

**LOS OSOS COMMUNITY SERVICES DISTRICT**

**CONSTRUCTION OF  
LOS OSOS WASTEWATER PROJECT  
AREA A, AREA B, AREA C, & AREA D AND WWTF**

**STATE REVOLVING FUND LOAN PROGRAM  
PROJECT NO. C - 06 - 4014 - 110**

**ADDENDUM NO. 2  
April 1, 2004**



**MWH**  
MONTGOMERY WATSON HARZA

**Addendum No. 2  
to the  
Los Osos Wastewater Project**

**April 1, 2004**

Los Osos Community Services District  
2122 9<sup>th</sup> Street, Los Osos, CA 93402

To all prospective Bidders:

Attached herein are addendum items that shall be incorporated into the Contract Documents for the Los Osos Wastewater Project. These changes shall be considered as part of the Contract Documents, as if they were originally provided therein, and as such shall be used as Contract Documents. All other terms, conditions, requirements, and specifications of the Contract Documents shall remain unchanged.

Bidders must acknowledge receipt of this addendum on the Bid Forms. Failure to acknowledge receipt of this addendum may be considered non-responsive by the OWNER and may be cause for rejection of your Bid.

All communications relative to this addendum shall be directed to the ENGINEER prior to opening of the Bids.

For Area construction contact:

MWH Americas, Inc.  
1340 Treat Blvd., Suite 300  
Walnut Creek, CA 94597-7966  
Telephone: (925) 274 - 2245  
Attention: John Bergen

For WWTF construction contact:

MWH Americas, Inc.  
1340 Treat Blvd., Suite 300  
Walnut Creek, CA 94597-7966  
Telephone: (925) 274 - 2201  
Attention: Steve Hyland

Meeting notes of the Pre-Bid Meeting conducted on March 22, 2004 for the Los Osos Wastewater Project are attached to this addendum for reference only. The meeting notes are not part of the Contract Documents.

The Contract Documents for the Los Osos Wastewater Project shall be modified by this addendum in accordance with the following changes:

No.	Ref.	Description
	<u>Vol. I</u>	
2.1	00100	<p><b>Delete</b> the first sentence in Paragraph 5. BID FORMS and <b>replace</b> with the following:</p> <p>“Each Bid shall be submitted on the attached Bid Forms bound as a separate workbook and the pages shall not be removed from the bound workbook. A separate workbook shall be submitted for each Bid Schedule. Additional copies of the Bid Forms workbook are available upon request.”</p>
2.2	00300	<p><b>Delete</b> Section 00300CA – Bid Forms in its entirety and <b>replace</b> with the new Section 00300CA – Bid Forms attached to this addendum.</p>
2.3	00700	<p><b>Delete</b> Section 00700 – General Conditions in its entirety and <b>replace</b> with new Section 00700 – General Conditions attached to this addendum. (Note that the new General Conditions have been reissued with all changes indicated either as deletions of text shown in “<del>striketrough</del>” format and as additions of text shown in “underline” format.)</p>
2.4	00800	<p><b>Delete</b> Section 00800 – Supplementary General Conditions in its entirety and <b>replace</b> with new Section 00800 – Supplementary General Conditions attached to this addendum. (Note that the new Supplementary General Conditions have been reissued with all changes indicated either as deletions of text shown in “<del>striketrough</del>” format and as additions of text shown in “underline” format.)</p>
2.5	01025	<p><b>Add</b> the following to Paragraph 1.2:</p> <p>“33A. <u>BID ITEM 33A: Furnish Area B &amp; Area C Equipment.</u> Payment shall be LUMP SUM. Work shall include the furnishing of equipment by the Area A &amp; Area D Contractor for installation by the Area B &amp; Area C Contractor. Equipment shall include submersible pumps, engine-generator sets, and electrical gear as specified in the Contract Documents for the Lupine Pump Station, the Sunny Oaks Pump Station, and the Loma Harvest Well. The equipment shall be delivered to the Site.</p> <p>36A. <u>BID ITEM 36A: East Paso Production Well.</u> Payment shall be LUMP SUM. Work shall include that portion of the work summarized in Bid Item 36: Harvest Well/Wellhouse for the East Paso Harvest Well associated with the construction of the East Paso Production Well facility shown on Drawings A-C-205A and Ad-M-205A.</p> <p>43A. <u>BID ITEM 43A: 12” Disposal Main – 9<sup>th</sup> Street.</u> Payment shall be per LINEAR FEET. Work shall be as described for Bid Item 43: 12” Disposal Main and shall include the construction of the 12” Disposal Main from</p>

		Palisades Avenue via Los Osos Valley Road and 9 <sup>th</sup> Street to Pismo Avenue as shown in Drawings B-PP-400, C-PP-401, D-PP-402, D-PP-403, D-PP-404, and D-PP-405.
2.6	01060	<p><b>Delete</b> Paragraph 1.2.B.4 and <b>replace</b> with the following:</p> <p>"4. Construction Stormwater Program/Construction General Permit. This permit applies both to stormwater surface runoff management from CONTRACTOR construction areas and to the disposal of groundwater removed by the CONTRACTOR's construction dewatering operations. The OWNER has received approval of its Notice of Intent from the State Water Resources Control Board (SWRCB) to comply with the Construction General Permit. The CONTRACTOR is obligated to abide by said requirements. The following provides additional information in this regard.</p> <p>Dischargers whose projects disturb 1 or more acres of soil or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ). Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.</p> <p>The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP should contain site map(s) which shows the construction site perimeter, existing and proposed buildings, lots, roadways, storm water collection and discharge points, general topography both before and after construction, and drainage patterns across the project. The SWPPP must list Best Management Practices (BMPs) the discharger will use to protect storm water runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "nonvisible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Section A of the Construction General Permit describes the elements that must be contained in a SWPPP. For additional information refer to the SWRCB website: <a href="http://www.swrcb.ca.gov/stormwtr/construction.html">http://www.swrcb.ca.gov/stormwtr/construction.html</a>."</p>
2.7	01110	<p><b>Delete</b> the words "... of the tunnel portion of the Work of the Contract." In the first sentence of Paragraph 1.1.A and <b>replace</b> with the following:</p> <p>"... of the WORK."</p> <p><b>Delete</b> Paragraph 1.3.A and Paragraph 1.3.B and <b>replace</b> with the following:</p> <p>"A. General: The DRB will consist of one member mutually selected by the OWNER and the CONTRACTOR(s). If the OWNER awards multiple</p>

		<p>Contracts for construction of the Project, the objective would be to select a single member that would serve as the DRB for all Contracts.”</p> <p>B. Experience: The intent is to select the DRB member that is experienced with the Project construction, interpretation of Contract Documents, and resolution of construction disputes.”</p> <p><b>Delete</b> the first sentence of Paragraph 1.3.F and <b>replace</b> with the following:  “Before the appointment is final, the prospective applicant will submit a complete disclosure statement for approval of the OWNER and the CONTRACTOR(s).”</p> <p><b>Delete</b> Paragraph 1.3.G, 1.3.H, and 1.3.I and <b>replace</b> with the following:  “G. Execution of Three Party Agreement: The OWNER, CONTRACTOR(s), and DRB member shall execute the Three Party Agreement within four weeks after selection and approval of the DRB member.”</p>
2.8	01532	<p><b>Add</b> the following to Paragraph 1.2.B;  “The aerial photos shall be planimetric only (orthographic not required) and at a minimum scale of 1" = 200'.”</p>
2.9	01571	<p><b>Add</b> the following to Paragraph 1.5:  “D. The approximate locations of bus stops within the Site are shown on the sketch entitled “Bus Stop Locations” (attached to this Addendum). The CONTRACTOR shall maintain access to the bus stop locations at all times. When access to existing bus stops is not practical due to construction activities, the CONTRACTOR shall provide a nearby temporary bus stop location until the existing location is accessible. The CONTRACTOR shall provide signage at the existing bus stop and at the temporary bus stop. The CONTRACTOR shall coordinate the location of temporary bus stop locations with the ENGINEER.”</p> <p><b>Delete</b> the phrase "or County of San Luis Obispo Sheriff's Department" in the first sentence of Paragraph 3.3.I.</p> <p><b>Add</b> the following to Paragraph 3.3.I:  "As of March 2004, the cost for CHP car and personnel is as follows: Officer: \$56.31/hr, Sergeant (Sergeant would only be used if Officers were unavailable or on beat patrol): \$68.46/hr, mileage charge: \$0.59/mile.”</p>
2.10	01655	<p><b>Add</b> the following to Paragraph 3.8:  “D. Force Mains, Harvest Mains, and Disposal Mains shall not require television inspection.”</p>
2.11	01656	<p><b>Delete</b> the heading "PIGGING" of Paragraph 3.2 and <b>replace</b> with the following:  "BALLING AND FLUSHING"</p> <p><b>Delete</b> the words "... pigging ..." and "Pigging..." in Paragraph 3.2.A and <b>replace</b> with the following:</p>

		<p>"... pigging ..." and "Balling and flushing ...", respectively.</p> <p><b>Delete</b> the words "Pigging shall ...", "... pigs ...", and "... substitute for pigging ..." in Paragraph 3.2.B and <b>replace</b> with the following:</p> <p>"Balling and flushing shall ...", "... balls ...", and "... substitute for balling ...", respectively.</p> <p><b>Delete</b> the words "... pig access ..." in Paragraph 3.2.C and <b>replace</b> with the following:</p> <p>"... balling and flushing access ...".</p>
2.12	01656	<b>Delete</b> Paragraph 3.2.D and Paragraph 3.2.E.
2.13	01658	<p><b>Delete</b> Paragraph 1.3.B and Paragraph 1.3.C and <b>replace</b> with the following:</p> <p>"B. Pressure pipelines (force mains, disposal mains, and harvest mains) will not be required to be television inspected, but shall be thoroughly cleaned prior to acceptance.</p> <p>C. Sewer mains and sewer laterals shall be television inspected."</p>
	<b><u>Vol. IIA</u></b>	
2.14	02355	<p><b>Add</b> the following to Paragraph 1.1:</p> <p>"B. Selection and use of the caisson construction method is at the CONTRACTOR's option. The CONTRACTOR may elect to construct pump station and pocket pump station wetwells using conventional shoring and dewatering approaches."</p>
2.15	02597	<p><b>Delete</b> the words "PVC pipe ..." in the second sentence of Paragraph 2.5.A and <b>replace</b> with the following:</p> <p>"Pipe ...".</p>
2.16	02597	<p><b>Delete</b> Paragraph 2.5.B and <b>replace</b> with the following:</p> <p>"B. All ductile iron fittings shall have factory applied mortar lining and bituminous coating."</p>
2.17	02635	<b>Add</b> Section 02635 - Lower Aquifer Production Well attached to this addendum.
	<b><u>Vol. IIB</u></b>	
2.18	11148	<p><b>Delete</b> the word "... both ..." and the phrase "... and the Waste Water Treatment Plant CONTRACTOR ..." in the first sentence of Paragraph 1.1.B".</p> <p><b>Delete</b> the third sentence of Paragraph 1.1.B."</p>
2.19	16800	<p><b>Delete</b> Paragraph 1.1.A and Paragraph 1.1.B and <b>replace</b> with the following:</p> <p>"A. The CONTRACTOR shall provide the Area conduit system for the fiber optic cable serving Area A, Area B, Area C, and Area D in accordance with the Contract Documents. Area conduit system shall include, but</p>

		<p>not be limited to, the installation of conduit, pull boxes, identification tape, and pull rope and the cleaning and testing as specified herein.</p> <p>B. The fiber optic cable will be furnished and installed by the contractor for the Wastewater Treatment Facility.”</p>
2.20	17300	<p><b>Delete</b> the “Interlocks” paragraph under the heading “Collection System Main Pump Stations” on page 7 and <b>replace</b> with the following:</p> <p>“Interlocks: Any operating pump will be commanded to shutdown if a power failure occurs at the Wastewater Treatment Facility, but will resume operation if the level in the wetwell reaches the high-high level float switch.”</p>
2.21	17510	<p><b>Delete</b> Paragraph 1.1 THE REQUIREMENT in its entirety and <b>replace</b> with the following:</p> <p><b>“1.1 THE REQUIREMENT</b></p> <p>A. It is the intent of these Contract Documents that the prequalified Instrumentation Subcontractor for the Wastewater Treatment Facility (WWTF) shall provide all of the PLC-Based hardware and software specified in Division 17 – Instrumentation of Volume IIB for the Area A, Area B, Area C, &amp; Area D construction as well as the Wastewater Treatment Facility. The CONTRACTOR shall refer to Volume IIB, Specification 17510 – PLC-Based Control Systems Hardware, Paragraph 1.1, for the requirements of both the Area A, Area B, Area C, &amp; Area D work and the WWTF work. References in the Contract Documents to “Instrumentation Supplier” shall mean the prequalified Instrumentation Subcontractor.”</p>
2.22	17510	<p><b>Delete</b> the second and third sentences of Paragraph 3.3.E.1.</p>
2.23	17520	<p><b>Add</b> the following to Part 3 – Execution:</p> <p><b>“3.3 PROGRAMMING, TESTING, AND INSTRUCTION</b></p> <p>A. General: The PLC-based control system software calibration, testing, and instruction shall be provided in accordance with Section 17510 – PLC-Based Control System Hardware.</p> <p><b>3.4 SOFTWARE LICENSE AND REGISTRATION:</b></p> <p>A. All software provided shall be installed and used within the terms of the software manufacturer’s license agreement. All software purchased by the CONTRACTOR shall be registered to the CONTRACTOR during the construction phase of this project. During that time, the CONTRACTOR shall be responsible for providing and incorporating minor software package updates issued by the software manufacturer. For example, if version 3.1 of a program is purchased, and version 3.2 and 3.3 were released prior to Project completion, the CONTRACTOR shall be responsible for</p>

		<p>incorporating these later versions into the final project. The CONTRACTOR would not be responsible for incorporating major software revisions such as the release of a version 4.0 or 4.1.</p> <p>B. Prior to substantial completion of this Project, the CONTRACTOR shall re-register all provided software packages to the OWNER and provide the ENGINEER and OWNER with written confirmation of having done so.</p> <p>1.5 WORKSTATION SOFTWARE APPLICATION CONFIGURATION (PROGRAMMING)</p> <p>A. Workstation Graphics Generation: The workstations that will display the graphics for the Los Osos Area collection facilities will be located at the Wastewater Treatment Facility and the LOCSD 9<sup>th</sup> Street and Water Yard remote sites. If the contract for the Los Osos Area Collection Facilities is awarded to a different CONTRACTOR than the Wastewater Treatment Facility, then the following software application programming shall be performed separately. If the contract is awarded to the same CONTRACTOR then the application programming for the Area Facilities will be completed as part of the Wastewater Treatment Facility.</p> <p>B. It is the responsibility of the CONTRACTOR to configure the workstations and to develop, design, engineer, configure, and test all of the CRT-based graphic displays required for this project. All of this work shall take into account the specific needs of the end user. For continuity it is the intention of these Contract Documents that the graphic conventions developed for the Wastewater Treatment Facility be the same graphic conventions used for the Area construction,</p> <p>1. Area Construction Graphics Meeting</p> <p>a. The CONTRACTOR shall chair and develop an agenda for a meeting that shall address the basic criteria to be adhered to in the configuration and development of CRT-based graphic displays. At this meeting, which shall be attended by plant managerial personnel, the CONTRACTOR shall distribute sample displays for illustration purposes. As a minimum, this meeting shall address the following issues:</p> <ul style="list-style-type: none"> <li>• All remote site areas and conventions for identifying tag name and descriptors.</li> <li>• Designation of groups within each area along with tag names and descriptors.</li> <li>• The assignment of individual control loops and inputs to</li> </ul>
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		<p>specific groups.</p> <ul style="list-style-type: none"> <li>• Organization of the systems universal display hierarchy.</li> <li>• An itemization of the type of display to be used at each level in the graphic hierarchy (e.g., pre-formatted displays, templates, custom graphics, etc.)</li> <li>• The utilization of blinking and conditional text.</li> <li>• Definition of graphic symbolism to be used on the project that is not already covered under the Wastewater Treatment Facility. If the CONTRACTOR's library of shapes does not adequately describe facility conditions, the CONTRACTOR shall develop additional shapes to meet the facility requirements.</li> </ul> <p>b. Subsequent to the adjournment of the graphics meeting the CONTRACTOR shall prepare and formalize a document titled "GRAPHICS CRITERIA" which shall contain detailed meeting minutes and a definition of all graphic guidelines to be adhered to. This report shall be supplemented by graphic examples that illustrate the incorporation and application of each graphic criteria. The report shall be submitted within 30 calendar days of the meeting's adjournment.</p> <p>2. The CONTRACTOR shall allow a minimum of 4 hours for this meeting.</p>
	<b><u>Vol. IIIA</u></b>	
2.24	TOC	<p><b>Delete</b> the following under the heading Division 11 - Equipment:  "Section 11400 Residential Appliances .....11400-1 - 11400-4"  and <b>replace</b> with the following:  "Section 11452 Residential Appliances .....11452-1 - 11452-3"</p>
2.25	02597	<p><b>Delete</b> the words "PVC pipe ..." in the second sentence of Paragraph 2.5.A and <b>replace</b> with the following:  "Pipe ...".</p>
2.26	02597	<p><b>Delete</b> Paragraph 2.5.B and <b>replace</b> with the following:  "B. All ductile iron fittings shall have factory applied mortar lining and bituminous coating."</p>
	<b><u>Vol. IIIB</u></b>	
2.27	TOC	<p><b>Delete</b> the following under the heading Division 11 - Equipment:  "Section 11400 Residential Appliances .....11400-1 - 11400-4"</p>

		and <b>replace</b> with the following: "Section 11452 Residential Appliances .....11452-1 - 11452-3"
2.28	11289	<b>Add</b> the following to Paragraph 2.9.A: "3. The equipment identification and instrumentation tagging convention used for the Ultraviolet Disinfection System shall follow the identification and tagging convention used in the Contract Documents."
2.29	11345	<b>Delete</b> items 1 and 2 in Paragraph 2.2.J.
2.30	11345	<b>Delete</b> items 1 thru 5 in Paragraph 2.2.K and <b>replace</b> with the following:  "1. The drum screen shall be capable of being operated either locally or remotely. In Local mode, the drum screen shall be started and stopped manually at the LCP. In Remote mode, the drum screen shall start and stop based on commands from the plant SCADA system. In Remote mode, the drum screen will operate when the influent knife gate is in the open position, and will stop when the knife gate valve is in the closed position. The LCP shall be provided with contacts to receive the signal outputs for start and stop of the drum screen from the SCADA system based on the position of the knife gate valve. The unit controls shall provide for single point startup, shutdown, and emergency shutdown.  2. The LCP and operator interface shall include push buttons, indicator lights, alarm horn, timers for spray system, manual and automatic options, emergency stop, and motor starters. The LCP and operator interface shall indicate unit on or off, hours of operation, alarm conditions, and spray wash operational cycle information. As a minimum the operator interface shall provide adequate analog or digital operator interface for controlling and initiating screening wash cycle.  3. LCP shall be programmed with logic control for operation of the drum screen wash cycle. The wash cycle shall have the following operational options: 1) Adjustable timer option to open and close solenoid valve on a timer cycle. Adjustments to timing shall be made from the LCP operator interface. 2) Blinding sensor Type 2 alarm opens solenoid valve. Wash cycle remains on (solenoid valve remains open) until alarm conditions are relieved. 3) Screen wash cycle operates continuously (solenoid valve remains open).  4. Provide LCP with contacts to relay to plant SCADA system "Run" status for indication and runtime totalization.  5. Provide LCP with contacts to relay to plant SCADA system Local or Remote status.  6. LCP shall be provided with power permissive interlock as indicated in

		<b>Section 17300, Control Strategies.”</b>
2.31	11345	<p><b>Add</b> the following to Paragraph 2.2:</p> <p>“O. Alarms: All alarm conditions shall signal an alarm at the LCP and transmit alarm status to the plant SCADA system. The following alarms, as a minimum shall be provided:</p> <ol style="list-style-type: none"> <li>1. Rotary Sensor: Provide rotary sensor to sense the rotation of the drum screen cylinder. Sensor shall be operated on 120-volt circuit and shall set off Type 1 alarm for emergency shutdown if no screen rotation is sensed. Manufacturer to provide contacts for transmittance of rotary sensor alarm conditions to the plant SCADA system. Type 1 alarm shall initiate emergency shutdown and consist of the plant SCADA system providing signals to: open knife gate valve to standby drum screen, start standby drum screen, close knife gate valve to alarm condition drum screen, and send stop signal to the alarm condition drum screen.</li> <li>2. Blinding Sensor: Provide and install blinding sensor with the drum screen to indicate if the screen is blinded and initiate a screen wash cycle. The blinding sensor measures transmittance of light through the screen and shall be operated on a 120 V circuit. The LCP shall be provided with contacts for relaying to the SCADA system initial trigger of the blinding sensor as a Type 2 alarm condition. The LCP shall be programmed to energize Type 1 alarm conditions if drum screen is still blinded after an adjustable time interval. Manufacturer to provide contacts at LCP for displaying Type 2 and Type 1 alarm conditions at the SCADA workstation. Type 1 alarm shall initiate emergency shutdown of the alarm condition drum screen based on stop signal output from the SCADA system.</li> <li>3. Hood Sensor: Provide hood sensor to initiate emergency shut down if the hood is removed during drum screen operation. Sensor shall operate on a 120 V circuit and is provided for safety. Emergency shutdown shall be initiated from hood sensor alarm condition. Manufacturer to provide contacts to relay hood sensor alarm conditions to the SCADA system. SCADA signal outputs shall open the standby knife gate valve and start the standby drum screen.</li> <li>4. Failure Alarm: Provide contacts at LCP to relay to SCADA system motor failure alarm and/or temperature sensor to initiate emergency shut down of the operating drum screen and to energize the standby drum screen. The temperature sensor shall operate on a 120 V circuit.</li> <li>5. Screenings Collection Pipe Level Alarm: Contractor to provide ultrasonic level indicator in the 18-inch Screenings Collection pipe</li> </ol>

		(see Contract Drawings) which conveys screenings to the washer compactor units. High level conditions in the pipeline indicate drum screen overloading and/or drum screen malfunction. Drum screen manufacturer shall provide contacts at the drum screen LCPs to relay High and High-High Level alarm conditions in the Screenings Collection pipe to the plant SCADA system. Under alarm conditions, the SCADA system shall energize the standby drum screen, open its knife gate valve and shutdown the alarm condition drum screen, and shut its knife gate valve. “
2.32	11349	<b>Delete</b> the words “... shall be no larger than 10 hp.” In the second sentence of Paragraph 2.3.C and <b>replace</b> with the following: “... shall be no larger than 13 HP.”
2.33	11349	<b>Delete</b> Paragraph 2.3.E and <b>replace</b> with the following: “E. <b>Electrical Local Control Panel:</b> Each washer compactor unit shall be provided with a Local Control Panel (LCP) for control and monitoring of each unit. The LCP shall be free standing fabricated of 12 gauge (minimum) stainless steel, and manufactured to NEMA 4X standards. Each LCP shall be mounted a minimum of 2 feet above the floor, adjacent to the washer compactor as shown in the Contract Documents. The panel shall include a Programmable Logic Controller (PLC) with graphical operator interface and manual controls to operate the machine in the event the PLC fails. The Manufacturere shall provide a PLC with operator interface for compatibility with the plant SCADA system as specified in Section 17520 – PLC-Based Control System Hardware. No substitutions shall be permitted. The NEMA rating of LCPs shall be in accordance with the area designations of Section 16050.”
2.34	11349	<b>Delete</b> Paragraph 2.3.F and <b>replace</b> with the following: “F. <b>Controls:</b> The manufacturer shall provide the LCP with the following controls as a minimum, and as specified in Section 17300 - Control Strategies.  1. The washer compactor shall be capable of being operated either in Remote or Local modes. In local mode, the washer compactor shall be started and stopped manually from the LCP. In the Remote mode, the washer compactor will start and stop based on a remote signal from the plant SCADA system. SCADA will transmit a start signal when the influent knife gate valve to the unit is in the open position, and will transmit a stop/shutdown signal when the knife gate valve is in the closed position. Unit controls shall provide for single point startup, shutdown, and emergency shutdown.  2. Provide LCP with contacts to relay to plant SCADA system Local or Remote status.  3. The washer compactor LCP shall be provided with logic control to initiate a jam reversal sequence for the screw conveyor. The LCP shall also be provided with logic control to initiate a jam reversal

		<p>sequence for the grinder. The sequence is to clear the jam and normal operations would resume after the sequence is completed.</p> <ol style="list-style-type: none"> <li>4. Provide level sensor in collection hopper to sense high level in the inlet trough.</li> <li>5. Provide logic control and solenoid valve for spray wash system. Solenoid valve shall open and close to provide washwater to the screw conveyor on an adjustable timed sequence.</li> <li>6. The LCP and operator interface shall indicate unit on or off, hours of operation, jam or alarm conditions, and water level in trough and hopper. As a minimum the operator interface shall provide adequate analog or digital operator interface for controlling and initiating the wash and screw conveyor cycle.</li> <li>7. Provide LCP with contacts to relay to plant SCADA system "Run" status for indication and runtime totalization.</li> <li>8. LCP shall be provided with power permissive interlock as indicated in Section 17300 - Control Strategies."</li> </ol>
2.35	11349	<p><b>Add section 2.3 G "Alarms", as follows;</b></p> <p><b>"G. Alarms:</b> All alarm conditions shall signal an alarm at the LCP and transmit alarm status to the plant SCADA system. The following alarms, as a minimum shall be provided:</p> <ol style="list-style-type: none"> <li>1. High Torque – Screw: High torque alarm from jammed screw conveyor shall activate alarm at the LCP. Manufacturer to provide contacts to relay alarm status to the plant SCADA system. SCADA system shall relay start signal to the standby washer compactor and relay signal to open its knife gate valve. SCADA system shall relay stop signal (emergency shutdown) to alarm condition washer compactor and relay signal to close its knife gate valve.</li> <li>2. High Torque – Grinder (if applicable): High torque alarm from jammed grinder shall activate alarm at the unit LCP. Manufacturer to provide contacts to relay alarm status to the plant SCADA system. SCADA system shall relay stop signal to alarm condition unit, and start the standby washer compactor. SCADA system shall relay signals to open standby knife gate valve, and close alarm condition knife gate valve.</li> <li>3. Motor Failure – Screw and Grinder: Manufacturer to provide motor failure alarm for screw conveyor and grinder. Provide contacts to relay alarm status to the SCADA system. SCADA system shall energize standby unit and shutdown the alarm condition unit.</li> <li>4. Inlet Trough Level Alarm: Provide contacts to relay High-High level alarm conditions in the inlet trough to the plant SCADA system.</li> </ol>

		<p>The ultrasonic level indicator located in each unit trough or inlet hopper shall be interlocked such that under High-High Level Alarms, the plant SCADA system shall open the knife gate valve to the standby washer compactor and energize the standby unit.</p> <p>5. Curbed Area Level Alarm: Manufacturer to provide contacts to relay High and High-High level alarm conditions to the SCADA system in the curbed area surrounding the washer compactor units (see Contract Drawings). Contractor to provide level indicator for the curbed area. Under High-High alarm conditions SCADA system shall energize the standby washer compactor and open its knife gate valve, and shutdown the alarm condition washer compactor, and close its knife gate valve.”</p>
2.36	11452	<b>Delete</b> "11425" in the footer "PAGE 11425-X" and <b>replace</b> with "11452", where "X" is the page number.
2.37	11560	<b>Add</b> the following to Paragraph 2.6.D: <p>“The equipment identification and instrumentation tagging convention used for the Centrifuges shall follow the identification and tagging convention used in the Contract Documents.”</p>
2.38	13100	<b>Add</b> the following to Paragraph 2.14.D: <p>“9. The equipment identification and instrumentation tagging convention used for the MBR PLC Control System shall follow the identification and tagging convention used in the Contract Documents. The identification and tagging convention shall be reviewed at the initial coordination submittal review meeting.”</p>
2.39	15145	<b>Add</b> Specification Section 15145 - Pipe, Ductwork, and Equipment Insulation attached to this addendum.
2.40	15200	<b>Delete</b> “PIPE AND EQUIPMENT INSULATION” in the footer and <b>replace</b> with the following: <p>“VALVES, GENERAL”</p> <p><b>Delete</b> "15145" in the footer "PAGE 15145-X" and <b>replace</b> with "15200", where "X" is the page number.</p>
2.41	15201	<b>Add</b> the following to Paragraph 2.4.A.1: <p>“c. Pneumatic cylinder actuators shall be controlled by the opening and closing of a solenoid valve which will direct pressurized air to the pneumatic cylinder actuator. The solenoid valve shall receive a remote signal to open and close which will provide the air necessary to move the actuator and change the position of the valve it is controlling.</p> <p>d. Pneumatic cylinder actuators shall be provided with a limit switch or a minimum of four contacts for communication with the remote operating system. The limit switch or contacts shall be provided to relay the valve position (open and closed).“</p>

2.42	15203	<p><b>Delete</b> "PIPE AND EQUIPMENT INSULATION" in the footer and <b>replace</b> with the following: "CHECK VALVES"</p> <p><b>Delete</b> "15145" in the footer "PAGE 15145-X" and <b>replace</b> with "15203", where "X" is the page number.</p>
2.43	15206	<p><b>Delete</b> "PIPE AND EQUIPMENT INSULATION" in the footer and <b>replace</b> with the following: "GATE VALVES"</p> <p><b>Delete</b> "15145" in the footer "PAGE 15145-X" and <b>replace</b> with "15206", where "X" is the page number.</p>
2.44	15210	<b>Add</b> Specification Section 15210 - Pinch Valves attached to this addendum.
2.45	16400	<p><b>Add</b> the following to Paragraph 2.6:</p> <p>"G. Circuit breakers, that are provided for Automatic Transfer Switches only, may be thermal magnetic breakers as an acceptable substitute for circuit breakers with solid state trip devices to comply with UL labeling requirements."</p>
2.46	16800	<p><b>Delete</b> Paragraph 1.1.A and <b>replace</b> with the following:</p> <p>"A. The CONTRACTOR shall provide the fiber optic conduit and cable system for the Wastewater Treatment Facility. The fiber optic conduit and cable system shall include, but not be limited to, the installation of conduit, pull boxes, identification tape, and pull rope; the conduit cleaning and testing; and installation and testing of the fiber optic cable as specified herein.</p> <p>B. The CONTRACTOR shall provide the fiber optic cable system for the Area fiber optic system. The Area conduit system for the fiber optic cable serving Area A, Area B, Area C, and Area D will be installed by the Area A &amp; Area D Contractor and the Area B and Area C Contractor. The Area fiber optic cable system shall include, but not be limited to, the installation and testing of the fiber optic cable as specified herein."</p>
2.47	17100	<p><b>Add</b> the following to Paragraph 1.1.A:</p> <p>"References in the Contract Documents to "Instrumentation Supplier" shall mean the prequalified Instrumentation Subcontractor."</p>
2.48	17100	<p><b>Delete</b> the second sentence of Paragraph 1.2.B.3.d and <b>replace</b> with the following:</p> <p>"Dates of submittals, design, fabrication, programming, factory testing, deliveries, installation, field testing, and training shall be shown."</p>
2.49	17100	<p><b>Delete</b> the specification number "17107" for instrument 43-LE-501 in Appendix A, Page 52 and replace with the following:</p> <p>"17106, 2.1."</p>

2.50	17100	<b>Delete</b> the instrument entries "43-LSH-501, 43-LSHH-501, 43-LSL-501 & 43-LSLL-501" in Appendix A, Page 52 and Page 53.
2.51	17300	<b>Delete</b> Specifications Section 17300 - Control Strategies in its entirety and <b>replace</b> with new Specification Section - 17300 Control Strategies attached to this addendum.
2.52	17510	<p>Delete Section 1.1 "THE REQUIREMENT" in its entirety and <b>replace</b> with the following:</p> <p><b>1.1 THE REQUIREMENT</b></p> <p><b>A. General:</b> The CONTRACTOR, through the use of a prequalified Instrumentation Subcontractor and Electrical Subcontractor, shall furnish, supervise installation, assemble, configure, and startup the PLC-based Control System specified under this Section and in Section 17520 - PLC-Based Control System-Software, all in accordance with the requirements of the Contract Documents.</p> <ol style="list-style-type: none"> <li>1. The area control system equipment consists of a number of RTU/LCP's located at Pump Stations/Standby Power Facilities, Harvest Wells and Effluent Disposal Facilities throughout Los Osos. Each PLC shall be provided with power supply module(s), communication interface device(s), peripheral equipment, and UPS.</li> <li>2. It is the intent of this Project that the communication with the Los Osos Wastewater Treatment Facility be seamless as possible. Therefore it is the intent of these Contract Documents that the supplied PLC system hardware for Area A, Area B, Area C &amp; Area D shall be provided by the same PLC manufacturer that is provided at the Wastewater Treatment Facility (WWTF).</li> <li>3. The main WWTF PLC shall be redundant and shall be provided with power supply module(s), communication interface device(s), peripheral equipment, and UPS power and shall be located in an enclosure in the Operations Building communications room. The WWTF PLC shall communicate with remote I/O located within the same enclosure in the Operations Building and single enclosures located in the electrical room of both the Treatment Building and the Residuals Building. The remote I/O locations will also receive power monitoring information, that will include as a minimum power (KW), current (A) and phase voltages from the respective MCC's located in the buildings as shown on Contract Drawing GI-05 and included in Specification Section 16425 – 480V Main Switchgear, Paragraph 2.2. The WWTF PLC shall also communicate using ethernet and serial with the WWTF and remote office SCADA System Workstations and several vendor-packaged units including Centrifuges, Membrane Batch Reactors (MBR's), and UV System and the collection system pump</li> </ol>

stations, effluent disposal sites, and harvest well sites. See Contract Drawing GI-05 for schematic detail. Two operator workstations shall be provided in the Operations Building Control Room and one each in the electrical rooms of the Residual and Treatment Buildings.

- B. Instrumentation Supplier:** It is the intent of these specifications to have the prequalified Instrumentation Supplier be singularly responsible for selecting, configuring, and verifying correct operation of compatible hardware and software to provide a functional Control System for the WWTF and the associated collection system. In order to preserve this focused responsibility, the Instrumentation Supplier shall be the integrator of all hardware and all database, data acquisition, control, display, and all other system software. Additionally the Instrumentation Supplier shall be responsible for the application programming of the PLCs as specified in the Contract Documents.
- C. A Control System block diagram showing the communication medium that will be used for area each location is provided on Area Contract Drawings AD-GI-202 and BC-GI-202.
- D. The Area control system installation shall consist of the following:
  - 1. The Instrument Supplier shall be responsible for furnishing all of the equipment for the Area A & Area D project and Area B & Area C project to ensure that the products are the same for all of the Los Osos projects. The CONTRACTOR for each project shall be responsible for installing and testing the radio, modem, and fiber optic equipment required to communicate with the new SCADA system located at the WWTF that is included in a separate project as follows:
    - a. All of the Pocket Pump Stations will communicate via dial-up modem. The Instrument Supplier shall provide each Pocket Pump Station with the instrumentation equipment that will become part of a combined Instrument and Electrical LCP located in close proximity to the pump station. The CONTRACTOR shall coordinate with the Electrical Subcontractor to provide a new PLC, modem, UPS, and associated power supplies, with the associated level transmitter specified in Section 17106 of the Area Contract Documents, on a single backpanel that will mount on the instrument side of a combined LCP. The Electrical Subcontractor will be responsible for providing the enclosure for the combined LCP. See Area electrical Contract Drawing AD-E-200 for sizing requirements and locations.
    - b. The Pismo and Santa Maria Effluent Disposal Facilities will communicate via dial-up modem. The Instrument Supplier

shall provide each a new PLC, modem, UPS, and associated power supplies on a single backpanel that will mount in a weatherproof LCP. The Electrical Subcontractor will be responsible for providing the enclosure for the LCP.

- c. The Instrument Supplier shall provide a new PLC, fiber optic modem, UPS, and associated power supplies, with the associated level transmitter (specified in Area Section 17106 of the Contract Documents), on a single backpanel that will mount on the instrument side of a combined LCP for the Baywood and West Paso Submersible Pump Station Facilities. The West Paso LCP shall also contain a patch panel to route an incoming 24-fiber cable from the WWTF that will be provided and installed as part of the WWTF project. Four fibers shall be dedicated to the West Paso Pump Station, 16 fibers shall be routed to the Standby Power Facility at 8<sup>th</sup> and El Moro and four fibers shall be routed to the Baywood Pump Station. Eight of the fibers routed to the 8<sup>th</sup> and El Moro Facility shall be reserved for future SCADA purposes. The Electrical Subcontractor will be responsible for providing the enclosure for the LCP. See area electrical contract drawing A-E-200 for locations.
- d. The Instrument Supplier shall provide a new PLC, fiber optic modem, UPS, and associated power supplies on a single backpanel that will be installed in an LCP enclosure provided by the Electrical Subcontractor inside the Palisades Harvest Well Facility. The fiber optic cable shall be provided and installed by the WWTF project.
- e. The Instrument Supplier shall provide a new PLC, radio, UPS, and associated power supplies, with the associated level transmitter (specified in Section 17106 of the Area Contract Documents), on a single backpanel that will be installed in an LCP enclosure provided by the Electrical Subcontractor inside the Standby Power Building for the East Paso and East Ysabel Submersible Pump Station Facilities and the Mountain View Standby Power Facility. The East Paso Harvest well instrumentation and control will be connected to the East Paso Submersible Pump Station RTU. The LCP shall be used for both the pump station and the associated standby power facility I/O. A separate LCP shall be provided next to the Mountain View Submersible Pump Station for mounting of the instruments only. The instrument signals shall be routed to the RTU/PLC located at the standby power facility. The Instrument Supplier shall also provide the antenna cable, surge suppressor, antenna and antenna pole for these facilities.
- f. The Instrument Supplier shall provide a new PLC, radio, UPS,

		<p>and associated power supplies on a single backpanel that will be installed in an LCP enclosure provided by the Electrical Subcontractor at the Loma Harvest well Facility. The Instrument Supplier shall also provide the antenna cable, surge suppressor, antenna, and antenna pole for these facilities.</p> <p>g. The Instrument Supplier shall provide a new PLC, radio, UPS, and associated power supplies, with the associated level transmitter (specified in Section 17106 of the Area Contract Documents), on a single backpanel that will be installed in an LCP enclosure provided by the Electrical Subcontractor inside the Standby Power Building for the Sunny Oaks and Lupine Submersible Pump Station Facilities. The LCP shall be used for both the pump station and the associated standby power facility I/O. The Instrument Supplier shall also provide the antenna cable, surge suppressor, antenna and antenna pole for these facilities.</p> <p>h. The Instrument Supplier shall provide a new PLC, radio, UPS, and associated power supplies on a single backpanel that will be installed in an LCP enclosure provided by the Electrical Subcontractor at the Broderson Effluent Disposal Facility. The Instrument Supplier shall also provide the antenna cable, surge suppressor, antenna, and antenna pole for the facility.</p> <p>i. The Instrument Supplier shall reconfigure the Mountain View Standby Power Facility to be a repeater station for the radio signal from the Sunny Oaks facility.</p> <p>j. The Instrument Supplier shall provide two operator workstations for the OWNER's use. The workstations shall be located at OWNER's office at 2122 9<sup>th</sup> Street and the Water Yard office at 8<sup>th</sup> Street and El Moro Avenue. The workstation will allow remote monitoring/operation of the combined Project.</p> <p><b>E. Minimum Instrumentation Supplier Scope:</b> The exact contractual relationship and scope definition shall be established exclusively between the CONTRACTOR and the Instrumentation Subcontractor. It is the intent of these Contract Documents that the Instrumentation Supplier, under the direction of the CONTRACTOR, shall assume full responsibility for the following, as a minimum:</p> <ol style="list-style-type: none"> <li>1. Procurement of all hardware and software required to conform to the Contract Documents.</li> <li>2. Design and submit hardware, software, and spare parts submittals.</li> </ol>
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		responsibility of the CONTRACTOR. The CONTRACTOR shall have responsibility for providing a fully integrated Control System. The CONTRACTOR shall coordinate the WORK of his personnel and the Instrumentation Supplier's personnel for the installation, interconnection, testing, calibration, and operation of all Control System equipment and coordinate the scheduling. The CONTRACTOR shall be responsible for providing equipment that properly meets the functional intent of the Contract Documents. Substitutions for Control System functions specified are not permitted.
2.53	17510	<b>Delete</b> Paragraph 1.3.B.4 and <b>replace</b> with the following: "4. UPS and battery load calculations for the units specified for each remote I/O location as detailed on Contract Drawings 42-E-11, 43-E-16, and 44-E-05 shall show that the backup capacity and time meet the specified requirements."
2.54	17510	<b>Delete</b> the fourth sentence of Paragraph 2.3.A and <b>replace</b> with the following: "The output power from R I/O#2 UPS shall feed a distribution panel, UPS Panel 44-UPS-01, for the Operations Building shown on the electrical Contract Drawings, the equipment in the PLC enclosure, and the instruments in the Residuals Building. "
2.55	17510	<b>Add</b> the following to Paragraph 2.4.C: "9. <b>Communications Cards:</b> The remote I/O drops in the Residuals Building and the Treatment Building shall have communications cards provided for the power monitoring requirements of the two building MCC's. The Treatment Building power monitoring shall include all of the generator and main switchgear monitoring including the ATS."
2.56	17510	<b>Delete</b> the third sentence of Paragraph 3.3.E.1.
2.57	17510	<b>Delete</b> Paragraph 3.3.F and <b>replace</b> with the following: "F. <b>Instruction:</b> The CONTRACTOR shall provide training for the purpose of familiarizing the OWNER's maintenance and operating personnel with the use, maintenance, calibration, and repair of all components of the Control System.  The training shall be scheduled concurrent with the calibration, equipment testing, and process system testing phases of the Project.  The training shall be performed by qualified representatives of the CONTRACTOR or the Manufacturer as noted in the table below. Training shall be specifically tailored to the Project and reflect the Control System installation and configuration. The table below summarizes training hours required, which shall be provided at no additional cost to the OWNER. All training shall be conducted at the Site unless the ENGINEER and OWNER approve another location.

