for equipment verification, run time and three separate 2-hr training sessions. Coordinate with SacSewer on specifics.

3.02 TESTING

- A. Field-testing shall include overloading simulation to activate the automatic stop and reverse control. Simulation will occur by breaking the contact.
- B. Field-testing shall include a demonstration of the specified motor interlock by tripping the cover latch with the machine in operation.
- C. Coordinate with the SacSewer and demonstrate operation of equipment.

3.03 MACERATOR SCHEDULE

Tag Numbers	GDR890003, GDR890004
General	
Product Fluid Type	FOG / Food Processing Waste / Biological Solids / Food Waste Sludges / High Strength Waste
Rated Capacity, gpm	Greater than 300
Maximum Percent Solids, %	10
Pressure Rating, psi	29
Maximum Pressure Loss at Maximum Rated Flow, feet	3.5
Flanges	
Suction Flange Size, inches	6 or 8
Discharge Flange Size, inches	6 or 8
Clean-Out Size, inches	8
Cutter Assembly	
Maximum Particle Passing Size, inches	0.25
Drive Motor	
Horsepower	7.5
Voltage/Phases/Hertz	460/3/60
Service Factor	1.15
Enclosure	TEFC

****END OF SECTION****

ATTACHMENT A:

CN 1420 - FOG/FPW TRUCK UNLOADING CONTROL

CN 1421 - FOG /FPW TANK MIXING CONTROL

CONTROL NARRATIVE 1420

TITLE: FOG/FPW TRUCK UNLOADING CONTROL

PLC: PLC 88111D

**FINAL CONTROL
ELEMENTS:**

P890003	FOG MIXING PUMP 1
GDR890003	ROCK TRAP/GRINDER 1
V890001	FOG UNLOAD VALVE 1
V890011	FOG TANK 1 MIXING VALVE
P890004	FOG MIXING PUMP 2
GDR890004	ROCK TRAP/GRINDER 2
V890002	FOG UNLOAD VALVE 2
V890012	FOG TANK 2 MIXING VALVE

DIAGRAMS: 46C05, 46C06, 46C08

INPUTS:

DISCRETE:

P890003R	FOG/FPW MIXING PUMP 1 RUNNING
P890003W	FOG/FPW MIXING PUMP 1 READY
P890004R	FOG/FPW MIXING PUMP 2 RUNNING
P890004W	FOG/FPW MIXING PUMP 2 READY
GDR890003R	FOG/FPW GRINDER 1 RUNNING
GDR890003W	FOG/FPW GRINDER 1 READY
GDR890004R	FOG/FPW GRINDER 2 RUNNING
GDR890004W	FOG/FPW GRINDER 2 READY
V890001W	FOG/FPW TANK 1 UNLD. VALVE RDY
V890001R	FOG/FPW TANK 1 UNLD. VALVE OPN
V890001G	FOG/FPW TANK 1 UNLD. VALVE CLSD
V890002W	FOG/FPW TANK 2 UNLD. VALVE RDY
V890002R	FOG/FPW TANK 2 UNLD. VALVE OPN
V890002G	FOG/FPW TANK 2 UNLD. VALVE CLSD
V890011W	FOG/FPW TANK 1 MIX. VALVE RDY
V890011R	FOG/FPW TANK 1 MIX. VALVE OPN
V890011G	FOG/FPW TANK 1 MIX. VALVE CLSD
V890012W	FOG/FPW TANK 2 MIX. VALVE RDY
V890012R	FOG/FPW TANK 2 MIX. VALVE OPN
V890012G	FOG/FPW TANK 2 MIX. VALVE CLSD
CPNL890003BA	FOG TANK 1 UNLOAD START
CPNL890003BB	FOG TANK 1 UNLOAD STOP
CPNL890003BC	FOG TANK 1 UNLOAD ENABLE (KEY)
CPNL890004BA	FOG TANK 2 UNLOAD START

CPNL890004BB	FOG TANK 2 UNLOAD STOP
CPNL890004BC	FOG TANK 2 UNLOAD ENABLE (KEY)

CALC

DISCRETE:	L890005X	TANK 1 LOW LEVEL (FRM LIT)
	L890005V	TANK 1 HIGH LEVEL (FRM LIT)
	L890006X	TANK 2 LOW LEVEL (FRM LIT)
	L890006V	TANK 2 HIGH LEVEL (FRM LIT)

ANALOG:

L890005	TANK 1 LEVEL
L890006	TANK 2 LEVEL

CALC

ANALOG:	SP890005	TANK 1 HIGH LEVEL SETPOINT
	SP890006	TANK 2 HIGH LEVEL SETPOINT
	T890005	TANK 1 VOLUME REMAINING
	T890006	TANK 2 VOLUME REMAINING

OUTPUTS:

DISCRETE:	P890003A	FOG/FPW MIX. PUMP 1 START
	P890003B	FOG/FPW MIX. PUMP 1 STOP
	P890004A	FOG/FPW MIX. PUMP 2 START
	P890004B	FOG/FPW MIX. PUMP 2 STOP
	V890001A	FOG/FPW TANK 1 UNLD. VALVE OPN
	V890001B	FOG/FPW TANK 1 UNLD. VALVE CLS
	V890002A	FOG/FPW TANK 2 UNLD. VALVE OPN
	V890002B	FOG/FPW TANK 2 UNLD. VALVE CLS
	V890011A	FOG/FPW TANK 1 MIX. VALVE OPN
	V890011B	FOG/FPW TANK 1 MIX. VALVE CLS
	V890012A	FOG/FPW TANK 2 MIX. VALVE OPN
	V890012B	FOG/FPW TANK 2 MIX. VALVE CLS
	CPNL890003BG	UNLOAD SYSTEM 1 READY
	CPNL890004BG	UNLOAD SYSTEM 2 READY
	GDR890003A	FOG/FPW GRINDER 1 START
	GDR890003B	FOG/FPW GRINDER 1 STOP
	GDR890004A	FOG/FPW GRINDER 2 START
	GDR890004B	FOG/FPW GRINDER 2 STOP

CALC

DISCRETE:	NONE.
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CALC

ANALOG:	NONE.
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ANALOG:	NONE.
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ALARM:

INPUTS:

P890003T MIXING PUMP 1 TROUBLE
GDR890003T ROCK TRAP/GRINDER 1 TROUBLE
P890004T MIXING PUMP 2 TROUBLE
GDR890004T ROCK TRAP/GRINDER 2 TROUBLE
L890005U FOG/FPW TANK 1 LOW LOW LEVEL ALARM
L890005T FOG/FPW TANK 1 HIGH HIGH LEVEL ALARM
L890006U FOG/FPW TANK 2 LOW LOW LEVEL ALARM
L890006T FOG/FPW TANK 2 HIGH HIGH LEVEL ALARM

OUTPUTS:

CPNL890003BR UNLOAD SYSTEM 1 FAIL
CPNL890004BR UNLOAD SYSTEM 2 FAIL

PCCS MONITORING:

INPUTS:

DISCRETE:

V890001R TANK 1 UNLOAD VALVE OPEN
V890001G TANK 1 UNLOAD VALVE CLOSED
V890002R TANK 2 UNLOAD VALVE OPEN
V890002G TANK 2 UNLOAD VALVE CLOSED
GDR890003W GRINDER ROCKTRAP 1 READY
GDR890003R GRINDER ROCKTRAP 1 RUNNING
GDR890003T GRINDER ROCKTRAP 1 TROUBLE
GDR890004W GRINDER ROCKTRAP 2 READY
GDR890004R GRINDER ROCKTRAP 2 RUNNING
GDR890004T GRINDER ROCKTRAP 2 TROUBLE
V890001R TANK 1 UNLOAD VALVE OPEN
V890001G TANK 1 UNLOAD VALVE CLOSED
V890002R TANK 2 UNLOAD VALVE OPEN
V890002G TANK 2 UNLOAD VALVE CLOSED
L890005T TANK 1 LEVEL HIGH HIGH
L890005U TANK 1 LEVEL LOW LOW
L890006T TANK 2 LEVEL HIGH HIGH
L890006U TANK 2 LEVEL LOW LOW

ANALOG:

L890005 TANK 1 LEVEL
L890006 TANK 2 LEVEL

CALC

DISCRETE:

L890005V TANK 1 HIGH LEVEL (FROM LIT)
L890006V TANK 2 HIGH LEVEL (FROM LIT)

OUTPUTS:

CALC

DISCRETE: NONE.

CALC

ANALOG: NONE.

CONTROL NARRATIVE 1420

TITLE: FOG/FPW TRUCK UNLOADING

DESCRIPTION:

The purpose of this narrative is to describe the controls to unload FOG/FPW from the FOG truck to the FOG/FPW tank. Two FOG/FPW unload systems are provided. They are operated independently; however, the intent is to only run one unload system at a time.