		Training Classes Required	Maintenance Class (Hrs.)	Operator's Class (Hrs.)	Conducted By
		1. Control Hardware/Software General Familiarity	8	8	Contractor
		2. Control Hardware -			
		2.a. Troubleshooting and Repair of PLC's	8	-	Manufacturer
		2.b. Troubleshooting and Repair of Communications	8	8	Manufacturer
		3. Control Software			
		3a. PLC programming, logic, registers, etc	16	-	Contractor
		3b. Workstation programming, database, etc	16	-	Contractor
		3c. Workstation Operation, graphics, alarm handling, trending, reports, etc	8	16(x2)	Contractor
		<p>Each training class shall be a minimum of 4 hours in duration. Separate classes shall be conducted for the OWNER's maintenance and operating personnel. Maintenance classes shall stress troubleshooting, repair, calibration, and other technical aspects of the Control System. Operator classes shall stress operational theory and use of the Control System. Each of the training classes listed above for operators shall be conducted twice during separate weeks to allow for scheduling of OWNER personnel. A total of 64 hours of training for maintenance personnel and 48 hours of training for operators shall be provided.</p> <p>The training classes shall be scheduled a minimum of 3 weeks in advance of when they are to be given. Proposed training material, including a resume for the proposed instructor(s) (indicating previous instructional experience) and a detailed outline of each lesson shall be submitted to the ENGINEER at least 30 days in advance of when the lesson is to be given. The ENGINEER shall review the submitted data for suitability and provide comments that shall be incorporated into the course.</p> <p>Within 10 days after the completion of each class the CONTRACTOR shall present to the ENGINEER the following:</p> <ol style="list-style-type: none"> <li>1. A list of all OWNER personnel that attended the class</li> <li>2. A copy of the hard copy text utilized during the class with all notes,</li> </ol>			

		diagrams, and comment."
2.58	17510	<b>Delete</b> digital inputs "44-YA-001" and "44-YA-002" in Appendix A, page A-19.
2.59	17510	<b>Add</b> SPEED analog inputs "42-SI-301", "42-SI-302", "42-SI-303" to R I/O#2 from each Polymer Mix Feed LCP in Appendix A, Page A-21.
2.60	17510	<b>Add</b> a REMOTE status digital input "42-YI-103C" and "42-YI-104C" to R I/O#2 from each Drum Screen LCP in Appendix A, Page A-25.
2.61	17510	<b>Add</b> a REMOTE status digital input "42-YI-107C" and "42-YI-108C" to R I/O#2 from each Washer Compactor LCP in Appendix A, Page A-27.
2.62	17510	<b>Add</b> a Zero Speed Alarm digital input "42-YA-403" to R I/O#2 from the Solids Conveyor in Appendix A, Page A-27.
2.63	17520	<b>Delete</b> Specification Section 17520 - PLC-Based Control Systems Software and <b>replace</b> with new Specification Section 17520 - PLC-Based Control Systems Software attached to this addendum.
	<b>Vol. IV</b>	
2.64	Sheet No. 1 through Sheet No. 2	<b>Add</b> four Drawings entitled "Plans for Improvements of Los Osos Valley Road Between Ravenna Avenue and Palisades Avenue" prepared by San Luis Obispo County attached to this addendum. This work shall be conducted as part of Area C construction.
2.65	B-PP-XXX	<b>Add</b> the following note to all sewer main plan and profile Drawings: <p>"Note: CONTRACTOR may use precast concrete manhole base sections per Detail C-101 in lieu of cast-in-place manhole base sections per Detail C-100 where sewer main alignments and profiles entering and leaving the manhole are achieved without horizontal or vertical offsets."</p> <b>Add</b> the following note to all disposal main and harvest main plan and profile Drawings: <p>"Note: Where callout for Detail C-115 is shown for pipeline blowoff of disposal mains and harvest mains, use Detail C-620."</p>
2.66	BC-G-011	<b>Delete</b> Leaking Allowance "(A)" for DM (Disposal Mains), HM (Harvest Mains), and FM (Force Mains) and <b>replace</b> with the following: <p>"(B)"</p> <b>Delete</b> the words "Polyvinyl Chloride" under the column heading Fittings for Pipe Type 33 and <b>replace</b> with the following: <p>"Ductile Iron".</p>
2.67	B-PP-117	<b>Delete</b> standard detail callout "C-102" for MH-LU-B07 and <b>replace</b> with the following: <p>"C102A"</p>

2.68	B-C-202	<b>Delete</b> Drawing B-C-202 and <b>replace</b> with new Drawing B-C-202 attached to this addendum.
2.69	B-PP-333	<b>Delete</b> standard detail callout "C-115" and replace with the following: "C-620"
2.70	B-PP-334	<b>Delete</b> callout "P.I. N2314031.85, E5713586.32" on the plan view and <b>replace</b> with the following: "P.I. N2314073.13, E5713587.70". <b>Delete</b> callout "P.I. N2314036.12, E5713578.39" on the plan view and <b>replace</b> with the following: "P.I. N2314077.37, E5713579.77" <b>Delete</b> callout "STA 14+37.66, EL 43.06" on the profile view and <b>replace</b> with the following: "STA 14+78.91, EL 39.19". <b>Delete</b> callout "STA 14+41.66, EL 42.69" on the profile view and <b>replace</b> with the following: "STA 14+82.91, EL 38.82"
2.71	B-PP-347	<b>Delete</b> the pipeline callout "8" DM" and replace with the following: "12" DM".
2.72	B-PP-400	<b>Add</b> Drawing B-PP-400: "Plan and Profile – EDS Palisades & LOVR" attached to this addendum.
2.73	B-E-203	<b>Add</b> the following under Notes; "2. Contractor shall route underground electrical conduit via Broderson Avenue and Loma Street. 3. See Civil Drawing B-C-202 for revised building location and revised driveway access."
2.74	C-PP-XXX	<b>Add</b> the following note to all sewer main plan and profile Drawings: "Note: CONTRACTOR may use precast concrete manhole base sections per Detail C-101 in lieu of cast-in-place manhole base sections per Detail C-100 where sewer main alignments and profiles entering and leaving the manhole are achieved without horizontal or vertical offsets." <b>Add</b> the following note to all disposal main and harvest main plan and profile Drawings: "Note: Where callout for Detail C-115 is shown for pipeline blowoff of disposal mains and harvest mains, use Detail C-620."
2.75	C-PP-401	<b>Add</b> Drawing C-PP-401: "Plan and Profile – EDS LOVR & 9th" attached to this addendum.
2.76	BC-E-200	<b>Add</b> the following under Notes" "6. Under column ATS Dimensions in Table 2, add 18-inches to the width

		dimension to accommodate PGE requirements.”
2.77	B-E-202	<b>Delete</b> the width “48” for the ATS and <b>replace</b> with “66”.
2.78	C-E-202	<b>Delete</b> the width “40” for the ATS and <b>replace</b> with “58”.
	<b>Vol. V</b>	
2.79	AD-G-011	<b>Delete</b> Leaking Allowance "(A)" for DM (Disposal Mains), HM (Harvest Mains), and FM (Force Mains) and <b>replace</b> with the following: "(B)" <b>Delete</b> the words “Polyvinyl Chloride” under the column heading Fittings for Pipe Type 33 and <b>replace</b> with the following: “Ductile Iron”.
2.80	A-PP-XXX	<b>Add</b> the following note to all sewer main plan and profile Drawings: "Note: CONTRACTOR may use precast concrete manhole base sections per Detail C-101 in lieu of cast-in-place manhole base sections per Detail C-100 where sewer main alignments and profiles entering and leaving the manhole are achieved without horizontal or vertical offsets." <b>Add</b> the following note to all disposal main and harvest main plan and profile Drawings: "Note: Where callout for Detail C-115 is shown for pipeline blowoff of disposal mains and harvest mains, use Detail C-620."
2.81	A-PP-XXX	<b>Add</b> the following note to all sewer main plan and profile Drawings: "Note: Area A Plan & Profile drawings with legible Utility Designations are available upon request to the ENGINEER."
2.82	A-PP-103	<b>Delete</b> callout “INV OUT 65.60” for MH-WP-12 on the profile view and <b>replace</b> with the following: “INV OUT 65.00”
2.83	A-PP-104	<b>Add</b> the following callout to MH-WP-B12 on the plan view: “C-102A”
2.84	A-PP-113	<b>Delete</b> callout “C-123A” at MH-WP-B06 on the plan view and <b>replace</b> with the following: “C-102A”.
2.85	A-PP-122	<b>Delete</b> callout “MH-9A-A02” on the plan view and <b>replace</b> with the following: “MH-8A-A02” <b>Delete</b> callout “C-102” on the plan view and <b>replace</b> with following: “C-102A” <b>Delete</b> callout “MH-9A-A02” on the profile view and <b>replace</b> with the following:

		"MH-8A-A02"
2.86	A-PP-123	<b>Delete</b> callout "MH-WP-8A-A02" on the plan view and <b>replace</b> with the following: "MH-8A-A02" <b>Delete</b> callout "C-102" on the plan view and <b>replace</b> with the following: "C-102A"
2.87	A-PP-126	<b>Delete</b> callout "C-102" on the plan view and <b>replace</b> with the following: "C-102A"
2.88	A-PP-133	<b>Delete</b> callout "C-100" on the plan view and <b>replace</b> with the following: "C-102"
2.89	A-PP-142	<b>Add</b> the following callout for the diameter and slope of the pipeline on the profile view between MH-WP-BS02 and MH-WP-BS03: "8" SS @ 0.0208"
2.90	A-PP-161	<b>Delete</b> callout "MH" at the manhole located at STA=14+00.21 on the profile view and <b>replace</b> with the following: "MH-EP-B00" <b>Add</b> the following callout at the manhole located at STA=14+00.21 on the plan view: "MH-EP-B00" <b>Add</b> the following Standard Detail callout at the manhole located at STA=14+00.21 on the plan view: "C-100"
2.91	A-PP-163	<b>Delete</b> sewer slope callout "0.0757" between manholes MH-EP-C02 and MH-EP-C03 on the profile view and <b>replace</b> with the following: "8" SS @ 0.0757"
2.92	A-C-205A	<b>Add</b> Drawing A-C-205A - East Paso PS & Standby Power Site Plan attached to this addendum. This Drawing shows the supplemental work to add a production well to the Harvest Well Building shown on Drawing A-C-205.
2.93	D-PP-XXX	<b>Add</b> the following note to all sewer main plan and profile Drawings: "Note: CONTRACTOR may use precast concrete manhole base sections per Detail C-101 in lieu of cast-in-place manhole base sections per Detail C-100 where sewer main alignments and profiles entering and leaving the manhole are achieved without horizontal or vertical offsets." <b>Add</b> the following note to all disposal main and harvest main plan and profile Drawings: "Note: Where callout for Detail C-115 is shown for pipeline blowoff of disposal mains and harvest mains, use Detail C-620."

2.94	D-PP-106	<p><b>Add</b> the following clarifying notes in the lower left hand corner of the drawing below the profile grid as follows:</p> <p>“Notes:        1. Parallel utilities along San Luis Ave.                          2. Future Storm Drain on the north side.                          3. Existing CATV on the north side.                          4. Existing Gas on the south side.”</p>
2.95	D-PP-107	<p><b>Add</b> the following clarifying notes in the lower left hand corner of the drawing below the profile grid as follows:</p> <p>“Notes:        1. Parallel Utilities along 7th St.                          2. Existing Water on the East side                          3. Existing CATV                          4. Existing Gas on the South side”</p>
2.96	D-PP-108	<p><b>Add</b> the following clarifying notes in the lower left hand corner of the drawing below the profile grid as follows:</p> <p>“Notes:        1. Parallel Utilities along Nipomo St.                          2. Future Storm Drain on the North side.                          3. Existing CATV on the North side.                          4. Existing Gas on the North side”</p>
2.97	D-PP-109	<p><b>Add</b> the following clarifying notes in the lower left hand corner of the drawing below the profile grid as follows:</p> <p>“Notes:        1. Parallel Utilities along Nipomo St.                          2. Existing Water on the South side.                          3. Existing CATV along the center line.                          4. Existing Gas on the North side”</p>
2.98	D-PP-117	<p><b>Add</b> the following:</p> <p>“Notes:                          1. Storm Drain running North-South located on Ramona near 9<sup>th</sup> is existing 18" CMP (D-PP-117)                          2. Storm Drain running East-West located at Ramona and 11th intersection is existing 12" CMP (D-PP-117)”</p>
2.99	D-PP-129	<p><b>Add</b> the following on the profile view:</p> <p>“Note: Construct 2" Force Main from Sta 27+93 (refer to Drawing D-C-203 - Pump Station 9C) to Sta 21+08.”</p> <p><b>Add</b> the following callout at dashed line between PPS-WP-09C-K01 and MH-WP-09C-K07 on the profile view:</p>

		"2" FM"
2.100	D-PP-139	<b>Add</b> the following: "Note: Existing 18" CMP storm drains are located on Fairchild between LOVR and Los Olivos Road, parallel to the water lines, are not shown."
2.101	D-PP-143	<b>Add</b> the following callout at property address 2104 Ferrell Avenue: "Additional 4" lateral service at STA 8+79, INV.EL 112.0 (LOT SPLIT)"
2.102	D-PP-153	On the "Profile on 9th Street" <b>Add</b> the following on the profile view: "Note: Sta 34+67 to Sta 36+08 has a 2" Force Main as shown on Sheet D-C-203 - Pump Station 9B." Also <b>add</b> callout at dashed line between PPS-WP-09B-CK02 and MH-WP-CK05 - "2" FM"
2.103	D-PP-168	<b>Add</b> the following on the profile view: "Note: Construct 2" Force Main from Sta 5+03 (refer to Drawing D-C-203 - Pump Station 15B) to Sta 7+62." <b>Add</b> the following callout at dashed line between PPS-WP-15B-CZ01 and MH-WP-CZ04 on the profile view: "2" FM"
2.104	D-PP-180	<b>Add</b> the following: "Note: Existing 18" CMP that runs diagonally across Mountain View Ave from STA 10+00 to 9+00 (from NW to SE) is not shown."
2.105	ED-C-339	<b>Delete</b> callout "Gravel Pack: 8 x 20 sand" and <b>replace</b> with the following: "Gravel Pack: 12 x 20 sand".
2.106	D-PP-402	<b>Add</b> Drawing D-PP-402: "Plan and Profile – EDS 9 <sup>th</sup> ST STA 19+50 TO STA 28+ 50" attached to this addendum.
2.107	D-PP-403	<b>Add</b> Drawing D-PP-402: "Plan and Profile – EDS 9 <sup>th</sup> ST STA 28+50 TO STA 38 + 50" attached to this addendum.
2.108	D-PP-404	<b>Add</b> Drawing D-PP-404: "Plan and Profile – EDS 9 <sup>th</sup> ST STA 38+50 TO STA 50+00" attached to this addendum.
2.109	D-PP-405	<b>Add</b> Drawing D-PP-402: "Plan and Profile – EDS 9 <sup>th</sup> ST STA 50+00 TO STA 58+49.94" attached to this addendum.
2.110	AD-M-205A	<b>Add</b> Drawing AD-M-205A - Production Well Plan & Section attached to this addendum. This Drawing shows the supplemental work to add a production well to the Harvest Well Building shown on Drawing A-M-205.
2.111	AD-E-202	<b>Add</b> the following under Notes" "6. Under column ATS Dimensions in Table 2, add 18-inches to the width dimension to accommodate PGE requirements."

2.112	A-E-206	<b>Delete</b> the width "46" for the ATS and <b>replace</b> with "64".
2.113	A-E-207	<b>Add</b> the following to Note 4: "& (1) 1 1/2" CO."
2.114	A-E-208	<b>Delete</b> the width "48" for the ATS and <b>replace</b> with "66".
2.115	A-E-210	<b>Delete</b> the width "40" for the ATS and <b>replace</b> with "58".
2.116	D-E-203	<b>Delete</b> the width "40" for the ATS and <b>replace</b> with "58".
	<b>Vol. VIA</b>	
2.117	41-C-38	<b>Add</b> the following note at the Septage Tank callout "36-INCH MANWAY SEE SEPTAGE TANK SPEC": "LEVEL ELEMENT 41-LE-30 SHALL BE LOCATED IN MANWAY"
2.118	41-L-06	<b>Delete</b> the first Note 12 referring to the concrete grade beam. <b>Delete</b> the words "Section 02000" in the second Note 12 and <b>replace</b> with the following: "Section 02200".
2.119	43-S-04	At "SECTION A", between Grid Lines 3 and 2: <b>Delete</b> callout "Detail 1" and <b>replace</b> with "Detail 46" <b>Delete</b> callout "Detail 2" and <b>replace</b> with "Detail 45" <b>Delete</b> callout "Detail 3" and <b>replace</b> with "Detail 48" <b>Delete</b> callout "Detail 4" and <b>replace</b> with "Detail 47".
2.120	43-S-05	At "SECTION B", between Grid Lines 3 and 2: <b>Delete</b> callout "Detail 1" and <b>replace</b> with "Detail 46" <b>Delete</b> callout "Detail 2" and <b>replace</b> with "Detail 45" <b>Delete</b> callout "Detail 3" and <b>replace</b> with "Detail 48" <b>Delete</b> callout "Detail 4" and <b>replace</b> with "Detail 47".
2.121	43-S-14	At "DETAIL 11": <b>Delete</b> left side detail callout "26" and <b>replace</b> with "24" <b>Delete</b> right side detail callout "26" and <b>replace</b> with "24" <b>Delete</b> right side detail callout "27" and <b>replace</b> with "26".
2.122	43-S-17	At "DETAIL 16": <b>Delete</b> left side detail callout "28" and <b>replace</b> with "34".
2.123	43-S-18	At "DETAIL 18": <b>Delete</b> left side detail callout "28" and <b>replace</b> with "34" <b>Delete</b> right side detail callout "28" and <b>replace</b> with "34".
2.124	43-S-19	At "DETAIL 20":

		<p><b>Delete</b> detail callout “29” and <b>replace</b> with “31”.</p> <p>At “DETAIL 21”:</p> <p><b>Delete</b> left side detail callout “28” and <b>replace</b> with “34”</p> <p><b>Delete</b> right side detail callout “28” and <b>replace</b> with “34”.</p>
2.125	43-S-20	<p>At the midpage “DETAIL 26”:</p> <p><b>Delete</b> callout label “DETAIL 26” and <b>replace</b> with label “DETAIL 24”.</p>
2.126	43-S-21	<p>At “DETAIL 28”:</p> <p><b>Delete</b> callout label “DETAIL 28” and <b>replace</b> with label “DETAIL 34”</p> <p>At “DETAIL 29”:</p> <p><b>Delete</b> callout label “DETAIL 29” and <b>replace</b> with label “DETAIL 31”.</p>
2.127	43-S-22	<p>At “DETAIL 1”:</p> <p><b>Delete</b> callout label “DETAIL 1” and <b>replace</b> with label “DETAIL 35”</p> <p>At “DETAIL 2”:</p> <p><b>Delete</b> callout label “DETAIL 2” and <b>replace</b> with label “DETAIL 36”</p> <p>At “DETAIL 3”:</p> <p><b>Delete</b> callout label “DETAIL 3” and <b>replace</b> with label “DETAIL 37”.</p>
2.128	43-S-23	<p>At the “PLAN”</p> <p><b>Delete</b> detail callout “4” and <b>replace</b> with “41”</p> <p>At “SECTION A”</p> <p><b>Delete</b> detail callout “3” and <b>replace</b> with “40”</p> <p><b>Delete</b> detail upper callout “4” and <b>replace</b> with “41”</p> <p><b>Delete</b> detail lower callout “4” and <b>replace</b> with “41”</p> <p><b>Delete</b> detail callout “5” and <b>replace</b> with “42”</p> <p><b>Delete</b> callout “DETAIL 1” and <b>replace</b> with “DETAIL 38”</p> <p><b>Delete</b> callout “DETAIL 2” and <b>replace</b> with “DETAIL 39”</p>
2.129	43-S-24	<p>At “DETAIL 3”:</p> <p><b>Delete</b> callout label “DETAIL 3” and <b>replace</b> with label “DETAIL 40”</p> <p>At “DETAIL 4”:</p> <p><b>Delete</b> callout label “DETAIL 4” and <b>replace</b> with label “DETAIL 41”</p> <p>At “DETAIL 5”:</p> <p><b>Delete</b> callout label “DETAIL 5” and <b>replace</b> with label “DETAIL 42”</p> <p>At “DETAIL 6”:</p> <p><b>Delete</b> callout label “DETAIL 6” and <b>replace</b> with label “DETAIL 43”</p>

2.130	43-S-25	At "DETAIL 1": <b>Delete</b> callout label "DETAIL 1" and <b>replace</b> with label "DETAIL 44"
2.131	43-S-26	At "DETAIL 1": <b>Delete</b> callout label "DETAIL 1" and <b>replace</b> with label "DETAIL 45" At "DETAIL 2": <b>Delete</b> callout label "DETAIL 2" and <b>replace</b> with label "DETAIL 46" At "DETAIL 3": <b>Delete</b> callout label "DETAIL 3" and <b>replace</b> with label "DETAIL 48" At "DETAIL 4": <b>Delete</b> callout label "DETAIL 4" and <b>replace</b> with label "DETAIL 47"
2.132	44-S-02	<b>Add</b> the following under Notes; "5. Roof overhangs at Grid lines 1 and 4 shall match the roof plan on Drawing 44-A-05. Roof Canopies shall match Drawing 44-A-05".
2.133	44-S-03	<b>Add</b> the following: "Note: The height of the exterior reinforced concrete wall between Grid lines 2 and 3 shall conform to the West elevation shown on Drawing 44-A-07. Roof canopies shall match Drawing 44-A-07."
2.134	44-S-04	<b>Add</b> the following: "Note: The height of the exterior reinforced concrete wall between Grid lines 2 and 3 shall conform to the East elevation shown on Drawing 44-A-07."
2.135	44-S-05	<b>Add</b> the following: "Note: The height of the exterior reinforced concrete wall between Grid lines 2 and 3 shall conform to the East elevation shown on Drawing 44-A-07. Roof canopies shall match Drawing 44-A-07."
	<b><u>Vol. VIB</u></b>	
2.136	40-GM-09	<b>Add</b> new Standard Detail M-105 attached to this addendum.
2.137	42-M-01	<b>Add</b> the following under Notes: "(10) PROVIDE 1" PW PIPELINE FROM 6" PW PIPELINE AT SOUTHEAST CORNER OF BUILDING TO TWO SINKS LOCATED IN THE WORKSHOP AND ADJACENT TO POLYMER AREA. SINKS WITH WATER HEATERS SHALL BE AS SPECIFIED IN SECTION 15440 – PLUMBING FIXTURES. PROVIDE 3" D PIPELINE FROM EACH SINK TO THE PLANT DRAIN SYSTEM BENEATH THE FIRST FLOOR."
2.138	42-M-04	<b>Add</b> the following under Notes:

		<p>"10. PROVIDE 1" PW PIPELINE FROM 6" PW PIPELINE AT SOUTHEAST CORNER OF BUILDING TO SINK LOCATED AT SOUTH WALL. SINK WITH WATER HEATER SHALL BE AS SPECIFIED IN SECTION 15440 – PLUMBING FIXTURES. PROVIDE 3" D PIPELINE FROM SINK TO THE PLANT DRAIN SYSTEM BENEATH THE SECOND FLOOR."</p>
2.139	43-M-04	<p><b>Add</b> sink at southwest corner of MBR tanks.</p> <p><b>Add</b> the following under Notes:</p> <p>"5. PROVIDE 1" PW PIPELINE FROM 6" PW PIPELINE AT WEST WALL OF BUILDING TO SINK LOCATED AT SOUTHWEST CORNER OF MBR TANKS. SINK WITH WATER HEATER SHALL BE AS SPECIFIED IN SECTION 15440 – PLUMBING FIXTURES. PROVIDE 3" D PIPELINE FROM SINK TO THE PLANT DRAIN SYSTEM BENEATH THE FIRST FLOOR."</p>
2.140	43-M-05	<p><b>Delete</b> the callout "See Civil C-41-25 and C-41-26" for the Septage Holding Tank and <b>replace</b> with the following:</p> <p>"See Drawings 41-C-38 and 41-C-39"</p>
2.141	43-M-07	<p><b>Add</b> sink at south side of MBR tanks adjacent of emergency eyewash shower.</p> <p><b>Add</b> the following under Notes:</p> <p>"6. PROVIDE 1" PW PIPELINE FROM 6" PW PIPELINE AT WEST WALL OF BUILDING TO SINK LOCATED AT SOUTH SIDE OF MBR TANKS. SINK WITH WATER HEATER SHALL BE AS SPECIFIED IN SECTION 15440 – PLUMBING FIXTURES. PROVIDE 3" D PIPELINE FROM SINK TO THE PLANT DRAIN SYSTEM BENEATH THE SECOND FLOOR."</p>
2.142	GH-02	<p><b>Delete</b> voltage/phase callout "230/1" for equipment number "42-S-01-CA" in the "SPLIT SYSTEM PACKAGED AIR CONDITIONING SCHEDULE" and <b>replace</b> with the following:</p> <p>"208/1"</p>
2.143	42-E-03	<p><b>Delete</b> the callout "SEE DWG 41-C-2 AND 41-C-25 FOR LOCATION" in Note 3 in "Cable and Conduit Notes:" and <b>replace</b> with the following:</p> <p>"SEE DWG 41-C-38"</p>
2.144	GI-06	<p><b>Delete</b> the R I/O#1 "UPS" and associated "On Battery" and "Trouble" digital inputs "44-YA-001" &amp; "44-YA-002".</p>
2.145	42-I-01	<p><b>Delete</b> the HOA switches from the Drum Screen and Washer Compactor LCP's and <b>replace</b> with a L/R switch.</p>
2.146	42-I-01	<p><b>Add</b> a REMOTE status digital input to R I/O#2 from each Drum Screen LCP.</p>
2.147	42-I-01	<p><b>Add</b> a REMOTE status digital input to R I/O#2 from each Washer Compactor LCP.</p>

2.148	42-I-04	<b>Add</b> a SPEED analog input to R I/O#2 from each Polymer Mix Feed Unit.
2.149	42-I-05	<b>Delete</b> the HOR switch for the Solids Conveyor and <b>replace</b> with a READY indication.
2.150	42-I-05	<b>Add</b> a Zero Speed Alarm digital input to R I/O#2 from the Solids Conveyor.

**Los Osos Wastewater Project**  
**Construction Pre-Bid Meeting**  
**March 22, 2004**  
**Sea Pines Golf Resort, Los Osos**

**Meeting Notes**

The following meeting notes summarize key discussion items from the subject pre-bid meeting.

- 1) **Attendees:** Refer to attached attendance list.
- 2) **Presentation of Project Background.** Refer to attached copy of slides presented during the meeting.
- 3) **Clarifications and questions with responses for items not addressed by addendum:**
  - a. Don Beckerman of MCI outlined the installation of the underground Trans-Pacific fiber optic cable bundle that is routed through the Site. There are 18 to 20 2-inch diameter HDPE conduits in the bundle that were installed by directional drilling. The conduits house the fiber optic cables. The directional drilling tends to arc the alignment of the conduit between drilling locations. Some drilling locations were used between manhole locations, so the drilling arcs are not necessarily uniform between manhole locations. Mr. Beckerman noted that hand digging or vacuum excavation to expose the fiber optic conduits will be required before crossing the fiber optic cables with any excavation or related construction activity.
  - b. Q: Due to the variability in existing pavement thickness, will unit price item(s) be established for AC pavement restoration?  
  
A: No. Based upon available pavement thickness information, three pavement restoration sections have been provided for minor, collector and arterial streets. Pavement restoration is included in the pipeline unit price items based on the street classification. If additional AC pavement is necessary to match thicker pavement found in the field, it would be paid for using the unit price item established for additional AC pavement.
  - c. Q: Are locations for disposal of dewatering water disposal dictated by the Contract Documents?  
  
A: No. It is up to the contractor to prepare its dewatering plan. Existing storm drains are shown on the plan and profile drawings. In addition, as described in the dewatering specifications, detention basins and percolation basins are located at various locations in the project area. Be aware that some basins are privately owned, therefore the contractor would need to obtain the owner's permission before using them. Dewatering water must be handled (e.g. desilting) and disposed of in accordance with the Stormwater General Permit. MWH will provide more information about this permit by addendum.

- d. If cultural resources are encountered that require stopping the work, the unit price bid item established for demobilization and remobilization would be used.
- e. The District has identified two properties located northeast of the intersection of Pismo Avenue and 18<sup>th</sup> Street and northeast of the intersection of Los Olivos Avenue and Fairchild Way that have been environmentally cleared for the potential use as staging areas by the Contractor for the Project. The Contractor would be responsible to negotiate arrangements with the respective property owners for use of the property. The property owners have expressed a willingness to lease their property for this function, but they are not obligated to do so. The contacts for the subject properties are listed as follows:

**Pismo Avenue & 18<sup>th</sup> Street.**

Contact: Phil Gray (805) 543 – 1500, e-mail: pgray@midstate-cal.com. The District has negotiated a lease option for this property (1590 18<sup>th</sup> Street) that establishes terms and conditions acceptable to the property owner that is assignable to the contractor at the option of the successful bidder. Up to 6 acres are available for staging, storage, and surplus fill disposal and includes a 3000 sf residence that is available for office space and dry storage. The property owner will credit the contractor \$3/cy for fill placed, up to 24,000 cy, as an offset against the property rent. The property owner is currently finalizing a grading plan for placement of fill.

**Los Olivos Avenue & Fairchild Way.**

Contact for west 1.2-acre parcel (074 293 016): Gabe Rossetti (805) 528 – 1484  
Contact for east 1.2-acre parcel (074 293 015): Sandra Burke (805) 528 - 3475

- f. Q: What role will San Luis Obispo County inspectors have on the project?  
  
A: MWH will serve as the Resident Project Representative as defined in the Contract Documents and will interface with the County inspector. The County will have an inspector who will regularly visit the Project and who will contact MWH to address encroachment permit compliance, pavement restoration issues, monitoring traffic control and dust control, and other construction related matters pertaining to the County's conditions of approval. The Contractor's staff should interface with MWH's field staff only and should not accept direction or other instructions from the County inspector.
- g. Q: Several bidders desire to dig test pits, how can this be accomplished?  
  
A: Unfortunately, the County will not permit test pits in street right-of-way. Bidders may elect to negotiate test pits with private property owners.
- h. All pressure pipelines will be installed with thrust restraint systems, not thrust blocks will be used.

PRE-QUAL CONTRACTORS  
PRE-BID MEETING

3/22/04

1:00 PM

GEOTECH REPORT

NAME

COMPANY

DOES

PAID

Deborah Martin

S. R. Filanc Cons.

✓

OWE

Josh Vukovich

BARNARD

Dan Schall

BARNARD Const.

Lyle McClellan

BCCI

Jack Bowler

BARNARD

Kelly Deal

Barnard Const.

John Costes

SIMONDS MACHINERY

Hans Burkhardt

SPECIALIZED PIPELINE SERVICES

Jim Roberts

PACIFIC MECHANICAL CORP.

Ron Halterman

SPRINT

Edward Valerog

VALERDE CONSTRUCTION

✓

OWE

TAI Vuong

KIEWIT PACIFIC

Larry Bousman

Whitaker Const.

John Bergen

MWH

Don Beuterman

MCE

Rex N. Black

W.M. Lykes Co.

Richard Neumer

"

✓

✓

Matt Texeira

"

Dan Scliter

YADHUIS CORP.

✓

✓

Pet Russo

C.R. Fedrick

Ed Knight

Baker Tanks

Mary McCormick

MBI Media

FRED MUELLER

PSOMAS

John Madonna

JMC

✓

✓ CASH

Ken Moore

Specialty Construction

<u>NAME</u>	<u>COMPANY</u>	<u>REPORT</u>	<u>PAID</u>
Bryan Coleman	Tri-Technic (sub)		
STEVE ARNOLD	THOMA ELECTRIC		
ROB FLORY	THOMA ELECTRIC		
SEAN TOBIN	MID-VALLEY ENG.		
RYAN VANCE	" " "		
PHIL REED	ARB INC.	✓	
Milt Burleson	Monterey Mech. Co.	✓	
Mike Layton	Special Service Contractors		
TERRY MAR	AT&T		
Joel Wright	WILTEL. COMM		
MATT TEIXEIRA	W.M. LYLES CO.		
DERRICK MEANS	TAPTELECTRIC Co.		
MARIL SATERFIELD	IBEW		
Ron Myers	Myers Drilling		
GREG SHERER	R. BAKER Inc	✓	
Bill Hagerer	Santa Fe Win Water		
Scott Coleman	Spicess Const.		
BRUCE ZIMMERMAN	COOMBS-HOPKINS		
ANNE SUPIK	WILTEL COMM		
JOHN NOLAN	RANGER PIPELINES		
DAVID HICKS	" "		
Chris Schill	Reinfor Rent	✓	OWE
Alec Garcia	G.F. Garcia & Sons Inc.		
Kevin Rousseau	Level 3 Comm.		
Greg Kohler	Level 3 comm.		
Rip VanderWeex	Mid State Concrete		
Steve Tamaka	JLWA		
JACK GADEY	Geo SOLUTIONS	✓	OWE

Check received via mail  
 ✓  
 ↓ CHECK REC'D FOR PREVIOUSLY DELIVERED REPORTS

CHECK REC'D 3/26. OWE

**Construction Pre-Bid Meeting**

**Los Osos Community Services District**

**Los Osos Wastewater Project**

**March 22, 2004**



**Introductions**

- Bruce Buel - LOCSD General Manager
- Jon Seitz - LOCSD Legal Counsel
- Rob Miller - JLWA District Engineer
- John Bergen - MWH Construction Manager
- Steve Hyland - MWH Design Manager

**Preliminaries**

- Sign In
- Geotechnical Reports
- Questions and Answers

**Agenda**

- Project Background
- Legal Status of Project
- Project Description
- Key Project Requirements
- Addendum Items
- Site Tour

**Los Osos Community Services District  
(LOCSD)**

- LOCSD formed in November 1998
- Provides following services:
  - Wastewater
  - Water
  - Fire and emergency
  - Solid waste
  - Drainage
- Five elected Board members



### Project Background

- 5000 septic tanks on 1800 acres
- High nitrates in groundwater
- Building moratorium since 1988
- RWQCB Time Schedule Order
- Endangered species present
- Native American artifacts and burial sites

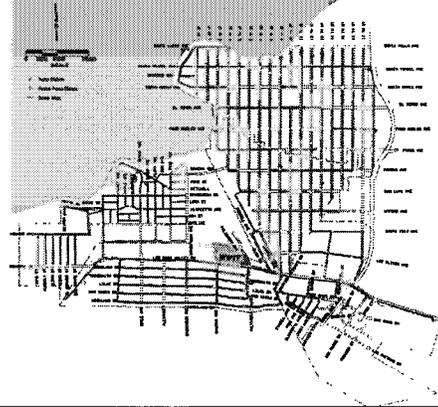
### Project Objective

- Project objective is to collect and treat wastewater to protect groundwater
- Existing septic tank discharges have resulted in nitrate contamination of the upper aquifer
- The project will provide a high quality effluent that will alleviate the nitrate contamination of the groundwater basin
- The project will achieve compliance with regulatory requirements of the RWQCB

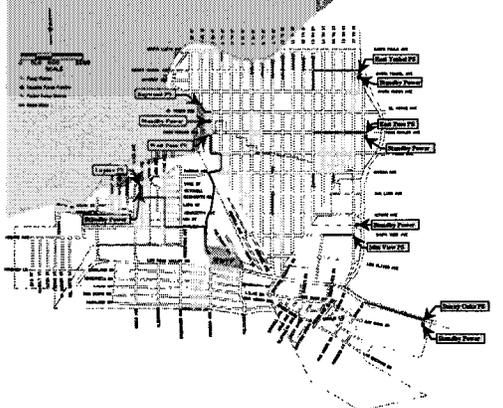
### Legal Status of Project

- Past and Current Litigation
- Technical Task Force
- Coastal Development Permit

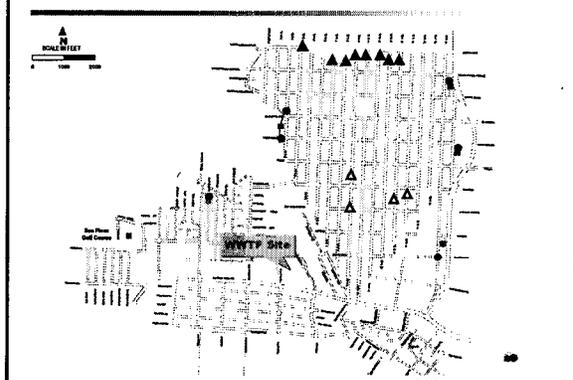
COLLECTION SYSTEM - SEWER MAINS

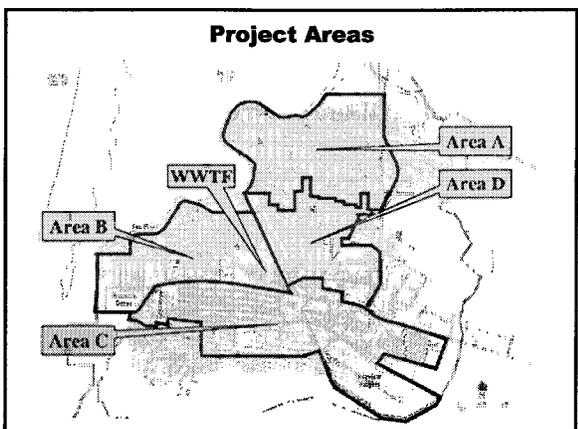
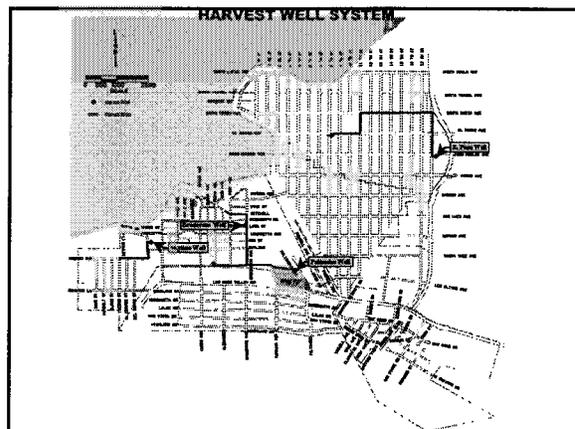
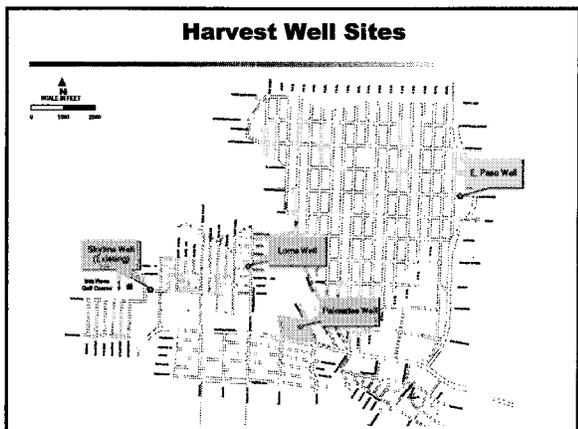
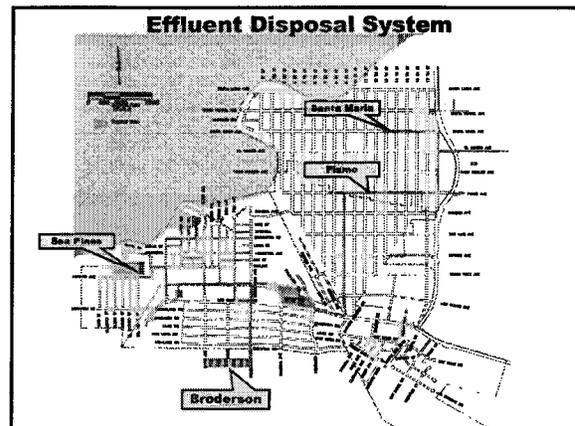
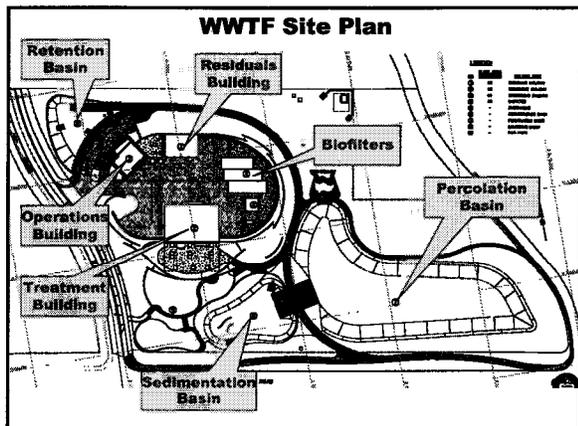


PUMP STATIONS AND FORCE MAINS



Pocket Pump Stations





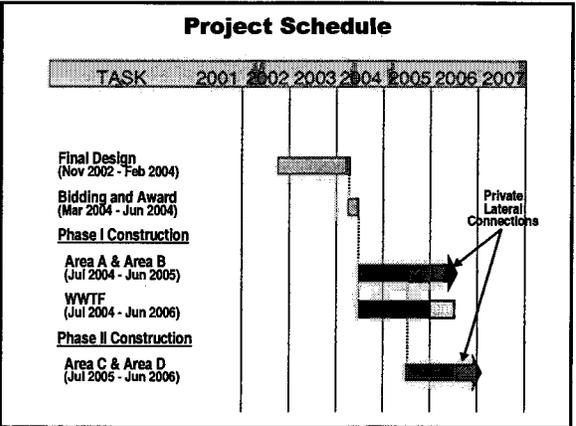
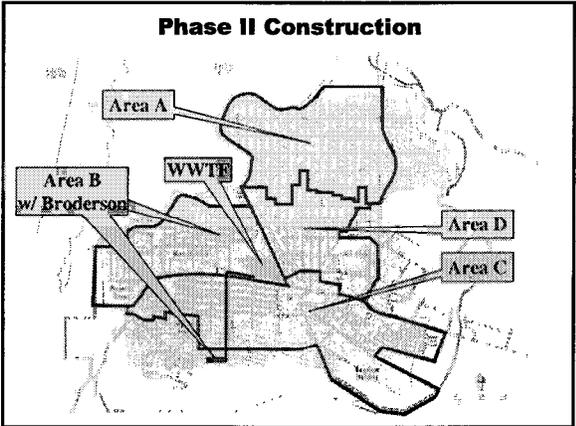
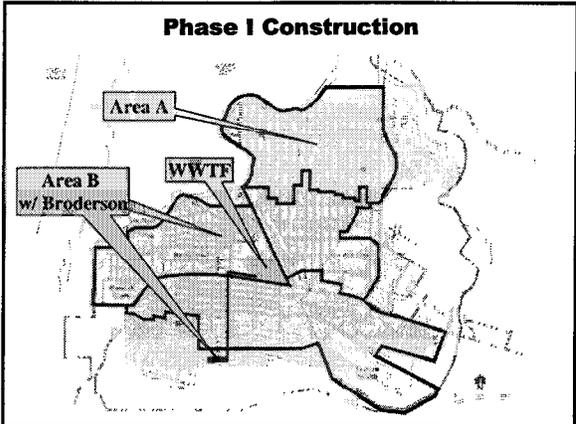
### Bid Packages

Description	Estimated Cost
Area A and Area D *	\$25,000,000
Area B and Area C *	<u>\$18,000,000</u>
Area A, Area B, Area C, and Area D	\$43,000,000
WWTF	<u>\$22,000,000</u>
Total	\$65,000,000

\* Construction will be conducted in sequence by Area.

**Project Funding**

Description	Amount
SRF Loan	\$65,000,000
Bonds	\$19,000,000
<b>Total</b>	<b>\$84,000,000</b>



**Construction Schedule**

Description	Date
Advertise	March 01, 2004
Pre-Bid Meeting	March 22, 2004
Submit Bids	April 28, 2004
Notice to Proceed	June 28, 2004

- Prequalification of General Contractors**
- Area Construction
    - Area A and Area D
    - Area B and Area C
  
  - Wastewater Treatment Facility (WWTF)

**Prequalification of Selected Subcontractors**

- Area underground pipeline
- Area microtunneling
- Area electrical
  
- WWTF mechanical (None)
- WWTF electrical
- WWTF instrumentation and control

**Bidding Schedule**

**April 28, 2004**

Time	Bid Schedule	Description
9:00 AM	1	Area B & Area C
10:00 AM	2	Area A & Area D
11:00 AM	3	WWTF
1:00 PM	4	Area A, Area B, Area C, & Area D
2:00 PM	5	Area A, Area B, Area C, & Area D and WWTF
3:30 PM		Bid Opening

**LOCSD will award lowest price combination of the following:  
 Bid Schedules 1, 2, and 3  
 Bid Schedules 3 and 4  
 Bid Schedule 5**

**WWTF Bid Schedule**

Item No.	Item Description	Unit	Estimated Quantity	Item Amount (\$)	Item Total (\$)
1	Mobilization / Demobilization	LS	1		
2	Shedding, Shoring, Stacking, and Bracing	LS	1		
3a	MBR Base Bid Price	LS	1		
3b	MBR Membrane Purchase Cost	LS	1		
3c	MBR Present Worth Adjustment Price Zenon: $\$1,120,000 + ((\$ \text{ } / \text{G}) \times \text{MBR Membrane Purchase Cost}) \times 2.42 =$ Or US Filter: $\$1,390,000 + ((\$ \text{ } / \text{G}) \times \text{MBR Membrane Purchase Cost}) \times 2.42 =$	LS	1	Or	
3d	MBR Adjusted Bid Price (Item 3a and Item 3c)				
4	Wastewater Treatment Facility (exclusive of Bid Items Nos. 1 through 3)				
	Total Bid Price				

Award of Contract will be based on the lowest Total Bid Price (Bid Item Nos. 1, 2, 3d, and 4).  
 Contract Amount will be based on the sum of Bid Item Nos. 1, 2, 3a, and 4.

**Key Project Requirements**

- 01060 - Regulatory and Utility Requirements  
Fiber Optic Cable (MCI)
- 01313 - Construction and Schedule Constraints
- 01561 - Biological & Cultural Resources Controls
- 01566 - Public Information
- 01571 - Traffic Control

**Key Project Requirements (Cont.)**

- 02120 - Shoring
- 02140 - Dewatering
- 02200 - Earthwork

**Key Project Requirements (Cont.)**

- Pavement restoration
- Disposal of dewatering water
- Potential Staging areas
  - Pismo and 18th Street
  - Los Olivos and Fairchild

**Addendum No. 1**

- Revised Bid Opening to April 28, 2004
- Clarified Partial Utilization of Area A and Area B
- Issued 5 Agreements
- Certified payroll and MBE/WBE reporting
- Added Value Engineering
- Area A and Area D to furnish equipment to Area B and Area C
- WWTF I&C Subcontractor to furnish PLCs

**Forthcoming Addendum No. 2**

- Bid Forms
- Area A Plan & Profile Drawings
- LOVR improvements
- RTA bus stops
- Disposal Main via 9th Street
- Production well at East Paso
- SCADA programming

**LOS OSOS COMMUNITY SERVICES DISTRICT**

**CONSTRUCTION OF  
LOS OSOS WASTEWATER PROJECT  
AREA A, AREA B, AREA C, & AREA D AND WWTF**

**STATE REVOLVING FUND LOAN PROGRAM  
PROJECT NO. C – 06 – 4014 - 110**

**SECTION 00030  
BID FORMS**



Bids will be received at the office of the Los Osos Community Services District  
located at 2122 9<sup>th</sup> Street, Los Osos, CA 93402 on April 28, 2004.

**SECTION 00300CA - BID FORMS**

**BID**

BID TO: Los Osos Community Services District

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with the OWNER in the form included in the Contract Documents to perform the WORK as specified or indicated in said Contract Documents entitled Los Osos Wastewater Project.
2. Bidder accepts all of the terms and conditions of the Contract Documents, including without limitation those in the Notice Inviting Bids and Instructions to Bidders, dealing with the disposition of the Bid security.
3. This Bid will remain open for the period stated in the "Notice Inviting Bids" unless otherwise required by law. Bidder will enter into an Agreement within the time and in the manner required in the "Notice Inviting Bids" and the "Instructions to Bidders", and will furnish the insurance certificates, Payment Bond, and Performance Bond required by the Contract Documents.
4. Bidder has examined copies of all the Contract Documents including the following addenda (receipt of all of which is hereby acknowledged):

Number	_____	Date	_____
	_____		_____
	_____		_____
	_____		_____

Failure to acknowledge addenda shall render the bid non-responsive and shall be cause for its rejection.

5. Bidder has familiarized itself with the nature and extent of the Contract Documents, WORK, site, locality where the WORK is to be performed, the legal requirements (federal, state and local laws, ordinances, rules, and regulations), and the conditions affecting cost, progress or performance of the WORK and has made such independent investigations as Bidder deems necessary.

To all the foregoing, and including all Bid Forms contained in this Bid, said Bidder further agrees to complete the WORK required under the Contract Documents within the Contract Time stipulated in said Contract Documents, and to accept in full payment therefor the Contract Price based on the Total Bid Price(s) named in the aforementioned Bid Forms.

Dated: \_\_\_\_\_

Bidder: \_\_\_\_\_

By: \_\_\_\_\_

(Signature)

Title: \_\_\_\_\_

**BID CERTIFICATE  
(if Corporation)**

STATE OF CALIFORNIA    )  
                                  )   SS:  
COUNTY OF                )

I HEREBY CERTIFY that a meeting of the Board of Directors of the \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

a corporation existing under the laws of the State of \_\_\_\_\_, held on  
\_\_\_\_\_, 20\_\_\_\_\_, the following resolution was duly passed and adopted:

"RESOLVED, that \_\_\_\_\_, as  
\_\_\_\_\_ President  
of this Corporation, be and is hereby authorized to execute the Bid dated \_\_\_\_\_,  
20\_\_\_\_, to the Los Osos Community Services District by this Corporation and that his/her  
execution thereof, attested by the Secretary of this Corporation, and with the Corporate  
Seal affixed, shall be the official act and deed of this Corporation."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the  
corporation this \_\_\_\_\_, day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Secretary

(SEAL)

**BID CERTIFICATE  
(if Partnership)**

STATE OF CALIFORNIA    )  
                                  )   SS:  
COUNTY OF                )

I HEREBY CERTIFY that a meeting of the Partners of the \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

a partnership existing under the laws of the State of \_\_\_\_\_, held on  
, 20\_\_\_\_\_, the following resolution was duly passed and adopted:

"RESOLVED, that \_\_\_\_\_, as  
General Partner of the Partnership, be and is hereby authorized to execute the Bid dated  
,  
20\_\_\_\_\_, to the Los Osos Community Services District by this Partnership and that  
his/her execution thereof, attested by the General Partner shall be the official act and  
deed of this Partnership."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this \_\_\_\_\_, day of \_\_\_\_\_,  
20\_\_\_\_\_.

\_\_\_\_\_  
General Partner

(SEAL)



**BID SCHEDULE 1****LOS OSOS WASTEWATER PROJECT  
AREA B & AREA C****Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
1	<u>Mobilization / Demobilization</u>	LS	1		
2	<u>Sheeting, Shoring, Sloping and Bracing</u>	LS	1		
3	<u>48" Standard Gravity Sewer Manhole</u>	EA	350		
4	<u>48" Drop Manhole</u>	EA	20		
5	<u>48" Beaver Slide Manhole</u>	EA	1		
6	<u>48" Force Main to Gravity Sewer Transition Manhole</u>	EA	1		
7	(Not Used)				
8	<u>8" Gravity Sewer</u>	LF	74,000		
9	<u>10" Gravity Sewer</u>	LF	2,000		
10	<u>12" Gravity Sewer</u>	LF	1,600		
11	<u>12" Gravity Sewer by Microtunneling</u>	LF	510		
12	<u>15" Gravity Sewer</u>	LF	3,800		
13	<u>18" Gravity Sewer</u>	LF	220		
14	<u>4" Sewer Lateral</u>	EA	1,700		
15	<u>4" Sewer Laterals from Existing Sewer Main</u>	EA	5		
16	<u>6" Sewer Lateral</u>	EA	24		

**BID SCHEDULE 1**

**LOS OSOS WASTEWATER PROJECT  
AREA B & AREA C**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
17	(Not Used)				
18	<u>48" Combination Air/Vacuum Release Manhole</u>	EA	2		
19	(Not Used)				
20	<u>4" Force Main</u>	LF	2,100		
21	(Not Used)				
22	(Not Used)				
23	<u>10" Force Main</u>	LF	7,600		
24	<u>12" Force Main</u>	LF	4,600		
25	<u>¾", 1" and 2" Polybutylene Water Service Replacement</u>	EA	320		
26	(Not Used)				
27	(Not Used)				
28	<u>2" Fiber Optic Cable Conduit</u>	LF	5,300		
29	<u>Fiber Optic Manhole</u>	EA	9		
30	<u>Duplex Pump Station</u>	EA	1		
31	<u>Triplex Pump Station</u>	EA	1		
32	(Not Used)				

**BID SCHEDULE 1**

**LOS OSOS WASTEWATER PROJECT  
AREA B & AREA C**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
33	<u>Standby Power Facility</u>	EA	2		
34	<u>6" Harvest Main</u>	LF	6,100		
35	(Not Used)				
36	<u>Harvest Well/Well House</u>	EA	2		
37	<u>Distribution Box</u>	EA	3		
38	<u>Flow Control Vaults</u>	EA	8		
39	(Not Used)				
40	<u>Reclaimed Water Turnouts</u>	EA	11		
41	<u>6" Disposal Main</u>	LF	1,800		
42	<u>8" Disposal Main</u>	LF	5,400		
43	<u>12" Disposal Main</u>	LF	8,300		
43A	<u>12" Disposal Main – 9<sup>th</sup> Street</u>	LF	2,000		
44	<u>4" Disposal Header</u>	LF	1,200		
45	<u>6" Disposal Header</u>	LF	720		
46	<u>8" Disposal Header</u>	LF	17,000		
47	<u>Broderson 4" Percolation Piping</u>	LF	20,000		

**BID SCHEDULE 1**

**LOS OSOS WASTEWATER PROJECT  
AREA B & AREA C**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
48	<u>Monitoring Wells</u>	EA	10		
49	<u>24" Bored and Jacked Casing</u>	LF	100		
50	<u>Fencing</u>	LF	3,200		
51	<u>Tree Removal at Broderson Disposal Site</u>	EA	40		
52	<u>Install Native Vegetation</u>	SF	350,000		
53	<u>Construct Los Osos Valley Road Improvements</u>	LS	1		
54	<u>Cultural Resources Caused Demobe/Remobe at Pipeline Heading</u>	EA	5		
55	<u>Overexcavation and Replacement with Foundation Rock Wrapped in Filter Fabric, as Ordered by the ENGINEER</u>	CY	200		
56	<u>Additional Pavement Restoration Ordered by the ENGINEER</u>	SF	800		
57	<u>Utility Crossing Not Shown and/or Identified on the Contract Drawings and Not Marked in the Field (1-inch to into to 12-inch diameter)</u>	EA	20		

TOTAL BID PRICE for Bid Items Nos. 1 through 57, inclusive: \$ \_\_\_\_\_

TOTAL BID PRICE (in words): \_\_\_\_\_  
\_\_\_\_\_

**BID SCHEDULE 2**

**LOS OSOS WASTEWATER PROJECT  
AREA A & AREA D**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
1	<u>Mobilization / Demobilization</u>	LS	1		
2	<u>Sheeting, Shoring, Sloping and Bracing</u>	LS	1		
3	<u>48" Standard Gravity Sewer Manhole</u>	EA	340		
4	<u>48" Drop Manhole</u>	EA	50		
5	<u>48" Beaver Slide Manhole</u>	EA	28		
6	<u>48" Force Main to Gravity Sewer Transition Manhole</u>	EA	4		
7	<u>48" Pocket PS FM Discharge MH</u>	EA	12		
8	<u>8" Gravity Sewer</u>	LF	93,000		
9	<u>10" Gravity Sewer</u>	LF	11,000		
10	<u>12" Gravity Sewer</u>	LF	3,200		
11	(Not Used)				
12	<u>15" Gravity Sewer</u>	LF	2,400		
13	<u>18" Gravity Sewer</u>	LF	7,000		
14	<u>4" Sewer Lateral</u>	EA	3,000		
15	(Not Used)				
16	<u>6" Sewer Lateral</u>	EA	24		

**BID SCHEDULE 2**

**LOS OSOS WASTEWATER PROJECT  
AREA A & AREA D**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
17	<u>8" Sewer Lateral</u>	EA	21		
18	<u>48" Combination Air/Vacuum Release Manhole</u>	EA	31		
19	<u>2" Force Main</u>	LF	8,900		
20	(Not Used)				
21	<u>6" Force Main</u>	LF	1,800		
22	<u>8" Force Main</u>	LF	2,600		
23	(Not Used)				
24	<u>12" Force Main</u>	LF	1,600		
25	<u>¾", 1' and 2" Polybutylene Water Service Replacement</u>	EA	480		
26	<u>Electrical Duct Bank</u>	LF	3,100		
27	<u>Electrical or Instrumentation Pullbox</u>	EA	7		
28	<u>2" Fiber Optic Cable Conduit</u>	LF	1,600		
29	<u>Fiber Optic Manhole</u>	EA	3		
30	<u>Duplex Pump Station</u>	EA	4		
31	<u>Triplex Pump Station</u>	EA	1		
32	<u>Pocket Pump Station</u>	EA	12		

**BID SCHEDULE 2**

**LOS OSOS WASTEWATER PROJECT  
AREA A & AREA D**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
33	<u>Standby Power Facility</u>	EA	4		
33A	<u>Furnish Area B &amp; Area C Equipment</u>	LS	1		
34	<u>6" Harvest Main</u>	LF	8,500		
35	<u>Harvest Main Valve Vaults</u>	EA	3		
36	<u>Harvest Well/Well House</u>	EA	1		
36A	<u>East Paso Production Well</u>	LS	1		
37	(Not Used)				
38	<u>Flow Control Vaults</u>	EA	6		
39	<u>Vertical Disposal Wells</u>	EA	48		
40	<u>Reclaimed Water Turnouts</u>	EA	13		
41	<u>6" Disposal Main</u>	LF	5,000		
42	<u>8" Disposal Main</u>	LF	4,800		
43	<u>12" Disposal Main</u>	LF	20,000		
43A	<u>12" Disposal Main – 9<sup>th</sup> Street</u>	LF	3,900		
44	<u>4" Disposal Header</u>	LF	200		
45	(Not Used)				

**BID SCHEDULE 2**

**LOS OSOS WASTEWATER PROJECT  
AREA A & AREA D**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
46	(Not Used)				
47	(Not Used)				
48	<u>Monitoring Wells</u>	EA	10		
49	(Not Used)				
50	(Not Used)				
51	(Not Used)				
52	(Not Used)				
53	(Not Used)				
54	<u>Cultural Resources Caused Demobe/Remobe at Pipeline Heading</u>	EA	15		
55	<u>Overexcavation and Replacement with Foundation Rock Wrapped in Filter Fabric, as Ordered by the ENGINEER.</u>	CY	300		
56	<u>Additional Pavement Restoration Ordered by the ENGINEER</u>	SF	1,000		
57	<u>Utility Crossing Not Shown and/or Identified on the Contract Drawings and Not Marked in the Field (1-inch to inch to 12-inch diameter)</u>	EA	20		

TOTAL BID PRICE for Bid Items Nos. 1 through 57, inclusive: \$ \_\_\_\_\_

TOTAL BID PRICE (in words): \_\_\_\_\_  
\_\_\_\_\_

**BID SCHEDULE 3**

**LOS OSOS WASTEWATER PROJECT  
WASTEWATER TREATMENT FACILITY**

**Schedule of Lump Sum bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Item Amount (\$)	Item Total (\$)
58	<u>Mobilization / Demobilization</u>	LS	1		
59	<u>Sheeting, Shoring, Sloping, and Bracing</u>	LS	1		
60a	<u>MBR Base Bid Price</u>	LS	1		
60b	<u>MBR Membrane Purchase Cost</u>	LS	1		
60c	<u>MBR Present Worth Adjustment Price</u>  Zenon: \$1,190,000 + { [ \$ (3b) MBR Membrane Purchase Cost ] * 2.42 } =  Or  US Filter: \$1,730,000 + { [ \$ (3b) MBR Membrane Purchase Cost ] * 2.42 } =	LS	1	Or	
60d	<u>MBR Adjusted Bid Price ( Item 3a and Item 3c )</u>				
61	<u>Wastewater Treatment Facility (exclusive of Bid Items Nos. 1 through 3)</u>				
TOTAL BID PRICE for Bid Items Nos. 58, 59, 60d, and 61:				\$	
TOTAL BID PRICE (in words):					

**Notes:**

- Award of Contract will be based on the lowest Total Bid Price (Bid Item Nos. 58, 59, 60d, and 61) from the responsible, responsive Bidder.
- Contract Amount will be based on the sum of Bid Item Nos. 58, 59, 60a, and 61.

**BID SCHEDULE 4****LOS OSOS WASTEWATER PROJECT  
AREA A, AREA B, AREA C, & AREA D****Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
1	<u>Mobilization / Demobilization</u>	LS	1		
2	<u>Sheeting, Shoring, Sloping and Bracing</u>	LS	1		
3	<u>48" Standard Gravity Sewer Manhole</u>	EA	690		
4	<u>48" Drop Manhole</u>	EA	70		
5	<u>48" Beaver Slide Manhole</u>	EA	29		
6	<u>48" Force Main to Gravity Sewer Transition Manhole</u>	EA	5		
7	<u>48" Pocket PS FM Discharge MH</u>	EA	12		
8	<u>8" Gravity Sewer</u>	LF	167,000		
9	<u>10" Gravity Sewer</u>	LF	13,000		
10	<u>12" Gravity Sewer</u>	LF	4,800		
11	<u>12" Gravity Sewer by Microtunneling</u>	LF	510		
12	<u>15" Gravity Sewer</u>	LF	6,200		
13	<u>18" Gravity Sewer</u>	LF	7,220		
14	<u>4" Sewer Lateral</u>	EA	4,700		
15	<u>4" Sewer Laterals from Existing Sewer Main</u>	EA	5		
16	<u>6" Sewer Lateral</u>	EA	48		

**BID SCHEDULE 4**

**LOS OSOS WASTEWATER PROJECT  
AREA A, AREA B, AREA C, & AREA D**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
17	<u>8" Sewer Lateral</u>	EA	21		
18	<u>48" Combination Air/Vacuum Release Manhole</u>	EA	33		
19	<u>2" Force Main</u>	LF	8,900		
20	<u>4" Force Main</u>	LF	2,100		
21	<u>6" Force Main</u>	LF	1,800		
22	<u>8" Force Main</u>	LF	2,600		
23	<u>10" Force Main</u>	LF	7,600		
24	<u>12" Force Main</u>	LF	6,200		
25	<u>¾", 1' and 2" Polybutylene Water Service Replacement</u>	EA	800		
26	<u>Electrical Duct Bank</u>	LF	3,100		
27	<u>Electrical or Instrumentation Pullbox</u>	EA	7		
28	<u>2" Fiber Optic Cable Conduit</u>	LF	6,900		
29	<u>Fiber Optic Manhole</u>	EA	12		
30	<u>Duplex Pump Station</u>	EA	5		
31	<u>Triplex Pump Station</u>	EA	2		
32	<u>Pocket Pump Station</u>	EA	12		

**BID SCHEDULE 4**

**LOS OSOS WASTEWATER PROJECT  
AREA A, AREA B, AREA C, & AREA D**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
33	<u>Standby Power Facility</u>	EA	6		
34	<u>6" Harvest Main</u>	LF	14,600		
35	<u>Harvest Main Valve Vaults</u>	EA	3		
36	<u>Harvest Well/Well House</u>	EA	3		
36A	<u>East Paso Production Well</u>	LS	1		
37	<u>Distribution Box</u>	EA	3		
38	<u>Flow Control Vaults</u>	EA	14		
39	<u>Vertical Disposal Wells</u>	EA	48		
40	<u>Reclaimed Water Turnouts</u>	EA	24		
41	<u>6" Disposal Main</u>	LF	6,800		
42	<u>8" Disposal Main</u>	LF	10,200		
43	<u>12" Disposal Main</u>	LF	28,300		
43A	<u>12" Disposal Main – 9thStreet</u>	LF	5,900		
44	<u>4" Disposal Header</u>	LF	1,400		
45	<u>6" Disposal Header</u>	LF	720		
46	<u>8" Disposal Header</u>	LF	17,000		

**BID SCHEDULE 4**

**LOS OSOS WASTEWATER PROJECT  
AREA A, AREA B, AREA C, & AREA D**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
47	<u>Broderson 4" Percolation Piping</u>	LF	20,000		
48	<u>Monitoring Wells</u>	EA	20		
49	<u>24" Bored and Jacked Casing</u>	LF	100		
50	<u>Fencing</u>	LF	3,200		
51	<u>Tree Removal at Broderson</u>	EA	40		
52	<u>Install Native Vegetation</u>	SF	350,000		
53	<u>LOVR Improvements</u>	LS	1		
54	<u>Cultural Resources Caused Demobe/Remobe at Pipeline Heading</u>	EA	20		
55	<u>Overexcavation and Replacement with Foundation Rock Wrapped in Filter Fabric, as Ordered by the ENGINEER.</u>	CY	500		
56	<u>Additional Pavement Restoration Ordered by the ENGINEER</u>	SF	1,800		
57	<u>Utility Crossing Not Shown and/or Identified on the Contract Drawings and Not Marked in the Field (1-inch to inch to 12-inch diameter)</u>	EA	40		

TOTAL BID PRICE for Bid Items Nos. 1 through 57, inclusive: \$ \_\_\_\_\_

TOTAL BID PRICE (in words): \_\_\_\_\_  
 \_\_\_\_\_

**BID SCHEDULE 5**

**LOS OSOS WASTEWATER PROJECT  
AREA A, AREA B, AREA C, & AREA D and WWTF**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
1	<u>Area Mobilization / Demobilization</u>	LS	1		
2	<u>Area Sheeting, Shoring, Sloping and Bracing</u>	LS	1		
3	<u>48" Standard Gravity Sewer Manhole</u>	EA	690		
4	<u>48" Drop Manhole</u>	EA	70		
5	<u>48" Beaver Slide Manhole</u>	EA	29		
6	<u>48" Force Main to Gravity Sewer Transition Manhole</u>	EA	5		
7	<u>48" Pocket PS FM Discharge MH</u>	EA	12		
8	<u>8" Gravity Sewer</u>	LF	167,000		
9	<u>10" Gravity Sewer</u>	LF	13,000		
10	<u>12" Gravity Sewer</u>	LF	4,800		
11	<u>12" Gravity Sewer by Microtunneling</u>	LF	510		
12	<u>15" Gravity Sewer</u>	LF	6,200		
13	<u>18" Gravity Sewer</u>	LF	7,220		
14	<u>4" Sewer Lateral</u>	EA	4,700		
15	<u>4" Sewer Laterals from Existing Sewer Main</u>	EA	5		
16	<u>6" Sewer Lateral</u>	EA	48		

**BID SCHEDULE 5**

**LOS OSOS WASTEWATER PROJECT  
AREA A, AREA B, AREA C, & AREA D and WWTF**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
17	<u>8" Sewer Lateral</u>	EA	21		
18	<u>48" Combination Air/Vacuum Release Manhole</u>	EA	33		
19	<u>2" Force Main</u>	LF	8,900		
20	<u>4" Force Main</u>	LF	2,100		
21	<u>6" Force Main</u>	LF	1,800		
22	<u>8" Force Main</u>	LF	2,600		
23	<u>10" Force Main</u>	LF	7,600		
24	<u>12" Force Main</u>	LF	6,200		
25	<u>¾", 1" and 2" Polybutylene Water Service Replacement</u>	EA	800		
26	<u>Electrical Duct Bank</u>	LF	3,100		
27	<u>Electrical or Instrumentation Pullbox</u>	EA	7		
28	<u>2" Fiber Optic Cable Conduit</u>	LF	6,900		
29	<u>Fiber Optic Manhole</u>	EA	12		
30	<u>Duplex Pump Station</u>	EA	5		
31	<u>Triplex Pump Station</u>	EA	2		
32	<u>Pocket Pump Station</u>	EA	12		

**BID SCHEDULE 5**

**LOS OSOS WASTEWATER PROJECT  
AREA A, AREA B, AREA C, & AREA D and WWTF**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
33	<u>Standby Power Facility</u>	EA	6		
34	<u>6" Harvest Main</u>	LF	14,600		
35	<u>Harvest Main Valve Vaults</u>	EA	3		
36	<u>Harvest Well/Well House</u>	EA	3		
36A	<u>East Paso Production Well</u>	LS	1		
37	<u>Distribution Box</u>	EA	3		
38	<u>Flow Control Vaults</u>	EA	14		
39	<u>Vertical Disposal Wells</u>	EA	48		
40	<u>Reclaimed Water Turnouts</u>	EA	24		
41	<u>6" Disposal Main</u>	LF	6,800		
42	<u>8" Disposal Main</u>	LF	10,200		
43	<u>12" Disposal Main</u>	LF	28,300		
43A	<u>12" Disposal Main – 9<sup>th</sup> Street</u>	LF	5,900		
44	<u>4" Disposal Header</u>	LF	1,400		
45	<u>6" Disposal Header</u>	LF	720		
46	<u>8" Disposal Header</u>	LF	17,000		

**BID SCHEDULE 5**

**LOS OSOS WASTEWATER PROJECT  
AREA A, AREA B, AREA C, & AREA D and WWTF**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
47	<u>Broderson 4" Percolation Piping</u>	LF	20,000		
48	<u>Monitoring Wells</u>	EA	20		
49	<u>24" Bored and Jacked Casing</u>	LF	100		
50	<u>Fencing</u>	LF	3,200		
51	<u>Tree Removal at Broderson</u>	EA	40		
52	<u>Install Native Vegetation</u>	SF	350,000		
53	<u>LOVR Improvements</u>	LS	1		
54	<u>Cultural Resources Caused Demobe/Remobe at Pipeline Heading</u>	EA	20		
55	<u>Overexcavation and Replacement with Foundation Rock Wrapped in Filter Fabric, as Ordered by the ENGINEER.</u>	CY	500		
56	<u>Additional Pavement Restoration Ordered by the ENGINEER</u>	SF	1,800		
57	<u>Utility Crossing Not Shown and/or Identified on the Contract Drawings and Not Marked in the Field (1-inch to inch to 12-inch diameter)</u>	EA	40		
58	<u>WWTF Mobilization / Demobilization</u>	LS	1		
59	<u>WWTF Sheeting, Shoring, Sloping, and Bracing</u>	LS	1		
60a	<u>MBR Base Bid Price</u>	LS	1		
60b	<u>MBR Membrane Purchase Cost</u>	LS	1		

**BID SCHEDULE 5**

**LOS OSOS WASTEWATER PROJECT  
AREA A, AREA B, AREA C, & AREA D and WWTF**

**Schedule of Lump Sum and Unit Price bid items, all complete as specified and shown:**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price (\$)	Item Total (\$)
60c	<p><u>MBR Present Worth Adjustment Price</u></p> <p>Zenon: \$1,190,000 + { [ \$ (60b) MBR Membrane Purchase Cost ] * 2.42 } =</p> <p align="center">Or</p> <p>US Filter: \$1,730,000 + { [ \$ (60b) MBR Membrane Purchase Cost ] * 2.42 } =</p>	LS	1	Or	
60d	<u>MBR Adjusted Bid Price ( Item 60a and item 60c )</u>				
61	<u>Wastewater Treatment Facility (exclusive of Bid Items Nos. 57 through 60)</u>				

TOTAL BID PRICE for Bid Items Nos. 1 through 59, 60d, and 61: \$ \_\_\_\_\_

TOTAL BID PRICE (in words): \_\_\_\_\_

**Notes:**

- Award of Contract will be based on the lowest Total Bid Price (Bid Item Nos. 1 through 59, 60d, and 61) from the responsible, responsive Bidder.
- Contract Amount will be based on the sum of Bid Item Nos. 1 through 59, 60a, and 61.

**LIST OF SUBCONTRACTORS**

Section 4104 of the Public Contract Code requires the Bidder to list below the name and the location of the place of business of each Subcontractor who will perform work or labor or render service to the prime contractor in or about the construction of the work or improvement, or a Subcontractor licensed by the State of California who, under subcontract to the prime contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of 1 percent of the prime contractor's total bid. The Bidder shall also list below the portion of the WORK which will be performed by each Subcontractor under its contract. The prime contractor shall list only one Subcontractor for each portion as is defined by the prime contractor in its bid. The Bidder's attention is directed to the provisions of Paragraph entitled "Subcontract Limitations," of the Supplementary General Conditions which stipulates the percent of the WORK to be performed with the Bidder's own forces. Failure to comply with this requirement will render the Bid non-responsive and may cause its rejection.

**For selected Subcontractors, only those Subcontractors previously prequalified under the OWNER's prequalification process shall be allowed to bid the Project. See Section 00030CA for listing of prequalified Subcontractors.**

<u>Work to be Performed</u>	<u>Percent of Total Bid</u>	<u>Subcontractor's Name &amp; Address</u>
1. _____	_____	_____ _____ _____
2. _____	_____	_____ _____ _____
3. _____	_____	_____ _____ _____
4. _____	_____	_____ _____ _____
5. _____	_____	_____ _____ _____

Note: Attach additional sheets if required.

**LIST OF NAMED EQUIPMENT/MATERIAL MANUFACTURERS**

**AREA CONSTRUCTION**

The Bidder shall indicate below which manufacturer the Bidder intends to use for each item of equipment or material listed on this form by writing in one of the named manufacturers specified in the Technical Specifications for that equipment or material. Proposed substitutes may be listed on the List of Proposed Substitutions but requests will only be considered if sufficient information substantiating the request is submitted within 14 days following submission of the Bid. If no manufacturer is named in the Technical Specifications, the Bidder may list any manufacturer whose product meets all of the requirements and technical criteria specified. The listing of more than one manufacturer for each item of equipment/material to be furnished with the words "and/or" will not be permitted. Failure to comply with this requirement may render the Bid non-responsive and may cause its rejection.

<u>Specification Section</u>	<u>Equipment/Material</u>	<u>Named Manufacturer (List Only One)</u>
02490	Manholes	_____
02490	Manhole Frames and Covers	_____
02595	PVC Gravity Sewer Pipe	_____
02597	PVC Pressure Pipe	_____
11101	Well Pumps	_____
11148	Submersible Non-Clog Pumps	_____
11149	Submersible Grinder Pumps	_____
16480	Motor Control Centers	_____
16400	Switchgear	_____
16455	Variable Frequency Drives	_____
16620	Standby Generator Systems	_____

**LIST OF NAMED EQUIPMENT/MATERIAL MANUFACTURERS**

**WWTF CONSTRUCTION**

The Bidder shall indicate below which manufacturer the Bidder intends to use for each item of equipment or material listed on this form by writing in one of the named manufacturers specified in the Technical Specifications for that equipment or material. Proposed substitutes may be listed on the List of Proposed Substitutions but requests will only be considered if sufficient information substantiating the request is submitted within 14 days following submission of the Bid. If no manufacturer is named in the Technical Specifications, the Bidder may list any manufacturer whose product meets all of the requirements and technical criteria specified. The listing of more than one manufacturer for each item of equipment/material to be furnished with the words "and/or" will not be permitted. Failure to comply with this requirement may render the Bid non-responsive and may cause its rejection.

<u>Specification Section</u>	<u>Equipment/Material</u>	<u>Named Manufacturer (List Only One)</u>
11103	Vertical Turbine Pumps	_____
11111	Horizontal End Suction Pumps	_____
11148	Submersible Non-Clog Pumps	_____
11205	Submersible Impeller Mixers	_____
11289	Ultraviolet Disinfection System	_____
11326/7	Grit Cyclones/Grit Classifiers	_____
11328	Mechanical Vortex Grit Unit	_____
11345	Rotary Drum Screen	_____
11349	Washer/Compactor	_____
11453	Fine Bubble Diffusers	_____
11501	Positive Displacement Blowers	_____
11560	Centrifuges	_____
13100	Membrane Bioreactor	_____
13270	Biofilter Media	_____
16310	Secondary Unit Substation	_____
16425	480V Main Switchgear	_____
16455	Variable Frequency Drives	_____
16480	Motor Control Centers	_____
16620	Standby Engine-Generator	_____
17510	PLC-Based Control Hardware	_____



## PROPOSED SUBSTITUTIONS OR "OR-EQUAL" ITEM

- A. Whenever materials or equipment are indicated in the Contract Documents by using the name of a proprietary item or the name of a particular manufacturer, the naming of the item is intended to establish the type, function, and quality required. If the name is followed by the words "or equal" indicating that a substitution is permitted, materials or equipment of other manufacturers may be accepted if sufficient information is submitted by the BIDDER to allow the ENGINEER to determine that the material or equipment 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 CONTRACTOR.
  2. The ENGINEER will be the sole judge as to the type, function, and quality of any such substitution and the ENGINEER's decision shall be final.
  3. The ENGINEER may require the CONTRACTOR to furnish additional data about the proposed substitution.
  4. The OWNER may require the CONTRACTOR to furnish a special performance guarantee or other surety with respect to any substitution.
  5. Acceptance by the ENGINEER of a substitution item proposed by the CONTRACTOR shall not relieve the CONTRACTOR of the responsibility for full compliance with the Contract Documents and for adequacy of the substitution.
  6. The CONTRACTOR shall pay all costs of implementing accepted substitutions, including redesign and changes to WORK necessary to accommodate the substitution.
  7. If the CONTRACTOR's request for proposed substitution is not allowed, the CONTRACTOR shall furnish the materials or equipment by the named manufacturer listed on the List of Named Equipment/Material Manufacturers form, subject to acceptance of the Contractor's Submittal, without any change in Contract Price or Contract Time.
- B. The procedure for review by the ENGINEER will include the following:
1. If the CONTRACTOR wishes to provide a substitution of "an equal" item, the CONTRACTOR shall make written application to the ENGINEER on the "Substitution Request Form" within 14 days following submission of the Bid.
  2. Wherever a proposed substitution item has not been submitted within said 14-day period, or wherever the submission of a proposed substitution material or equipment has been judged to be unacceptable by the ENGINEER, the CONTRACTOR shall provide the material or equipment indicated in the Contract Documents.
  3. (Not Used)
  4. The ENGINEER will evaluate each proposed substitution within a reasonable period of time.
  5. As applicable, no shop drawing submittals shall be made for a substitution item nor shall any substitution item be ordered, installed, or utilized without the

ENGINEER'S prior written acceptance of the CONTRACTOR's "Substitution Request Form."

6. The ENGINEER will record the time required by the ENGINEER in evaluating substitutions proposed by the CONTRACTOR and in making changes by the CONTRACTOR in the Contract Documents occasioned thereby.
- C. The CONTRACTOR's application shall address the following factors which will be considered by the ENGINEER in evaluating the proposed substitution:
1. Whether evaluation and acceptance of the proposed substitution will prejudice the CONTRACTOR's achievement of Substantial Completion on time.
  2. Whether acceptance of the substitution for use in the WORK will require a change in any of the Contract Documents to adapt the design to the proposed substitution.
  3. Whether incorporation or use of the substitution in connection with the WORK is subject to payment of any license fee or royalty.
  4. Whether all variations of the proposed substitution from the items originally specified are identified.
  5. Whether available maintenance, repair, and replacement service are indicated. The manufacturer shall have a local service agency (within 50 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. Whether an itemized estimate is included of all costs that will result directly or indirectly from acceptance of such substitution, including cost of redesign and claims of other contractors affected by the resulting change.
  7. Whether the proposed substitute item meets or exceeds the experience and/or equivalency requirements listed in the appropriate technical specifications.
- D. Without any increase in cost to the OWNER, the CONTRACTOR shall be responsible for and pay all costs in connection with proposed substitutions and of inspections and testing of equipment or materials submitted for review prior to the CONTRACTOR's purchase thereof for incorporation in the WORK, whether or not the ENGINEER accepts the proposed substitution or proposed equipment or material. The CONTRACTOR shall reimburse the OWNER for the charges of the ENGINEER for evaluating each proposed substitution.

**INFORMATION REQUIRED OF BIDDER**

The Bidder shall furnish the following information. Additional sheets shall be attached as required. Failure to complete Item Nos. 1 and 3, will cause the Bid to be non-responsive and may cause its rejection. In any event, no award will be made until all of the Bidder's General Information is delivered to the OWNER.

(1) CONTRACTOR's name and address:

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(2) CONTRACTOR's telephone number: \_\_\_\_\_

CONTRACTOR's fax number: \_\_\_\_\_

(3) CONTRACTOR's license: Primary classification \_\_\_\_\_

State License No. and Expiration Date \_\_\_\_\_

Specialty classifications held, if any: \_\_\_\_\_

Name of Licensee, if different from (1) above: \_\_\_\_\_

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(4) Name, address, and telephone number of surety company and agent who will provide the required bonds on this contract:

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**FORM 4 (Attachment B)**

**PRIME CONTRACTOR/RECIPIENT**

**SELECTED MINORITY- AND WOMEN-OWNED BUSINESS ENTERPRISES (MBE/WBEs)**

CONTRACT RECIPIENTS NAME	CONTRACT NO. OR SPECIFICATION NO.
PROJECT DESCRIPTION	PROJECT LOCATION
<b>PRIME CONTRACTOR INFORMATION</b>	
NAME AND ADDRESS (Include ZIP Code, Federal Employer Tax ID #)	<input type="checkbox"/> MBE <span style="margin-left: 100px;"><input type="checkbox"/> WBE</span>
PHONE	AMOUNT OF CONTRACT\$
<b>MBE/WBE INFORMATION</b>	
<input type="checkbox"/> NONE*	
<input type="checkbox"/> MBE <span style="margin-left: 100px;"><input type="checkbox"/> WBE</span>	NAME AND ADDRESS (Include ZIP Code,)
<input type="checkbox"/> SUBCONTRACTOR <input type="checkbox"/> JOINT VENTURE <span style="margin-left: 20px;"><input type="checkbox"/> SUPPLIER/SERVICE <input type="checkbox"/> BROKER</span>	
AMOUNT OF CONTRACT \$	PHONE
WORK TO BE PERFORMED	
<input type="checkbox"/> MBE <span style="margin-left: 100px;"><input type="checkbox"/> WBE</span>	NAME AND ADDRESS (Include ZIP Code)
<input type="checkbox"/> SUBCONTRACTOR <input type="checkbox"/> JOINT VENTURE <span style="margin-left: 20px;"><input type="checkbox"/> SUPPLIER/SERVICE <input type="checkbox"/> BROKER</span>	
AMOUNT OF CONTRACT \$	PHONE
WORK TO BE PERFORMED	
<input type="checkbox"/> MBE <span style="margin-left: 100px;"><input type="checkbox"/> WBE</span>	NAME AND ADDRESS (Include ZIP Code,)
<input type="checkbox"/> SUBCONTRACTOR <input type="checkbox"/> JOINT VENTURE <span style="margin-left: 20px;"><input type="checkbox"/> SUPPLIER/SERVICE <input type="checkbox"/> BROKER</span>	
AMOUNT OF CONTRACT \$	PHONE
WORK TO BE PERFORMED	
<input type="checkbox"/> MBE <span style="margin-left: 100px;"><input type="checkbox"/> WBE</span>	NAME AND ADDRESS (Include ZIP Code)
<input type="checkbox"/> SUBCONTRACTOR <input type="checkbox"/> JOINT VENTURE <span style="margin-left: 20px;"><input type="checkbox"/> SUPPLIER/SERVICE <input type="checkbox"/> BROKER</span>	
AMOUNT OF CONTRACT \$	PHONE
WORK TO BE PERFORMED	
<input type="checkbox"/> MBE <span style="margin-left: 100px;"><input type="checkbox"/> WBE</span>	NAME AND ADDRESS (Include ZIP Code)
<input type="checkbox"/> SUBCONTRACTOR <input type="checkbox"/> JOINT VENTURE <span style="margin-left: 20px;"><input type="checkbox"/> SUPPLIER/SERVICE <input type="checkbox"/> BROKER</span>	
AMOUNT OF CONTRACT \$	PHONE
WORK TO BE PERFORMED	
TOTAL MBE AMOUNT:      \$	TOTAL WBE AMOUNT:      \$
SIGNATURE OF PERSON COMPLETING FORM: _____	
TITLE: _____	PHONE: _____ DATE: _____

\*Negative reports are required.

**ORIGINAL SIGNATURE AND DATE REQUIRED**



**BID BOND**

KNOW ALL MEN BY THESE PRESENTS,

That \_\_\_\_\_ as Principal, and \_\_\_\_\_ as Surety, are held and firmly bound unto Los Osos Community Services District, hereinafter called "**OWNER**," in the sum of \_\_\_\_\_ dollars,  
Not Less than 10 Percent of Total Bid Amount

for the payment of which sum, well and truly to be made, we jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns firmly by these presents.

WHEREAS, said Principal has submitted a Bid to said **OWNER** to perform the WORK required under the bidding schedule(s) of the **OWNER's** Contract Documents entitled Los Osos Wastewater Project Collection System Areas A, B, C and D and WWTF.

NOW THEREFORE, if said Principal is awarded a contract by said **OWNER** and, within the time and in the manner required in the "Notice Inviting Bids" and the "Instructions to Bidders" enters into a written Agreement on the form of agreement bound with said Contract Documents, furnishes the required certificates of insurance, and furnishes the required Performance Bond and Payment Bond, and performs in all other respects the agreement created by this bid, then this obligation shall be null and void, otherwise it shall remain in full force and effect. The Surety stipulates and agrees that the obligation of said Surety shall in no way be impaired or affected by an extension of the time within which the **OWNER** may accept such bid and Surety further waives notice of any such extension. In the event suit is brought upon this bond by said **OWNER** and **OWNER** prevails, said Principal and Surety shall pay all costs incurred by said **OWNER** in such suit, including reasonable attorney's fees and costs to be fixed by the court.

SIGNED AND SEALED, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_  
(Principal) (SEAL) \_\_\_\_\_ (SEAL)  
(Surety)

By: \_\_\_\_\_ By: \_\_\_\_\_  
(Signature) (Signature)

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

- END OF BID FORMS -

**SECTION 00700CA - GENERAL CONDITIONS**

**TABLE OF CONTENTS**

	<u>Page Number</u>
<b>ARTICLE 1 -- DEFINITIONS</b>	
Addenda.....	1
Agreement .....	1
Application for Payment.....	1
Asbestos .....	1
Bid .....	1
Bonds.....	1
Change Order .....	1
Clarification .....	1
Contract Documents .....	1
Contract Price .....	1
Contract Times.....	1
<b>CONTRACTOR</b> .....	1
Day .....	1
Defective Work.....	1
Drawings.....	2
Effective Date of the Agreement.....	2
<b>ENGINEER</b> .....	2
Field Order .....	2
General Requirements.....	2
Hazardous Waste Material.....	2
Laws and Regulations; Laws or Regulations .....	2
Lien or Mechanic's Lien .....	2
Milestone.....	2
Notice of Award.....	2
Notice of Completion.....	2
Notice to Proceed .....	2
<b>OWNER</b> .....	3
Partial Utilization .....	3
PCBs.....	3
Petroleum.....	3
Project.....	3
Radioactive Material .....	3
Resident Project Representative.....	3
Samples .....	3
Shop Drawings.....	3
Site .....	3
Specifications.....	3
Stop Notice .....	3
Subcontractor.....	3
Substantial Completion .....	3
Supplementary General Conditions .....	3
Supplier .....	4
Technical Specifications .....	4
Utilities.....	4
<b>WORK</b> .....	4

<b>ARTICLE 2 -- PRELIMINARY MATTERS</b>	
2.1	DELIVERY OF BONDS AND INSURANCE CERTIFICATES..... 4
2.2	COPIES OF DOCUMENTS ..... 4
2.3	COMMENCEMENT OF CONTRACT TIMES; NOTICE TO PROCEED ..... 4
2.4	STARTING THE WORK..... 4
2.5	PRECONSTRUCTION CONFERENCE..... 4
<b>ARTICLE 3 -- INTENT AND USE OF CONTRACT DOCUMENTS</b>	
3.1	INTENT ..... 5
3.2	REFERENCE STANDARDS..... 5
3.3	REVIEW OF CONTRACT DOCUMENTS..... 5
3.4	ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS..... 6
3.5	AMENDING OF CONTRACT DOCUMENTS ..... 6
3.6	REUSE OF DOCUMENTS..... 6
<b>ARTICLE 4 -- SITE OF THE WORK</b>	
4.1	AVAILABILITY OF LANDS..... 6
4.2	REPORTS OF PHYSICAL CONDITIONS ..... 7
4.3	PHYSICAL CONDITIONS - UNDERGROUND UTILITIES ..... 7
4.4	DIFFERING SITE CONDITIONS ..... 7
4.5	HAZARDOUS MATERIALS ..... 8
4.6	REFERENCE POINTS..... 9
<b>ARTICLE 5 -- BONDS AND INSURANCE</b>	
5.1	BONDS ..... 9
5.2	INSURANCE ..... 10
<b>ARTICLE 6 -- CONTRACTORS RESPONSIBILITIES</b>	
6.1	COMMUNICATIONS.....12
6.2	SUPERVISION AND SUPERINTENDENCE ..... 12
6.3	LABOR, MATERIALS, AND EQUIPMENT ..... 12
6.4	SCHEDULE..... 13
6.5	SUBSTITUTES OR "OR EQUAL" ITEMS ..... 13
6.6	CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS..... 13
6.7	PERMITS ..... 13
6.8	PATENT FEES AND ROYALTIES ..... 13
6.9	LAWS AND REGULATIONS..... 14
6.10	TAXES..... 14
6.11	USE OF PREMISES ..... 14
6.12	SAFETY AND PROTECTION ..... 14
6.13	EMERGENCIES..... 15
6.14	SUBMITTALS..... 16
6.15	CONTINUING THE WORK ..... 16
6.16	CONTRACTOR'S GENERAL WARRANTY AND GUARANTEE..... 16
6.17	INDEMNIFICATION ..... 17
6.18	CONTRACTOR'S DAILY REPORTS ..... 18
<b>ARTICLE 7 -- OTHER WORK</b>	
7.1	RELATED WORK AT SITE ..... 18
7.2	COORDINATION ..... 18

**ARTICLE 8 -- OWNER'S RESPONSIBILITIES**

8.1	COMMUNICATIONS.....	19
8.2	PAYMENTS.....	19
8.3	LANDS, EASEMENTS, AND SURVEYS .....	19
8.4	REPORTS AND DRAWINGS .....	19
8.5	CHANGE ORDERS.....	19
8.6	INSPECTIONS AND TESTS.....	19
8.7	SUSPENSION OF WORK.....	19
8.8	TERMINATION OF AGREEMENT.....	19
8.9	LIMITATION OF OWNER'S RESPONSIBILITIES .....	19
8.10	UNDISCLOSED HAZARDOUS ENVIRONMENTAL CONDITION .....	19

**ARTICLE 9 -- ENGINEER'S STATUS DURING CONSTRUCTION**

9.1	OWNER'S REPRESENTATIVE .....	20
9.2	OBSERVATIONS ON THE SITE .....	20
9.3	PROJECT REPRESENTATION .....	20
9.4	CLARIFICATIONS.....	20
9.5	AUTHORIZED VARIATIONS IN WORK .....	20
9.6	REJECTING DEFECTIVE WORK .....	20
9.7	CONTRACTOR SUBMITTALS, CHANGE ORDERS, AND PAYMENTS.....	20
9.8	DECISIONS ON DISPUTES .....	21
9.9	LIMITATION ON ENGINEER'S RESPONSIBILITIES .....	21

**ARTICLE 10 -- CHANGES IN THE WORK**

10.1	GENERAL .....	21
10.2	ALLOWABLE QUANTITY VARIATIONS .....	22

**ARTICLE 11 -- CHANGE OF CONTRACT PRICE**

11.1	GENERAL .....	22
11.2	COSTS RELATING TO WEATHER.....	23
11.3	COST OF WORK (BASED ON TIME AND MATERIALS) .....	23
11.4	CONTRACTOR'S OVERHEAD AND PROFIT.....	26
11.5	EXCLUDED COSTS .....	26
11.6	CONTRACTOR'S EXTRA WORK REPORT .....	27

**ARTICLE 12 -- CHANGE OF CONTRACT TIMES**

12.1	GENERAL .....	27
12.2	EXTENSIONS OF CONTRACT TIMES FOR DELAY DUE TO WEATHER.....	27

**ARTICLE 13 -- INSPECTIONS AND TESTS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK**

13.1	NOTICE OF DEFECTIVE WORK .....	28
13.2	ACCESS TO WORK .....	28
13.3	INSPECTIONS AND TESTS.....	28
13.4	OWNER MAY STOP THE WORK .....	29
13.5	CORRECTION OR REMOVAL OF DEFECTIVE WORK.....	29
13.6	ACCEPTANCE OF DEFECTIVE WORK .....	30
13.7	OWNER MAY CORRECT DEFECTIVE WORK .....	30
13.8	CORRECTION PERIOD .....	30

**ARTICLE 14 -- PAYMENTS TO CONTRACTOR AND COMPLETION**

14.1	SCHEDULE OF VALUES (LUMP SUM PRICE BREAKDOWN) .....	31
14.2	UNIT PRICE BID SCHEDULE .....	31
14.3	APPLICATION FOR PROGRESS PAYMENT .....	31
14.4	CONTRACTOR'S WARRANTY OF TITLE .....	32

14.5	REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT .....	32
14.6	SUBSTANTIAL COMPLETION .....	33
14.7	PARTIAL UTILIZATION .....	33
14.8	FINAL APPLICATION FOR PAYMENT .....	33
14.9	FINAL PAYMENT AND ACCEPTANCE.....	33
14.10	RELEASE OF RETAINAGE AND OTHER DEDUCTIONS.....	34
ARTICLE 15 -- SUSPENSION OF WORK AND TERMINATION		
15.1	SUSPENSION OF WORK BY OWNER.....	34
15.2	TERMINATION OF WORK BY OWNER FOR DEFAULT.....	35
15.3	TERMINATION OF AGREEMENT BY OWNER FOR CONVENIENCE.....	35
15.4	TERMINATION OF AGREEMENT BY CONTRACTOR .....	36
ARTICLE 16 -- MISCELLANEOUS		
16.1	GIVING NOTICE .....	36
16.2	TITLE TO MATERIALS FOUND ON THE WORK .....	36
16.3	RIGHT TO AUDIT .....	36
16.4	SURVIVAL OF OBLIGATIONS .....	37
16.5	CONTROLLING LAW .....	37
16.6	SEVERABILITY .....	37
16.7	WAIVER .....	37
ARTICLE 17 -- CALIFORNIA STATE REQUIREMENTS		
17.1	STATE WAGE DETERMINATIONS .....	37
17.2	WORKERS' COMPENSATION.....	37
17.3	APPRENTICES ON PUBLIC WORKS.....	38
17.4	WORKING HOURS.....	38
17.5	CONTRACTOR NOT RESPONSIBLE FOR DAMAGE RESULTING FROM CERTAIN ACTS OF GOD.....	38
17.6	NOTICE OF COMPLETION .....	38
17.7	UNPAID CLAIMS .....	38
17.8	CONCRETE FORMS, FALSEWORK, AND SHORING .....	39
17.9	RETAINAGE FROM MONTHLY PAYMENTS .....	39
17.10	PUBLIC WORKS CONTRACTS; ASSIGNMENT TO AWARDING BODY .....	39
17.11	PAYROLL RECORDS; RETENTION; INSPECTION; NONCOMPLIANCE PENALTIES; RULES AND REGULATIONS .....	40
17.12	CULTURAL RESOURCES.....	41
17.13	PROTECTION OF WORKERS IN TRENCH EXCAVATIONS.....	41
17.14	TRAVEL AND SUBSISTENCE PAY .....	41
17.15	REMOVAL, RELOCATION, OR PROTECTION OF EXISTING UTILITIES.....	41
17.16	CONTRACTOR LICENSE AGREEMENT.....	42
17.17	DIGGING TRENCHES OR EXCAVATIONS; NOTICE ON DISCOVERY OF HAZARDOUS WASTE <del>MATERIAL</del> OR OTHER UNUSUAL CONDITIONS; INVESTIGATIONS; CHANGE ORDERS; EFFECT ON CONTRACT .....	43
17.18	RETENTION PROCEEDS; WITHHOLDING; DISBURSEMENT .....	44
17.19	TIMELY PROGRESS PAYMENTS; INTEREST; PAYMENT REQUESTS.....	45
17.20	PREFERENCE FOR MATERIAL .....	45
17.21	RESOLUTION OF CONSTRUCTION CLAIMS .....	45

## ARTICLE 1 -- DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents, the following terms have the meanings indicated in this Article 1 which meanings are applicable to both the singular and plural thereof. If a word which is entirely in upper case in these definitions is found in lower case in the Contract Documents, then the lower case word will have its ordinary meaning.