Unloading Conditions

The FOG truck driver enters the plant site and stops at the guard shack and leaves the load manifest and obtains an unload key to the unloading stations (they are keyed the same). Driver pulls up to the lead tank indicated by the unload station with the green System Ready light illuminated. The driver connects the hose to his truck inserts the key in the lock in CPNL890003B or CPNL890004B and activates the associated system by turning the key.

System Ready Status “Green Light” will illuminate on the Lead tank when the following conditions are met =

- If tank 1 is lead:
 - Tank T890005 level low enough (less than X feet – programmable)
 - Unload Valve V890001 ready
 - Mixing Valve V890011 ready
 - Rock Trap/Strainer GDR890003 READY or RUNNING
 - Mixing Pump P890003 (also used for FOG/FPW unload) READY or RUNNING
- If tank 2 is lead:
 - Tank T890006 level low enough (less than X feet – programmable)
 - Unload Valve V890002 ready
 - Mixing Valve V890012 ready
 - Rock Trap/Strainer GDR890004 READY or RUNNING
 - Mixing Pump P890004 (also used for FOG/FPW unload) READY or RUNNING

If both storage tanks have a high level, the FOG/FPW system will not be able to accept FOG or FPW and neither unload station will have the System Ready green light illuminated.

Once the driver has connected to the FOG/FPW Unload Station, he may then insert the unload key and turn it to the right enabling FOG Unload. The driver then pushes start button to activate unloading system. The driver must push the stop button when they wish to disconnect from the system. Usually, once the FOG/FPW truck is empty, the unload system will only run for “20” minutes (PCCS programmable timer) per unload to prevent equipment damage. This should be adequate time to unload a full 5,000 gallon truck. Once the unload timer has expired, the unload pump will stop.

Once the unload pump stops, the driver may push the start button if there is still FOG/FPW to be unloaded. If there is no additional FOG/FPW to be unloaded, the driver may remove the unload key. Once the unload key is removed, the FOG/FPW system returns to FOG/FPW mixing control, see Control Narrative 1421 for details on mixing control.

The dual manual strainers must be cleaned by the driver after every load, which will allow for uninterrupted flow while unloading.

Failure conditions

- If any of the following alarms are received, the associated FOG/FPW unload system shall shut down and the associated System Failed Red light shall be illuminated.
 - FOG/FPW Tank 1 (T890005)
 - Unload Valve V890001 closed or position unknown
 - Mixing Valve V890011 open or position unknown
 - Rock Trap/Strainer GDR890003 fail
 - Mixing Pump P890003 fail due to:
 - Mixing Pump P890003 High Discharge Pressure PSH890003
 - Mixing Pump P890003 Seal Water Fail FS890003
 - Mixing Pump P890003 Overload
 - FOG/FPW Tank 2 (T890006)
 - Isolation Valve V890002 closed or position unknown
 - Mixing Valve V890012 open or position unknown
 - Rock Trap/Strainer GDR890004 fail
 - Mixing Pump P890004 fail due to:
 - Mixing Pump P890004 High Discharge Pressure PSH890004
 - Mixing Pump P890004 Seal Water Fail FS890004
 - Mixing Pump P890004 Overload
- Any of these failures will shut down the associated mixing pump and grinder as well as close the unload valve and mixing valve.

PLC MONITORING:

- High tank level is derived for the tank level transmitter to alert the operator that the system is approaching the tank full (high high) shut down condition (L890006T). No action is taken on the high level condition.
- Low tank level is derived for the tank level transmitter to alert the operator that the system is approaching the tank empty (low low) shut down condition (L890006U). No action is taken on the low level condition.

PLC FIELD CONTROLS:

- After the driver pushes the start pushbutton, the PLC commands the mixing pump and grinder to stop, the mixing valve to close, and unload valve to open. Once the unload valve is confirmed open and the mixing valve is confirmed closed, the PLC starts the mixing pump and grinder. The system remains in this configuration until the driver

pushes the stop pushbutton, the unload timer expires, mixing pump or grinder fail, unload valve in not closed, a tank high high level is reached, or the mixing valve is not open.