**Addenda**- Written or graphic instruments issued prior to the opening of Bids which make additions, deletions, or revisions to the Contract Documents.

**Agreement** - The written contract between the OWNER and the CONTRACTOR covering the WORK to be performed; other documents are attached to the Agreement and made a part thereof as provided therein.

**Application for Payment** - The form accepted by the ENGINEER which is to be used by the CONTRACTOR to request progress payments or final payment and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

**Asbestos** - Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

**Beneficial Occupancy or Use** – See Partial Utilization.

**Bid**- The offer or proposal of the Bidder submitted on the prescribed form setting forth the price or prices for the WORK.

**Bonds** - Bid, Performance, and Payment Bonds and other instruments of security.

**Change Order** - A document recommended by the ENGINEER, which is signed by the CONTRACTOR and the OWNER, and authorizes an addition, deletion, or revision in the WORK, or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

**Clarification** - A document issued by the ENGINEER to the CONTRACTOR that interprets the requirement(s) and/or design intent of the Contract Documents, which may not represent an addition, deletion, or revision in the WORK or an adjustment in the Contract Price or the Contract Times.

**Contract Documents** - The Notice Inviting Bids, Instructions to Bidders, Bid Forms (including the Bid, Bid Schedule(s), Information Required of Bidder, Bid Bond, and all required certificates, affidavits and other documentation), Agreement, Performance Bond, Payment Bond, General Conditions, Supplementary General Conditions, Technical Specifications, Drawings, all Addenda, and Change Orders executed pursuant to the provisions of the Contract Documents. Shop Drawings are not Contract Documents.

**Contract Price** - The total monies payable by the OWNER to the CONTRACTOR under the terms and conditions of the Contract Documents.

**Contract Times** - The number or numbers of successive calendar days or dates stated in the Contract Documents for the completion of the WORK.

**CONTRACTOR** - The individual, partnership, corporation, joint-venture, or other legal entity with whom the OWNER has executed the Agreement.

**Day** - A calendar day of 24 hours measured from midnight to the next midnight.

**Defective Work** - Work that is unsatisfactory, faulty, or deficient; or that does not conform to the Contract Documents; or that does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents; or work that has been damaged prior to the ENGINEER's recommendation of final payment.

**Drawings** - The drawings, plans, maps, profiles, diagrams, and other graphic representations which indicate the character, location, nature, extent, and scope of the WORK and which have been prepared by the ENGINEER and are included and/or referred to in the Contract Documents. Shop Drawings are not Drawings as so defined.

**Effective Date of the Agreement** - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

**ENGINEER** - The individual, partnership, corporation, joint-venture, or other legal entity named as such by the OWNER as set forth in the Supplementary General Conditions.

**Field Order**- A written order issued by the ENGINEER which may or may not involve a change in the WORK.

**General Requirements** - Division 1 of the Technical Specifications.

~~**Hazardous Waste** - The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6906) as amended from time to time.~~

**Hazardous Material** – The term “Hazardous Material” as used herein shall mean any flammable materials, explosives, petroleum products, hazardous wastes, toxic substances, or related materials, including without limitation, asbestos, asbestos containing materials, polychlorinated biphenyl (PCB), PCB containing materials, and any substances defined as or included in the definition of “hazardous substances”, “hazardous wastes”, “hazardous materials”, or “toxic substances”, under any applicable federal, state, or local laws or regulations, now in effect or enacted prior to Substantial Completion of the Project.

**Laws and Regulations; Laws or Regulations** - Any and all applicable laws, rules, regulations, ordinances, codes, and/or orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

~~**Lien or Mechanic's Lien** – A form of security, an interest in real property, which is held to secure the payment of an obligation. When related to public works construction, Lien or Mechanic's Lien may be called Stop Notice.~~

**Lien** – As used in the Contract Documents, Lien shall mean Stop Notice.

**Milestone** - A principal event specified in the Contract Documents relating to an intermediate completion date of a separately identifiable part of the WORK or a period of time within which the separately identifiable part of the WORK should be performed prior to Substantial Completion of all the WORK.

**Notice of Award** - The written notice by the OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein within the time specified, the OWNER will enter into an Agreement.

~~**Notice of Completion** – A form signed by the ENGINEER and the CONTRACTOR~~

~~recommending to the OWNER that the WORK is Substantially Complete and fixing the date of Substantial Completion. After acceptance of the WORK by the OWNER's governing body, the form is signed by the OWNER and filed with the County Recorder. This filing starts the 30 day lien filing period on the WORK.~~

**Notice of Completion** – A form signed by the OWNER after acceptance of the WORK by the OWNER's governing body and recorded with the County Recorder. This filing starts the 30 day Stop Notice filing period of the WORK.

**Notice to Proceed** - The written notice issued by the OWNER to the CONTRACTOR authorizing the CONTRACTOR to proceed with the WORK and establishing the date of commencement of the Contract Times.

**OWNER** - The public body or authority, corporation, association, firm, or person with whom the CONTRACTOR has entered into the Agreement and for whom the WORK is to be provided.

**Partial Utilization** - Use by the OWNER of a substantially completed part of the WORK for the purpose for which it is intended prior to Substantial Completion of all the WORK.

**PCBs** - Polychlorinated biphenyls.

**Petroleum** - Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous ~~Wastes~~ Material and crude oils.

**Project** - The total construction project of which the WORK to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

**Radioactive Material**- Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

**Resident Project Representative** - The authorized representative of the ENGINEER who is assigned to the Site or any part thereof.

**Samples** - Physical examples of materials, equipment, or workmanship that are representative of some portion of the WORK and which establish the standards by which such portion of the WORK will be judged.

**Shop Drawings**- All drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for the CONTRACTOR and submitted by the CONTRACTOR to illustrate some portion of WORK.

**Site** - Lands or other areas designated in the Contract Documents as being furnished by the OWNER for the performance of the construction, storage, or access.

**Specifications** - (Same definition as for Technical Specifications hereinafter).

**Stop Notice** - A legal remedy for subcontractors and suppliers who contribute to public works, but who are not paid for their work, which secures payment from construction funds possessed by the OWNER. ~~In some states, for public property, the Stop Notice remedy is designed to substitute for a mechanic's lien.~~

**Subcontractor** - An individual, partnership, corporation, joint-venture, or other legal entity having a direct contract with the CONTRACTOR or with any other Subcontractor for the performance of a

part of the WORK ~~at the Site.~~

**Substantial Completion** - The time at which the WORK (or specified part) has progressed to the point where it is sufficiently complete, in accordance with the Contract Documents, ~~as evidenced by Notice of Completion (or Notice of Partial Utilization)~~ so that the WORK (or specified part) can be utilized for the purposes for which it is intended; ~~or, if no such notice is issued, when final payment is due in accordance with Paragraph 14.8.~~ The terms "substantially complete" and "substantially completed" as applied to any work refer to substantial completion thereof.

**Supplementary General Conditions** - The part of the Contract Documents which make additions, deletions, or revisions to these General Conditions.

**Supplier** - A manufacturer, fabricator, distributor, material man, or vendor having a direct contract with the CONTRACTOR or with any Subcontractor to furnish materials, equipment, or product to be incorporated in the WORK by the CONTRACTOR or any Subcontractor.

**Technical Specifications** - Divisions 1 through 17 of the Contract Documents consisting of the General Requirements and written technical descriptions of products and execution of the WORK.

**Utilities** - All pipelines, conduits, ducts, cables, wires, tracks, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities which have been installed underground or above the ground to furnish any of the following services or materials: water, sewage, sludge, drainage, fluids, electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, traffic control, or other control systems.

**WORK** - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. WORK is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

## **ARTICLE 2 -- PRELIMINARY MATTERS**

### **2.1 DELIVERY OF BONDS AND INSURANCE CERTIFICATES**

- A. When the CONTRACTOR delivers the signed Agreement to the OWNER, the CONTRACTOR shall also deliver to the OWNER such Bonds and insurance policies and certificates as the CONTRACTOR may be required to furnish in accordance with the Contract Documents.

### **2.2 COPIES OF DOCUMENTS**

- A. The OWNER will furnish to the CONTRACTOR the required number of copies of the Contract Documents specified in the Supplementary General Conditions.

### **2.3 COMMENCEMENT OF CONTRACT TIMES; NOTICE TO PROCEED**

- A. The Contract Times will start to run on the commencement date stated in the Notice to Proceed.

## 2.4 STARTING THE WORK

- A. The CONTRACTOR shall begin to perform the WORK on the commencement date stated in the Notice to Proceed, but no work shall be done at the Site prior to said commencement date.
- B. Before undertaking each part of the WORK, the CONTRACTOR shall review the Contract Documents in accordance with Paragraph 3.3.

## 2.5 PRECONSTRUCTION CONFERENCE

- A. The CONTRACTOR is required to attend a preconstruction conference. This conference will be attended by the OWNER, ENGINEER, and others as appropriate in order to discuss the WORK in accordance with the applicable procedures specified in Section 01010 - Summary of Work.
- B. The CONTRACTOR's initial schedule submittals for shop drawings, obtaining permits, and Plan of Operation and CPM Schedule will be reviewed and finalized. As a minimum, the CONTRACTOR's representatives should include its project manager and schedule expert. The CONTRACTOR should plan on this meeting taking no less than 8 hours. If the submittals are not finalized at the end of the meeting, additional meetings will be held so that the submittals can be finalized prior to the submittal of the first Application for Payment. No Application for Payment will be processed prior to receiving acceptable initial submittals from the CONTRACTOR.

## ARTICLE 3 -- INTENT AND USE OF CONTRACT DOCUMENTS

### 3.1 INTENT

- A. The Contract Documents comprise the entire agreement between the OWNER and the CONTRACTOR concerning the WORK. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the State in which the Project is located.
- B. It is the intent of the Contract Documents to describe the WORK, functionally complete, to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not called for specifically.
- C. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe work, materials, or equipment such words or phrases shall be interpreted in accordance with that meaning unless a definition has been provided in Article 1 of the General Conditions.

### 3.2 REFERENCE TO STANDARDS

- A. Reference to standard specifications, manuals, or codes of any technical society, organization, or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code shall be effective to change the duties and responsibilities of the OWNER, the CONTRACTOR, the ENGINEER, or any of their consultants, agents, or employees, from those set forth in the Contract Documents, nor shall it be effective to assign to OWNER, ENGINEER, or any of ENGINEER's consultants, agents, or employees any duty or authority to direct the performance of the WORK or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

### 3.3 REVIEW OF CONTRACT DOCUMENTS

- A. If, during the performance of the WORK, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the WORK or of any such standard, specification, manual, or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once, and CONTRACTOR shall not proceed with the work affected thereby (except in an emergency as authorized by Paragraph 6.12) until a Clarification, Field Order, or Change Order to the Contract Documents has been issued.

### 3.4 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

- A. In resolving conflicts resulting from errors or discrepancies in any of the Contract Documents, the order of precedence shall be as follows:

- ~~1. Permits from other agencies as may be required by law~~
21. Change Orders
- ~~3~~2. Agreement
- ~~4~~3. Addenda
- ~~5~~4. Contractor's Bid (Bid Form)
- ~~6~~5. Supplementary General Conditions
- ~~7~~6. Notice Inviting Bids
- ~~8~~7. Instructions to Bidders
- ~~9~~8. General Conditions
- ~~10~~9. Technical Specifications
- ~~11~~10. Referenced Standard Specifications
- ~~12~~11. Drawings

- B. With reference to the Drawings the order of precedence is as follows:

1. Figures govern over scaled dimensions
2. Detail drawings govern over general drawings
3. Addenda/Change Order drawings govern over any other drawings
4. Drawings govern over standard drawings

### 3.5 AMENDING CONTRACT DOCUMENTS

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the WORK, or to modify the terms and conditions thereof, only by a Change Order (pursuant to issued in accordance with Article 10).

### 3.6 REUSE OF DOCUMENTS

- A. Neither the CONTRACTOR, nor any Subcontractor or Supplier, nor any other person or organization performing any of the WORK under a contract with the OWNER shall have or acquire any title to or Ownership rights in any of the Drawings, Technical Specifications, or other documents used on the WORK, and they shall not reuse any of them on the extensions of the Project or any other project without written consent of OWNER.

## ARTICLE 4 -- SITE OF THE WORK

### 4.1 AVAILABILITY OF LANDS

- A. The OWNER will furnish, as indicated in the Contract Documents, the lands upon which the WORK is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the OWNER, unless otherwise provided in the Contract Documents. Nothing contained in the Contract Documents shall be interpreted as giving the CONTRACTOR exclusive occupancy of the lands or rights-of-way provided. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment; provided, that the CONTRACTOR shall not enter upon nor use any property not under the control of the OWNER until a written temporary construction easement agreement has been executed by the CONTRACTOR and the property OWNER, and a copy of said easement furnished to the ENGINEER prior to said use; and, neither the OWNER nor the ENGINEER will be liable for any claims or damages resulting from the CONTRACTOR's trespass on or use of any such properties. The CONTRACTOR shall provide the OWNER with a signed release from the property owner confirming that the lands have been satisfactorily restored upon completion of the WORK.

### 4.2 REPORTS OF PHYSICAL CONDITIONS

- A. **Subsurface Explorations:** Reference is made to the Supplementary General Conditions for identification of those reports of explorations and tests of subsurface conditions at the Site that have been utilized by the ENGINEER in the preparation of the Contract Documents.
- B. **Existing Structures:** Reference is made to the Supplementary General Conditions for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except underground Utilities referred to in Paragraph 4.3 herein) which are at or contiguous to the Site that have been utilized in the preparation of the Contract Documents.
- C. Neither the OWNER nor ENGINEER makes any representation as to the completeness of the reports or drawings referred to in Paragraph 4.2 A or B above or the accuracy of any data or information contained therein. The CONTRACTOR may rely upon the accuracy of the technical data contained in such reports and drawings. However, the CONTRACTOR may not rely upon any interpretation of such technical data, including any interpolation or

extrapolation thereof, or any non-technical data, interpretations, and opinions contained therein.

#### 4.3 PHYSICAL CONDITIONS - UNDERGROUND UTILITIES

- A. **Indicated:** The information and data indicated in the Contract Documents with respect to existing underground Utilities at or contiguous to the Site are based on information and data furnished to the OWNER or the ENGINEER by the owners of such underground Utilities or by others. Unless it is expressly provided in the Supplementary General Conditions and/or Section 01530 - Protection and Restoration of Existing Facilities, the OWNER and the ENGINEER will not be responsible for the accuracy or completeness of any such information or data, and the CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all underground Utilities indicated in the Contract Documents, for coordination of the WORK with the owners of such underground Utilities during construction, for the safety and protection thereof and repairing any damage thereto resulting from the WORK, the cost of all of which are deemed to have been included in the Contract Price.
- B. **Not Indicated:** If an underground Utility is uncovered or revealed at or contiguous to the Site which was not indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall identify the owner of such underground Utility and give written notice thereof to that owner and shall notify the ENGINEER in accordance with the requirements of the Supplementary General Conditions and Section 01530 - Protection of Existing Facilities.

#### 4.4 DIFFERING SITE CONDITIONS

- A. The CONTRACTOR shall notify the ENGINEER, in writing, of the following unforeseen conditions, hereinafter called differing Site conditions, promptly upon their discovery (but in no event later than 14 days after their discovery) and before they are disturbed:
1. Subsurface or latent physical conditions at the Site of the WORK differing materially from those indicated, described, or delineated in the Contract Documents, including those reports discussed in Paragraph 4.2, 4.3, and 4.5; and
  2. Unknown physical conditions at the Site of the WORK of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents, including those reports and documents discussed in Paragraph 4.2, 4.3, and 4.5.
- B. The ENGINEER will review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto, and advise the OWNER, in writing, of the ENGINEER's findings and conclusions.
- C. If the OWNER concludes that because of newly discovered conditions a change in the Contract Documents is required, a Change Order will be issued as provided in Article 10 to reflect and document the consequences of the difference.
- D. In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Times, or any combination thereof, will be allowable to the extent that they are attributable to any such difference. If the OWNER and the CONTRACTOR are unable to agree as to the amount or length thereof, a claim may be made therefor as provided in Articles 11 and 12.

- E. The CONTRACTOR's failure to give notice of differing Site conditions within 14 days of their discovery and before they are disturbed shall constitute a waiver of all claims in connection therewith, whether direct or consequential in nature.

#### 4.5 HAZARDOUS MATERIALS

- A. Reference is made to the Supplementary General Conditions for identification of those reports and drawings relating to ~~Asbestos, Hazardous Waste, PCBs, Petroleum and/or Radioactive~~ Hazardous Material identified at the Site that have been utilized by the ENGINEER in the preparation of the Contract Documents.

- B. OWNER shall be responsible for any ~~Asbestos, Hazardous Waste, PCBs, Petroleum, or Radioactive~~ Hazardous Material uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the WORK and which may present a substantial danger to persons or property exposed thereto in connection with the WORK at the Site. OWNER will not be responsible for any such material brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.

1. Upon discovery of any ~~Asbestos, Hazardous Waste, PCBs, Petroleum, or Radioactive~~ Hazardous Material, the CONTRACTOR shall immediately stop all work in any area affected thereby (except in an emergency as required by Paragraph 6.12) and notify OWNER and ENGINEER (and thereafter confirm such notice in writing). CONTRACTOR shall not be required to resume any work in any such affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR special written notice. Such written notice will specify that such condition and any affected area is or has been rendered safe for the resumption of the work or specify any special conditions under which the work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of adjustment, if any, in Contract Price or Contract Times as a result of such work stoppage or such special conditions under which work is agreed by CONTRACTOR to be resumed, either party may make a claim therefor as provided in Articles 11 and 12.

2. If, after receipt of such special written notice, CONTRACTOR does not agree to resume such WORK based on a reasonable belief it is unsafe, or does not agree to resume such WORK under special conditions, then OWNER may order such portion of the WORK that is in connection with such hazardous condition or in such affected area to be deleted from the WORK. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the WORK then either party may make a claim therefor as provided in Articles 11 and 12. OWNER may have such deleted portion of the WORK performed by OWNER's own forces or others in accordance with Article 7.

3. To the fullest extent permitted by Laws and Regulations, OWNER will indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's consultants, and the officers, directors, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages arising out of or resulting from such ~~hazardous condition~~ Hazardous Material discovered on the Site; provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the WORK itself), including the loss of use resulting therefrom. Nothing in this Paragraph shall obligate OWNER to

indemnify a person or entity from and against the consequences of that person's or entity's own negligence.

- C. The provisions of Paragraphs 4.2, 4.3, and 4.4 are not intended to apply to Asbestos, PCBs, Petroleum, Hazardous Waste Material, or Radioactive Material uncovered or revealed at the Site.
- D. In the event that Hazardous Material are brought on to the Site or are discharged or released by the CONTRACTOR, any Subcontractor, Supplier, or any person or entity under the direct or indirect control of any of them, and not withstanding any other item or provision of the Contract, the CONTRACTOR agrees to defend, indemnify, and hold the OWNER and the ENGINEER harmless from and against any and all claims, liability, fines, penalties, response costs, damages or judgements, associated with the presence, discharge, release, or escape of such materials or contamination. Upon request of the OWNER, the CONTRACTOR shall take such steps, at its own expense, as are reasonably necessary to remove from the Site the Hazardous Material or contamination brought onto the Site by the CONTRACTOR, Subcontractor, Supplier, or any person or entity under the direct control of any of them. The requirements of this paragraph are in addition to, and do not replace, the provisions of Paragraph 6.17 Indemnification. CONTRACTOR shall not be responsible for pre-existing Hazardous Material, and the foregoing indemnification obligation shall not apply thereto, unless CONTRACTOR causes Hazardous Material to be discharged, or fails to respond promptly and appropriately to the discovery or discharge of Hazardous Material.

#### 4.6 REFERENCE POINTS

- A. The OWNER will provide one bench mark, near or on the Site of the WORK, and will provide two points near or on the Site to establish a base line for use by the CONTRACTOR for alignment control. Unless otherwise specified in the Supplementary General Conditions, the CONTRACTOR shall furnish all other lines, grades, and bench marks required for proper execution of the WORK.
- B. The CONTRACTOR shall preserve all bench marks, stakes, and other survey marks, and in case of their removal or destruction by any party, the CONTRACTOR shall be responsible for the accurate replacement of such reference points by personnel qualified under the applicable state codes governing land surveyors.

### ARTICLE 5 -- BONDS AND INSURANCE

#### 5.1 BONDS

- A. The CONTRACTOR shall furnish Performance and Payment Bonds, each in the amount set forth in the Supplementary General Conditions, as security for the faithful performance and payment of all the CONTRACTOR's obligations under the Contract Documents. ~~These Bonds shall remain in effect at least until one year after the date of Substantial Completion, except as otherwise provided by Law or Regulation or by the Contract Documents.~~ The CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary General Conditions.
- B. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury

Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

- C. If the surety on any Bond furnished by the CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the WORK is located, the CONTRACTOR shall within 7 days thereafter substitute another Bond and surety, which must be acceptable to the OWNER.
- D. All Bonds required by the Contract Documents to be purchased and maintained by CONTRACTOR shall be obtained from surety companies that are duly licensed or authorized in the State in which the Project is located to issue Bonds for the limits so required. Such surety companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions.

## 5.2 INSURANCE

- A. The CONTRACTOR shall purchase and maintain the insurance required under this Paragraph. Such insurance shall include the specific coverages set out herein and be written for not less than the limits of liability and coverages provided in the Supplementary General Conditions, or required by Laws or Regulations, whichever are greater. All insurance shall be maintained continuously during the life of the Agreement up to the date of Substantial Completion and at all times thereafter when the CONTRACTOR may be correcting, removing, or replacing Defective Work in accordance with Paragraph 13.5. The CONTRACTOR's liabilities under this Agreement shall not be deemed limited in any way to the insurance coverage required.
- B. All insurance required by the Contract Documents to be purchased and maintained by the CONTRACTOR shall be obtained from insurance companies that are duly licensed or authorized to issue insurance policies for the limits and coverages so required in the State in which the Project is located. Such insurance companies shall have a current Best's Rating of at least an "A" (Excellent) general policy holder's rating and a Class VII financial size category and shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions.
- C. The CONTRACTOR shall furnish the OWNER, with copies to each additional insured who is indicated in the Supplementary General Conditions, with certificates and original endorsements showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be canceled, reduced in coverage, or renewal refused until at least 30 days prior written notice has been given to the OWNER and additional insureds by certified mail. All such insurance required herein (except for worker's compensation and employer's liability) shall name the OWNER, the ENGINEER, and their consultants and subconsultants and their officers, directors, agents, and employees as "additional insureds" under the policies. The CONTRACTOR shall purchase and maintain the following insurance:
  - 1. **Worker's Compensation and Employer's Liability:** This insurance shall protect the CONTRACTOR against all claims under applicable workers' compensation laws or federal acts, including claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a workers' compensation law. This insurance shall include an "all states" endorsement. In the event of a "monopolistic" state, CONTRACTOR shall certify all employees are covered by the state fund or shall provide a separate policy providing "all states" benefits. Employer's liability "stop gap" coverage for monopolistic states shall be provided

under either a worker's compensation policy or general liability policy. The CONTRACTOR shall require each subcontractor similarly to provide workers' compensation insurance for all of the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the CONTRACTOR's workers' compensation insurance. In case any class of employees is not protected under the workers' compensation laws, the CONTRACTOR shall provide and shall cause each Subcontractor to provide adequate employer's liability insurance for the protection of such of its employees as are not otherwise protected. The CONTRACTOR and each Subcontractor shall provide a waiver of subrogation in favor of the OWNER and ENGINEER.

2. ~~Comprehensive or~~ Commercial General Liability: This insurance shall be written in comprehensive form and shall protect the CONTRACTOR against all claims arising from injuries to persons other than its employees or damage to property of the OWNER or others arising out of any act or omission of the CONTRACTOR or its agents, employees, or subcontractors. The policy shall also include protection against claims insured by personal injury liability coverage and contractual coverage to insure the contractual liability assumed by the CONTRACTOR under the indemnification provisions in the General Conditions. To the extent that the CONTRACTOR's work, or work under its direction, may require blasting, explosive conditions, or underground operations, the comprehensive or commercial general liability coverage shall include coverage relative to blasting, explosion, collapse, and/or underground hazards.
3. Commercial Automobile Liability: This insurance shall be written in comprehensive form and shall protect the CONTRACTOR against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, and shall cover operation on or off the Site of all motor vehicles licensed for highway use, whether they are owned, nonowned, or hired.
4. Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance: The CONTRACTOR shall either require each of the Subcontractors to procure and to maintain subcontractor's public liability and property damage insurance and vehicle liability insurance of the type and in the same amounts specified in the Supplementary General Conditions for the CONTRACTOR or insure the activities of the Subcontractors under the CONTRACTOR's own policies.
5. Builder's Risk:
  - a. This insurance shall be of the "all risks" type, shall be written in completed value form, and shall protect the CONTRACTOR, Subcontractors, the OWNER, and the ENGINEER, against risks of damage to buildings, structures, and materials and equipment (including any stored off-site and while in transit), CONTRACTOR'S equipment, debris removal and including demolition and contingent loss occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for ENGINEER'S services and expenses required as a result of such insured loss. The amount of such insurance shall be not less than the insurable value of the WORK at completion plus equipment. Builder's risk insurance shall provide for losses to be payable to the CONTRACTOR and the OWNER, as their interests may appear. This insurance shall contain a provision that in the event of payment for any loss under the coverage provided, the insurance company shall have no rights of recovery against the CONTRACTOR,

the OWNER, and the ENGINEER. This insurance shall insure against all risks of loss (including earthquake, flood and collapse) and, at the option of the OWNER, shall include comprehensive boiler and machinery coverage including coverage for installation and testing.

- b. If the OWNER finds it necessary to occupy or use a portion or portions of the Project prior to Substantial Completion thereof, such occupancy shall not commence prior to the time mutually agreed to by the OWNER and CONTRACTOR and to which the insurance company or companies providing the Builder's Risk Insurance have consented by endorsement to the policy or policies.

## **ARTICLE 6 -- CONTRACTORS RESPONSIBILITIES**

### **6.1 COMMUNICATIONS**

- A. Written communications with the OWNER shall be only through or as directed by the ENGINEER.

### **6.2 SUPERVISION AND SUPERINTENDENCE**

- A. The CONTRACTOR shall supervise, inspect, and direct the WORK competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the WORK in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction and all safety precautions and programs incidental thereto. The CONTRACTOR shall be responsible to see that the completed WORK complies accurately with the Contract Documents.
- B. The CONTRACTOR shall designate in writing and keep on the Site at all times during the performance of the WORK a technically qualified, English-speaking superintendent, who is an employee of the CONTRACTOR and who shall not be replaced without written notice to the OWNER and the ENGINEER. The superintendent will be the CONTRACTOR's representative at the Site and shall have authority to act on behalf of the CONTRACTOR. All communications given to the superintendent shall be as binding as if given to the CONTRACTOR.
- C. The CONTRACTOR's superintendent shall be present at the Site at all times while work is in progress and shall be available by phone for emergencies 24 hours per day, 7 days per week. Failure to observe this requirement shall be considered suspension of the WORK by the CONTRACTOR until such time as such superintendent is again present at the Site.
- D. The CONTRACTOR shall not transfer or reassign a superintendent without advance written notice to the OWNER and the ENGINEER.

### **6.3 LABOR, MATERIALS, AND EQUIPMENT**

- A. The CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the WORK and perform construction as required by the Contract Documents. The CONTRACTOR shall furnish, erect, maintain, and remove the construction plant and any required temporary works. The CONTRACTOR shall at all times maintain good discipline and order at the Site. Except in connection with the safety or protection of persons or the WORK or property at the Site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all work at the Site shall be performed during regular working hours, and the CONTRACTOR will not permit overtime work or the performance of work on

Saturday, Sunday, or any federally observed holiday without the OWNER's written consent. The CONTRACTOR shall apply for this consent through the ENGINEER in writing a minimum of 24 hours in advance.

- B. Except as otherwise provided in this Paragraph, the CONTRACTOR shall receive no additional compensation for overtime work, i.e., work in excess of 8 hours in any one calendar day or 40 hours in any one calendar week, even though such overtime work may be required under emergency conditions and may be ordered by the ENGINEER in writing. Additional compensation will be paid to the CONTRACTOR for overtime work only in the event extra work is ordered by the ENGINEER and the Change Order specifically authorizes the use of overtime work and then only to such extent as overtime wages are regularly being paid by the CONTRACTOR for overtime work of a similar nature in the same locality.
- C. All increased costs of inspection and testing performed during overtime work by the CONTRACTOR which is allowed solely for the convenience of the CONTRACTOR shall be borne by the CONTRACTOR. The OWNER has the authority to deduct the cost of all such inspection and testing from any partial payments otherwise due to the CONTRACTOR.
- D. Unless otherwise specified in the Contract Documents, the CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, lubricants, power, light, heat, telephone, water, sanitary facilities, and all other facilities, consumables, and incidentals necessary for the furnishing, performance, testing, start-up, and completion of the WORK.
- E. All materials and equipment incorporated into the WORK shall be of specified quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of the OWNER. If required by the ENGINEER, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the source, kind and quality of materials and equipment. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provisions of any such instructions will be effective to assign to the OWNER, ENGINEER, or any of their consultants, agents, or employees, any duty or authority to supervise or direct the furnishing or performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.9 C.

#### 6.4 SCHEDULE

- A. The CONTRACTOR shall comply with the schedule requirements in the General Requirements.

#### 6.5 SUBSTITUTES OR "OR EQUAL" ITEMS

- A. The CONTRACTOR shall submit proposed substitutes or "or equal" items in accordance with the ~~Bidding Requirements~~ bidding requirements. No request for substitution of an "or equal" item will be considered by the ENGINEER after award of the Contract.

#### 6.6 CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- A. The CONTRACTOR shall be responsible to the OWNER and the ENGINEER for the acts and omissions of its Subcontractors, Suppliers, and their employees to the same extent as

CONTRACTOR is responsible for the acts and omissions of its own employees. Nothing contained in this Paragraph shall create any contractual relationship between any Subcontractor and the OWNER or the ENGINEER nor relieve the CONTRACTOR of any liability or obligation under the Contract Documents. The CONTRACTOR shall include these General Conditions and the Supplementary General Conditions as a part of all its subcontract and supply agreements.

#### 6.7 PERMITS

- A. Unless otherwise provided in the Supplementary General Conditions, the CONTRACTOR shall obtain and pay for all construction permits and licenses from the agencies having jurisdiction, including the furnishing of insurance and bonds if required by such agencies. The enforcement of such requirements shall not be made the basis for claims for additional compensation by CONTRACTOR. When necessary, the OWNER will assist the CONTRACTOR, in obtaining such permits and licenses. The CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the WORK, which are applicable at the time of opening of Bids. The CONTRACTOR shall pay all charges of utility owners for inspection or connections to the WORK.

#### 6.8 PATENT FEES AND ROYALTIES

- A. The CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the WORK or the incorporation in the WORK of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the WORK and if to the actual knowledge of the OWNER or the ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed by the OWNER in the Contract Documents. The CONTRACTOR's indemnification obligation under this Paragraph 6.7 A. for all claims and liabilities arising out of any infringement of patent rights or copyrights incident to the use in the performance of the WORK or resulting from the incorporation in the WORK of any invention, design, process, product, or device not specified in the Contract Documents shall be in accordance with Paragraph ~~6.16~~6.17 of these General Conditions.

#### 6.9 LAWS AND REGULATIONS

- A. The CONTRACTOR shall observe and comply with all Laws and Regulations which in any manner affect those engaged or employed on the WORK, the materials used in the WORK, or the conduct of the WORK. If any discrepancy or inconsistency should be discovered between the Contract Documents and any such Laws or Regulations, the CONTRACTOR shall report the same in writing to the ENGINEER. Any particular Law or Regulation specified or referred to elsewhere in the Contract Documents shall not in any way limit the obligation of the CONTRACTOR to comply with all other provisions of federal, state, and local laws and regulations. The CONTRACTOR's indemnification obligations for all claims or liability arising from violation of any such law, ordinance, code, order, or regulation, whether by CONTRACTOR or by its employees, Subcontractors or Suppliers shall be in accordance with Paragraph ~~6.16~~6.17 of these General Conditions.

#### 6.10 TAXES

- A. The CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by the CONTRACTOR in accordance with the laws and regulations of the place of the Project which are applicable during the performance of the WORK.

## 6.11 USE OF PREMISES

- A. The CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site, the land and areas identified in and permitted by the Contract Documents, and the other land and areas permitted by Laws and Regulations, rights-of-way, permits, and easements. The CONTRACTOR shall assume full liability and responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the WORK. Should any claim be made against the OWNER or the ENGINEER by any such owner or occupant because of the performance of the WORK, the CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim through litigation at the CONTRACTOR's sole liability expense. The CONTRACTOR's indemnification obligations for all claims and liability, arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any such owner or occupant against the OWNER, the ENGINEER, their consultants, subconsultants, and the officers, directors, employees and agents of each and any of them to the extent caused by or based upon the CONTRACTOR's performance of the WORK shall be in accordance with Paragraph ~~6.166.17~~ of these General Conditions.

## 6.12 SAFETY AND PROTECTION

- A. The CONTRACTOR shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
1. All persons at the Site and other persons and organizations who may be affected thereby;
  2. All the WORK and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  3. Other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of the performance of the WORK.
- B. The CONTRACTOR shall comply with all applicable Laws and Regulations relating to the safety of persons or property or to the protection of persons or property from damage, injury, or loss and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utilities when prosecution of the WORK may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. CONTRACTOR'S duties and responsibilities for safety and for protection of the WORK shall continue until such time as all the WORK is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with Paragraph 14.7 B. that the WORK is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
- C. The CONTRACTOR shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.
- D. Materials that contain hazardous substances or mixtures may be required on the WORK. A Material Safety Data Sheet shall be made available at the Site by the CONTRACTOR for every hazardous product used.

- E. Material usage shall strictly conform to OSHA safety requirements and all manufacturer's warnings and application instructions listed on the Material Safety Data Sheet and on the product container label.
- F. The CONTRACTOR shall be responsible for the exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.
- G. The CONTRACTOR shall notify the ENGINEER in writing if it considers a specified product or its intended use to be unsafe. This notification must be given to the ENGINEER prior to the product being ordered, or if provided by some other party, prior to the product being incorporated in the WORK.

#### 6.13 EMERGENCIES

- A. In emergencies affecting the safety or protection of persons or the WORK or property at the Site or adjacent thereto, CONTRACTOR, without special instruction or authorization from OWNER or ENGINEER, is obligated to immediately act to prevent threatened damage, injury, or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the WORK or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Change Order will be issued to document the consequences of such action.

#### 6.14 SUBMITTALS

- A. After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, the CONTRACTOR shall submit to the ENGINEER for review all Shop Drawings in accordance with the accepted schedule of Shop Drawing submittals specified in Section 01300 - Contractor Submittals.
- B. The ENGINEER'S review will be only to determine if the items covered by the submittals will, after installation or incorporation in the WORK, generally conform to the Contract Documents and with the design concept of the completed Project.
- C. The CONTRACTOR shall also submit to the ENGINEER for review all Samples in accordance with the accepted schedule of Sample submittals specified in Section 01300 - Contractor Submittals.
- D. Before submittal of each Shop Drawing or Sample, the CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the WORK and the Contract Documents. The CONTRACTOR shall provide submittals in accordance with the requirements of Section 01300 - Contractor Submittals.

## 6.15 CONTINUING THE WORK

~~A. The CONTRACTOR shall carry on the WORK and adhere to the progress schedule during all disputes or disagreements with the OWNER. No WORK shall be delayed or postponed pending resolution of any disputes or disagreements, except as the CONTRACTOR and the OWNER may otherwise agree in writing.~~

A. No claim, potential claim, dispute, or controversy shall interfere with the progress and performance of the WORK, or any changes thereto, and the CONTRACTOR shall proceed in all instances with its work, including any disputed work, or any changes thereto, and that any failure of the CONTRACTOR to comply herewith and to proceed with the WORK shall automatically be deemed a material breach of the Agreement entitling the OWNER to all remedies available under Article 15 of the General Conditions or other provisions of the Contract Documents and applicable law. Except as provided elsewhere in the Contract Documents, the OWNER will continue to make undisputed payments in accordance with the Contract Documents.

## 6.16 CONTRACTOR'S GENERAL WARRANTY AND GUARANTEE

A. CONTRACTOR warrants and guarantees that all WORK will be in accordance with the Contract Documents and will not be defective. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

1. Abuse, modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, or Suppliers, or any other individual or entity for whom CONTRACTOR is responsible;
2. Normal wear and tear under normal usage.

B. CONTRACTOR's obligation to perform and complete the WORK in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of WORK that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents:

1. Observations by ENGINEER;
2. Recommendation by ENGINEER or payment by OWNER of any progress or final payment;
3. The issuance of a Certificate of Completion by the OWNER;
4. Use or occupancy of the WORK or any part thereof by the OWNER;
5. Any acceptance by OWNER or any failure to do so;
6. Any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER pursuant to Paragraph 14.7 B.;
7. Any inspection, test, or approval by others; or
8. Any correction of Defective Work by OWNER.

## 6.17 INDEMNIFICATION

~~A. To the fullest extent permitted by Laws and Regulations, the CONTRACTOR shall indemnify, defend, and hold harmless the OWNER, the ENGINEER, their consultants, subconsultants, and the officers, directors, employees, and agents of each and any of them, against and from all claims and liability arising under, by reason of, related, or incidental to the Contract Documents or any performance of the WORK, but not from the sole negligence or willful misconduct of the OWNER and/or the ENGINEER. Such indemnification by the CONTRACTOR shall include, but not be limited to, the following:~~

- ~~1. Liability or claims resulting directly or indirectly from the negligence or carelessness of the CONTRACTOR, its employees, or agents in the performance of the WORK, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the CONTRACTOR, its employees, or agents;~~
- ~~2. Liability or claims arising directly or indirectly from bodily injury, occupational sickness or disease, or death of the CONTRACTOR's, Subcontractor's, or Supplier's own employees, or agents engaged in the WORK resulting in actions brought by or on behalf of such employees against the OWNER and/or the ENGINEER;~~
- ~~3. Liability or claims arising directly or indirectly from or based on the violation of any Laws or Regulations, whether by the CONTRACTOR, its employees, or agents;~~
- ~~4. Liability or claims arising directly or indirectly from the use or manufacture by the CONTRACTOR, its employees, or agents in the performance of this Agreement of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article, or appliance, unless otherwise specifically stipulated in this Agreement;~~
- ~~5. Liability or claims arising directly or indirectly from the breach of any warranties, whether express or implied, made to the OWNER and/or ENGINEER or any other parties by the CONTRACTOR, its employees, or agents;~~
- ~~6. Liability or claims arising directly or indirectly from the willful misconduct of the CONTRACTOR, its employees, or agents;~~
- ~~7. Liability or claims arising directly or indirectly from any breach of the obligations assumed in this Agreement by the CONTRACTOR;~~
- ~~8. Liability or claims arising directly or indirectly from, relating to, or resulting from a hazardous condition created by the CONTRACTOR, Subcontractors, Suppliers, or any of their employees or agents, and;~~
- ~~9. Liability or claims arising directly, or indirectly, or consequentially out of any action, legal or equitable, brought against the OWNER, the ENGINEER, their consultants, subconsultants, and the officers, directors, employees and agents of each or any of them, to the extent caused by the CONTRACTOR's use of any premises acquired by permits, rights of way, or easements, the Site, or any land or areas contiguous thereto or its performance of the WORK thereon.~~

A. To the fullest extent allowed by law, the CONTRACTOR shall defend, indemnify, and hold harmless the OWNER, its elected and appointed officials, agents, and employees, ENGINEER and its subconsultants, officers, directors, and employees (collectively, the

Indemnified Parties), from all liability, penalties, costs, losses, damages, expenses, caused of action, claims, and judgements, including attorney's fees and other defense costs, resulting from injury to or death sustained by any person (including CONTRACTOR's employees), or damage to property of any kind, or any other damage whatsoever, which injury, death, or damage arises out of or related to the performance of the WORK, including any of the same resulting from the alleged or actual negligent act or omission of the Indemnified Parties, except the obligation to indemnify shall not be applicable to injury, death, or damage to property arising from the sole or active negligence or willful misconduct of the Indemnified Parties. This indemnification shall extend to all claims asserted after termination of this Contract for whatever reason.