- When the stop pushbutton is pressed or the unload timer expires, the mixing pump and grinder are commanded stop. The system remains in this configuration until the start pushbutton is pressed or the unload key is removed.
- If the start pushbutton is pressed, the **ACC PLC** starts the mixing pump and grinder to continue to unload FOG from the truck. **1.11**
- If the unload key is removed, the mixing pump and grinder shall be stopped, if not already commanded to do so (this will be the case if the driver forgets to press the stop pushbutton before removing the unload key. The **ACC PLC** shall close the unload valve, open the mixing valve and the start mixing pump and grinder once the valves are in the correct position. **1.11**
- Tanks will be rotated between lead and lag every truck load. (Once the unload key is removed from the system)

HAND FIELD CONTROL

- The Mixing Pumps P890003 and P890004 may be started and stopped from the local Start/Ready/Off.
- Valves V890001, V890002, V890011, and V890012 may be opened or closed manually via the local control station.
- The Rock Trap/Grinders GDR890003 and GDR890004 may be started and stopped manually via the vendor supplied control panel.

CONTROL MODES:

PCCS: None
PLC: Auto
Field: Manual

CONTROL NARRATIVE 1421

TITLE: FOG/FPW TANK MIXING CONTROL

PLC: PLC 88111D

**FINAL CONTROL
ELEMENTS:**

P890003	FOG MIXING PUMP 1
GDR890003	ROCK TRAP/GRINDER 1
V890001	FOG UNLOAD VALVE 1
V890011	FOG TANK 1 MIXING VALVE
P890004	FOG MIXING PUMP 2
GDR890004	ROCK TRAP/GRINDER 2
V890002	FOG UNLOAD VALVE 2
V890012	FOG TANK 2 MIXING VALVE

DIAGRAMS: 46C05, 46C06, 46C08

INPUTS:

DISCRETE:	P890003R	FOG/FPW MIXING PUMP 1 RUNNING
	P890003W	FOG/FPW MIXING PUMP 1 READY
	P890004R	FOG/FPW MIXING PUMP 2 RUNNING
	P890004W	FOG/FPW MIXING PUMP 2 READY
	GDR890003R	ROCK TRAP/GRINDER 1 RUNNING
	GDR890003W	ROCK TRAP/GRINDER 1 READY
	V890001R	FOG/FPW TANK 1 UNLOAD VLV OPN
	V890001G	FOG/FPW TANK 1 UNLOAD VLV CLSD
	V890002R	FOG/FPW TANK 2 UNLOAD VLV OPN
	V890002G	FOG/FPW TANK 2 UNLOAD VLV CLSD
	V890011R	FOG/FPW TANK 1 MIXING VLV OPN
	V890011G	FOG/FPW TANK 1 MIXING VLV CLSD
	V890012R	FOG/FPW TANK 2 MIXING VLV OPN
	V890012G	FOG/FPW TANK 2 MIXING VLV CLSD
	CPNL890003BA	FOG TANK 1 UNLOAD START
	CPNL890003BB	FOG TANK 1 UNLOAD STOP
	CPNL890003BC	FOG TANK 1 UNLOAD ENABLE (KEY)
	CPNL890004BA	FOG TANK 2 UNLOAD START
	CPNL890004BB	FOG TANK 2 UNLOAD STOP
	CPNL890004BC	FOG TANK 2 UNLOAD ENABLE (KEY)

CALC

DISCRETE: NONE.

ANALOG:

L890005	TANK 1 LEVEL
L890006	TANK 2 LEVEL

CALC

ANALOG: NONE.

OUTPUTS:

DISCRETE:	P890003A	FOG/FPW MIXING PUMP 1 START
	P890003B	FOG/FPW MIXING PUMP 1 STOP
	P890004A	FOG/FPW MIXING PUMP 2 START
	P890004B	FOG/FPW MIXING PUMP 2 STOP
	V890011A	FOG/FPW TANK 1 MIXING VLV OPEN
	V890011B	FOG/FPW TANK 1 MIXING VLV CLOSE
	V890012A	FOG/FPW TANK 2 MIXING VLV OPEN
	V890012B	FOG/FPW TANK 2 MIXING VLV CLOSE

CALC

DISCRETE:	L890005V	TANK 1 HIGH LEVEL
	L890006V	TANK 2 HIGH LEVEL

CALC

ANALOG: NONE.

ANALOG: NONE.