B. Without limiting the generality of the foregoing indemnity, such indemnity obligation expressly extends to and includes any and all claims, demands, damages, costs, expenses, fines, penalties, or liability occasioned as a result of:

1. Damages to adjacent property related to the construction of the WORK;
2. The violation by the CONTRACTOR, the CONTRACTOR's agents, employees, or independent contractors or subcontractors, or any provisions of federal, state, or local law, including applicable administrative regulations;
3. Injury to or death of any person, or any damage to property owned by any person, while on or about the Site or as a result of the WORK, whether such persons are on or about the Site by right or not, whenever the WORK is alleged to have been a contributing cause in any degree whatsoever.

BC. The CONTRACTOR shall reimburse the OWNER and the ENGINEER for all costs and expenses, (including but not limited to fees and charges of engineers, architects, attorneys, and other professionals and court costs including all costs of appeals) incurred by said OWNER and ENGINEER in enforcing the provisions of this Paragraph 6.17.

CD. The indemnification obligation under this Paragraph 6.17 shall not be limited in any way by any limitation on the amount or type of insurance carried by CONTRACTOR or by the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any Subcontractor or other person or organization under workers' compensation acts, disability benefit acts, or other employee benefit acts.

#### 6.18 CONTRACTOR'S DAILY REPORTS

A. The CONTRACTOR shall complete a daily report indicating location worked, total manpower for each construction trade, major equipment on Site, each Subcontractor's manpower and equipment, weather conditions, and other related information involved in the performance of the WORK. The daily report shall be completed on forms furnished by the ENGINEER, and shall be submitted to the ENGINEER at the conclusion of each work day. The daily report shall comment on the daily progress and status of each major component of the WORK. These components will be decided by the ENGINEER.

## ARTICLE 7 – OTHER WORK

### 7.1 RELATED WORK AT SITE

- A. The OWNER may perform other work related to the Project at or adjacent to the Site by the OWNER's own forces, have other work performed by utility owners, or let other direct contracts for other parts of the Project. The CONTRACTOR shall include in its Bid all costs associated with coordinating and connecting its work with adjoining work performed under other contracts. The CONTRACTOR shall be solely responsible for aligning and coordinating its work with other portions of the Project performed by others. such other work. ~~If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to starting any such other work.~~
- B. The CONTRACTOR shall afford each person who is performing the other work (including the OWNER's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the WORK with theirs. The CONTRACTOR shall do all cutting, fitting, and patching of the WORK that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of the ENGINEER and the others whose work will be affected.
- C. If the proper execution or results of any part of the CONTRACTOR's work depends upon such other work by another, the CONTRACTOR shall inspect and report to the ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for such proper execution and results. The CONTRACTOR's failure to report such delays, defects, or deficiencies will constitute an acceptance of the other work as fit and proper for integration with the CONTRACTOR's work except for latent or nonapparent defects and deficiencies in the other work.

### ~~7.2 COORDINATION~~

- ~~A. If the OWNER contracts with others for the performance of other work at the Site, OWNER will have sole authority and responsibility in respect of such coordination, unless otherwise provided in the Supplementary General Conditions.~~

## ARTICLE 8 -- OWNER'S RESPONSIBILITIES

### 8.1 COMMUNICATIONS

- A. Except as may be otherwise provided in these General Conditions or the Supplementary General Conditions, the OWNER will issue all its communications to the CONTRACTOR through the ENGINEER.

### 8.2 PAYMENTS

- A. The OWNER will make payments to the CONTRACTOR as provided in Article 14.

### 8.3 LANDS, EASEMENTS, AND SURVEYS

- A. The OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.1 and 4.6.

#### 8.4 REPORTS AND DRAWINGS

- A. The OWNER will identify and make available to the CONTRACTOR copies of reports of physical conditions at the Site and drawings of existing structures which have been utilized in preparing the Contract Documents as set forth in Paragraph 4.2.

#### 8.5 CHANGE ORDERS

- A. The OWNER will execute Change Orders as indicated in Article 10.

#### 8.6 INSPECTIONS AND TESTS

- A. The OWNER's responsibility for inspections and tests is set forth in Paragraph 13.3.

#### 8.7 SUSPENSION OF WORK

- A. The OWNER's right to stop work or suspend work is set forth in Paragraphs 13.4 and 15.1.

#### 8.8 TERMINATION OF AGREEMENT

- A. The OWNER's right to terminate services of the CONTRACTOR is set forth in Paragraphs 15.2 and 15.3.

#### 8.9 LIMITATION ON OWNER'S RESPONSIBILITIES

- A. The OWNER shall not supervise, direct or have control or authority over, nor be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of the WORK. OWNER will not be responsible for CONTRACTOR's failure to perform or furnish the WORK in accordance with the Contract Documents.

#### 8.10 UNDISCLOSED HAZARDOUS ENVIRONMENTAL CONDITIONS

- A. OWNER's responsibility in respect to an undisclosed hazardous environmental condition is set forth in Paragraph 4.5.

### **ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION**

#### 9.1 OWNER'S REPRESENTATIVE

- A. The ENGINEER will be the OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of the ENGINEER as the OWNER's representative during construction are set forth in the Contract Documents.

#### 9.2 OBSERVATIONS ON THE SITE

- A. The ENGINEER will make observations on the Site during construction to monitor the progress and quality of the WORK and to determine, in general, if the WORK is proceeding in accordance with the Contract Documents. The ENGINEER will not be required to make exhaustive or continuous inspections to check the quality or quantity of the WORK.

### 9.3 PROJECT REPRESENTATION

- A. The ENGINEER ~~may will~~ furnish a Resident Project Representative to assist in observing the performance of the WORK. The duties, responsibilities, and limitations of authority of any such Resident Project Representative will be as ~~provided~~ described in the ~~Supplementary General Conditions~~ Contract Documents.

### 9.4 CLARIFICATIONS

- A. The ENGINEER will issue with reasonable promptness such written Clarifications of the requirements of the Contract Documents as the ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.

### 9.5 AUTHORIZED VARIATIONS IN WORK

- A. The ENGINEER may authorize variations in the WORK from the requirements of the Contract Documents. These may be accomplished by a Field Order and will require the CONTRACTOR to perform the WORK involved in a manner that minimizes the impact to the WORK and the Contract Times. If the CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Times, the CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

### 9.6 REJECTING DEFECTIVE WORK

- A. The ENGINEER will have authority to reject Defective Work and will also have authority to require special inspection or testing of the WORK as provided in Article 13.

### 9.7 CONTRACTOR SUBMITTALS, CHANGE ORDERS, AND PAYMENTS

- A. In accordance with the procedures set forth in the General Requirements, the ENGINEER will review all CONTRACTOR submittals.
- B. The ENGINEER's responsibilities for Change Orders are set forth in Articles 10, 11, and 12.
- C. The ENGINEER's responsibilities for Applications for Payment are set forth in Article 14.

### 9.8 DECISIONS ON DISPUTES

- A. The ENGINEER will be the initial interpreter of the requirements of the Contract Documents and of the acceptability of the WORK thereunder. Claims, disputes, and other matters relating to the acceptability of the WORK and interpretation of the requirements of the Contract Documents pertaining to the performance of the WORK shall be determined by the ENGINEER. Any claims in respect to changes in the Contract Price or Contract Times shall be resolved in accordance with the requirements set forth in Articles 10, 11, and 12.

### 9.9 LIMITATION ON ENGINEER'S RESPONSIBILITIES

- A. Neither the ENGINEER's authority to act under this Article 9 or other provisions of the Contract Documents nor any decision made by the ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the ENGINEER to the CONTRACTOR, any Subcontractor, any Supplier, any surety for any of them, or any other person or organization performing any of the WORK.

- B. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as reviewed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," or "satisfactory," or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of the ENGINEER as to the WORK, it is intended that such requirement, direction, review, or judgment will be solely to evaluate the WORK for compliance with the requirements of the Contract Documents, and conformance with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, unless there is a specific statement indicating otherwise. The use of any such term or adjective shall not be effective to assign to the ENGINEER any duty or authority to supervise or direct the performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.9 C.
- C. The ENGINEER will not supervise, direct, control, or have authority over or be responsible for the CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the CONTRACTOR to comply with Laws and Regulations applicable to the performance of the WORK. The ENGINEER will not be responsible for the CONTRACTOR's failure to perform the WORK in accordance with the Contract Documents. The ENGINEER will not be responsible for the acts or omissions of the CONTRACTOR nor of any Subcontractor, Supplier, or any other person or organization performing any of the WORK.

## **ARTICLE 10 -- CHANGES IN THE WORK**

### **10.1 GENERAL**

- A. Without invalidating the Agreement and without notice to any surety, the OWNER may at any time or from time to time, order additions, deletions, or revisions in the WORK. Such additions, deletions or revisions will be authorized by a Change Order or Field Order. Upon receipt of any such document, CONTRACTOR shall promptly proceed to implement the additions, deletions, or revisions in the WORK in accordance with the applicable conditions of the Contract Documents.
- B. The CONTRACTOR shall not be entitled to an increase in the Contract Price nor an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented by Change Order, except in the case of an emergency and except in the case of uncovering work as provided in Paragraph 13.3.F and G.
- C. The OWNER and the CONTRACTOR shall execute appropriate Change Orders covering:
  - 1. Changes in the WORK which are ordered by the OWNER pursuant to Paragraph 10.1 A.;
  - 2. Changes required because of acceptance of Defective Work under Paragraph 13.6; and
  - 3. Changes in the Contract Price or Contract Times which are agreed to by the parties under Articles 11 and/or 12, respectively.
- D. If notice of any change in the WORK is required to be given to a surety, the giving of any such notice shall be the CONTRACTOR's responsibility. If the change in the WORK affects the Contract Price, the OWNER may require an adjustment to the amount of any applicable Bond and the amount of each applicable Bond shall be adjusted accordingly.

- E. If the OWNER and CONTRACTOR agree as to the extent, if any, of an increase in the Contract Price or an extension or shortening of the Contract Times that should be allowed as a result of a Field Order, the CONTRACTOR shall proceed so as to minimize the impact on and delays to the WORK pending the issuance of a Change Order.
- F. If the OWNER and the CONTRACTOR are unable to agree as to the extent, if any, of an increase in the Contract Price or an extension or shortening of the Contract Times that should be allowed as a result of a Field Order, the ENGINEER can direct the CONTRACTOR to proceed on the basis of time and materials so as to minimize the impact on and delays to the WORK, and the CONTRACTOR may make a claim as provided in Articles 11 and 12.

## 10.2 ~~ALLOWABLE QUANTITY VARIATIONS~~

- A. In the event of an increase or decrease in the quantity of any bid item under a unit price contract, the total amount of work actually done or materials or equipment furnished will be paid for according to the unit price established for such work under the Contract Documents, wherever such unit price has been established; provided, that an adjustment in the ~~Contract Price~~ unit price may be made for changes which result in an increase or decrease in excess of 25 percent of the estimated quantity of any unit price bid item of the WORK.
- B. In the event a part of the WORK is to be entirely eliminated and no lump sum or unit price is named in the Contract Documents to cover such eliminated work, the price of the eliminated work shall be agreed upon by the OWNER and the CONTRACTOR by Change Order.

## ARTICLE 11 -- CHANGE OF CONTRACT PRICE

### 11.1 GENERAL

- A. The Contract Price constitutes the total compensation payable to the CONTRACTOR for performing the WORK. All duties, responsibilities, and obligations assigned to or undertaken by the CONTRACTOR to complete the WORK shall be at its expense without change in the Contract Price.
- B. The Contract Price may only be changed by a Change Order. The value of any work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:
  - 1. Where the work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved.
  - 2. By mutual acceptance of a lump sum, which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.4; or
  - 3. On the basis of the cost of work (determined as provided in Paragraph 11.3) plus the CONTRACTOR's overhead and profit (determined as provided in Paragraph 11.4).
- C. Any claim for an increase in the Contract Price shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 10 days) after the start of the event giving rise to the claim and shall state the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within 60

days after the start of such event (unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which the CONTRACTOR is entitled as a result of such event. All claims for adjustment in the Contract Price will be determined by the ENGINEER. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this Paragraph 11.1 C.

## 11.2 COSTS RELATING TO WEATHER

- A. The CONTRACTOR shall have no claims against the OWNER for damages for any injury to work, materials, or equipment, resulting from the action of the elements. If, however, in the opinion of the ENGINEER, the CONTRACTOR has made all reasonable efforts to protect the materials, equipment, and work, the CONTRACTOR may be granted a reasonable extension of Contract Times to make proper repairs, renewals, and replacements of the work, materials, or equipment at CONTRACTOR's own cost.

## 11.3 COST OF WORK (BASED ON TIME AND MATERIALS)

- A. **General:** The term "cost of work" means the sum of all costs necessarily incurred and paid by the CONTRACTOR for labor, materials, and equipment in the proper performance of extra work. Except as otherwise may be agreed to in writing by the OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in Paragraph 11.5.
- B. **Labor:** The costs of labor will be the actual cost for wages prevailing for each craft or type of workers performing the extra work at the time the extra work is done, plus employer payments of payroll taxes, workers compensation insurance, liability insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from federal, state or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. Labor costs for equipment operators and helpers will be paid only when such costs are not included in the invoice for equipment rental. The labor costs for foremen shall be proportioned to all of their assigned work and only that applicable to extra work shall be paid. ~~Non-direct~~ Indirect labor costs including superintendence shall be considered part of the markup set out in Paragraph 11.4.
- C. **Materials:** The cost of materials reported shall be at invoice or lowest current price at which materials are locally available and delivered to the Site in the quantities involved, plus the cost of freight, delivery and storage, subject to the following:
  - 1. All trade discounts and rebates shall accrue to the OWNER, and the CONTRACTOR shall make provisions so that they may be obtained;
  - 2. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual supplier as determined by the ENGINEER. Except for actual costs incurred in the handling of such materials, markup will not be allowed;
  - 3. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from said sources on extra work items or the current wholesale price for such materials delivered to the Site, whichever price is lower; and

4. If in the opinion of the ENGINEER the cost of material is excessive, or the CONTRACTOR does not furnish satisfactory evidence of the cost of such material, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned delivered to the Site less trade discount. The OWNER reserves the right to furnish materials for the extra work and no claim will be allowed by the CONTRACTOR for costs and profit on such materials.
- D. **Equipment:** The CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the Supplementary General Conditions. Such rental rate will be used to compute payments for equipment whether the equipment is under the CONTRACTOR's control through direct ownership, leasing, renting, or another method of acquisition. The rental rate to be applied for use of each item of equipment will be the rate resulting in the least total cost to the OWNER for the total period of use. If it is deemed necessary by the CONTRACTOR to use equipment not listed in the publication specified in the Supplementary General Conditions, an equitable rental rate for the equipment will be established by the ENGINEER. The CONTRACTOR may furnish cost data which might assist the ENGINEER in the establishment of the rental rate. Payment for equipment shall be subject to the following:
1. All equipment shall, in the opinion of the ENGINEER, be in good working condition and suitable for the purpose for which the equipment is to be used;
  2. Before construction equipment is used on the extra work, the CONTRACTOR shall plainly stencil or stamp an identifying number thereon at a conspicuous location, and shall furnish to the ENGINEER, in duplicate, a description of the equipment and its identifying number;
  3. Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer;
  4. Individual pieces of equipment or tools having a replacement value of \$500 or less, whether or not consumed by use, will be considered to be small tools and no payment will be made therefore.
- E. **Equipment Rental Time:** The rental time to be paid for equipment on the Site will be the time the equipment is in productive operation on the extra work being performed and, in addition, will include the time required to move the equipment to the location of the extra work and return it to the original location or to another location requiring no more time than that required to return it to its original location; except, that moving time will not be paid if the equipment is used on other than the extra work, even though located at the Site of the extra work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made for loading and transporting costs when the equipment is used at the Site of the extra work on other than the extra work. Rental time will not be allowed while equipment is inoperative due to breakdowns. The rental time of equipment on the work Site will be computed subject to the following:
1. When hourly rates are listed, any part of an hour less than 30 minutes of operation will be considered to be half-hour of operation, and any part of an hour in excess of 30 minutes will be considered one hour of operation;

2. When daily rates are listed, any part of a day less than 4 hours operation will be considered to be half-day of operation. When owner-operated equipment is used to perform extra work to be paid for on a time and materials basis, the CONTRACTOR will be paid for the equipment and operator, as set forth in Paragraphs 3, 4, and 5, following;
3. Payment for the equipment will be made in accordance with the provisions in Paragraph 11.3 D., herein;
4. Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the CONTRACTOR to other workers operating similar equipment already on the Site, or in the absence of such labor, established by collective bargaining agreements for the type of workmen and location of the extra work, whether or not the operator is actually covered by such an agreement. A labor surcharge will be added to the cost of labor described herein in accordance with the provisions of Paragraph 11.3 B., herein, which surcharge shall constitute full compensation for payments imposed by state and federal laws and all other payments made to or on behalf of workers other than actual wages; and
5. To the direct cost of equipment rental and labor, computed as provided herein, will be added the allowances for equipment rental and labor as provided in Paragraph 11.4, herein.

F. **Special Services:** Special work or services are defined as that work characterized by extraordinary complexity, sophistication, innovation, or a combination of the foregoing attributes which are unique to the construction industry. The ENGINEER will make estimates for payment for special services and may consider the following:

1. When the ENGINEER and the CONTRACTOR, determine that a special service or work is required which cannot be performed by the forces of the CONTRACTOR or those of any of its Subcontractors, the special service or work may be performed by an entity especially skilled in the work to be performed. After validation of invoices and determination of market values by the ENGINEER, invoices for special services or work based upon the current fair market value thereof may be accepted without complete itemization of labor, material, and equipment rental costs;
2. When the CONTRACTOR is required to perform work necessitating special fabrication or machining process in a fabrication or a machine shop facility away from the Site, the charges for that portion of the work performed at the off-site facility may, by agreement, be accepted as a special service and accordingly, the invoices for the work may be accepted without detailed itemization; and
3. All invoices for special services will be adjusted by deducting all trade discounts. In lieu of the allowances for overhead and profit specified in Paragraph 11.4, herein, an allowance of 15 percent will be added to invoices for special services.

G. **Sureties:** All work performed hereunder shall be subject to all of the provisions of the Contract Documents and the CONTRACTOR's sureties shall be bound with reference thereto as under the original Agreement. Copies of all amendments to Bonds or supplemental Bonds shall be submitted to the OWNER for review prior to the performance of any work hereunder.

11.4 CONTRACTOR'S OVERHEAD AND PROFIT

- A. Extra work ordered on the basis of time and materials will be paid for at the actual necessary cost as determined by the ENGINEER, plus allowances for overhead and profit. The allowance for overhead and profit will include full compensation for superintendence, taxes, field office expense, extended overhead, home office overhead, and all other items of expense or cost not included in the cost of labor, materials, or equipment provided for under Paragraph 11.3. The allowance for overhead and profit will be made in accordance with the following schedule:

Overhead and Profit Allowance

Labor	20 percent
Materials	15 percent
Equipment	15 percent

To the sum of the costs and markups provided for in this Article, an additional 2-1 percent of the sum will be added as compensation for Bonds and insurance.

- B. It is understood that labor, materials, and equipment for extra work may be furnished by the CONTRACTOR or by the Subcontractor on behalf of the CONTRACTOR. When all or any part of the extra work is performed by a Subcontractor, the allowance specified herein will be applied to the labor, materials, and equipment costs of the Subcontractor, to which the CONTRACTOR may add 5 percent of the Subcontractor's total cost for the extra work. Regardless of the number of hierarchical tiers of Subcontractors, the 5 percent increase above the Subcontractor's total cost which includes the allowances for overhead and profit specified herein may be applied one time only .

11.5 EXCLUDED COSTS

- A. The term "cost of the work" shall not include any of the following:
  1. Payroll costs and other compensation of CONTRACTOR's officers, executives, proprietors, partners, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by CONTRACTOR whether at the Site or in CONTRACTOR's principal or a branch office for general administration of the WORK all of which are to be considered administrative costs covered by the CONTRACTOR's allowance for overhead and profit;
  2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the Site;
  3. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the WORK and charges against CONTRACTOR for delinquent payments;
  4. Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except as provided by Paragraph 11.4 above);
  5. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of Defective Work, disposal of

materials or equipment wrongly supplied, and making good any damage to property; and

6. Other overhead or general expense costs of any kind and the cost of any item not specifically and expressly included in Paragraph 11.4.

#### 11.6 CONTRACTOR'S EXTRA WORK REPORT

- A. In order to be paid for extra work, the CONTRACTOR must submit a daily extra work report on the form furnished by the ENGINEER. The form must be completely filled out based on the provisions of Paragraphs 11.3 through 11.5 and signed by the CONTRACTOR and ENGINEER at the end of each work day. Failure to complete the form and obtain appropriate signatures by the next working day after the extra work of the previous day was completed will result in CONTRACTOR's costs for extra work being disallowed.

### ARTICLE 12 -- CHANGE OF CONTRACT TIMES

#### 12.1 GENERAL

- A. The Contract Times may only be changed by a Change Order. Any claim for an extension of the Contract Times shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 10 days) after the start of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within 30 days after the start of such event (unless the ENGINEER allows an additional period of time for the submission of additional or more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR is entitled as a result of said event. All claims for adjustment in the Contract Times will be determined by the ENGINEER. No claim for an adjustment in the Contract Times will be valid if not submitted in accordance with the requirements of this Paragraph 12.1 A. An increase in Contract Times does not mean that the CONTRACTOR is due an increase in Contract Price. Only compensable time extensions will result in an increase in Contract Price.
- B. All time limits stated in the Contract Documents are of the essence of the Agreement.
- C. When CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost on the critical path of the WORK due to such delay, if a claim is made therefor as provided in Paragraph 12.1.A. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER; acts or neglect of those performing other work as contemplated by Article 7; and fires, floods, epidemics, terrorist acts, acts of the public enemy, acts of war, abnormal weather conditions, or acts of God. Delays attributable to and within the control of any Subcontractor or Supplier shall be deemed to be delays within the control of the CONTRACTOR.
- D. In no event will OWNER be liable to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them, for any increase in the Contract Price or other damages arising out or resulting from the following:
  1. Delays caused by or within the control of CONTRACTOR; or

2. Delays beyond the control of both OWNER and CONTRACTOR including but not limited to fires, floods, epidemics, terrorist acts, acts of the public enemy, acts of war, abnormal weather conditions, acts of God, or acts or neglect by those performing other work as contemplated by Article 7.

## 12.2 EXTENSIONS OF CONTRACT TIMES FOR DELAY DUE TO WEATHER

- A. The CONTRACTOR's construction schedule shall anticipate delay due to unusually severe weather. The number of days of anticipated delay is set forth in the Supplementary General Conditions.
- B. Contract Times may be extended by the ENGINEER because of delays in excess of the anticipated delay. The CONTRACTOR shall, within 10 days of the beginning of any such delay, notify the ENGINEER in writing and request an extension of Contract Times. The ENGINEER will ascertain the facts and the extent of the delay and extend the Contract Times when, in its judgement, the findings of the fact justify such an extension.

## **ARTICLE 13 -- INSPECTIONS AND TESTS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK**

### 13.1 NOTICE OF DEFECTIVE WORK

- A. Prompt notice of Defective Work known to the OWNER or ENGINEER will be given to the CONTRACTOR. All Defective Work, whether or not in place, may be rejected, corrected, or accepted as provided in this Article 13. Defective Work may be rejected even if approved by prior inspection.

### 13.2 ACCESS TO WORK

- A. OWNER, ENGINEER, their consultants, subconsultants, other representatives and personnel of OWNER, independent testing laboratories, and governmental agencies with jurisdictional interests shall have access to the WORK at reasonable times for their observation, inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's Site safety procedures and programs so that they may comply therewith as applicable.

### 13.3 INSPECTIONS AND TESTS

- A. The CONTRACTOR shall give the ENGINEER not less than 24 hours notice of readiness of the WORK for all required inspections, tests, or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. The OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
  1. For inspection, tests, or approvals covered by Paragraphs 13.3C. and 13.3D. below;
  2. That costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.3G. shall be paid as provided in said Paragraph 13.3G.; and
  3. As otherwise provided in the Contract Documents.
- C. If Laws and Regulations of any public body having jurisdiction require any WORK (or any part thereof) to be inspected, tested, or approved by an employee or other representative

of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests or approvals; pay all costs in connection therewith; and furnish the ENGINEER the required certificates of inspection or approval.

- D. The CONTRACTOR shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for the ENGINEER's acceptance of materials or equipment to be incorporated in the WORK or acceptance of materials, mix designs, or equipment submitted for approval prior to the CONTRACTOR's purchase thereof for incorporation in the WORK. Such inspections, tests, or approvals shall be performed by organizations acceptable to the ENGINEER.
- E. The ENGINEER will make, or have made, such inspections and tests as the ENGINEER deems necessary to see that the WORK is being accomplished in accordance with the requirements of the Contract Documents. Unless otherwise specified in the Supplementary General Conditions, the cost of such inspection and testing will be borne by the OWNER. In the event such inspections or tests reveal non-compliance with the requirements of the Contract Documents, the CONTRACTOR shall bear the cost of corrective measures deemed necessary by the ENGINEER, as well as the cost of subsequent reinspection and retesting. Neither observations by the ENGINEER nor inspections, tests, or approvals by others shall relieve the CONTRACTOR from the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.
- F. If any WORK (including the work of others) that is to be inspected, tested, or approved is covered without written concurrence of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for observation. Such uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the ENGINEER not less than 24 hours notice of the CONTRACTOR's intention to perform such test or to cover the same and the ENGINEER has not acted with reasonable promptness in response to such notice.
- G. If any WORK is covered contrary to the written request of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for the ENGINEER's observation and recovered at the CONTRACTOR's expense.
- H. If the ENGINEER considers it necessary or advisable that covered WORK be observed by the ENGINEER or inspected or tested by others, the CONTRACTOR, at the ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, material, and equipment. If it is found that such work is Defective Work, the CONTRACTOR shall bear all direct, indirect, and consequential costs and damages of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction, including but not limited to, fees and charges of engineers, architects, attorneys, and other professionals. However, if such work is not found to be Defective Work, the CONTRACTOR will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, the CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

#### 13.4 OWNER MAY STOP THE WORK

- A. If Defective Work is identified, the OWNER may order the CONTRACTOR to stop performance of the WORK, or any portion thereof, until the cause for such order has been eliminated; however, this right of the OWNER to stop the WORK shall not give rise to any duty on the part of the OWNER to exercise this right for the benefit of the CONTRACTOR or any other party.

#### 13.5 CORRECTION OR REMOVAL OF DEFECTIVE WORK

- A. If required by the ENGINEER, the CONTRACTOR shall promptly either correct all Defective Work, whether or not fabricated, installed, or completed, or, if the work has been rejected by the ENGINEER, remove it from the Site and replace it with non-defective WORK. The CONTRACTOR shall bear all direct, indirect, and consequential costs and damages of such correction or removal, including but not limited to fees and charges of engineers, architects, attorneys, and other professionals made necessary thereby.

#### 13.6 ACCEPTANCE OF DEFECTIVE WORK

- A. If, instead of requiring correction or removal and replacement of Defective Work, the OWNER prefers to accept the Defective Work, the OWNER may do so. The CONTRACTOR shall bear all direct, indirect, and consequential costs attributable to the OWNER's evaluation of and determination to accept such Defective Work. If any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK, and the OWNER shall be entitled to an appropriate decrease in the Contract Price.

#### 13.7 OWNER MAY CORRECT DEFECTIVE WORK

- A. If the CONTRACTOR fails within a reasonable time after written notice from the ENGINEER to correct Defective Work, or to remove and replace Defective Work as required by the ENGINEER in accordance with Paragraph 13.5A., or if the CONTRACTOR fails to perform the WORK in accordance with the Contract Documents, or if the CONTRACTOR fails to comply with any other provision of the Contract Documents, the OWNER may, after seven days written notice to the CONTRACTOR, correct and remedy any such deficiency.
- B. In exercising the rights and remedies under this paragraph, the OWNER shall proceed with corrective and remedial action. In connection with such corrective and remedial action, the OWNER may exclude the CONTRACTOR from all or part of the Site, take possession of all or part of the WORK, and suspend the CONTRACTOR's services related thereto and incorporate in the WORK all materials and equipment for which the OWNER has paid the CONTRACTOR whether stored at the Site or elsewhere. The CONTRACTOR shall provide the OWNER, OWNER's representatives, ENGINEER, and ENGINEER's consultants access to the Site to enable OWNER to exercise the rights and remedies under this paragraph.
- C. All direct, indirect, and consequential costs and damages incurred by the OWNER in exercising the rights and remedies under this paragraph will be charged against the CONTRACTOR and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK; and the OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, the OWNER may make a claim therefor as provided in Article 11. Such claim will include, but not be limited to, all costs of repair or replacement of work of others, destroyed or damaged by correction, removal, or replacement of

CONTRACTOR's Defective Work and all direct, indirect, and consequential damages associated therewith.

- D. The CONTRACTOR shall not be allowed an extension of Contract Times (or Milestones) because of any delay in the performance of the WORK attributable to the exercise by OWNER of OWNER's rights and remedies under this paragraph.

### 13.8 CORRECTION PERIOD

- A. The correction period for period following acceptance of the WORK in which the CONTRACTOR shall be required to correct Defective Work shall be the longer of:
1. One year after the date of final acceptance of the entire WORK;
  2. Such time as may be prescribed by Laws and Regulations;
  3. Such time as specified by the terms of any applicable special guarantee required by the Contract Documents; or
  4. Such time as specified by any specific provision of the Contract Documents.
- B. If, during the correction period as defined in Paragraph 13.8A above, any work is found to be Defective Work, the OWNER shall have the same remedies as set forth in Paragraphs 13.5, 13.6, and 13.7 above.
- C. Where Defective Work (and damage to other work resulting therefrom) has been corrected, removed, or replaced under this paragraph, the correction period hereunder with respect to such work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

## ARTICLE 14 -- PAYMENTS TO CONTRACTOR AND COMPLETION

### 14.1 SCHEDULE OF VALUES (LUMP SUM PRICE BREAKDOWN)

- A. The schedule of values or lump sum price breakdown established as provided in the General Requirements shall serve as the basis for progress payments and shall be incorporated into a form of Application for Payment acceptable to the ENGINEER.

### 14.2 UNIT PRICE BID SCHEDULE

- A. Progress payments on account of unit price work will be based on the number of units completed as verified by the ENGINEER in accordance with Section 01025 – Measurement and Payment. The ENGINEER's determination of quantities shall be final and binding on the parties.

### 14.3 APPLICATION FOR PROGRESS PAYMENT

- ~~A. Unless otherwise prescribed by law, on~~ On the 25th of each month, the CONTRACTOR shall submit to the ENGINEER for review, the Application for Payment filled out and signed by the CONTRACTOR covering the WORK completed as of the date of the Application for Payment and accompanied by such supporting documentation as is required by the Contract Documents. As a minimum, the CONTRACTOR shall include, but not be limited to, the following supporting documentation:

1. Documentation of value of materials stored at the Site in accordance with Article 14 – General Conditions.
  2. Quarterly State Water Resources Control Board Form UR 334 (MBE/WBE payments) in accordance with Article 14 – General Conditions.
  3. Certified payroll records in accordance with Article 14 – General Conditions.
  4. Record drawing update in accordance with Section 01300 – Contractor Submittals.
  5. CPM schedule update in accordance with Section 01311 – CPM Construction Schedule.
  6. Certificates or other evidence of that any insurance policy that will expire in the next 30 days.
  7. Conditional waiver and release of lien upon progress payment forms from all Subcontractors and Suppliers included in the current payment application.
  8. Unconditional waiver and release of lien upon progress payment forms from all Subcontractors and Suppliers included in the previous month's payment application.
- B. The Application for Payment shall identify, as a subtotal, the amount of the CONTRACTOR total earnings to date; plus the value of materials stored at the Site which have not yet been incorporated in the WORK; and less a deductive adjustment for materials installed which were not previously incorporated in the WORK, but for which payment was allowed under the provisions for payment for materials stored at the Site, but not yet incorporated in the WORK.
- C. The Application for Payment shall show the net payment due claimed by the CONTRACTOR, shall be the above-mentioned subtotal, from which shall be deducted the amount of retainage specified in the Supplementary General Conditions and the total amount of all previous payments made to the CONTRACTOR.
- D. The value of materials stored at the Site shall be an amount equal to the specified percent of the value of such materials as set forth in the Supplementary General Conditions. Said amount shall be based upon the value of all acceptable materials and equipment not incorporated in the WORK but delivered and suitably stored at the Site or at another location agreed to in writing; provided, each such individual item has a value of more than \$5,000 and will become a permanent part of the WORK. The Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that the CONTRACTOR has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the OWNER's interest therein, all of which will be satisfactory to the OWNER. At the OWNER's request, the CONTRACTOR shall execute a security agreement and UCC-1 Financing Statement as a condition of receiving payment for materials stored at another location.

#### 14.4 CONTRACTOR'S WARRANTY OF TITLE

- A. The CONTRACTOR warrants and guarantees that title to all WORK, materials, and equipment covered by an Application for Payment, whether incorporated in the WORK or not, will pass to the OWNER no later than the time of payment, free and clear of all Liens.

#### 14.5 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT

- A. The ENGINEER will, within 7 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the application to the OWNER, or return the application to the CONTRACTOR indicating in writing the ENGINEER's reasons for refusing to recommend payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the application. If the ENGINEER still disagrees with a portion of the application, it will submit the application recommending the undisputed portion of the application to the OWNER for payment and provide reasons for recommending non-payment of the disputed amount. Thirty days after presentation of the Application for Payment with the ENGINEER's recommendation to the OWNER, the amount recommended will (subject to the provisions of Paragraph 14.5B.) become due and when due will be paid by the OWNER to the CONTRACTOR.
- B. The ENGINEER, in its discretion, may refuse to recommend the whole or any part of any payment. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:
  - 1. The work is Defective Work or the completed WORK has been damaged requiring correction or replacement.
  - 2. The Contract Price has been reduced by written amendment or Change Order.
  - 3. The OWNER has been required to correct Defective Work or complete WORK in accordance with Paragraph 13.7.
  - 4. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.1 through 15.4 inclusive.
- C. The OWNER may refuse to make payment of the full amount recommended by the ENGINEER because:
  - 1. Claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the WORK.
  - 2. Liens have been filed in connection with the WORK, except where CONTRACTOR has delivered a specific Bond satisfactory to OWNER to secure the satisfaction and discharge of such Liens.
  - 3. There are other items entitling OWNER to a set-off against the amount recommended, or
  - 4. OWNER has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.5B. through 14.5C and 15.1 through 15.4 inclusive.

The OWNER must give the CONTRACTOR immediate written notice (with a copy to the ENGINEER) stating the reasons for such action and promptly pay the CONTRACTOR the

amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

#### 14.6 SUBSTANTIAL COMPLETION

~~A. When the CONTRACTOR considers the WORK ready for its intended use, the CONTRACTOR shall notify the OWNER and the ENGINEER in writing that the WORK is substantially complete. The CONTRACTOR shall attach to this request a list of all work items that remain to be completed and a request that the ENGINEER prepare a Notice of Completion. Within a reasonable time thereafter, the OWNER, the CONTRACTOR, and the ENGINEER shall make an inspection of the WORK to determine the status of completion. If the ENGINEER does not consider the WORK substantially complete, or the list of remaining work items to be comprehensive, the ENGINEER will notify the CONTRACTOR in writing giving the reasons therefor. If the ENGINEER considers the WORK substantially complete, the ENGINEER will prepare and deliver to the OWNER for its execution and recordation the Notice of Completion signed by the ENGINEER and CONTRACTOR, which shall fix the date of Substantial Completion.~~

A. When the CONTRACTOR considers the WORK is Substantially Complete, the CONTRACTOR shall notify the ENGINEER in writing. Upon receipt of the written notice, the ENGINEER will conduct an inspection to determine whether the WORK and administrative requirements are sufficiently complete in accordance with the Contract Documents so the OWNER can occupy or utilize the WORK for its intended use. If items are found which prevent such occupancy or utilization, the ENGINEER will issue the CONTRACTOR a preliminary punch list of deficiencies.

B. Upon completion of the preliminary punch list items, the CONTRACTOR shall notify the ENGINEER in writing. The ENGINEER will conduct an inspection of the WORK to determine its acceptability for Substantial Completion and to identify any items that do not meet the requirements of the Contract Documents. If the ENGINEER concludes that the WORK is Substantially Complete, the ENGINEER will prepare a Certificate of Substantial Completion and a final punch list of any deficiencies to be remedied. The Certificate shall establish the date of Substantial Completion and the responsibilities of the CONTRACTOR and OWNER for security, maintenance, heat, utilities, damage to the WORK, and insurance, commencement of warranties required by the Contract Documents, and shall fix the time, not to exceed 60 days, within which the CONTRACTOR shall finish all items on the final punch list or remaining work or administrative requirements accompanying the Certificate. When the preceding provisions have been approved by both the OWNER and the CONTRACTOR, they shall sign the Certificate to acknowledge their written acceptance of the responsibilities assigned to them in the subject Certificate. By such acknowledgement, the CONTRACTOR agrees to pay the OWNER's actual costs including, but not limited to, charges for engineering, inspection, and administration incurred due to failure to complete the punch list within the time period provided in the Certificate.

#### 14.7 PARTIAL UTILIZATION

A. The OWNER shall have the right to utilize or place into service any item of equipment or other usable portion of the WORK prior to completion of the WORK. Whenever the OWNER plans to exercise said right, the CONTRACTOR will be notified in writing by the OWNER, identifying the specific portion or portions of the WORK to be so utilized or otherwise placed into service.

- B. It shall be understood by the CONTRACTOR that until such written notification is issued, all responsibility for care and maintenance of all of the WORK shall be borne by the CONTRACTOR. Upon issuance of said written notice of Partial Utilization, the OWNER will accept responsibility for the protection and maintenance of all such items or portions of the WORK described in the written notice.
- C. The CONTRACTOR shall retain full responsibility for satisfactory completion of the WORK, regardless of whether a portion thereof has been partially utilized by the OWNER, and the CONTRACTOR's one year correction period shall commence only after the date of Substantial Completion for the WORK.

#### 14.8 FINAL APPLICATION FOR PAYMENT

- A. After the CONTRACTOR has completed all of the remaining work items referred to in Paragraph 14.6 and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in the General Requirements), and other documents, all as required by the Contract Documents, and after the ENGINEER has indicated that the WORK is acceptable, the CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to the OWNER) of all Liens-claims arising out of or filed in connection with the WORK.

#### 14.9 FINAL PAYMENT AND ACCEPTANCE

- A. Upon completion of the WORK, including all items of the final punch list of deficiencies and upon completion of final cleaning, the CONTRACTOR shall notify the ENGINEER in writing. Upon receipt of the written notice, the OWNER and ENGINEER will conduct the final inspection to determine the actual conformance of the WORK to the requirements of the Contract Documents.

- B. Upon confirmation by the OWNER and ENGINEER that a satisfactory final inspection has been conducted, the CONTRACTOR shall submit a request for final payment to the OWNER. The request shall include a completed and signed Application for Payment and shall include, but not be limited to, the following documentation:

1. Quarterly State Water Resources Control Board Form UR 334 (MBE/WBE payments) in accordance with Article 14 – General Conditions.
2. Certified payroll records in accordance with Article 14 – General Conditions.
3. Final technical manual in accordance with Section 01300 – Contractor Submittals.
4. Final record drawings in accordance with Section 01300 – Contractor Submittals.
5. Final CPM schedule in accordance with Section 01311 – CPM Construction Schedule showing the sequence of work as actually constructed.
6. Certificates or other evidence of that any insurance policy that will expire in the next 30 days.
7. Conditional waiver and release of lien upon progress payment forms from all Subcontractors and Suppliers included in the current payment application.

8. Unconditional waiver and release of lien upon progress payment forms from all Subcontractors and Suppliers included in the previous month's payment application.
  9. The Warranty Form, complete and executed on behalf of the CONTRACTOR.
  10. An inventory of all spare parts and maintenance materials the CONTRACTOR has provided the OWNER.
  11. As a condition of final payment, the CONTRACTOR shall be required to execute a release on the form provided by OWNER, releasing the OWNER from any and all claims of liability for payment on the Project except for such amounts as may be specifically described and excluded from the release.
- AC. If, on the basis of the ENGINEER's observation of the WORK during construction and final inspection, and the ENGINEER's review of the final Application for Payment and accompanying documentation, all as required by the Contract Documents, the ENGINEER is satisfied that the WORK has been completed and the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the ENGINEER will, within 14 days after receipt of the final Application for Payment, indicate in writing the ENGINEER's recommendation of payment and present the application to the OWNER for payment.
- D. Following receipt of all required submittals and the ENGINEER's written statement that the construction is complete, and the OWNER accepts the WORK, the OWNER will file a Notice of Completion.
- BE. ~~After acceptance of the WORK by the OWNER's governing body~~ Thirty-five days after recording the Notice of Completion, the OWNER will make final payment to the CONTRACTOR of the amount remaining after deducting all prior payments and all amounts to be kept or retained under the provisions of the Contract Documents, including the following items:
1. Liquidated damages, as applicable;
  2. Amounts withheld by OWNER under Paragraph 14.5B. and Paragraph 14.5C. which have not been released; and
  3. ~~Two times~~ One hundred fifty percent of the value of outstanding items of correction work or punch list items yet uncompleted or uncorrected, as applicable. All such work shall be completed or corrected to the satisfaction of the OWNER within the time stated on the Notice of Completion, otherwise the CONTRACTOR does hereby waive any and all claims to all monies withheld by the OWNER to cover the value of all such uncompleted or uncorrected items.
- C. ~~As a condition of final payment, the CONTRACTOR shall be required to execute a release on the form provided by OWNER, releasing the OWNER from any and all claims of liability for payment on the Project except for such amounts as may be specifically described and excluded from the release.~~

## 14.10 RELEASE OF RETAINAGE AND OTHER DEDUCTIONS

- A. After executing the necessary documents to initiate the Lien period, and not more than 45 days thereafter (based on a 30-day Lien filing period and 15-day processing time), the OWNER will release to the CONTRACTOR the retainage funds withheld pursuant to the Agreement, less any deductions withheld in accordance with Paragraph 14.9E. ~~to cover pending claims against the OWNER pursuant to Paragraph 14.5C.~~
- B. After filing of the necessary documents to initiate the Lien period, the CONTRACTOR shall have 30 days to complete any outstanding items of correction work remaining to be completed or corrected as listed on a final punch list made a part of the Notice of Completion. Upon expiration of the 45 days, referred to in Paragraph 14.10A., the amounts withheld pursuant to the provisions of Paragraph 14.9B9E. herein, for all remaining work items will be returned to the CONTRACTOR; provided, that said work has been completed or corrected to the satisfaction of the OWNER within said 30 days. Otherwise, the CONTRACTOR does hereby waive any and all claims for all monies withheld by the OWNER under this Agreement to cover two times the value of such remaining uncompleted or uncorrected items.

## ARTICLE 15 -- SUSPENSION OF WORK AND TERMINATION

### 15.1 SUSPENSION OF WORK BY OWNER

- A. The OWNER may, at any time and without cause, suspend the WORK or any portion thereof for a period of not more than 90 days by notice in writing to the CONTRACTOR. The CONTRACTOR shall resume the WORK on receipt of a notice of resumption of work. The CONTRACTOR will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if the CONTRACTOR makes an approved claim therefor as provided in Articles 11 and 12.

### 15.2 TERMINATION OF AGREEMENT BY OWNER FOR DEFAULT

- A. In the event of default by the CONTRACTOR, the OWNER may give seven days written notice to the CONTRACTOR of OWNER's intent to terminate the Agreement and provide the CONTRACTOR an opportunity to remedy the conditions constituting the default within a specified period of time. It will be considered a default by the CONTRACTOR whenever CONTRACTOR shall:
1. Declare bankruptcy, become insolvent, or assign its assets for the benefit of its creditors;
  2. Disregard or violate the Laws or Regulations of any public body having jurisdiction;
  3. Fail to provide materials or workmanship meeting the requirements of the Contract Documents;
  4. Disregard or violate provisions of the Contract Documents or ENGINEER's instructions;
  5. Fail to prosecute the WORK according to the approved progress schedule;
  6. Fail to provide a qualified superintendent, competent workmen, or materials or equipment meeting the requirements of the Contract Documents; or
  7. Disregard the authority of the ENGINEER.