ALARM:

INPUTS:	P890003T	MIXING PUMP 1 TRBL
	GDR890003T	ROCK TRAP/GRINDER 1 TRBL
	P890004T	MIXING PUMP 2 TRBL
	GDR890004T	ROCK TRAP/GRINDER 2 TRBL

OUTPUTS:	CPNL890003BR	UNLOAD SYSTEM 1 FAIL
	CPNL890004BR	UNLOAD SYSTEM 2 FAIL

PCCS MONITORING:

INPUTS:

DISCRETE:	V890001R	TANK 1 UNLOAD VALVE READY
	V890001W	TANK 1 UNLOAD VALVE FAIL
	V890002R	TANK 2 UNLOAD VALVE READY

V890002W	TANK 2 UNLOAD VALVE FAIL
GDR890003W	GRINDER ROCKTRAP 1 READY
GDR890003R	GRINDER ROCKTRAP 1 RUNNING
GDR890003T	GRINDER ROCKTRAP 1 TRBL
GDR890004W	GRINDER ROCKTRAP 2 READY
GDR890004R	GRINDER ROCKTRAP 2 RUNNING
GDR890004T	GRINDER ROCKTRAP 2 TRBL
T890001R	TANK 1 UNLOAD VALVE OPEN
T890001W	TANK 1 UNLOAD VALVE CLOSE
T890001F	TANK 1 UNLOAD VALVE FAILED
T890002R	TANK 2 UNLOAD VALVE OPEN
T890002W	TANK 2 UNLOAD VALVE CLOSED
T890002F	TANK 2 UNLOAD VALVE FAIL
T890005T	TANK 1 LEVEL HIGH HIGH
T890005U	TANK 1 LEVEL LOW LOW
T890006T	TANK 2 LEVEL HIGH HIGH
T890006U	TANK 2 LEVEL LOW LOW

ANALOG:	L890005	TANK 1 LEVEL
	L890006	TANK 2 LEVEL
	T890005	TANK 1 TEMPERATURE
	T890006	TANK 2 TEMPERATURE

OUTPUTS:

CALC

DISCRETE: NONE.

CALC

ANALOG:	SP890005	TANK 1 HIGH LEVEL SETPOINT
	SP890006	TANK 2 HIGH LEVEL SETPOINT

CONTROL NARRATIVE 1421

TITLE: FOG/FPW MIXING

DESCRIPTION:

FOG/FPW tanks will be mixed to keep FOG from gelling. Mixing occurs automatically after truck offloading is complete and driver has pushed “STOP” button and keyed out of system. Refer to Control Strategy 1420 for FOG Unloading. The mixing pump is now used for mixing at 450 gpm.

The FOG tank and piping is also heat traced to help prevent the FOG from solidifying. Heat tracing control is not available from the PLC or PCCS.

CONTROL FROM PCCS: NONE

CONTROL FROM THE PLC:

Mixing Conditions

- After the driver removes the unload key, the ACC commands the mixing pump and grinder to stop, unload valve to close, and mixing valve to open. Once the unload valve is confirmed closed and the valve is confirmed opened, the PLC starts the mixing pump and grinder. The system remains in this configuration until the start unload pushbutton is pressed, the mixing pump or grinder fails, unload valve is not closed, the mixing valve is not open, or a low low FOG tank level is detected.

Failure conditions

- If any of the following alarms are received, the associated FOG mixing system shall shut down and the associated System Failed Red light shall be illuminated.
 - FOG Tank 1 (T890005)
 - Unload Valve V890001 open or position unknown
 - Mixing Valve V890011 closed or position unknown
 - Rock Trap/Strainer GDR890003 fail
 - Mixing Pump P890003 fail
 - Mixing Pump P890003 High Discharge Pressure PSH890003
 - Mixing Pump P890003 Seal Water Fail FS890003
 - FOG Tank 2 (T890006)
 - Isolation Valve V890002 open or position unknown
 - Mixing Valve V890012 closed or position unknown
 - Rock Trap/Strainer GDR890004 fail
 - Mixing Pump P890004 trouble
 - Mixing Pump P890004 High Discharge Pressure PSH890004
 - Mixing Pump P890004 Seal Water Fail FS890003

- Any of these failures will shut down the associated mixing pump and grinder as well as close the unload valve and mixing valve.
- If any of the above conditions are detected during FOG mixing, the mixing pump and Grinder shall be commanded to stop, the unload valve shall be closed, and the mixing valve shall be closed. The FOG system fail Red Light on the unload panel shall also be illuminated. FOG mixing shall automatically resume once any alarm conditions have been removed.

FIELD CONTROL:

- The Mixing Pumps P890003 and P890004 may be started and stopped from the local Start/Ready/Off.
- Valves V890001, V890002, V890011, and V890012 may be opened or closed manually via the local control station.
- The Rock Trap/Grinders GDR890003 and GDR890004 may be started and stopped manually via the vendor supplied control panel.

CONTROL MODES:

PCCS: None
PLC: Auto
Field: Manual

****END OF SECTION****