- B. If the CONTRACTOR fails to remedy the conditions constituting default within the time allowed, the OWNER may then issue the notice of termination.
- C. In the event the Agreement is terminated in accordance with Paragraph 15.2A., herein, the OWNER may take possession of the WORK and may complete the WORK by whatever method or means the OWNER may select. The cost of completing the WORK will be deducted from the balance which would have been due the CONTRACTOR had the Agreement not been terminated and the WORK completed in accordance with the Contract Documents. If such cost exceeds the balance which would have been due, the CONTRACTOR shall pay the excess amount to the OWNER. If such cost is less than the balance which would have been due, the CONTRACTOR shall not have claim to the difference.

### 15.3 TERMINATION OF AGREEMENT BY OWNER FOR CONVENIENCE

- A. Upon seven days written notice to the CONTRACTOR and the ENGINEER, the OWNER may, without cause and without prejudice to any other right or remedy of the OWNER, elect to terminate the Agreement. In such case, the CONTRACTOR shall be paid (without duplication of any items):
  - 1. For completed and acceptable WORK executed in accordance with the Contract Documents, prior to the effective date of termination, including fair and reasonable sums for overhead and profit of such WORK;
  - 2. For expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted WORK, plus fair and reasonable sums for overhead and profit on such expenses;
  - 3. For all reasonable claims, costs, losses, and damages incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
  - 4. For reasonable expenses directly attributable to termination.

CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

### 15.4 WRONGFUL TERMINATION

- A. If the OWNER terminates the CONTRACTOR for default, and it is later determined that the termination was wrongful, such termination for default shall automatically be converted to and treated as termination for convenience. In such event, the CONTRACTOR shall be entitled to receive only the amounts payable under this section, and the CONTRACTOR specifically waives any claim for any other amounts or damages, including, but not limited to, any claim for lost profits or other economic loss resulting from the termination.

#### ~~15.4 TERMINATION OF AGREEMENT BY CONTRACTOR~~

- ~~A. The CONTRACTOR may terminate the Agreement upon 14 days written notice to the OWNER, whenever:~~
- ~~1. The WORK has been suspended under the provisions of Paragraph 15.1, herein, for more than 90 consecutive days through no fault or negligence of the CONTRACTOR, and notice to resume work or to terminate the Agreement has not been received from the OWNER within this time period; or~~
  - ~~2. The OWNER should fail to pay the CONTRACTOR any monies due him in accordance with the terms of the Contract Documents and within 60 days after presentation to the OWNER by the CONTRACTOR of a request therefor, unless within said 14-day period the OWNER shall have remedied the condition upon which the payment delay was based.~~
- ~~B. In the event of such termination, the CONTRACTOR shall have no claims against the OWNER except for those claims specifically enumerated in Paragraph 15.3, herein, and as determined in accordance with the requirements of said paragraph.~~

#### **ARTICLE 16 -- MISCELLANEOUS**

##### **16.1 GIVING NOTICE**

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice. A notice sent by facsimile will be deemed delivered upon receipt. A notice sent by recognized overnight delivery service will be deemed delivered the next business day after the notice is sent to the last business address known to the giver of the notice.

##### **16.2 TITLE TO MATERIALS FOUND ON THE WORK**

- A. The OWNER reserves the right to retain title to all soils, stone, sand, gravel, and other materials developed and obtained from excavations and other operations connected with the WORK. Unless otherwise specified in the Contract Documents, neither the CONTRACTOR nor any Subcontractor shall have any right, title, or interest in or to any such materials. The CONTRACTOR will be permitted to use in the WORK, without charge, any such materials which meet the requirements of the Contract Documents.

### 16.3 RIGHT TO AUDIT

- A. ~~If the CONTRACTOR submits a claim to the OWNER for additional compensation, the OWNER shall have the right, as a condition to considering the claim, and as a basis for evaluation of the claim, and until the claim has been settled, to audit the CONTRACTOR's books to the extent they are relevant. The OWNER, the State of California, and other public agencies having jurisdiction over the Project shall have the right to examine, audit, and copy the CONTRACTOR's books and financial records related the Project. This right shall include the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to discover and verify all direct and indirect costs of whatever nature claimed to have been incurred or anticipated to be incurred and for which the claim has been submitted. The right to audit shall include the right to inspect the CONTRACTOR's plant, or such parts thereof, as may be or have been engaged in the performance of the WORK. The CONTRACTOR further agrees that the right to audit encompasses all subcontracts and is binding upon Subcontractors. The rights to examine and inspect herein provided for shall be exercisable through such representatives as the OWNER deems desirable during the CONTRACTOR's normal business hours at the office of the CONTRACTOR. The CONTRACTOR shall make available to the OWNER for auditing, all relevant accounting records and documents, and other financial data, and upon request, shall submit true copies of requested records to the OWNER.~~

### 16.4 SURVIVAL OF OBLIGATIONS

- A. All representations, indemnifications, warranties, and guaranties made in, required by or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the WORK or termination or completion of the Agreement.

### 16.5 CONTROLLING LAW

- A. This Agreement is to be governed by the law of the State of California. ~~state in which the Project is located.~~

### 16.6 SEVERABILITY

- A. If any term or provision of this Agreement is declared invalid or unenforceable by any court of lawful jurisdiction, the remaining terms and provisions of the Agreement shall not be affected thereby and shall remain in full force and effect.

### 16.7 WAIVER

- A. The waiver by the OWNER of any breach or violation of any term, covenant or condition of this Agreement or of any provision, ordinance, or law shall not be deemed to be a waiver of any other term, covenant, condition, ordinance, or law or of any subsequent breach or violation of the same or of any other term, covenant, condition, ordinance, or law. The subsequent payment of any monies or fee by the OWNER which may become due hereunder shall not be deemed to be a waiver of any preceding breach or violation by CONTRACTOR or any term, covenant, condition of this Agreement or of any applicable law or ordinance.

## ARTICLE 17 -- CALIFORNIA STATE REQUIREMENTS

### 17.1 STATE WAGE DETERMINATIONS

- A. As required by Section 1770 and following, of the California Labor Code, the CONTRACTOR shall pay not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations. Copies of such prevailing rate of per diem wages are on file at the office of the OWNER, which copies shall be made available to any interested party on request. The CONTRACTOR shall post a copy of such determination at each job site.
- B. In accordance with Section 1775 of the California Labor Code, the CONTRACTOR shall, as a penalty to the OWNER, forfeit not more than \$50.00 for each calendar day or portion thereof, for each worker paid less than the prevailing rates as determined by the Director for the work or craft in which the worker is employed for any public work done under the contract by him or her or by any subcontractor under him or her.

### 17.2 WORKERS' COMPENSATION

- A. In accordance with the provisions of Section 3700 of the California Labor Code, the CONTRACTOR shall secure the payment of compensation to its employees.
- B. Prior to beginning work under the Contract, the CONTRACTOR shall sign and file with the OWNER the following certification:

"I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the WORK of this Contract."

- C. Notwithstanding the foregoing provisions, before the Contract is executed on behalf of the OWNER, a bidder to whom a contract has been awarded shall furnish satisfactory evidence that it has secured in the manner required and provided by law the payment of workers' compensation.

### 17.3 APPRENTICES ON PUBLIC WORKS

- A. The CONTRACTOR shall comply with all applicable provisions of Section 1777.5 of the California Labor Code relating to employment of apprentices on public works.

### 17.4 WORKING HOURS

- A. The CONTRACTOR shall comply with all applicable provisions of Section 1810 to 1815, inclusive, of the California Labor Code relating to working hours. The CONTRACTOR shall, as a penalty to the OWNER, forfeit \$25.00 for each worker employed in the execution of the Contract by the CONTRACTOR or by any subcontractor for each calendar day during which such worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week, unless such worker receives compensation for all hours worked in excess of 8 hours at not less than 1-1/2 times the basic rate of pay.

**17.5 CONTRACTOR NOT RESPONSIBLE FOR DAMAGE RESULTING FROM CERTAIN ACTS OF GOD**

- A. As provided in Section 7105 of the California Public Contract Code, the CONTRACTOR shall not be responsible for the cost of repairing or restoring damage to the WORK which damage is determined to have been proximately caused by an act of God, in excess of 5 percent of the contracted amount, provided, that the WORK damaged was built in accordance with accepted and applicable building standards and the plans and specifications of the OWNER. The CONTRACTOR shall obtain insurance to indemnify the OWNER for any damage to the WORK caused by an act of God if the insurance premium is a separate bid item in the bidding schedule for the WORK. For purposes of this Section, the term "acts of God" shall include only the following occurrences or conditions and effects: earthquakes in excess of a magnitude of 3.5 on the Richter Scale and tidal waves.

**17.6 NOTICE OF COMPLETION**

- A. In accordance with the Sections 3086 and 3093 of the California Civil Code, within 10 days after date of acceptance of the WORK by the OWNER's governing body, the OWNER will file, in the County Recorder's office, a Notice of Completion of the WORK.

**17.7 UNPAID CLAIMS**

- A. If, at any time prior to the expiration of the period for service of a stop notice, there is served upon the OWNER a stop notice as provided in Sections 3179 and 3210 of the California Civil Code, the OWNER shall, until the discharge thereof, withhold from the monies under its control so much of said monies due or to become due to the CONTRACTOR under this Contract as shall be sufficient to answer the claim stated in such stop notice and to provide for the reasonable cost of any litigation thereunder; provided, that if the ENGINEER shall, in its discretion, permit CONTRACTOR to file with the OWNER the bond referred to in Section 3196 of the Civil Code of the State of California, said monies shall not thereafter be withheld on account of such stop notice.

**17.8 CONCRETE FORMS, FALSEWORK, AND SHORING**

- A. The CONTRACTOR shall comply fully with the requirements of Section 1717 of the Construction Safety Orders, State of California, Department of Industrial Relations, regarding the design of concrete forms, falsework and shoring, and the inspection of same prior to placement of concrete. Where the said Section 1717 requires the services of a civil engineer registered in the State of California to approve design calculations and working drawings of the falsework or shoring system, or to inspect such system prior to placement of concrete, the CONTRACTOR shall employ a registered civil engineer for these purposes, and all costs therefore shall be included in the price named in the Contract for completion of the WORK as set forth in the Contract Documents.

**17.9 RETAINAGE FROM MONTHLY PAYMENTS**

- A. Pursuant to Section 22300 of the California Public Contract Code, the CONTRACTOR may substitute securities for any money withheld by the OWNER to insure performance under the Contract. At the request and expense of the CONTRACTOR, securities equivalent to the amount withheld shall be deposited with the OWNER or with a state or federally chartered bank in California as the escrow agent, who shall return such securities to the CONTRACTOR upon satisfactory completion of the Contract.

- B. Alternatively, the CONTRACTOR may request and the OWNER shall make payment of retentions earned directly to the escrow agent at the expense of the CONTRACTOR. At the expense of the CONTRACTOR, the CONTRACTOR may direct the investment of the payments into securities and the CONTRACTOR shall receive the interest earned on the investments upon the same terms provided for in this section for securities deposited by the CONTRACTOR. Upon satisfactory completion of the Contract, the CONTRACTOR shall receive from the escrow agent all securities, interest, and payments received by the escrow agent from the OWNER, pursuant to the terms of this section. The CONTRACTOR shall pay to each subcontractor, not later than 20 days of receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each subcontractor, on the amount of retention withheld to insure the performance of the CONTRACTOR.
- C. Securities eligible for investment under Section 22300 shall be limited to those listed in Section 16430 of the Government Code and to bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the CONTRACTOR and the OWNER.

#### 17.10 PUBLIC WORKS CONTRACTS; ASSIGNMENT TO AWARDING BODY

- A. In accordance with Section 7103.5 of the California Public Contract Code, the CONTRACTOR and Subcontractors shall conform to the following requirements. In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the CONTRACTOR or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the CONTRACTOR, without further acknowledgement by the parties.

#### 17.11 PAYROLL RECORDS; RETENTION; INSPECTION; NONCOMPLIANCE PENALTIES; RULES AND REGULATIONS

- A. In accordance with Section 1776 of the California Labor Code the CONTRACTOR and each Subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:
  - 1. The information contained in the payroll record is true and correct.
  - 2. The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project.
- B. The payroll records enumerated under Paragraph 17.11A shall be certified and shall be available for inspection at all reasonable hours at the principal office of the CONTRACTOR on the following basis:
  - 1. A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.

2. A certified copy of all payroll records enumerated in Paragraph 17.11A shall be made available for inspection or furnished upon request to a representative of the body awarding the contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.
  3. A certified copy of all payroll records enumerated in Paragraph 17.11A shall be made available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the body awarding the contract, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to Paragraph 17.11B2 the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the CONTRACTOR, Subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the CONTRACTOR.
- C. The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.
  - D. Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of the CONTRACTOR awarded the contract or performing the contract shall not be marked or obliterated.
  - E. The CONTRACTOR shall inform the body awarding the contract of the location of the records enumerated under Paragraph 17.11A including the street address, city and county, and shall, within 5 working days, provide a notice of change of location and address.
  - F. The CONTRACTOR shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects the CONTRACTOR must comply with this Section. In the event that the CONTRACTOR fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars (\$25.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section.

#### 17.12 CULTURAL RESOURCES

- A. The CONTRACTOR's attention is directed to the provisions of the Clean Water Grant Program Bulletin 76A which augments the National Historic Preservation Act of 1966 (16 U.S.C. 470) as specified under Section 01560 - Temporary Environmental Controls, of the General Requirements.

#### 17.13 PROTECTION OF WORKERS IN TRENCH EXCAVATIONS

- A. As required by Section 6705 of the California Labor Code and in addition thereto, whenever work under the Contract involves the excavation of any trench or trenches 5 feet or more in depth, the CONTRACTOR shall submit for acceptance by the OWNER or by a registered civil or structural engineer, employed by the OWNER, to whom authority to accept has been delegated, in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation, of such trench or trenches. If such plan varies from the shoring system standards established by the Construction Safety Orders of the Division of Occupational Safety and Health, the plan shall be prepared by a registered civil or structural engineer employed by the CONTRACTOR, and all costs therefore shall be included in the price named in the Contract for completion of the WORK as set forth in the Contract Documents. Nothing in this Section shall be deemed to allow the use of a shoring, sloping, or other protective system less effective than that required by the Construction Safety Orders. Nothing in this Section shall be construed to impose tort liability on the OWNER, the ENGINEER, or any of their officers, agents, representatives, or employees.
- B. Excavation shall not start until the CONTRACTOR has obtained a permit from the California Division of Industrial Safety and has posted it at the site.

#### 17.14 TRAVEL AND SUBSISTENCE PAY

- A. As required by Section 1773.8 of the California Labor Code, the CONTRACTOR shall pay travel and subsistence payments to each workman needed to execute the WORK, as such travel and subsistence payments are defined in the applicable collective bargaining agreements filed in accordance with this Section.
- B. To establish such travel and subsistence payments, the representative of any craft, classification or type of workman needed to execute the contracts shall file with the Department of Industrial Relations fully executed copies of collective bargaining agreements for the particular craft, classification or type of work involved. Such agreements shall be filed within 10 days after their execution and thereafter shall establish such travel and subsistence payments whenever filed 30 days prior to the call for bids.

#### 17.15 REMOVAL, RELOCATION, OR PROTECTION OF EXISTING UTILITIES

- A. In accordance with the provisions of Section 4215 of the California Government Code, any contract to which a public agency as defined in Section 4401 is a party, the public agency shall assume the responsibility, between the parties to the contract, for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the site of any construction project that is a subject of the contract, if such utilities are not identified by the public agency in the plans and specifications made a part of the invitation for bids. The agency will compensate CONTRACTOR for the costs of locating, repairing damage not due to the failure of the CONTRACTOR to exercise reasonable care, and removing or relocating such utility facilities not indicated in the plans and specifications with reasonable accuracy, and for equipment on the project necessarily idled during such work.
- B. The CONTRACTOR shall not be assessed liquidated damages for delay in completion of the project, when such delay was caused by the failure of the public agency or the OWNER of the utility to provide for removal or relocation of such utility facilities.

- C. Nothing herein shall be deemed to require the public agency to indicate the presence of existing service laterals or appurtenances when the presence of such utilities on the site of the construction project can be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, on or adjacent to the site of construction; provided, however, nothing herein shall relieve the public agency from identifying main or trunklines in the plans and specifications.
- D. If the CONTRACTOR while performing the Contract discovers utility facilities not identified by the public agency in the Contract Documents it shall immediately notify the public agency and utility in writing.
- E. The public utility, where they are the OWNER, shall have the sole discretion to perform such repairs or relocation work or permit the CONTRACTOR to do such repairs or relocation work at a reasonable price.

#### 17.16 CONTRACTOR LICENSE REQUIREMENTS

- A. In accordance with Section 7028.15 of the California Business and Professions Code:
- B. It is a misdemeanor for any person to submit a bid to a public agency in order to engage in the business or act in the capacity of a contractor within this state without having a license therefor, except in any of the following cases:
  - 1. The person is particularly exempted from this chapter.
  - 2. The bid is submitted on a state project governed by Section 10164 of the Public Contract Code or any local agency project governed by Section 20103.5 of the Public Contract Code.
- C. If a person has previously been convicted of the offense described in this section, the court shall impose a fine of 20 percent of the price of the contract under which the unlicensed person performed contract work, or four thousand five hundred dollars (\$4,500), whichever is greater, or imprisonment in the county jail for not less than 10 days nor more than six months, or both.
- D. In the event the person performing the contracting work has agreed to furnish materials and labor on an hourly basis, "the price of the contract" for the purpose of this subdivision means the aggregate sum of the cost of materials and labor furnished and the cost of completing the work to be performed.
- E. This section shall not apply to a joint venture license, as required by Section 7029.1. However, at the time of making a bid as a joint venture, each person submitting the bid shall be subject to this section with respect to his or her individual licensure.
- F. This section shall not affect the right or ability of a licensed architect, land surveyor, or registered professional engineer to form joint ventures with licensed contractors to render services within the scope of their respective practices.
- G. Unless one of the foregoing exceptions applies, a bid submitted to a public agency by a contractor who is not licensed in accordance with this chapter shall be considered nonresponsive and shall be rejected by the public agency. Unless one of the foregoing exceptions applies, a local public agency shall, before awarding a contract or issuing a purchase order, verify that the contractor was properly licensed when the contractor submitted the bid. Notwithstanding any other provision of law, unless one of the foregoing exceptions applies, the registrar may issue a citation to any public officer or employee of a

public entity who knowingly awards a contract or issues a purchase order to a contractor who is not licensed pursuant to this chapter. The amount of civil penalties, appeal, and finality of such citations shall be subject to Sections 7028.7 and 7028.13 inclusive. Any contract awarded to, or any purchase order issued to, a contractor who is not licensed pursuant to this chapter is void.

- H. Any compliance or noncompliance with subdivision (F) of this section, as added by Chapter 863 of the Statutes of 1989, shall not invalidate any contract or bid awarded by a public agency during which time that subdivision was in effect.
  - I. A public employee or officer shall not be subject to a citation pursuant to this section if the public employee, officer, or employing agency made an inquiry to the board for the purposes of verifying the license status of any person or contractor and the board failed to respond to the inquiry within three business days. For the purposes of this section, a telephone response by the board shall be deemed sufficient.
- 17.17 DIGGING TRENCHES OR EXCAVATIONS; NOTICE ON DISCOVERY OF HAZARDOUS WASTE MATERIAL OR OTHER UNUSUAL CONDITIONS; INVESTIGATIONS; CHANGE ORDERS; EFFECT ON CONTRACT

- A. If this Contract involves digging trenches or other excavations that extend deeper than four feet below the surface, the following shall apply:
  - 1. The CONTRACTOR shall promptly, and before the following conditions are disturbed, notify the OWNER in writing, of any:
    - a. Material that the CONTRACTOR believes may be material that is hazardous ~~wastematerial~~, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.
    - b. Subsurface or latent physical conditions at the site differing from those indicated.
    - c. Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.
    - d. The OWNER shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous ~~wastematerial~~, and cause a decrease or increase in the CONTRACTOR'S cost of, or the time required for, performance of any part of the work shall issue a change order the procedures described in the Contract.
    - e. In the event that a dispute arises between the OWNER and the CONTRACTOR whether the conditions materially differ, or involve hazardous ~~wastematerial~~, or cause a decrease or increase in the CONTRACTOR'S cost of, or time required for, performance of any part of the work, the CONTRACTOR shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all work to be performed under the Contract. The CONTRACTOR shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

## 17.18 RETENTION PROCEEDS; WITHHOLDING; DISBURSEMENT

- A. In accordance with Section 7107 of the Public Contract Code with respects to all contracts entered into on or after January 1, 1993 relating to the construction of any public work of improvement the following shall apply:
1. The retention proceeds withheld from any payment by the OWNER from the original CONTRACTOR, or by the original CONTRACTOR from any subcontractor, shall be subject to this paragraph 17.18.
  2. Within 60 days after the date of completion of the WORK, the retention withheld by the OWNER shall be released. In the event of a dispute between the OWNER and the original CONTRACTOR, the OWNER may withhold from the final payment an amount not to exceed 150 percent of the disputed amount. For the purposes of this paragraph, "completion" means any of the following:
    - a. The occupation, beneficial use, and enjoyment of a work of improvement, excluding any operation only for testing, startup, or commissioning, by the OWNER, accompanied by cessation of labor on the work of improvement.
    - b. The acceptance by the OWNER of the work of improvement.
    - c. After the commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 100 days or more, due to factors beyond the control of the CONTRACTOR.
    - d. After the commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 30 days or more, if the OWNER files for record a notice of cessation or a notice of completion.
  3. Subject to subparagraph 17.18 A.4, within 10 days from the time that all or any portion of the retention proceeds are received by the original CONTRACTOR, the original CONTRACTOR shall pay each of its subcontractors from whom retention has been withheld, each subcontractor's share of the retention received. However, if a retention payment received by the original CONTRACTOR is specifically designated for a particular subcontractor, payment of the retention shall be made to the designated subcontractor, if the payment is consistent with the terms of the subcontract.
  4. The original CONTRACTOR may withhold from a subcontractor its portion of the retention proceeds if a bona fide dispute exists between the subcontractor and the original CONTRACTOR. The amount withheld from the retention payment shall not exceed 150 percent of the estimated value of the disputed amount.
  5. In the event that retention payments are not made within the time periods required by this paragraph 17.18, the OWNER or original CONTRACTOR shall be subject to a charge of 2 percent per month on the improperly withheld amount, in lieu of any interest otherwise due. Additionally, in any action for the collection of funds wrongfully withheld, the prevailing party shall be entitled to attorney's fees and costs.
  6. Any attempted waiver of the provisions of this section shall be void as against the public policy of this state.

#### 17.19 TIMELY PROGRESS PAYMENTS; INTEREST; PAYMENT REQUESTS

- A. If the OWNER fails to make any progress payment within 30 days after receipt of an undisputed and properly submitted payment request from the CONTRACTOR, the OWNER shall pay interest to the CONTRACTOR equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.
- B. Upon receipt of a payment request, the OWNER shall act in accordance with both of the following:
  - 1. Each payment request shall be reviewed by the OWNER as soon as practicable after receipt for the purpose of determining that the payment request is a proper payment request.
  - 2. Any payment request determined not to be a proper payment request suitable for payment shall be returned to the CONTRACTOR as soon as practicable, but not later than seven days, after receipt. A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.
- C. The number of days available to the OWNER to make a payment without incurring interest pursuant to this paragraph shall be reduced by the number of days by which the OWNER exceeds the seven-day requirement set forth above.
- D. For purposes of this paragraph:
  - 1. A "progress payment" includes all payments due the CONTRACTOR, except that portion of the final payment designated by the contract as retention earnings.
  - 2. A payment request shall be considered properly executed if funds are available for payment of the payment request, and payment is not delayed due to an audit inquiry by the financial officer of the OWNER.

#### 17.20 PREFERENCE FOR MATERIAL

- A. In accordance with Section 3400 of the California Public Contract Code, the CONTRACTOR will be provided a period prior to award of the contract for submission of data substantiating a request for a substitution of an "as-or equal" items.

## 17.21 RESOLUTION OF CONSTRUCTION CLAIMS

A. Any disagreement or dispute regarding the WORK that may lead to a potential construction claim shall be avoided by taking the following successive actions as needed:

1. First, the field staff of the CONTRACTOR and ENGINEER shall conduct good faith negotiation regarding changes in the WORK, Contract Price, and Contract Time in accordance with the requirements of the Contract Documents.
2. Second, if the above negotiation is unsuccessful, the conflict resolution procedures developed in accordance with Section 01120 – Project Partnering shall be implemented.
3. Third, if the above conflict resolution procedures are unsuccessful, the dispute resolution procedures set forth in Section 01110 – Dispute Review Board shall be implemented.

B. If the successive actions specified above are unsuccessful, the OWNER has elected to resolve any disputes arising from or related to the WORK through arbitration before the State of California Office of Administrative Hearings pursuant to Public Contract Code Sections 10240 et seq. and the related regulations.

~~A. In accordance with Section 20104 et. Seq. of the California Public Contract Code. This paragraph 17.21 applies to all claims of \$375,000 or less which arise between the CONTRACTOR and the OWNER under this Contract for:~~

- ~~1. A time extension;~~
- ~~2. Payment of money or damages arising from work done by or on behalf of the CONTRACTOR pursuant to this CONTRACT and payment of which is not otherwise expressly provided for as the CONTRACTOR is not otherwise entitled; or~~
- ~~3. An amount the payment of which is disputed by the OWNER~~

~~B. For any claim set out in Paragraphs 17.21 A.1, 2, or 3 above, the following requirements apply:~~

- ~~1. The claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing herein is intended to extend the time limit or supersede notice requirements otherwise provided by Contract for the filing of claims.~~
- ~~2. For claims of less than fifty thousand dollars (\$50,000), the OWNER shall respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the OWNER may have against the CONTRACTOR.~~

~~If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the OWNER and the CONTRACTOR.~~

~~The OWNER's written response to the claim, as further documented, shall be submitted to the CONTRACTOR within 15 days after receipt of further~~

~~documentation or within a period of time no greater than that taken by the CONTRACTOR in producing the additional information, whichever is greater.~~

- ~~3. For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the shall respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the OWNER may have against the CONTRACTOR.~~

~~If additional information is therefore required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the OWNER and the CONTRACTOR.~~

~~The OWNER'S written response to the claim, as further documented, shall be submitted to CONTRACTOR within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the CONTRACTOR in producing the additional information or requested documentation, whichever is greater.~~

- ~~4. If the CONTRACTOR disputes the OWNER'S written response, or the OWNER fails to respond within the time prescribed, the CONTRACTOR may notify the OWNER, in writing, either within 15 days of receipt of the OWNER response or within 15 days of the OWNER failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the OWNER shall schedule a meet and confer conference within 30 days for settlement of the dispute.~~

- ~~5. If, following the meet and confer conference the claim or any portion remains in dispute, the CONTRACTOR may file a claim pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of these provisions, the running of the period of time within which a claim must be filed shall be tolled from the time CONTRACTOR submits its written claim pursuant to subdivision (a) until the time the claim is denied, including any period of time utilized by the meet and confer conference.~~

~~C. The following procedures are established for all civil actions filed to resolve claims subject to this article:~~

- ~~1. Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court.~~
- ~~2. If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act of 1986 (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.~~

~~In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure (A) arbitrators shall, when possible, be experienced in construction law, and (B) any party appealing an arbitration award who does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, also pay the attorney's fees on appeal of the other party.~~

- ~~3. The OWNER shall not fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in this Contract.~~
- ~~4. In any suit filed under Section 20104.4 of the California Public Contract Code, the OWNER shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.~~

- END OF GENERAL CONDITIONS -

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## SECTION 00800CA - SUPPLEMENTARY GENERAL CONDITIONS

### PART 1 -- GENERAL

These Supplementary General Conditions make additions, deletions, or revisions to the General Conditions as indicated herein. All provisions which are not so added, deleted, or revised remain in full force and effect. Terms used in these Supplementary General Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

#### SGC-1 DEFINITIONS

Add the following definitions to Article 1:

~~ENGINEER - In accordance with its contract with the OWNER, t~~The ENGINEER is further defined as the firm of MWH Americas, Inc. (formerly known as Montgomery Watson Harza Americas, Inc.), located at 1340 Treat Blvd., Suite 300, Walnut Creek, CA 94597.

OWNER - The OWNER is further defined as Los Osos Community Services District.

ENGINEER's Consultant(s): ENGINEER's Consultants are the individuals, partnerships, corporations, joint-ventures, or other legal entities named as such below:

- EDA, Incorporated, San Luis Obispo, CA
- RRM Design Group, Incorporated, San Luis Obispo, CA
- Raines, Melton and Carella, Walnut Creek, CA
- Cleath and Associates, San Luis Obispo, CA
- Fugro West, Incorporated, San Luis Obispo, CA

#### SGC-2.2 COPIES OF DOCUMENTS

The OWNER shall furnish to the CONTRACTOR 5 copies of the Contract Specifications and Drawings (reduced scale drawings). Additional quantities of the Contract Documents will be furnished at reproduction cost plus mailing cost if copies are mailed. The CONTRACTOR is advised that Specifications Volume I is common to Area and WWTF work, Specifications Volumes IIA and IIB are for Area work only, Specifications Volumes IIIA and IIIB are for WWTF work only, Drawings Volume IV is for Areas B and C work only, Drawings Volume V is for Areas A and D work only, and Drawings Volumes VIA and VIB are for WWTF work only.

#### SGC-2.4 STARTING THE WORK

Add the following as Paragraphs 2.4C, 2.4D, and 2.4E of the General Conditions:

- C. The CONTRACTOR shall notify the Underground Service Alert of Northern California (Dig Alert), Phone No. 1-800-642-2444, at least two working days in advance of the commencement of work at any part of the sSite to allow the member utilities to examine the construction sSite and mark the location of the utilities' respective facilities.
- D. The CONTRACTOR acknowledges that some (or all) of the utility companies with facilities shown on the drawings may not be members of the USA System and, therefore, not automatically contacted by-at the above referenced telephone number. The CONTRACTOR shall be responsible for making itself aware of utility company facilities not reported by the USA System, and shall be liable for any and all damages stemming from repair or delay costs or any other expenses resulting from the unanticipated discovery of

underground utilities. The CONTRACTOR shall be responsible for notifying all of the utilities at least 48 hours in advance of the commencement of work at any part of the sSite to allow the utilities to examine the construction site and mark the location of the utilities' respective facilities. The CONTRACTOR shall also be responsible for verifying that each utility has responsibly responded to such notification.

- E. The CONTRACTOR shall also be responsible to perform its own utility potholing to locate underground utilities in advance of construction.

#### SGC-3.4 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

Revise Paragraph 3.4.A of the General Conditions as follows:

Add new Item 1. SWRCB SRF Loan Program Requirements.

Change former Item numbers 1 through 12 to Item numbers 2 through 13.

#### SGC-4.2 REPORTS OF PHYSICAL CONDITIONS

In the preparation of the Contract Documents, the ENGINEER has relied upon:

- A. The following reports of explorations and tests of subsurface conditions at the Site:
  - 1. Report dated February, 2004 prepared by Fugro West, Inc. entitled "Geotechnical Report for the Los Osos Wastewater Project"
- B. Copies of this report may be examined at the offices of the OWNER and ENGINEER during regular business hours if said report is not bound herein. As provided in Paragraph 4.2 of the General Conditions and as identified and established above, the CONTRACTOR may rely upon the accuracy of the technical data contained in such report except for such physical dimensions that can be field verified; however, the interpretation of such technical data, including any interpolation or extrapolation thereof, and opinions contained in such report are not to be relied on by the CONTRACTOR.

#### SGC-4.5 HAZARDOUS MATERIALS

Phase II Site Investigation Report for the Bear Valley Chevron, 1099 Los Osos Valley Road (Weber, Hayes & Associates, August 29, 2001).

#### SGC-5.1 BONDS

Delete the first sentence of Paragraph 5.1A and add the following:

The CONTRACTOR shall furnish a satisfactory Performance Bond in the amount of 100 percent of the Contract Price and a satisfactory Payment Bond in the amount of 100 percent of the Contract Price as security for the faithful performance and payment of all the CONTRACTOR's obligations under the Contract Documents.

SGC-5.2 INSURANCE

A. The limits of liability for the insurance required by Paragraph 5.2 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations. Limits may be provided by a combination of primary and excess liability policies or through a single policy. If the limits are provided by a combination of primary and excess liability policies, then the excess or umbrella liability coverages shall include commercial general, comprehensive automobile, and employer's liability and shall provide coverage at least as broad as the underlying policies.

1. Workers' Compensation:

a. State: Statutory

b. Applicable Federal (e.g. USL&H) Statutory

Note: If the WORK called for in the Contract Documents involves work in or on any navigable waters, the CONTRACTOR shall provide Workers' Compensation coverage which shall include coverage under the Longshore and Harbor Workers' Compensation Act, the Jones Act, Maritime Law, and any other coverage required under Federal or State laws pertaining to workers in or on navigable waters.

c. Employer's Liability:

Bodily Injury by Accident	\$2,000,000	each accident
Bodily Injury by Disease	\$2,000,000	policy limit
Bodily Injury by Disease	\$2,000,000	each employee

2. Comprehensive or Commercial General Liability:

Combined Single Limit:

a. Premises/operations \$5,000,000 each occurrence

b. Products/completed operations \$5,000,000 each occurrence  
 \$10,000,000 annual aggregate

c. Personal Injury \$5,000,000 each occurrence

d. Policies shall include premises/operations, products, completed operations, independent contractors, explosion, collapse, underground hazards, broad form contractual, personal injury with employment contractual exclusions deleted, and broad form property damage.

e. If policies are written on a Commercial General liability form, the General Aggregate shall be at least two times the each occurrence limit or be written on a "per project" basis.

f. ~~(Not Used) If policies are written on a claims made form, the certificate should so specify and policies shall continue in force for three years completion of the Project. The retroactive date of the policy must be no later than the date of the Agreement.~~

- g. If policies are written for split limits, limits shall be equal for bodily injury and property damage liability.
3. Comprehensive Automobile Liability (including owned, hired, and nonowned vehicles):
- Combined Single Limit:
- a. Bodily Injury and Property Damage: \$5,000,000 each accident
- b. If policies are written for split limits, limits shall be equal for bodily injury per person, bodily injury per accident and property damage.
4. Builder's Risk Insurance:
- a. In an amount equal to the replacement cost of the completed value of the project.
- b. Any deductibles or self-insured retentions shall be in accordance with Paragraph SGC-5.2F or as agreed to by the OWNER and CONTRACTOR.
- B. All policies shall be endorsed to provide that the CONTRACTOR agrees to waive all rights of subrogation against the OWNER, the ENGINEER, and their subconsultants, employees, officers and directors, for WORK performed under the Agreement. Endorsements shall be provided with certificates of insurance.
- C. All policies shall also specify that the insurance provided by the CONTRACTOR will be considered primary and not contributory to any other insurance available to the OWNER or ENGINEER.
- D. All policies except Workers' Compensation and Builders Risk shall name the OWNER, ENGINEER, their consultants, subconsultants, and their officers, directors, agents and employees as additional insureds. The Builders Risk insurance shall name the CONTRACTOR, OWNER, and ENGINEER as named insureds as their interests may appear.
- E. All policies shall provide for thirty days notice prior to any cancellation, reduction in coverage or nonrenewal.
- F. The CONTRACTOR shall declare in writing to the OWNER all the deductibles or self insured retentions on Comprehensive or Commercial General Liability policies. shall not be greater than T.B.C. Deductibles on Builder's Risk coverage shall not be greater than \$25,000 for flood or \$100,000 or 5 percent of the Contract Price, whichever is greater, for earthquake coverage. All deductibles are the responsibility of the CONTRACTOR.

#### SGC-6.6 SUBCONTRACT LIMITATIONS

Add the following as Paragraph 6.6B of the General Conditions:

- B. The CONTRACTOR shall perform not less than 20 percent of the WORK with its own forces (i.e., without subcontracting). The 20 percent requirement shall apply to the Contract Price less the values of OWNER-assigned contracts and allowances in the Bid for prenegotiated WORK.

## SGC-6.7 PERMITS

A. The OWNER will acquire the following permits:

1. County of San Luis Obispo Department of Public Works project encroachment permit. (The CONTRACTOR shall obtain an associated construction encroachment permit.)
2. County of San Luis Obispo Planning Commission Coastal Development Permit Conditions of Approval.
3. See Section 01060 – Regulatory Agency and Utility Requirements for additional permit requirements and related information.

B. The CONTRACTOR shall be responsible for complying with the requirements of all permits acquired by the OWNER and for obtaining and complying with all permits required for construction.

C. Except for the permits specifically set forth in Paragraph A above, the CONTRACTOR shall acquire and comply with all permits required by Laws or Regulations and Section 01060 – Regulatory and Utility Agency Requirements, including, without limitation, the following specific permits (if applicable):

1. County of San Luis Obispo construction encroachment permit.
2. State permits to construct and/or operate sources of air pollution.
3. Certificates and permits are required for sources such as, but not limited to:
  - a. Fuel burning equipment
  - b. Gasoline and petroleum distillate storage containers
  - c. Land disturbing activities
  - d. Processing equipment (sand, gravel, concrete batch plant, etc.)
  - e. Odors
4. Stormwater General Permit and CONTRACTOR's Stormwater Pollution Prevention Plan (SWPPP).
5. Permit-Required Confined Space  

The workplace in which the WORK is to be performed may contain permit-required confined spaces (permit spaces) as defined in 29 CFR 1910.146 and, if so, permit space entry is allowed only through compliance with a confined space entry program meeting the requirements of 29 CFR 1910.146.
6. ~~(not Used) NPDES permit(s) from the Regional Water Quality Control Board for dewatering groundwater disposal.~~
7. Fill and grading permits for trench and excavation spoils.

## SGC-9.3 PROJECT REPRESENTATION

A. The Resident Project Representative, who is the ENGINEER's agent, will act as directed by and under the supervision of the ENGINEER and will confer with the ENGINEER

regarding its actions. The Resident Project Representative's dealings in matters pertaining to the WORK shall, in general, be only with the ENGINEER and the CONTRACTOR, and dealings with Subcontractors shall only be through or with the full knowledge of the CONTRACTOR. Written communication with the OWNER will be only through or as directed by the ENGINEER.

B. The Resident Project Representative shall have the duties and responsibilities of the ENGINEER set forth in this paragraph the Contract Documents including, but not limited to, the following:-

1. Review the progress schedule of Shop Drawing submittals and schedule of values prepared by the CONTRACTOR and consult with the ENGINEER concerning their acceptability.
2. Attend preconstruction conferences. Arrange a schedule of progress meetings and other job conferences as required in consultation with the ENGINEER and notify in advance those expected to attend. Attend meetings and maintain and circulate copies of minutes thereof.
3. Serve as the ENGINEER's liaison with the CONTRACTOR, working principally through the CONTRACTOR's superintendent and assist said superintendent in understanding the intent of the Contract Documents. Assist the ENGINEER in serving as the OWNER's liaison with the CONTRACTOR.
4. Receive Shop Drawings and samples furnished by the CONTRACTOR.
5. Conduct on-site observations of the WORK in progress to assist the ENGINEER in determining if the WORK is proceeding in accordance with the Contract Documents.
6. Verify that the tests, equipment, and systems startups and operating and maintenance instruction are conducted as required by the Contract Documents and in presence of the required personnel, and that the CONTRACTOR maintains adequate records thereof.
7. Transmit to the CONTRACTOR the ENGINEER's clarifications and interpretations of the Contract Documents.
8. Consider and evaluate the CONTRACTOR's suggestions for modifications in the Contract Documents and report them with recommendations to the ENGINEER.
9. Review applications for payment with the CONTRACTOR for compliance with the established procedure for their submittal and forward them with recommendations to the ENGINEER, noting particularly their relation to the schedule of values, work completed, and materials and equipment delivered at the Site but not incorporated in the WORK.
10. During the course of the WORK, verify that certificates, maintenance and operation manuals, and other data required to be assembled and furnished by the CONTRACTOR are applicable to the items actually installed.
11. Before the ENGINEER prepares a Notice of Completion, as applicable, submit to the CONTRACTOR a list of observed items requiring completion or correction.

12. Conduct final inspection in the company of the ENGINEER, the OWNER, and the CONTRACTOR, and prepare a punch list of items to be completed or corrected.
13. Verify that all items on the punch list have been completed or corrected and make recommendations to the ENGINEER concerning acceptance.

#### SGC-11.3D EQUIPMENT

The CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the current edition of the following reference publication:

- A. Caltrans' "Labor Surcharge And Equipment Rental Rates" latest edition available at all Caltrans District Offices.

#### SGC-12.2 WEATHER DELAYS

The CONTRACTOR's construction schedule shall be based on a minimum of 10 days of delay due to unusually severe weather for each 12 month period commencing with Notice to Proceed.

#### SGC-14.3C AMOUNT OF ~~RETENTION~~RETAINAGE

Add the following to Paragraph 14.3C of the General Conditions:

Unless otherwise prescribed by law, the OWNER may retain a portion of the amount otherwise due to the CONTRACTOR, as follows:

1. ~~Retention~~Retainage of 10 percent of each approved progress payment until the work is 50 percent complete; then the OWNER may, at its ~~option~~ sole discretion, refund that portion of retainage held by the OWNER that is in excess of 5 percent of the total of the WORK done to date and thereafter continue to retain 5 percent of the value of all approved progress payment requests subsequently submitted.
2. The OWNER may reinstate up to 10 percent ~~retention~~retainage of the total of the WORK done if the OWNER determines, at its discretion, that the CONTRACTOR is not performing the WORK satisfactorily or there is other specific cause for such withholding.

#### SGC-14.3D VALUE OF MATERIALS STORED AT THE SITE

Unless otherwise prescribed by law, the value of materials stored at the Site shall be 75% of the value of such materials.

- END OF SUPPLEMENTARY GENERAL CONDITIONS (~~STATE~~)-

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## SECTION 02635 – LOWER AQUIFER PRODUCTION WELL

### PART 1 – GENERAL

#### 1.1 THE REQUIREMENT

- A. The CONTRACTOR shall construct, test, and disinfect harvest wells and all appurtenant work, complete and operable, all in accordance with the requirements of the Contract Documents. This technical specification applies to the construction and testing of ground water supply wells. The purpose of this specification is to document the level of effort expected from the drilling contractor. This specification does not, through omission, excuse the contractor from complying with any laws, rules and regulations, or standards governing the work being performed.
- B. The work shall be performed by a licensed California water well Contractor with equipment which is adequate to complete all phases of well construction and rehabilitation. If the CONTRACTOR's equipment is not capable of satisfactorily performing the work provided for in these specifications, the CONTRACTOR at his own expense shall substitute equipment satisfactory to the ENGINEER.
- C. The CONTRACTOR shall furnish sound proofing barriers, provide mufflers on equipment, and take whatever other steps necessary during drilling, pumping, testing, and all other work incidental thereto to ensure that noise levels conform to San Luis Obispo County noise ordinances. The CONTRACTOR will take necessary measures to limit access to drilling sites to minimize public hazards.
- D. All work shall conform with and be completed by a licensed California water well Contractor in full conformance with the State of California rules and regulations for water wells, or this Specification whichever is greater and more restrictive.
- E. **Scope of Work** The work includes furnishing all labor, materials, transportation, tools, supplies, equipment, and appurtenances necessary for the complete and satisfactory construction, and testing, a lower aquifer of water supply well. The design and testing parameters are as follows:

#### 1. Well Design – Lower Aquifer Production Well

Drilling site:	Paso Robles Ave. at 18 <sup>th</sup> St.
Conductor casing:	none
	Total test hole depth: 320 feet
Geophysics:	e-log (spontaneous potential, long and short normal, single point).
	Total well depth: 300 feet
Final borehole size:	22-inch nominal diameter
Completion:	Wellhead to 190 feet depth blank casing. 190 to 290 feet depth screen (length of screen is 100 feet).

290 to 300 feet blank casing with casing shoe.

Centralizers: Every 60 lineal feet up, beginning from the bottom of screen.

**Blank Casing:**

- a. 10-inch I.D., 0.312-in wall, carbon steel from wellhead to 177 feet.
- b. 10-in I.D., 0.5-in wall heavy duty carbon steel dielectric coupler from 177-180 feet.
- c. 10-inch I.D., 0.250-in wall, 304 stainless steel from 180-190 feet and 290-300 feet with casing shoe.

**Screen:**

- a. 10-inch I.D., 304 stainless steel wire-wrap screen, 0.040-inch slot.

**Gravel pack:** RMC Lapis Luster #3 sand (8 x 20), or approved equal. Install 2-inch diameter galvanized steel gravel fill tube.

**Sanitary Seal:** Install 150-foot cement seal in accordance with County of San Luis Obispo Environmental Health Division requirements.

**Wellhead:** Provide 6' x 6' x 6' reinforced concrete well pad (sloped to drain away from casing). Install 1½ -inch diameter sounding tube. Cover well with welded steel plate.

**Rig development:** 8 hours

**Pump development:** 16 hours

**Pump tests:** West Side:  
4-hour step test (assume 200, 250, 300, and 350 gpm)  
24-hour constant discharge (assume 300 gpm)

**Cuttings/mud:** Removed from site by the CONTRACTOR.

**2. Preparation and Mobilization**

- a. Clear site and establish vertical and horizontal control.
- b. Mobilize drilling equipment.

- c. Construct temporary drilling pad (i.e. gravel base).
- d. Install surface casing, as specified.

## 1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. **Codes:** All codes, as referenced herein, are specified in Section 01090, "Reference Standards." Without limiting the generality of other requirements of these specifications, all work specified herein shall conform to or exceed the requirements of the applicable codes and standards relating to the referenced portions of the following documents only to the extent that the requirements therein are not in conflict with the provisions of this section. Where such documents have been adopted as a code or ordinance by the public agency having jurisdiction, such code or ordinance shall take precedence.
- B. **Permits, Laws, and Standards** The CONTRACTOR is responsible for obtaining a well application permit prior to drilling and for filing a Well Completion Report at the conclusion of the project. The CONTRACTOR shall comply with all federal, state, or local laws, ordinances, rules and regulations, and standards relating to the performance of work, including the California Water Well Standards (Dept. of Water Resources Bulletins 74-81 and 74-90) and any applicable noise ordinance.
- C. **Commercial Standards:**
  - ANSI/AWWA C654                      Disinfection of Wells.
  - ASTM C 150                              Specification for Portland Cement.
  - AWWA A100                              Standard for Water Wells.
  - API Spec. 10D                          Specification for Bow-Spring Casing Centralizers.

## 1.3 CONTRACTOR SUBMITTALS

- A. **General:** All CONTRACTOR submittals shall conform to the applicable requirements of Section 01300 - Contractor Submittals and the supplementary requirements specified. All measurements for depths shall be referenced to existing ground surface at each well site.
- B. **Equipment List:** The CONTRACTOR shall submit a list of the equipment proposed on the project. The list shall include manufacturer's load capacities, horsepower, year of manufacture, year of purchase, and any other pertinent information, as requested by the Engineer.
- C. **Material and Supplier's List.** The CONTRACTOR shall submit a complete list of all proposed vendors and suppliers, along with corresponding material specifications to be used in the work.
- D. **Subcontractor's List.** The CONTRACTOR shall submit a complete list of all proposed subcontractors to be used in the work. The CONTRACTOR may be required to submit additional information or a resume of qualifications for any of the subcontractors proposed.

- E. **Horizontal and Vertical Control:** The CONTRACTOR shall establish on site vertical and horizontal control by a licensed land surveyor in the State of California. The CONTRACTOR shall submit five (5) copies of the certified topographic survey to the ENGINEER prior to initiating drilling activities.
- F. **Daily Log:** The CONTRACTOR shall maintain a detailed daily log of events for his activities at each rig on the site, during well construction and testing.
1. The report forms should include information on bit assembly and drill string, drilling mud and additives, fluid losses, water- and fluid- level changes, footage drilled and formations encountered, and cementing operations. In addition, information relative to maintenance and repair time along with details of repair, and presence of CONTRACTOR's personnel and sub-contractor, and other pertinent data as may be required by the ENGINEER.
  2. One legible form suitable for photocopying shall be submitted to the ENGINEER on a daily basis.
- G. **Mill Certificates:** Casing mill certificates shall be submitted to the ENGINEER for all casings, one week prior to the installation of the casing in the ground.
- H. **Geological Samples:** The CONTRACTOR shall collect, label, and store, in sturdy containers in a well protected place near the drilling site, samples of all geological formations encountered in ten foot increments during drilling operations. Each sample shall be clearly labeled and indicate well number, time, and the exact depth from which the sample was taken. One set of samples should be collected.
- I. **Geophysical Logging:** The CONTRACTOR shall submit 4 field copies of all geophysical logs to the ENGINEER within 24 hours following logging activities, and one electronic copy provided within 10 days of logging. For each geophysical log suite performed, the ENGINEER may request the CONTRACTOR to obtain a brief descriptive report from the service company interpreting the results of the log or logs. These completed reports must be submitted to the ENGINEER within 72 hours of completion of logging. The logs to be performed are listed in Part 3 Execution, Paragraph 3.8.
- J. **Video Survey:** The CONTRACTOR shall submit to the ENGINEER two (2) copies of the video television survey on the day the well is surveyed, and four additional copies of each survey within one week of running the survey. Video surveys shall be recorded on video recording tape.
- K. **Laboratory Analyses:** The CONTRACTOR shall submit 2 copies of the laboratory report, for the analyses of the water quality samples collected during reverse air drilling and pump tests within 30 days of receipt of samples by the laboratory.
- L. **Calibration Data:**
1. Inclination tools and geophysical logs: Each downhole instrument used in testing the wells during construction shall demonstrate acceptable calibration before use. Where possible, this calibration record shall be included on the output of the test or on the log.
- M. **Development and Test Records:** Development and test records shall be recorded on an hourly basis, showing production rates, static water level, pumping level, drawdown,

production of sand, and all other pertinent information concerning development, and testing methods.

- N. **Permits:** The CONTRACTOR shall apply for all necessary drilling and testing permits with local and state regulatory agencies,
- O. **Plumbness and Alignment Tests:** The contractor shall guarantee that the well, when completed, shall be sufficiently straight and plumb to permit the free installation and operation of submersible and turbine pumps regularly built for the installed well casing diameter to a depth acceptable to the project inspector.
- P. **Final Description:** The final well descriptions shall show the following: diameter, wall thickness, depths, and lengths of casings installed; borehole diameters; cemented casings; depths and thicknesses of annular seals; and all other pertinent details, and shall be submitted to the ENGINEER prior to acceptance of the well.
- Q. **Records Required by Law:** The CONTRACTOR shall maintain all records required by governmental agencies having jurisdiction, and shall submit such records to them as may be required. Two copies of all such material shall also be furnished to the ENGINEER.
- R. **Resumes:** Resumes of key personnel will be submitted to the ENGINEER.
- S. **Record Drawings:** Record drawings shall be submitted in accordance with relevant section of the technical specifications and Drawings.
- T. **Completion Report Required:** A Water Well completion Report (Form 0124) must be filled with the appropriate agencies within 30 days of well completion.
- U. **Drilling Waste Disposal:** The CONTRACTOR shall provide ENGINEER with notification of drilling waste disposal location.

#### 1.4 QUALITY ASSURANCE

- A. **Subcontractor's List:** Each subcontractor listed shall be approved by the ENGINEER. The ENGINEER reserves the right to disapprove the use of any subcontractor proposed.
- B. **Geophysical Logs:** Geophysical logs shall be performed by a company experienced in the performance of such logs. Each log shall be recorded using a depth measurement that is accurate to within 0.1 feet using a resolution of approximately 1/50<sup>th</sup> of the greatest deviation of the quantity measured over the entire log. Each log shall include a repeat section at a depth determined by the ENGINEER.
- C. **Guarantee:** The CONTRACTOR Guarantees that the work performed under this section of the Contract, and the workmanship, materials and equipment supplied or used in the execution of the work, are free from defects or flaws and are furnished in strict accordance with the Contract Documents in every respect. The CONTRACTOR further guarantees that the performance test requirements of the Contract Documents shall be fulfilled. The CONTRACTOR shall repair, correct, or replace all damage to the work covered by failures under the guarantee. The guarantee shall remain in effect for a period of 5 years from the date of final acceptance by the OWNER.
- D. **Sand Production:** Sand production during development shall be recorded on pump development and testing records. Sand production, shall be qualified as measured by a Rossum sand content tester or equivalent centrifugal sand separating meter as

described in the Journal of the American Water Works Association, Vol. 46, No. 2, February 1954.

- E. **Water Production Test:** The CONTRACTOR shall demonstrate to the ENGINEER that the producing zone yields water as described in Part 3 Execution, Paragraph 3.6. The CONTRACTOR shall furnish two copies of each test's record and result.

#### 1.5 MATERIALS DELIVERY, STORAGE, AND PROTECTION OF MATERIALS

- A. **General:** All materials shall be delivered in an undamaged condition and stored to provide protection against damage. All defective or damaged materials shall be replaced with new materials at the CONTRACTOR's expense.
- B. **Storage Area:** The CONTRACTOR shall prepare an area, within the limits of a location approved by the ENGINEER, for the storage of materials required for this work.

#### 1.6 CONTRACTOR'S EQUIPMENT

- A. **General:** The CONTRACTOR's equipment shall be clean, well maintained, and in good operating condition when delivered to the site, and during the entire operation.
  - 1. The equipment shall be of adequate size, strength, horsepower, and capacity for the project and shall be of the type successfully utilized by the CONTRACTOR for the construction of similar or larger wells within the last 2 years.
  - 2. All equipment shall be provided with safety devices as required by governmental authorities having jurisdiction.
- B. **Equipment Use:** Reaming and setting of casing shall be done with the same equipment and no resetting of equipment will be allowed after the hole is reamed. The equipment shall be provided with all reasonably possible sound deadening devices.

#### 1.7 MOBILIZATION, PERSONNEL AND OPERATING REQUIREMENTS

- A. **Mobilization:** The CONTRACTOR shall mobilize its equipment and personnel to effectively commence its drilling operations within the time limit specified. Any improvements necessary for access should be identified by the CONTRACTOR during the initial site inspection. The CONTRACTOR is responsible for ensuring that site access is satisfactory prior to mobilizing equipment on-site. Arranging for, obtaining, and transporting water for drilling shall be the CONTRACTOR's responsibility.
- B. Work is in residential areas. The CONTRACTOR shall be responsible for site security. The work area shall be temporarily fenced and the test hole shall be covered to prevent unauthorized access when CONTRACTOR is not present on site.
- C. **Personnel Requirements:** The CONTRACTOR shall furnish capable personnel, experienced in the work required by these specifications. In addition, the following shall apply:
  - 1. The personnel shall be subject to the ENGINEER's approval.
  - 2. The CONTRACTOR, in addition to providing the services of skilled and experienced drillers in the type of formations expected, shall also provide an adequate number of competent helpers.

a. The drillers shall be capable of keeping good and clean well logs, and reports of the drilling, developing and pump testing operations as instructed by the ENGINEER.

b. The drillers also shall be capable of recognizing and making lithologic classifications of the formations to be encountered during the work. Drillers should be experienced and competent in drilling fluids, additives, and maintenance.

c. Drillers and helpers should know how to collect and handle representative formation and water samples as required by the ENGINEER, as described in these Technical Specifications.

D. **Equipment Operation:** All equipment shall be carefully maintained during the CONTRACTOR's operations and any damage to the well or surrounding property and/or facilities of any nature due to the CONTRACTOR's operations shall be repaired or replaced.

E. **Service Companies:** Where possible, the CONTRACTOR shall utilize the skills of a specialist service company, expert in the type of service for which they are employed. The name and the background of the company and the individuals providing the services shall be submitted to the ENGINEER for approval prior to beginning work. The ENGINEER reserves the right to reject any service company. At a minimum, service companies shall be employed for the following:

1. Geophysical Logging.
2. Cementing.

F. **Water Samples:** The CONTRACTOR will be required to collect water samples during construction activities for analysis by a State of California certified laboratory.

1. Receptacles. Samples for which laboratory analysis is required, shall be collected in specially designated and approved sample containers to be provided to the CONTRACTOR by a State of California certified laboratory approved by the ENGINEER for the specific parameters required by these specification documents.
2. Labeling. The sample containers shall be clearly labeled with the well identification, and the depth interval below ground surface from which the sample was collected and the time and date of sample collection.
3. Delivery. The CONTRACTOR shall collect the samples, store them in the appropriate manner as instructed by the laboratory, and deliver them to the laboratory in accordance with the laboratory's instructions.
4. Chain of Custody. Chain of Custody forms shall be completed for all water samples. Copies of the Chain of Custody forms shall be submitted to the ENGINEER within ten days of final delivery of the samples to the laboratory. All persons handling the samples shall be required to sign the Chain of Custody form.
5. Sample Collection. For the background samples to be collected after completion of well construction, the CONTRACTOR shall use the approved laboratory

field sampling services approved by the ENGINEER to collect the water samples and transmit them to their laboratory.

6. **Holding Times.** The CONTRACTOR shall be apprised of applicable water sampling holding times for the samples for which he is responsible and assure that the samples are transmitted to the laboratory within these time periods. For samples collected by the laboratory the CONTRACTOR shall be responsible to the ENGINEER for the performance of the sub-contractor's service analyzing the samples within established holding times.
7. **Cuttings and Fluid Disposal.** It shall be the CONTRACTOR's responsibility to arrange for an approved disposal site for both drill cuttings and fluid from drilling that complies with all applicable regulations. No drilling operations can commence without an approved disposal site. The CONTRACTOR shall be responsible for providing and maintaining all necessary tank trucks, dump trucks, pipe, pumps and equipment necessary to pump and haul excess pad drainage, drilling fluid, drill cuttings and development water to a pre-determined disposal site in accordance with federal, state, and local regulations, or subcontract with firm capable of providing these services when necessary.
- G. **Access to Well:** At certain intervals, for the purposes of gathering samples and test data, the ENGINEER shall require access to the well in close proximity to the drill rig. The CONTRACTOR shall assist the ENGINEER in this activity, providing safe conditions for the collection of information and samples during drilling and testing operations.
- H. **Field Relocation:** During construction, it is expected that minor relocation of proposed facilities may be necessary. Such relocations will only be made at the direction of the ENGINEER. If existing structures are encountered that prevent construction as shown, the CONTRACTOR shall notify the ENGINEER prior to continuing the work, so the necessary field revisions can be made.
- I. **Standby Time:** The ENGINEER may order the CONTRACTOR to stop his operations so that extra work not included in the specifications may be performed. The ENGINEER will advise the CONTRACTOR when he proposes to do this and will schedule his request so it causes the minimum of delay. The CONTRACTOR will be reimbursed for all approved standby time at hourly rates, which will be listed in the Bid Proposal form. All extra work must be approved in advance by the ENGINEER, in writing.
- J. **Construction Safety Program:** The CONTRACTOR shall comply with the OSHA regulations contained in 29CFR Section 1910 for General Industry Regulations and 29CFR Section 1926 for Construction Regulations.
- K. **Safety Equipment:** At all times, the CONTRACTOR must provide safety equipment, as required by all applicable Federal and State regulations.
- L. **Accident Reports:** One copy of the CONTRACTOR's accident report form should be submitted to the ENGINEER within 24 hours of the occurrence of any accident in connection with the work.
- M. **Repeat Work:** All work required to be repeated, resulting from the CONTRACTOR's performance, including all additional materials, labor and equipment required, shall be furnished at the expense of the CONTRACTOR and no claim for additional

compensation shall be made or be allowed therefore, except as specifically provided herein.

- N. **Protection of Water Quality:** The CONTRACTOR and his sub-contractors shall take all necessary precautions to prevent contaminated water, gasoline, or other hazardous substances from entering the well, either through the wells or through seepage from ground surface. The CONTRACTOR shall maintain precautions during and after construction of the well and until acceptance of the wells by the OWNER. If the CONTRACTOR fails to prevent contaminants from entering the groundwater, remedial action as required by the governing regulatory agencies shall be performed by the CONTRACTOR at the sole expense of the CONTRACTOR.

#### 1.8 SITE CLEANUP, PRESERVATION AND RESTORATION

- A. **Unused Materials and Equipment.** During construction, the CONTRACTOR shall regularly remove from the site all accumulated debris and surplus materials of any kind which results from his operations. Unused tools or equipment shall be stored at the CONTRACTOR's yard or base of operations for the project.
- B. **Periodic Cleaning.** The CONTRACTOR shall perform clean-up work on a regular basis and as frequently as requested by the ENGINEER.
1. Basic site restoration in an area shall be accomplished immediately following installation or substantial completion of the required facilities in that area. Also, such work shall be performed, when requested by the ENGINEER, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.
  2. If the CONTRACTOR fails to perform periodic clean-up and basic restoration of the site to the ENGINEER's satisfaction, he may, upon five days written notice to the CONTRACTOR, employ such labor and equipment as he deems necessary for the purpose.
- C. **Work Completion.** Upon completion of work at the site, the CONTRACTOR shall promptly remove all his equipment and unused materials. The CONTRACTOR shall dismantle any temporary structures erected for his purposes that are not part of the final product. The CONTRACTOR shall promptly effect minor repairs and leave the site in a manner acceptable to the ENGINEER, within one month after the completion of drilling and testing.

#### 1.9 WELL ABANDONMENT AND REMEDIAL WORK

- A. **Abandonment of Well by CONTRACTOR:** If, at any time the CONTRACTOR voluntarily stops work, and/or fails to complete a hole in a satisfactory manner in accordance with governing regulations of the Contract Documents, the hole will be considered abandoned. The CONTRACTOR shall not be paid for all or part of a hole declared as abandoned by the OWNER.
1. The cost of properly plugging and sealing a well or hole, in accordance with applicable local, state, or federal regulations, shall be borne by the CONTRACTOR. In addition, if a well or part thereof, does not have mechanical integrity as defined by the appropriate regulatory authorities, it must be restored prior to abandonment of the well.

2. Under conditions where post-abandonment monitoring requirements are imposed by regulation as a direct result of the CONTRACTOR's abandonment of the well, or hole, the cost of this monitoring also must be borne by the CONTRACTOR.
  3. All salvageable material furnished by the CONTRACTOR may be removed and remain his property.
  4. The CONTRACTOR shall propose his method of abandonment of the well or hole in writing to the OWNER. The ENGINEER and OWNER shall review the method of abandonment, and accept the plan in writing before work can proceed. At all times all work on the well must be in accordance with all applicable local, state, and federal regulations.
- B. Abandonment:** If information indicates that the completion of a well at a pilot hole site is not warranted, the OWNER reserves the right to terminate all further work at the site. In such an event, the CONTRACTOR will be paid the value of its work completed to that time based on unit prices indicated in the Bidding Schedule.
1. The CONTRACTOR shall be required to abandon the pilot hole as directed by the OWNER in accordance with regulations formulated by governmental agencies having such jurisdiction.
  2. The OWNER reserves the right upon termination of work at the site to have the CONTRACTOR move to another site selected by the OWNER within Los Osos and to drill another pilot hole.
- C. Remedial Work:** If it becomes necessary to perform remedial work prior to final acceptance, on the well in order for it to meet either regulatory requirements or the Contract Documents, or both, due to defective materials, accident, loss of equipment or equipment malfunction, or for any other cause directly attributable to the CONTRACTOR's actions, the CONTRACTOR shall bear the entire cost of the remediation, including any necessary Engineering costs to meet regulatory requirements. In the event of a problem, the ENGINEER shall be notified immediately, and the following shall apply:
1. The CONTRACTOR shall propose a method of correcting the problem, in writing to the OWNER. The ENGINEER and OWNER shall review the method of corrective action, and accept the plan in writing before work can proceed.
  2. At all times all work on the well must be in accordance with all applicable local, state, and federal regulations.

## **PART 2 – PRODUCTS**

### **2.1 TEMPORARY DRILLING PAD**

#### **TEST HOLE DRILLING**

- A.** A pilot hole shall be drilled to the total depth listed in the Scope of Work. During test hole drilling, the contractor shall keep the following minimum records:

- 1.0 A descriptive log of the formation materials with depths at which each change in materials occur.
- 2.0 The penetration rate of each drill pipe section, reported in minutes per joint.
- 3.0 Collect representative formation samples in labeled containers at regular 10-foot intervals.
- 4.0 Record the drill bits used (type and size) and any notable events, such as loss of circulation, hole instability, voids, etc.
- 5.0 A mud condition log

## 2.2 DRILLING EQUIPMENT

- A. Provide direct – circulation mud rotary drilling equipment capable of completing the wells as shown on the Drawings and described in the Specifications.

## 2.3 DRILLING FLUID

- A. **Rotary Method:** Material for drilling fluid for well construction by the rotary method shall be high-grade, bentonite clays in common drilling usage. The drilling fluid shall possess such characteristics as are required to adequately condition the walls of the hole to prevent caving of the walls as drilling progresses, and to permit recovery of representative samples of cuttings.
  1. Only fresh water from the designated source (per Water Supply specified in Section 01510 Temporary Utilities), shall be used in drilling fluids whether employed alone or in a combination with drilling additives. Any other drilling additives to be used will require acceptance by the ENGINEER.
  2. The CONTRACTOR shall maintain complete control over drilling fluid characteristics during the entire operation of well construction.
- B. **Drilling Fluid Additives:**
  1. Some mud drilling conditioning polymers be permitted during drilling. All additives shall be approved prior to use by the ENGINEER.
  2. Provide equipment for measuring drilling fluid properties including a marsh funnel and a fluid density balance. Provide lithologic sampling bags or containers and water sample containers.

## 2.4 GEOPHYSICAL LOGGING

- A. Provide continuous-recording geophysical logging equipment capable of running:
  1. Long and short normal electric and spontaneous potential
  2. Caliper
  3. Fluid Resistivity

## 2.5 CASING AND APPURTENANCES

### A.

1. **Carbon Steel Casing:** The carbon steel casing shall be 10-inch I.D. with a minimum wall thickness of 0.312 inches and shall meet the requirements of ASTM A53 grade B, or API 5L grade B. A 3-foot 0.500-inch coupler shall be installed to join with 304 stainless steel casing. The casing shall be factory assembled in not less than 20-foot lengths. The ends of each joint shall be machine bevelled perpendicular to the casing axis to ensure the straightness of each assembled section. Casing joints shall be welded in accordance with ANSI/AWS D1.1. All final casing material shall be new and no used or rusted casing will be accepted.
2. **Stainless Steel Casing:** The stainless steel casing shall be 10-inch I.D. type 304 stainless steel, 0.250-inch wall, as manufactured specifically for water well casings by Johnson Screens or Roscoe Moss Co.

### B. Casing Guides:

1. One at 10 feet above the bottom end of the casing.
2. Every 60 Lineal feet.

## 2.6 CEMENT

- A. **General:** Material used for sealing the casing shall consist of a neat cement grout using Type II Portland cement conforming to ASTM C 150. Neat cement grout shall contain not more than 5 gal of water per 94-lb sack of cement.
- B. **Sanitary Seal:** A sanitary seal shall be pumped into the annular space between the casing and borehole to a depth of 150 feet, in accordance with State of California Water Well Standards and as directed by the County of San Louis Obispo Environmental Health Division.

## 2.7 FILTER PACK

- A. Material shall be Lapis #3 (8 X 20) sand, well graded, and free from debris. The amount of filter pack and placement method shall be approved by the ENGINEER.
- B. **Gravel Fill Tube:** A 2-inch diameter galvanized steel gravel fill tube shall be installed into the top of the gravel pack. It shall extend approximately 4 inches above the well pad finish grade, and be fitted with a threaded cap.

## 2.8 WELLHEAD

- A. **Wellhead Capping and Valves:** Wellhead capping and valves shall be installed in accordance with the Specifications and Drawings.
- B. **Well Pad:** The well pad shall be of ¼-inch rebar-reinforced, 6-inch minimum pad thickness, 6-foot by 6-foot in area, and sloping at approximately ¼-inch per foot away from the well casing at the center of the well pad.

## 2.9 PUMPS AND DEVELOPMENT EQUIPMENT

- A. The CONTRACTOR shall furnish and operate a test pump assembly for tests on the well. The pump shall be capable of pumping 400 gpm against up to 75 psi of pressure. The pump assembly shall also include a gate valve to regulate the flow rate during the tests. The pump shall be set to a depth of up to 180 feet below pad surface.
- B. Furnish all necessary and adequately sized compressors, piping tools, pumps and any other equipment to develop the well by air lift methods and to pump test well as required.
- C. The CONTRACTOR shall furnish and install discharge piping for the pumping unit used in well development of sufficient size and length to conduct water to the den water handling tanks together with an in-line meter with 6-digit, straight reading totalizer, registering in units of 100 gallons, together with a rate of flow indicator dial, which reads in units of gallons per minute and is suitable for the expected flow range. All water removed from the well during pump development shall be pumped into the tanks. No standby time will be allowed to clean tank system of sediments.

## PART 3 – EXECUTION

### 3.1 DRILLING

- A. **Drilling Methods:** The well shall be drilled using the direct rotary mud process in which the walls of the drill hole are held in place at all times with a circulating fluid. The work shall be performed by a competent crew with equipment which is adequate to complete all phases of well construction. Drill cuttings and drilling fluids must be contained and removed from the site and disposed of properly at the contractor's expense.
  - 1. Mud Rotary Method. Shall be used through the unconsolidated formatting to a depth of up to approximately 320 feet.
  - 2. Drill bore holes of the dimensions and through each interval as determined by the ENGINEER and prepare borehole for geophysical logging. Boreholes shall be drilled to allow installation of casing straight and plumb as specified.
- B. A mud program is required. Only high-grade products shall be used in the make-up of the drilling fluid. The purpose of the mud program is to prevent formation invasion by drilling fluid and to reduce the potential for other downhole problems. Solids control is very important to limiting water loss and the desanding equipment should be capable of handling about 1-1/2 times the anticipated maximum pumping volume, with fines removal down to about 25 microns.
  - 1. The contractor shall either provide and follow a mud program designed by a qualified Mud Engineer or shall follow the mud program described below. The program involves maintaining mud values within specified limits and checking/adjusting mud values at least once every 4 hours during drilling. The program may be modified if necessary during drilling, however, the reasons for any modification to the program should be noted. Sufficient time for proper monitoring and conditioning of the drilling mud every morning and as needed during drilling should be taken and will be expected. The basic monitoring components of the mud program are as follows

- a. Drilling fluid pH should be between 8.5-9 units. Adjust make-up water pH with soda ash before adding bentonite. pH strips are acceptable for testing.
  - b. Mud weight should be less than 9.0 pounds per gallon. A mud balance is required.
  - c. Mud viscosity should generally be between 35-50 seconds. Viscosity should only be as high as needed to clean out hole. A marsh funnel viscometer is required.
  - d. Sand content should be less than 2 percent. An Imhoff cone or equivalent is required.
2. A mud conditioning polymer for shielding formation clays from hydrating is recommended (i.e. Drispac, Hydro Drill, Uni-Drill, or the equivalent product). The polymer should be added after all other mud adjustments are made in the morning, very slowly, while circulating. Mud viscosity increases due to the polymer should be taken into consideration when adding bentonite. The basic procedure for daily mud monitoring/adjusting is as follows:
- a. Circulate mud in the morning. If greater volume is needed, add clean water first. Pre-treat make-up water with about 6 ounces of soda ash per 300 gallons.
  - b. Check fluid pH. Adjust using soda ash (to increase) or clean water (to decrease).
  - c. Check mud viscosity. Add bentonite to increase. Allow for about 10 seconds of increased viscosity for polymer, if used.
  - d. Check sand content. If too high, circulate through desanding cones and recheck.
  - e. Check mud weight. If too high, add clean water and return to step 2.b.
  - f. Add polymer last. Polymer should be added very slowly and used sparingly. Check final viscosity.
  - g. Recheck mud values every 4 hours during drilling. All mud values and product quantities used should be recorded in a log.

C. **Formation Samples:** At 10-foot intervals and at changes of formations, the CONTRACTOR shall collect representative formation samples in order to provide an indication and classification of geological formations penetrated. The CONTRACTOR shall take a large representative sample of the cuttings from the interval or new formation, and shall label and preserve each sample in a sturdy container. All sample containers shall be labeled to indicate well number, date, time, and the exact depth from which the sample was taken and stored in a manner to prevent damage or loss.

### 3.2 CASINGS

- A. **Tension:** The casing shall be suspended in tension from the surface by means of a landing clamp. The bottom of the casing shall be at a sufficient distance above the bottom of the reamed hole as to insure that none of the casing will be supported from the bottom of the hole.
- B. **Failure to Complete:** If the casing cannot be landed in the correct position or at a depth acceptable to the ENGINEER, the CONTRACTOR shall construct another well immediately adjacent to the original location and complete this well in accordance with the Contract Documents at no additional cost to the OWNER. The abandoned hole shall be sealed in accordance with all State of California regulations.
- C. **Collapsed Casing:** If the casing should collapse for any reason prior to well completion, it shall be withdrawn and replaced at the CONTRACTOR's expense.
- D. **Centralizers:** All casing in the well shall be centralized in the borehole using strap-type centralizers or other methods acceptable to the ENGINEER.
- E. **Final Casings:** Centralizers in all other casings and tubings will be placed as follows:
  - 1. One at 10 feet above the bottom end of the casing.
  - 2. One at 20 feet above the bottom centralizer or across the first welded joint.
  - 3. A 60 foot interval thereafter.
- F. **Alignment:** All centralizers shall be in perfect vertical alignment, one above the other in order to permit the passage of at least one tremie pipe alongside the casing to the bottom of the borehole.
- G. **Installation of Well Casing:** Well casing installation shall begin as soon as possible after the final reaming pass. A Bill of Lading containing the material specification for the casing supplied to the project, including blank and screened sections, shall be submitted to the project inspector. All casing material delivered to the site will be new.
  - 1. All sections of casing will be welded. The well casing and screens will be placed in the correct position and depth or an alternate acceptable to the project inspector. Casing centralizers will be clamped at intervals no less than 60 feet. The well casing will be suspended from the top and allowed to hang freely in the borehole at all times during well construction. Plumbness and Alignment
  - 2. The contractor shall guarantee that the well, when completed, shall be sufficiently straight and plumb to permit the free installation and operation of submersible and turbine pumps regularly built for the installed well casing diameter to a depth acceptable to the project inspector.

### 3.3 CEMENT

- A. **General:** The cement shall be pumped as a slurry of thoroughly mixed components in stages that are designed to fill the annular space without exceeding the collapse pressure of the casing pipe to which the cement is applied. It is the CONTRACTOR's responsibility to conduct the cementing operations in such a manner that the burst strengths of the casing (with safety factor) are not exceeded and casing failure does not occur.

### 3.4 FILTERPACK PLACEMENT

- A. Filter Pack Placement The filter pack will consist of clean, mostly rounded to sub-rounded silica sand, graded to the specifications listed in the Scope of Work. A recent sieve analysis of the product being used must be provided to the project inspector. The project inspector has the right to reject a filter pack if the sieve analysis is unsatisfactory or not representative of the actual delivered load, if the grains are mostly angular to highly angular, or if the same has more than a trace of impurities, especially of calcium carbonate (such as shell fragments). The filter pack shall be protected from contamination during storage. If stored on site, the filter pack shall be placed on new plastic sheeting (visqueen) and covered with new plastic sheeting.
- B. Prior to placement of the gravel pack into the annular space, the drilling fluid shall be thinned with clean water. The contractor should maintain circulation in the hole from the time the thinning of the mud begins to the time when the gravel pack is completely in place. The rate of gravel placement shall not exceed 1.5 feet per minute, and placement of gravel shall proceed without interruption until completion.

### 3.5 WELL DEVELOPMENT

- A. After well has been completely constructed in accordance with the requirements of the Contract Documents, the CONTRACTOR shall notify the ENGINEER and shall make the necessary arrangements for well development, and product testing.
- B. The CONTRACTOR shall be entitled to a decision in writing from the ENGINEER as to final well design within two working days of the completion of test hole drilling and e-log. The preliminary design listed in the Scope of Work may be significantly changed, or the test hole may be abandoned.
- C. Borehole reaming may commence at any time following the decision to complete a well, however, the final pass cannot be started until all materials to case and gravel pack the well are on-site or secured at the CONTRACTOR's yard (ENGINEER approval required).
- D. The well shall be initially developed by airlifting opposite the screened sections beginning with the shallowest section. Each section shall be worked for a minimum of three passes before moving to the next section. Upon completion of airlift development, the well shall be cleaned of all mud, sand, and sediment. The gravel pack shall be checked and added to, if necessary.
- E. The CONTRACTOR shall furnish, install, and operate a well pump with sufficient capacity to meet the Scope of Work requirements. Up to 100 feet of discharge line should be available for use (as necessary) at no extra cost. A water flow meter is required. A sampling tap and a Rossum sand tester must be furnished.
- F. Well development shall consist of cycles of pumping and surging until the discharged water is clear of sand, silt, and mud and until there is no further increase in specific capacity. Well development water shall be contained in portable tanks for disposal off-site at contractor's expense. At the conclusion of well development, a sand test shall be performed. Sand content shall average not more than 5 mg/l for a complete pumping cycle of two hours duration when pumping at the anticipated design capacity.
  - 1. If pump development is employed, initial pumping rate shall be restricted and as the water clears shall be gradually increased until the maximum rate is reached. The maximum rate will be determined by the ENGINEER after consideration of the

drawdown and discharge characteristics of the respective zone. At frequent intervals the pump shall be stopped and the water in the well shall be allowed to surge back through the pump bowls or drill pipe and through the open area beneath the casing.

2. The cycle of circulation or pumping shall be repeated until the discharge water is clear of sand, silt and mud and until there is no increase in specific density (discharge per foot of drawdown) in the well. The well shall be thoroughly developed so that it will produce a reasonable maximum capacity based on the consideration of depth and nature of the water-bearing formations, and so that it will not produce a composite amount of fine sands in excess of that specified.
3. Upon completion of the development operations, the CONTRACTOR shall demonstrate that the bottom of the well is clear of all sand, mud, and other foreign material.

**3.6 WELL PUMPING TESTS:** The CONTRACTOR shall operate the pump, collect water level data, and monitor discharge rates to conform to the testing program requirements supplied by the ENGINEER. At least one CONTRACTOR employee must be on-site at all times during the testing. Where a constant discharge test is required, there shall be an 8-hour minimum resting period with no pumping prior to the test. Discharge water shall not be allowed to flow onto adjacent properties or roads without approval from the ENGINEER. Following completion of the pump development and pumping tests, the contractor will clean the well of all sand, silt, and mud accumulated at the bottom.

- A. The pumping equipment and pump setting shall be the same as used for well development pumping.
  1. Pumping tests conducted for the well shall include: a step-drawdown test with increasing discharge rate, and a continuous, constant rate, time-drawdown test. A period of time is required for pump shut down and water level recovery between the well development and the tests and between the step-drawdown and constant rate pumping test.
  2. The pumping rate shall be increased by increments determined by the ENGINEER until the well has been tested at maximum capacity. The test duration and pumping rates will be determined by the ENGINEER. During the step-drawdown test, the CONTRACTOR shall record the time, pumping level, and discharge at 5-minute intervals. When the test is completed, the pump shall be stopped and the water level in the well allowed to recover.
  3. Constant-Rate Pumping Test: A continuous, constant-rate, time-drawdown test shall commence after the water level in the well had recovered from the step-drawdown test for at least 8 hours, or until recovery levels are approved by the ENGINEER. The rate of pumping will be determined by the ENGINEER. The CONTRACTOR shall assure that the pumping rate selected remains constant throughout the test. The test duration shall be 24-hours. When the test is completed and the pump stopped, the CONTRACTOR shall not remove the test pump from the well for a period of approximately 12 hours.
  4. The CONTRACTOR shall record the discharge rate each time the pumping water level is measured. During the constant discharge test, the CONTRACTOR shall record the time pumping level and discharge rate

on at minimum 60-minute intervals or less as directed by the ENGINEER. In addition to these measurements, the ENGINEER may require the CONTRACTOR to periodically record the temperature of the discharge water or collect water samples.

5. Supervision by the CONTRACTOR of constant rate pumping tests shall be maintained on a continuous basis by qualified personnel.
6. If either test is aborted or interrupted for any reason, the test shall be stopped, the water level allowed to recover, and the test restarted.
7. After the test pump has been removed, the CONTRACTOR shall remove any accumulated sediment from the well.

### 3.7 DISINFECTION

- A. The CONTRACTOR shall provide for disinfection of the well immediately after test pumping of the well has been completed. The CONTRACTOR shall carry out adequate cleaning procedures immediately preceding disinfection where evidence indicates that normal well construction and development work have not adequately cleaned the well. All sand, silt, and mud shall be removed from the well.
  1. **Bacterial Evaluation:** The disinfected well shall be tested for the presence of coliform in accordance with ANSI/AWWA C654. The results shall be submitted to the ENGINEER. If bacterial evaluation fails, disinfection and testing shall be repeated until the results indicate a pass.

### 3.8 GEOPHYSICAL LOGS

- A. Geophysical logs shall be performed following drilling and borehole preparation. The logging intervals shall be the total length of the borehole unless otherwise directed by ENGINEER. Each log must be run in a continuous fashion to be acceptable.
- B. Down-hole geophysical logs listed in the Scope of Work will be performed by a qualified geophysical logging company as soon as possible upon completion of the test hole and removal of the drill pipe. The drilling contractor will be responsible for coordinating the arrival time of the geophysical logging truck to minimize delay and for providing an open borehole for logging to the total test hole depth. The scale for the log shall be 1 inch = 20 feet. Four hard copies and one electronic copy on 3.5-inch diskette shall be provided to the ENGINEER.
- C. The CONTRACTOR is responsible for conditioning the borehole prior to logging to remove any drill cuttings and to prevent formation collapse. The CONTRACTOR shall clean the hole and rerun logs if logging attempt at the CONTRACTOR's expense fail to survey within 5 feet of the bottom of the hole.
- D. The CONTRACTOR will provide adequate access for geophysical logging during pumping tests. No additional compensation will be granted for removal and reinstallation of pumps to facilitate logging.
- E. Geophysical logs will be performed according to the following schedule during testing of the well:

### 3.9 FINAL INSPECTION

- A. The project inspector will inspect the site and wellhead prior to releasing the contractor from the job. All trash, extra materials, cuttings and drilling fluids generated by the contractor must be off the site, and the wellhead must be properly secured.

- END OF SECTION -

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2. Manufacturer's data on materials of coverings, jackets, and surface finishes.

C. Certificates:

1. Certification from the acoustic insulation/duct lining manufacturer that the lining has the sound absorption coefficients as indicated in these Specifications.

1.3 WORKMANSHIP

A. The work shall be installed by workers thoroughly experienced in such work, and the workmanship shall be first class in every respect. The CONTRACTOR's attention is called to the fact that neat and workmanlike appearance in the finished work will be required.

**PART 2 -- PRODUCTS**

2.1 GENERAL

A. All components of the insulation, including covering, mastics and adhesives shall have a flame-spread rating of not over 25, and a smoke development rating of not over 50. Ratings shall be as established by tests in accordance with ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials, ASTM C547 - Specification for Mineral Fiber Preformed Pipe Insulation, and Federal Specification HH-1-558B - Insulation Blocks, Boards, Blankets, Felts, Sleeving (Pipe and Tube Covering), and Pipe Fitting Covering, Thermal (Mineral Fiber, Industrial Type). The integrated insulation assemblies shall also conform to the above standards. Insulation shall be applied in strict accordance with the manufacturer's instructions.

2.2 PIPING INSULATION

A. All piping, fittings, and valves to be insulated shall be clean and dry prior to installation of insulation. All piping of the services described herein shall be completely insulated inside structures, except where otherwise indicated.

B. All piping, except as indicated herein, shall be insulated with heavy density, unfaced, fiberglass pipe insulation. The insulation shall have an average density of 4 pounds per cubic foot or greater. The "K" factor shall not exceed 0.23 Btu-In/SF/ degree F/Hr at 75 degrees F.

C. The fiberglass insulation shall be securely held in place before the final covering is applied. A scrim fabric, similar to a 20 x 10 thread count mesh, 100 percent fiberglass, shall be used for this purpose. The scrim fabric shall be pasted in place to hold the pipe insulation securely to the pipe. The scrim fabric shall be at least 4-inches wide, with at least two applications per length of pipe insulation, and one at each joint.

D. A final covering of the insulation for all piping shall be of 0.030 inch thick PVC. All valves, flanges, fittings, and ends of insulation shall be covered with a pre-molded, high-low temperature PVC fitting cover or end cap, or similar preformed unit. The pre-molded cover shall be sized to receive the same thickness of insulation as used on the adjacent piping. Pre-molded fittings shall be **Zeston, 2000 PVC; or equal**.

E. All joints shall be neatly finished with no ragged ends. When finished, the PVC covering shall show no exposed staples or other binding used during installation. Staples, if used, shall be stainless steel.

- F. On piping 3-inches and larger, the insulation shall be protected at supporting hangers by the installation of suitable hollow steel protection saddles, filled with loose glass fiber insulation as indicated.
- G. Piping smaller than 3-inches shall have a 1/16-inch thick sheet metal shim placed between the insulation and the supporting hanger. The shim shall be at least 6-inches long.
- H. Valves, fittings and flanges on all lines shall be covered in a similar manner to the adjacent piping.
- I. **Manufacturers or Equal:**
  - 1. The insulation shall be manufactured by:
    - a. **Manville, Flame Safe Fiberglass, unfaced.**
    - b. **Owens-Corning Fiberglass, unfaced.**
  - 2. The scrim fabric shall be manufactured by:
    - a. **Alpha Associates, Inc., Luben #58 (White).**
    - b. **Southern Asbestos Company**
- J. Pipe insulation thickness shall be as follows:

	Minimum Thickness of Insulation (inches)
Hot and cold water (domestic) - 6 inches and smaller	1
8 inches and larger	1-1/2
Heated sludge and process piping - 6 inches and smaller	1
8 inches and larger	1-1/2
Compressed air piping and liquid refrigerant piping exposed to the weather - All sizes	2
Heat traced piping - 3 inches and smaller	1
4 inches and larger	1-1/2

- K. All exterior non-buried pipe insulation shall be protected with an aluminum-magnesium alloy jacket having a minimum thickness of 0.016 inch with built-in isolation felt. Lap jacket at least three inches on all joints and secure with stainless steel bands on six inch centers.

**2.3 AERATION AND MEMBRANE AIR PIPING INSULATION**

- A. The CONTRACTOR shall furnish and install acoustical-thermal insulation on membrane air and aeration air, blower inlet and discharge piping, including fittings, flanges, valves,

couplings, silencers, and appurtenances between the blower and flow meter as indicated on the Contract Drawings.

- B. The acoustical insulation shall consist of one-half inch thick fiberglass laminated to a lead barrier having a density of 16 ounces per square foot. The fiberglass and lead barrier shall have a temperature capability to 350 degrees F and shall be **Hushcloth** as manufactured by **American Acoustical Products; Alpha Associates, Inc., or equal**. The insulation shall overlap at least two inches in both the transverse and longitudinal directions and shall be installed to avoid any sagging or gapping. The acoustical insulation shall be held in place by the use of scrim fabric at least six inches wide. There shall be at least two wraps of scrim per length of acoustical insulation. The scrim shall be 5x5 thread count fiberglass mesh, thread thickness 0.03 inch, weighing 5.8 ounces per square yard as fabricated by **Alpha Associates Luben 8405, Southern Asbestos Co., or equal**.
- C. The acoustical insulation shall be covered by a fiberglass thermal insulation and fiberglass lagging fabric. The thermal insulation shall be three inches thick rigid fiberglass having a "K" factor of not greater than 0.23 Btu-In/SF/degree F/Hr at 75 degrees F mean temperature. The density shall be not less than four pounds per cubic foot and the fiberglass shall have a compressive strength of not less than 50 psi.
- D. The thermal insulation shall be as manufactured by **Manville, Owens-Corning, or equal**.
- E. The final covering shall be a 100 percent fiberglass lagging fabric, 0.034 inch thick and weighing 19 oz. per sq. yd. The lagging fabric shall be **Alpha Associates - Style 2025; J.P. Stevens Co., or equal**.
- F. The final lagging fabric shall be neatly pasted in place with a three inch longitudinal overlap using a **Luben No. 9 adhesive, or equal**. Each transverse joint shall have a three inch butt strip of the same fiberglass fabric. All final joints shall be neatly finished with no ragged ends and the covering shall present a neat, uniform surface when finished. The fabric shall show no exposed staples or other binding used during construction. Staples, if used, shall be stainless steel.
- G. Valves and flanges on all piping shall be covered in a similar manner to the adjacent piping.

#### 2.4 STANDBY GENERATOR PIPING INSULATION

- A. The exhaust piping, fittings, and silencers on the new standby generator shall be insulated with a rigid calcium silicate material, capable of withstanding pipe temperatures of 1200 degrees F. and shall be of the **Kaylo 10 Asbestos Free** type pipe insulating material as manufactured by **Owens-Corning Fiberglass Corporation** or similar material as manufactured by **Manville; or equal**. The insulation shall be six inches thick around the silencers and four inches thick around the piping. The insulation shall be covered with a glass cloth vapor barrier jacket secured by adhesive.
- B. Insulation shall be installed in strict accordance with the manufacturer's recommendations.

#### 2.5 ANTI-CONDENSATION PIPING INSULATION

- A. In general all piping 5 inches and larger in diameter for raw water, settled water, filtered water, service water, water tanks, and as indicated, shall be insulated with **Armstrong, AP Armaflex Sheet and Roll Insulation; or equal**. It is a flexible closed cell elastomeric

thermal insulation, black in color and furnished with a smooth skin on one side which forms the outer exposed insulation surface.

- B. The insulation shall be supplied in sheets and rolls, 1/8 inch to 2 inches thickness, with a thermal conductivity of 0.27 Btu x inch/hr x sq. ft. x degree F. at 75 degrees mean temperature, a water vapor permeability of 0.10 perm-inch, a water absorption of 6 percent max., a upper use limit of 180 degrees F., a lower use limit of -40 degrees F. a flame-spread rating of 25 or less and a smoke-developed rating of 50 or less for insulation thickness to 3/4-inch, and a flame-spread rating of 25 or less and a smoke-developed rating of 100 or less for insulation thickness of 1 inch and greater.
- C. For controlling outer insulation surface condensation for pipes or tanks at a metal surface temperature of 35 degrees F., in normal design conditions an insulation thickness of 3/4 inch is recommended. In severe design conditions an insulation thickness of 1-1/2 inches is recommended.
- D. The insulation shall be applied to clean, dry surfaces. Remove all oil, grease, dust, scale, rust and moisture before applying the insulation. No protective finish is required indoors, but may be desirable. A weather-resistant protective finish is recommended if installed outdoors. Install insulation according to manufacturers recommendations.

## 2.8 BOILER BREECHING PIPING INSULATION

- A. The flue piping, fittings, and breeching on the new boiler system shall be insulated with a rigid calcium silicate material capable of withstanding pipe temperatures of 1200 degrees F., and shall be of the **Kaylo 10 asbestos Free** pipe insulating material as manufactured by **Owens-Corning Fiberglass Corporation**; or similar material as manufactured by **Manville**; or equal. The insulation shall be four inches thick. The insulation shall be covered with a glass cloth vapor barrier jacket secured by adhesive.
- B. Insulation shall be installed in strict accordance with the manufacturer's recommendations.

## 2.9 DUCTWORK INSULATION

- A. All HVAC ductwork with exterior insulation shall be a minimum 1-inch thick, rigid board, having a thermal conductivity of not greater than 0.23 Btu/SF/degree F/Hr at 75 degrees F mean temperature with a foil faced reinforced facing. The insulation shall be applied with edges tightly butted and secured by impaling on pins fastened to the ductwork. The pin spacing shall be sufficient to hold the insulation firmly to the duct surface and the insulation shall be held with speed clips. Pins shall be clipped after installation. All joints shall be sealed with a minimum 3-inch vapor barrier tape. The final outer covering shall be a rewettable, incombustible, 100 percent fiberglass lagging. The finish covering shall be neatly pasted in place with joint taping as required. All pasting of lagging shall be done with manufacturers recommended adhesive. The insulation shall be **Owens Corning Type 705, Johns Manville, or equal**. The lagging fabric shall be **Alpha Associates, Alpha-Matrix 3451-RW, J. P. Stevens, or equal**.
- B. All ductwork with exterior insulation which is exposed to the weather shall be protected with an aluminum-magnesium alloy jacket having a minimum thickness of 0.016 inch with built-in isolation felt. Lap jacket at least three inches on all joints and secure with stainless steel bands on six inch centers.
- C. **Duct Lining:** Ductwork lining shall be 1-inch thick, 1-1/2 lbs/cu. ft. density fiberglass duct liner as manufactured by **Manville Products Corp., Linacoustic-HP; Owens-Corning;**

**or equal.** The liner shall have a flame spread rating of 25 or less, a smoke development rating of 50 or less, an average thermal conductivity not to exceed 0.23 Btu-In/SF/Degree F/Hr at a mean temperature of 75 degrees F, and shall be suitable for duct velocities up to 5,000 FPM.

1. The liner shall have sound absorption coefficients as follows:

		Sound Absorption Coefficients as Frequencies (Hertz) of					
		NRC					
2000	4000	125	250	500	1000		
1.05	.80	.15	.55	.71	.94	1.03	

2. The liner shall be installed per manufacturer's recommendations
3. The duct sizes shown on the Drawings are the airway dimensions of the duct system which does not include any provisions for the duct liner. The CONTRACTOR shall add the duct liner thickness to the indicated duct sizes.

## 2.10 EQUIPMENT AND TANK INSULATION

- A. **Low Temperature Insulation:** For equipment and tank insulation up to 250 degrees F, use pipe insulation as described above. The installation shall be in strict accord with the manufacturer's recommendations. An aluminum or PVC jacket shall be installed over the insulation for protection.
- B. **High Temperature Insulation:** This type of insulation shall be employed for equipment and tanks with surface temperatures up to 1200 degrees F. The high temperature insulation shall consist of 4-inch thick calcium silicate or similar pre-molded blocks, in two layers of 2-inch thickness, each, with staggered joints, all applied over a 3/4-inch high metal rib lath. The inner layer shall be suitable for 1200 degrees F, and the second layer for 1000 degrees F. All bends, voids, joints, fittings and other parts shall be filled with insulating cement. Aluminum laggings shall be banded to the insulation in a similar fashion as specified for standard insulation. Allowances shall be made for thermal expansion.
- C. The insulation thickness shall be as recommended by the manufacturer of the equipment and tanks.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

- A. All insulation shall be installed by a qualified insulation CONTRACTOR in strict accordance with the manufacturer's recommendations.

- END OF SECTION

## SECTION 15210 - PINCH VALVES

### PART 1 -- GENERAL

#### 1.1 THE REQUIREMENT

- A. The CONTRACTOR shall provide pinch valves and appurtenances, complete and operable, in accordance with the Contract Documents.
- B. The requirements of Section 15200- Valves, General apply to this Section.
- C. The requirements of Section 15201 - Valve and Gate Actuators apply to this Section.

#### 1.2 CONTRACTOR SUBMITTALS

- A. The CONTRACTOR shall furnish submittals in accordance with Section 15200 - Valves, General.

### PART 2 -- PRODUCTS

#### 2.1 PINCH VALVES (MECHANICALLY ACTUATED) (sizes 1/2-inch through 24-inch)

- A. **Construction:** The valve bodies shall be of fully enclosed cast iron construction with flanged ends to ANSI/ASME B 16.10- Face-to-Face and End-to-End Dimensions of Valves, and Class 125 drilling to ANSI/ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800. The valve sleeves shall be of pure gum rubber with heavy nylon fabric reinforcement and flanged ends, wrapped over the body flanges. The valve shall have a full port through the entire body. All internal metal parts shall be completely isolated from the liquid by the elastomer pinch tube. The valves shall be suitable for bi-directional service and bubble-tight shut-off at the following working pressures at 100 degrees F:

Sizes from 4-inch through 12-inch - 100 psi

- B. **Actuator:** Valve actuators shall be in accordance with Section 15201- Valve and Gate Actuators, except as follows. Unless otherwise indicated, valves shall have manual actuators with position indicators and a double-acting steel or ductile iron mechanism compressing the sleeve equally from two sides. The valve stem shall be non-rising, of carbon steel or stainless steel, with ACME thread, and with a lubrication fitting. Valves up to and including 4-inch in size shall have direct acting handwheel actuation. Larger sizes shall have bevel gear actuators.
- C. Manufacturers, or Equal
  - 1. **Flexible Valve Corporation**
  - 2. **Red Valve Company, Inc.**
  - 3. **Robbins & Myers, Inc.**

2.2 PINCH VALVES (AIR ACTUATED) (sizes 1/2-inch through 24-inch)

- A. **Construction:** The valve bodies shall be of horizontally split, flanged cast iron construction, with end flanges drilled to class 125 ANSI/ASME B 16.1. The castings shall have drilled and tapped air connections; 1/4-inch NPT for valves 1/2-inch through 10-inch, and 1/2-inch NPT for valves 12-inch through 24-inch in size. The valve sleeves shall be of pure gum rubber with heavy nylon fabric reinforcement, and of standard full port design, with integral elastomer flanges each end, wrapped over the full face of the body flanges. Internal metal parts shall be completely isolated from the liquid by the elastomer pinch tube. The valves shall be suitable for bi-directional service and bubble-tight shut-off at 100 degrees F, and 100 psi working pressure.

**Valve Schedule**

<u>Valve</u>	<u>Diameter</u>	<u>Location</u>
41-V-01-SEP	4"	Septage Tank

- B. **Actuation:** The valve shall be actuated by compressed air at 100 psi pressure, by means of solenoid valves and valve positioners receiving 4 to 20 mA process signals, as indicated.
- C. Manufacturers, or Equal
  - 1. **Flexible Valve Corporation**
  - 2. **Plant Specialties, Inc.**
  - 3. **Red Valve Company, Inc.**
  - 4. **Robbins & Myers, Inc.**

2.3 PINCH CHECK VALVES (size 1-inch through 84-inch)

- A. **Construction:** The valve shall consist of a one-piece, duck-bill pattern elastomer sleeve with one integral elastomer flange at the inlet and a Type 316 stainless steel back-up ring flange, drilled to ANSI/ASME B 16.10 class 150 lb. standard. The elastomer sleeve shall be fabricated of pure gum rubber with heavy nylon reinforcement. The valve shall be suitable for sewage, sewer outfalls in seawater, and similar applications. The valve shall have tight shut-off at low differential pressure and repeated cycling without deterioration.
- B. Manufacturers, or Equal
  - 1. **Red Valve Company, Inc.**

**PART 3 -- EXECUTION**

3.1 GENERAL

- A. **General:** Valves shall be installed in accordance with the manufacturer's recommendation and with Section 15200 - Valves, General.

- END OF SECTION -

## SECTION 17300 - CONTROL STRATEGIES

### PART 1 -- GENERAL

#### 1.1 COMMON FUNCTIONS

- A. Common functions that are generally applicable to all loops or to many similar loops are described under the heading "General Control Loop Functions." These functions are not repeated in the descriptions for each individual control strategy.
- B. General Control Loop Functions.
  - 1. The following terms are used in the descriptions of PLC functions:
    - a. **Operator Settings:** Operator set or entered values shall be constants that are adjustable or set from operator displays. Examples of operator set or entered values are controller set points, batch set points, etc. Specific values that are required to be operator set are noted in the process control strategy descriptions.
    - b. **Tunable Values:** Tunable values are constants that are adjustable at engineer level displays without requiring any software reconfiguration. These values are not adjustable from operator level displays.
  - 2. The following general PLC functions shall be provided:
    - a. All analog and discrete inputs to the PLC shall be displayed. Both RUNNING and OFF input states shall be displayed.
    - b. All analog inputs shall have instrument failure alarms when the input is below 0 percent or above 100 percent for a tunable time initially set at 10 seconds.
    - c. All discrete FAIL inputs shall be alarmed. Other discrete inputs shall be alarmed as noted in the control strategy descriptions.
    - d. Where alarms are specified in the control strategy descriptions, alarms shall be initiated from the applicable inputs. If discrete inputs are not available, the specified alarms shall be initiated from the applicable analog input.
    - e. All analog inputs shall be trended.
    - f. All flow inputs and equipment run times shall be totalized and recorded. All totalized values shall be displayed.
    - g. Displays shall be grouped functionally for ease of operation. Both analog and discrete functions associated with an item of equipment or a group of equipment shall be provided on the same display.
    - h. Unless otherwise stated or shown, all discrete outputs shall be maintained outputs. For START/STOP PLC functions, the PLC shall issue a maintained START command until a RUNNING state is no longer detected or when a STOP command is issued. When a momentary command is required, the PLC shall issue the command for two (2) seconds, then remove the signal.

- i. For equipment that is controllable from the PLC, a control mode status signal will be sent to the PLC to indicate when the PLC is allowed to control the equipment. The PLC shall monitor the control mode status (HAND/OFF/AUTO (REMOTE)) and attempt to control only equipment that is in the AUTO/REMOTE mode.
  - j. For equipment that the PLC is allowed to control, the PLC shall provide a FAIL alarm if the equipment fails to comply with a PLC command signal (START, STOP, OPEN, CLOSE) that has been present for more than an adjustable time period. In this event, the command shall be removed subsequent to the expiration of the adjustable time period.
  - k. All PID control functions (P, PI, and PID) shall be provided with standard analog controller functions and operator interfaces including, but not limited to, the following;
    - AUTO/MANUAL mode selection: In AUTO, the output of controller shall be based on the PID control calculation. In MANUAL, the output of the controller shall be operator adjustable. Transfer between operational modes shall be bumpless.
    - LOCAL/REMOTE set point selection: In LOCAL, the set point shall be operator adjustable. In REMOTE, the set point shall be adjustable from a REMOTE set point input.
    - Set point, process variable, and controller output shall be displayed.
    - Provisions shall be included to prevent reset windup.
  - l. When equipment is tagged "OUT OF SERVICE" by the operator, all associated equipment shall have their alarms inhibited until the tagged equipment is re-tagged IN SERVICE.
3. Alarm Handling
- a. The following is a guideline for the programming of facility alarms
    - 1) Type 1 alarms are "major emergency"
    - 2) Type 2 are "major" alarms
    - 3) Type 3 are "alerts"
4. All WWTF equipment will be provided with a permissive contact. The contact will be used in a load restriction program covered in strategy CS- or is used as a safety shutdown for equipment such as mixers.

## CS-40-01 DIESEL ENGINE GENERATOR

**Reference Drawings:** 40-I-01 & 40-E-04

**General:** One 1500 kW diesel engine generator (43-GEN-01) is provided to generate emergency power in the event of a loss of utility power. The system includes an above ground fuel storage tank, 41-T-01 located in the yard, a day tank, fuel supply pump for fuel supply to the day tank, automatic transfer switches and a 2,000 kW load bank.

### **Local Manual**

**Control Mode:** For a detailed description of the local control panel refer to specification 16620.

### **Local Automatic**

**Control Mode:** For a detailed description of the local control panel refer to specification 16620.

### **SCADA Manual**

**Control Mode:** Engine generator run status is transmitted back to the PLC for indication and runtime totalization. A common generator trouble alarm is also transmitted for the engine to the PLC R I/O #3.

The high and low level alarms for the fuel day tank along with a confirmation of LCP AUTO and a common fail alarm are transmitted to the facility PLC R I/O #3.

No manual control of the diesel engine generators is provided from the SCADA screen.

**PLC AUTOMATIC  
CONTROL MODE:**

No automatic control of the diesel engine generator is provided from the SCADA screen.

## CS-41-01 PLANT DRAINAGE PUMP STATION

**Reference Drawing:** 41-I-01

**General:** A triplex submersible pump system will take facility drainage and discharges into the Wastewater Treatment Facility (WWTF) Influent Box.

**Local Controls:** When the LOCAL/REMOTE selector switch at the VFD is set to LOCAL a pump will run at the speed set at the VFD potentiometer when the START button at the VFD is pressed. A pump will stop when the STOP button at the VFD is pressed.

**Local Automatic Control Mode:** No Local Automatic operation is provided.

**SCADA Manual Control Mode:** When the LOCAL/REMOTE selector switch at the VFD is set to REMOTE a pump will run when the operator at the SCADA Workstation places the pump in SCADA Manual mode and initiates a manual start command at a speed set also set at the SCADA Workstation. A pump will stop when either the operator manually stops the pump or a respective high motor temperature or a high moisture contact is made only when the SCADA system is operating the pumps. A low water level in the Plant Drainage Wetwell will also shutdown any running pump.

Individual RUN status for each pump is transmitted to the SCADA system for indication and runtime totalization at the operator workstations. VFD READY, VFD in REMOTE and pump SPEED are also transmitted to the SCADA system for indication.

**SCADA Automatic Control Mode:** The pumps shall be controlled automatically when the LOCAL/REMOTE switch at the VFD is set to REMOTE and the pump is set to SCADA Automatic mode. The operator at the SCADA Workstation will select a lead, lag and standby pump. The lead pump will turn on and run at 50% speed when the wetwell level setpoint is reached. The pump speed will vary using a PID controller based on the level setpoint. When the lead pump speed increases to 95% the speed will be clamped and a lag pump will turn on at 50% speed the lag pump speed will then vary again based on the level setpoint in the wetwell.

The running lag pump will shutdown when the speed of the pump decreases to 45%. The Lead pump speed will then be unclamped and the speed again will vary to control a level in the wetwell. When the lead pump speed reaches 45% it will shutdown.

If a pump fails during normal operation the "standby" pump will assume the failed pump's operating mode (Lead or Lag) and will automatically start and will operate based on the level setpoint. To prevent the failed pump from being called to run the failed pump will require that the operator reset the failed status at the SCADA Workstation before the pump can resume a normal operating mode.

An alternator program will be provided at the SCADA system that the operator at the SCADA Workstation can place in the ON or OFF mode. If the alternator is placed in the ON mode and after the lead pump has shutdown the pump's lead, lag and standby modes will alternate. If the alternator program is in the OFF mode the operator will be responsible to change the pump's lead, lag and standby modes. All pumps will have a different operating mode.

**Interlocks:** Power Permissive.

**Alarms:** A Wetwell HIGH and LOW level alarms derived from the continuous level signal shall be displayed at the SCADA Workstation. A HIGH-HIGH wetwell alarm status derived from the wetwell level float switch shall be transmitted to the SCADA system for indication at the operator workstation at the Wastewater Treatment Plant. A pump common FAIL alarm shall also be transmitted to SCADA for indication at the SCADA workstation.

## CS-41-02 INFLUENT PUMP STATION

**Reference Drawing:** 41-I-02

**General:** A triplex submersible pump system will take influent from location in the Los Osos Wastewater Collection System other than from the Lupine and West Paso Pump Stations and discharges into the Wastewater Treatment Facility (WWTF) Influent Box.

**Local Manual  
Control Mode:**

When the LOCAL/REMOTE selector switch at the VFD is set to LOCAL a pump will run at the speed set at the VFD potentiometer when the START button at the VFD is pressed. A pump will stop when the STOP button at the VFD is pressed.

**Local Automatic  
Control Mode:**

No Local Automatic operation is provided.

**SCADA Manual  
Control Mode:**

When the LOCAL/REMOTE selector switch at the VFD is set to REMOTE a pump will run when the operator at the SCADA Workstation places the pump in SCADA Manual mode and initiates a manual start command at a speed set also set at the SCADA Workstation. A pump will stop when either the operator manually stops the pump or a respective high motor temperature or a high moisture contact is made only when the SCADA system is controlling the pumps. A low water level in the Plant Drainage Wetwell will also shutdown any running pump.

Individual RUN status for each pump is transmitted to the SCADA system for indication and runtime totalization at the operator workstations. VFD READY, VFD in REMOTE and pump SPEED are also transmitted to the SCADA system for indication.

**SCADA Automatic  
Control Mode:**

The pumps shall be controlled automatically when the LOCAL/REMOTE switch at the VFD is set to REMOTE and the pump is set to SCADA Automatic mode. The operator at the SCADA Workstation will select a lead, lag and standby pump. The lead pump will turn on and run at 50% speed when the wetwell level setpoint is reached. The pump speed will vary using a PID controller based on the level setpoint. When the lead pump speed increases to 95% the speed will be clamped and a lag pump will turn on at 50% speed the lag pump speed will then vary again based on the level setpoint in the wetwell.

The running lag pump will shutdown when the speed of the pump decreases to 45%. The Lead pump speed will then be unclamped and the speed again will vary to control a level in the wetwell. When the lead pump speed reaches 45% it will shutdown.

If a pump fails during normal operation the "standby" pump will assume the failed pump's operating mode (Lead or Lag) and will automatically start and will operate based on the level setpoint. To prevent the failed

pump from being called to run the failed pump will require that the operator reset the failed status at the SCADA Workstation before the pump can resume a normal operating mode.

An alternator program will be provided at the SCADA system that the operator at the SCADA Workstation can place in the ON or OFF mode. If the alternator is placed in the ON mode and after the lead pump has shutdown the pump's lead, lag and standby modes will alternate. If the alternator program is in the OFF mode the operator will be responsible to change the pump's lead, lag and standby modes. All pumps will have a different operating mode.

**Interlocks:** Power Permissive

**Alarms:** A Wetwell HIGH and LOW level alarms derived from the continuous level signal shall be displayed at the SCADA Workstation. A HIGH-HIGH wetwell alarm status derived from the wetwell level float switch shall be transmitted to the SCADA system for indication at the operator workstation at the Wastewater Treatment Plant. A pump common FAIL alarm shall also be transmitted to SCADA for indication at the SCADA workstation.

## RESIDUALS BUILDING

### Influent Flow Metering (42-I-01)

Wastewater flow entering the treatment plant will be metered using magnetic flowmeters. There are three wastewater pump stations that will deliver flow to the plant. In addition, there will be a Plant Drain Pump Station, located on-site, to receive and pump drainage, septage, and recycled flows back into the plant. The flow from each of the four pump stations will be metered.

### Inlet Box (42-I-01)

The Inlet Box will receive all of the influent flow from the three wastewater pump stations as well as the flow from the Plant Drain Pump Station and WAS flow (scum to screening) from the Treatment Building. The inlet box is equipped with an emergency overflow weir that will operate to bypass the drum screens should both screen inlet valves be closed due to some equipment malfunction or operator error. A level sensor in the inlet box will signal a high level alarm (Type 1). The inlet box also has an LEL sensor and a transmitter that will be mounted adjacent to the box. An alarm setpoint shall be provided for the LEL signal at the SCADA system and will generate a Type 1 alarm.

### Septage System (42-I-03)

A level sensor is provided in the septage storage tank. The discharge from the tank can be a manual or automatic function. If the discharge valve is placed in SCADA manual the operator will manually open and close the valve from the SCADA Workstation. If the valve is set to SCADA Auto and the level in the tank rises to an operator adjustable setpoint the discharge valve will be automatically commanded to open until a low level in the tank is reached. A high level alarm (type 3) is also provided that will alarm at the SCADA Workstation and at the Septage truck unloading bay.

### HVAC (42-I-06 & 42-I-07)

The HVAC system in the Residuals Building will be manually controlled either at the MCC, by thermostat or from the SCADA system. The fans that do not have a VFD either have ON/OFF controls at the MCC or have a circuit breaker that when made will start the fan. All of the fans have a RUN status that is transmitted to R I/O#2 for indication and runtime totalization at the SCADA Workstation. The fans that do have ON/OFF controls at the MCC also have power permissive interlocks and a FAIL alarm (Type 2) that is transmitted to R I/O#2.

The fans that have a VFD will also be manually controlled either at the VFD or by the Operator at the SCADA Workstation. If the LOCAL/REMOTE switch at the VFD is placed in LOCAL mode the fan will be controlled from start/stop and speed controls at the VFD. If the LOCAL/REMOTE switch at the VFD is placed in REMOTE mode the fan will be controlled from the SCADA Workstation. The operator based on a pressure reading at the Biofilter will manually set the fan VFD speed. Each of the VFD fans will have the RUN, READY and REMOTE status transmitted to R I/O#2 for indication and the RUN status used for runtime totalization. The VFD will also provide a speed signal and a VFD FAIL alarm (type 2) to R I/O#2.

## CS-42-01 DRUM SCREENS

**Reference Drawing:** 42-I-01

**General:** Two rotating Drum Screens (42-E-01-PI & 42-E-02-PI) will screen influent wastewater for larger objects after it has passed through the WWTF influent box. The screenings will be passed through to the Washer Compactors for washing. The screened wastewater will pass through to the Grit System.

**Normal Operation:** Normally, one drum screen will be in operation and the other unit will be a standby unit. The drum screens will be furnished with a vendor supplied LCP. This LCP shall provide the local control logic for the screens, a touch screen interface to the controls, and function as the interface between the SCADA system and the screens. The LCP will be provided with a LOCAL/REMOTE switch. When set to LOCAL the screen will operate manually from the LCP. When set to REMOTE the screen will start and stop based on commands from the SCADA system. The screen in REMOTE signal shall be transmitted to R I/O#2 for control and indication at the SCADA Workstation.

The drum screen package will include the following primary sensors:

1. Zero speed switch
2. Blinding sensor (photo cell)

The inlet to the two drum screens will be controlled using the pneumatically operated knife gate valves. Each valve is controlled via PLC R I/O#2. The operator at the SCADA Workstation can manually operate each valve and each screen by placing the drum screen in SCADA Manual Mode and selecting OPEN or CLOSE and START or STOP respectively. Normally the drum screen will be placed in SCADA automatic mode. When in automatic mode the drum screens and the pneumatic valves operate automatically. If both screens have stopped the operator at the SCADA Workstation will select which drum screen to operate and will initiate an automatic START command. This will initiate a valve open command to the respective inlet pneumatic valve for the selected drum screen. When the valve has fully opened a START command will be issued to the drum screen. The operator can then either STOP the running drum screen or the screen will be automatically commanded to stop and the valve closed and the other screen commanded to start. The new screen will start by opening the inlet valve and then starting the drum screen when any Type 1 alarm condition described below occurs if the screen is in REMOTE and the screens are in SCADA automatic mode. The opening and closing of the valves will be controlled such that one valve must be fully open before the other valve is closed. Two valves can be open at the same time, as long as both screens are in operation.

The screens will be equipped with a spray water system to clean the drum screen. This system shall include both an inside and outside spray

bar with individual solenoid valves to turn on each spray bar independently from the other. Wash water will be supplied from pumps located in the Treatment Building. The spray water system control shall provide the following modes of operation:

1. **Continuous operation.** The spray water system turns on when the drum screen is placed into operation and turns off when the drum screen is taken out of operation.
2. **Time control.** The spray water system shall be turned on and off based on a cycle timer function. The timer shall be able to turn both internal and external sprays off simultaneously or alternate the internal and external spray operation. The spray water control system shall interface with the spray water pumps so that the pumps are turned on when there is a water demand.
3. **Blinding control.** A blinding sensor will be provided to sense blinding of the screen surface by solids. The blinding sensor shall have a set-point value that shall initiate the operation of the spray water system. Once triggered, the internal and external spray bars shall be turned on/off in a programmed manner to clean the screen. This operation shall be time clock based.

The spray water controls shall call for the spray water pump to turn on whenever there is a demand for water. Depending on the spray water control mode selected, the spray water pumps will be operated in either an On/Off mode or an On/Off pump alternation.

The blinding control shall effectively measure the percent blinding on the screen and shall generate a 4-20 ma signal proportional to percent blinding. An adjustable setpoint shall be provided to activate the spray water system.

The zero-speed switch shall determine whether or not the drum is turning when the screen is in operation.

Sluice water will be supplied to the screenings discharge to convey the screenings to the washer compactor. Normally, one pump will be in service and the second unit will act as standby. The controls shall activate one sluice water pump when the screens are in operation.

Drum Screen RUN status is transmitted to the SCADA system for indication and runtime totalization at the SCADA workstations.

**Interlocks:** Power Permissive.

**Alarms:** A second blinding control setpoint shall be provided to generate an alarm signal (Type 2) from the LCP to R I/O#2. If, after the spray water system has been activated, and a set time delay has elapsed, the alarm condition does not clear the LCP will shutdown the operating screen. Also an alarm signal will be generated (Type 1) from the LCP to R I/O#2 to be displayed at the SCADA Workstation.

Should the drum not turn when the screen is in operation an Emergency alarm will be generated (Type 1) from the LCP to R I/O#2 to be displayed at the SCADA Workstation.

A high water level in the drum screen discharge channel (42-LSH-02) will generate a Type 1 alarm at the SCADA Workstation.

When a Drum Screen overload occurs at the drum screen starter a FAIL alarm (Type 1) will be generated from the LCP to R I/O#2 to be displayed at the SCADA Workstation.

## CS-42-02 WASHER COMPACTORS

**Reference Drawing:** 42-I-01

**General:** Two Washer Compactors (42-E-01-SCR & 42-E-02-SCR) will take the screenings from the Drum Screens and wash and separate-out the solids. The solids are then collected in a solids collection bin that will be removed by a truck.

**Normal Operation:** Normally, one washer compactor will be in operation and the other unit will be a standby unit. The washer compactors will be furnished with a vendor supplied LCP. This LCP shall provide the local control logic for the washer compactor, a touch screen interface to the control system, and function as the interface between the SCADA system and the washer compactors. The LCP will be provided with a LOCAL/REMOTE switch. When set to LOCAL the compactor will operate manually from the LCP. When set to REMOTE the compactor will start and stop based on commands from the SCADA system. The compactor in REMOTE signal shall be transmitted to R I/O#2 for control and indication at the SCADA Workstation. The washer compactor package will include a level sensing system that shall be used to operate the washer compactors and generate a high level signal if the unit is not operating properly

The inlet to the two washer compactors will be controlled using pneumatically operated knife gate valves. Each valve is controlled via PLC R I/O#2. The operator at SCADA Workstation can manually operate each valve and each compactor by placing the compactor in SCADA Manual Mode and selecting OPEN or CLOSE and START or STOP respectively. Normally the compactor will be placed in SCADA automatic mode. When in automatic mode the compactors and the pneumatic valves operate automatically. If both compactors have stopped the operator at the SCADA Workstation will select which compactor to operate and will initiate an automatic START command. This will initiate a valve open command to the respective inlet pneumatic valve for the selected compactor. When the valve has fully opened a START command will be issued to the compactor. The operator can then either STOP the running compactor or the compactor will be automatically commanded to stop and the valve closed and the other compactor commanded to start. The compactor will start by opening the inlet valve and then starting the compactor when any Type 1 alarm condition described below occurs if the compactor is in REMOTE and the compactors are in SCADA automatic mode. The opening and closing of the valves will be controlled such that one valve must be fully open before the other valve is closed. Two valves can be open at the same time, as long as both washer compactors are in operation.

The washer compactor control system shall allow the following modes of operation:

1. **Continuous operation** - The washer compactor and grinder shall operate continuously together with the spray water system.

2. **Time control** - A cycle timer function shall initiate the operation of the washer compactor system that will then run through the programmed operating cycle.
3. **Level control** - A level sensor will be provided to sense a high level in the washer. The level sensor shall initiate the operation of the washer compactor system that will then run through the programmed operating cycle.

The washer compactors will be equipped with a programmable operating cycle capability. The operating cycle shall enable the operation of the grinder, washer section, and screw compactor to operate in a controlled sequence to effectively grind, wash and compact the screenings. A spray water system shall be provided to assist in cleaning the screenings. This wash system shall include a spray bar with a solenoid valve to turn on the spray bar when required. Wash water will be supplied from the Utility Water system.

**Interlocks:** Power Permissive.

**Alarms:** The level sensing system shall activate the washer compactor operating cycle. If, after the operating cycle has been activated, and a set time delay has elapsed, the alarm condition does not clear, then the second washer compactor shall be commanded to start by the SCADA system. A Type 1 alarm signal will also be generated from the LCP to R I/O#2 to be displayed at the SCADA Workstation.

If a high torque on the washer compactor screw or grinder occurs a Type 2 alarm signal will be generated from the LCP to R I/O#2 to be displayed at the SCADA Workstation.

A washer compactor containment flood alarm (Type 1) is generated from a level switch in the containment area to R I/O#2 to be displayed at the SCADA Workstation. The alarm will result in the shutdown of the operating washer compactor and the starting of the second washer compactor if the washer compactors are in REMOTE mode.

## CS-42-03 GRIT CHAMBER

**Reference Drawing:** 42-I-02

**General:** One grit vortex chamber mixer, 42-E-01-G, shall be provided to remove grit from the influent process stream. The unit shall remove the grit by use of an axial flow propeller which scours the incoming flow stream allowing hydraulic currents to remove the grit before being passed on to the grit pumps.

### **Local Manual**

**Control Mode:** When the local HAND/OFF/REMOTE switch at the grit chamber is placed in HAND the grit chamber drive will operate. When the HAND/OFF/REMOTE switch is placed in OFF the grit chamber will stop.

### **Local Automatic**

**Control Mode:** No Local Automatic operation is provided.

### **SCADA Manual**

**Control Mode:** When the local HAND/OFF/REMOTE switch at the grit chamber is placed in REMOTE the grit chamber drive will operate from the SCADA system when the operator at the SCADA Workstation starts and stops the chamber. The grit chamber will normally run continuously.

Chamber RUN status is transmitted to the SCADA system for indication and runtime totalization at the operator workstations. A chamber in REMOTE status is also transmitted to the SCADA system for indication.

### **SCADA Automatic**

**Control Mode:** No SCADA Automatic operation is provided.

**Interlocks:** Power Permissive

**Alarms:** A grit chamber overload will generate a FAIL (Type 1) alarm signal from the MCC to R I/O#2 to be displayed at the SCADA Workstation.

## CS-42-04 GRIT PUMPS

**Reference Drawing:** 42-I-02

**General:** Two horizontal recessed impeller grit pumps, 42-P-01-G and 42-P-02-G shall be provided to pump grit to two cyclones, 42-E-03-G and 42-E-04-G and classifier, 42-E-02-G, located on the first floor of the Residuals Building. Each pump has a dedicated cyclone that then feed into a single classifier.

**Local Manual**

**Control Mode:** A HAND/OFF/AUTO switch is provided for local manual control of each pump. When set to HAND each pump will run and the seal water solenoid valve will open as long as the pump runs.

**Local Automatic**

**Control Mode:** No Local Automatic control is provided.

**SCADA Manual**

**Control Mode:** When the HAND/OFF/AUTO switch at each pump is placed in AUTO and the operator at the SCADA workstation has set the operation for SCADA manual the operator can start and stop the pumps manually. Individual RUN status for each pump is transmitted to the SCADA system for indication and runtime totalization at the operator workstations. Pump in AUTO is also transmitted to the SCADA system for indication.

**SCADA Automatic**

**Control Mode:** When the HAND/OFF/AUTO switch at each pump is placed in AUTO and the operator at the SCADA workstation has set the operation for SCADA automatic the SCADA system will start the pumps based on an adjustable ON time and OFF time cycle timer. An initial setting would be for the pump to run for two minutes every hour. The timer settings however will be adjustable by the operator at the SCADA workstation. Each pump is independent of the other with one exception. The pumps shall be alternated in operation, to allow for equal runtime. The only exception to this would be when either pump has failed.

**Interlocks:**

When a grit pump operates the grit classifier that the grit pumps will feed will also turn on (See grit classifier operation for details). A Power Permissive is provided for each pump.

**Alarms:**

A pump common FAIL alarm shall be transmitted to SCADA for indication at the SCADA workstation.

## CS-42-05 GRIT CLASSIFIER

**Reference Drawing:** 42-I-02

**General:** One grit classifier, 42-E-02-G, will be supplied to remove grit taken from the grit cyclones, 42-E-03-G and 42-E-04-G and deposit it in a grit dumpster. The classifier uses a screw or rake to transfer the grit from the outlet of the cyclones to the dumpster.

**Local Manual Control Mode:** When the local HAND/OFF/REMOTE switch is placed in HAND the classifier will run continuously. A washwater solenoid valve shall be energized by the MCC, supplying water to the classifier, whenever the classifier is running.

**Local Automatic Control Mode:** No automatic control is provided locally.

**SCADA Manual Control Mode:** When the HAND/OFF/REMOTE switch is set to REMOTE the classifier will run when the operator at the SCADA Workstation places the classifier in SCADA Manual mode and initiates a manual start command at the SCADA Workstation.

A classifier RUN status is transmitted to the SCADA system from the MCC to R I/O#2, for indication and runtime totalization at the SCADA Workstation. A classifier REMOTE status is also transmitted from the MCC to R I/O#2.

**SCADA Automatic Control Mode:** When the HAND/OFF/REMOTE switch at the classifier is placed in REMOTE and the operator at the SCADA Workstation places the classifier in SCADA Automatic mode the classifier will run when a confirmed grit pump run status is received by the SCADA system. The classifier will continue to run until the grit pump run status is removed plus an adjustable time delay initially set at 5 minutes.

**Interlocks:** Power Permissive.

**Alarms:** A classifier common FAIL alarm shall be transmitted to R I/O#2 from the MCC for indication at the SCADA workstation.

## CS-42-06 SLUICE CHANNEL PUMPS

**Reference Drawing:** 42-I-02

**General:** Two horizontal recessed impeller grit pumps, 42-P-01-SCR and 42-P-02-SCR shall be provided to pump screened wastewater to the sluice channel between the drum screens and the washer compactors.

**Local Manual**

**Control Mode:** A HAND/OFF/REMOTE switch is provided for local manual control of each pump. When set to HAND each pump will run.

**Local Automatic**

**Control Mode:** No Local Automatic control is provided.

**SCADA Manual**

**Control Mode:** When the HAND/OFF/REMOTE switch at each pump is placed in REMOTE the operator at the SCADA workstation has set the operation for SCADA manual the operator can start and stop the pumps manually. Individual RUN status for each pump is transmitted to the SCADA system for indication and runtime totalization at the operator workstations. Pump in REMOTE is also transmitted to the SCADA system for indication.

**SCADA Automatic**

**Control Mode:** No SCADA Automatic control will be provided.

**Interlocks:**

Power Permissive.

**Alarms:**

A pump common FAIL alarm shall be transmitted to SCADA for indication at the SCADA workstation.

## CS-42-07 CENTRIFUGES

**Reference Drawing:** 42-I-05

**General:** Two centrifuges, 42-E-01-WAS & 42-E-01-WAS will be provided to de-water the Waste Activated Sludge (WAS) produced from the MBR units. The centrifuges will be configured such that each will be provided with an LCP located next to each centrifuge that will each contain a PLC that will control the internal operation of the centrifuge. The centrifuge operation as a system including the polymer pumps, WAS pumps and solids conveyor however will be controlled through the SCADA system via ethernet communication link.

**Normal Operation:** The centrifuge operation will consist of a startup and shutdown procedure where the following units will be interlocked at the SCADA system to enable a programmed start/shutdown sequence as described below:

1. Waste Sludge Control Gate (Treatment Building)
2. WAS pumps (Treatment Building)
3. WAS Flow Meters (Residuals Building)
4. Centrifuge (Residuals Building)
5. Polymer Feed System (Residuals Building)
6. Screw Conveyor (Residuals Building)

The startup sequence is described below. Individual settings on each piece of equipment (e.g., centrifuge torque, polymer metering pumping rate, etc) will be changed through the LCP of each unit. Shutdown of the de-watering operation will follow the reverse sequence.

### De-watering Operation Startup Sequence:

- 1) Operator will determine wasting rate and wasting duration, or total sludge to be wasted (gallons), for the day and manually enter the values in the SCADA system.
- 2) Operator will select through the SCADA system the WAS feed pump(s) that will be used to pump WAS to the centrifuge(s).
- 3) Operator will select through the SCADA system the centrifuge(s) that will be used to de-water WAS and which centrifuge is operated with which WAS pump.
- 4) Operator will select through the SCADA system the polymer feed system(s) that will be used and which polymer system is operated with which centrifuge.
- 5) Operator will select a pre-programmed torque value for the specified feed rate (if applicable) OR will go to the centrifuge LCP and adjust torque as necessary.
- 6) Operator will manually open and close WAS pump and polymer feed valves, as necessary
- 7) Operator will then initiate "de-watering system operation" by pushing a Start button on the touch screen or centrifuge LCP panel and the following sequence of operation will occur:

- Centrifuge turns on
- Waste Sludge Control Gate opens
- WAS Pump starts
- Polymer Feed starts
- Diverter Gate remains in default position (with flap gate open so that discharge is diverted to plant drain)
- Screw Conveyor turns on (after centrifuge torque reaches set point)
- Diverter Gate changes position after torque reaches set point

If feed rate to the centrifuge is changed, the centrifuge torque and speed may be changed at the operator interface of the LCP. The polymer feed rate (metering pump speed/feed rate) would also be adjusted (if necessary at the polymer unit LCP).

Centrifuge will start when a run signal is received from the SCADA system after operator selects begin de-watering operation. When the centrifuge reaches a set torque value, the diverter gate will change position. The position of the diverter gate will be recorded at the SCADA system.

The following alarm conditions will be sent back to the SCADA system. Sensors for the alarms are provided in centrifuge package:

- Motor Temperature High Alarm (Type 2)
- Motor Temperature High-High Alarm (Type 1)
- Motor Overload/Failure Status (Type 1)
- Bowl or Back Drive Failure (Type 1)
- Centrifuge vibration sensor High Alarm (Type 2)
- Centrifuge vibration sensor – High-High Alarm (Type 1)

Any Type 1 alarm conditions will cause the SCADA system to begin emergency shutdown procedure of the de-watering operation (shutdown of the centrifuge, WAS pumps, polymer feed pumps, etc). In addition, an Emergency Stop pushbutton shall be supplied on the centrifuge LCP. Under normal operating conditions, shutdown of the centrifuge will be initiated from the SCADA system. A shutdown signal will be sent to LCP for the centrifuge from SCADA system. The centrifuge stop/shutdown procedure will then be run from the centrifuge LCP. When shutdown is initiated, the centrifuge will begin to slow down, torque will reduce, the diverter valve will change position, and a flushing process with plant utility water will be conducted for a set amount of time (flush time can be modified at the LCP).

## CS-42-08 POLYMER FEED SYSTEMS

**Reference Drawing:** 42-I-04

**General:** The polymer mix/feed units (42-C-01-PEC, 42-C-02-PEC and 42-C-03-PEC) will draw polymer from the polymer liquid storage bins, mix it with dilution water and feed it to the WAS entering a centrifuge. The mix/feed units and the centrifuges will be operated as an integrated system from the centrifuge local control panel through the SCADA system. Each mix/feed unit will be provided with an LCP and dedicated variable frequency drives to vary the speed of the feeder and the mixer to control the feed rate of polymer to the centrifuges.

**Local Manual Control Mode:** Each of the mix/feed units may be operated locally at the provided LCP. The LCP's will contain the VFD's. There is a LOCAL/REMOTE switch, a run status light, an ON/OFF/REMOTE switch a speed indicator controller for feeder pump speed a water dilution flow indicator and a discharge pressure indicator on the LCP. The local speed indicator controller is functional only when the ON/OFF/REMOTE switch on the LCP is switched to ON.

**Local Automatic Control Mode:** No automatic control is provided locally.

**SCADA Manual Control Mode:** Mix/feed unit run status is transmitted from the LCP to the SCADA system for indication and run time totalization. A unit fail alarm is generated by the SCADA system if it is called to run and no run status is received within 30 seconds. The SCADA system also receives a 0-100 percent feeder speed signal from the LCP for indication and retransmission. When the ON/OFF/REMOTE switch is in REMOTE, the SCADA system receives a REMOTE status input, and the mix/feed unit is controlled by the operator at the SCADA Workstation. The operator at the SCADA Workstation can manually start and stop each polymer feed unit when the unit is in SCADA Manual Mode.

**SCADA Automatic Control Mode:** There are three polymer mix/feed units and two centrifuges. Once a given centrifuge is chosen to run, the selected mix/feed unit will start automatically via the SCADA system when along with the associated WAS pump. It will continue to run until the WAS pump is stopped. During that time, the operator may change the mix/feed unit speed by using controls at the centrifuge LCP. Actual speed of the selected mix/feed unit is retransmitted from the SCADA system to the centrifuge LCP for indication.

Polymer feed system RUN status for the selected unit will be retransmitted from the SCADA system to the centrifuge LCP for indication.

**Interlocks:** The polymer feed system operation will be interlocked with the operation of the centrifuges through the SCADA system.

Power Permissive.

**Alarms:** A dilution water low-pressure (failure) alarm (Type 1) will be transmitted to the SCADA system.

## CS-42-09 SOLIDS CONVEYOR

**Reference Drawing:** 42-I-05

**General:** A conveyor system is provided below the centrifuges consisting of a conveyor (42-E-04-WAS) located above the truck loading bay.

**Local Control:** No Local control is provided. A zero speed switch on the conveyor will send a maintained alarm signal to R I/O#2 that shall initiate a safety shutdown of the conveyor. Further operation will require that the switch be manually reset at the conveyor.

**SCADA Manual Control Mode:** The operator at the SCADA Workstation can manually start and stop the conveyor when the unit is in SCADA Manual Mode.

**SCADA Automatic Control Mode:** After a centrifuge has been started the SCADA system will wait until the centrifuge reaches a torque setpoint, then the centrifuge LCP will command the diverter gate to position the discharge to the solids conveyor and will signal the SCADA system to start the solids conveyor. When the centrifuge stops and the diverter gate reverts to the default position the solids conveyor will continue to run for an operator adjustable period of time then will be commanded to stop.

A RUN status for the conveyor is transmitted to the SCADA system for indication and runtime totalization at the operator workstations.

**Interlocks:** The operation of the solids conveyor will be interlocked with the operation of the centrifuges through the SCADA system.

Two emergency stop pull-cords will be provided that will automatically stop the conveyor at the MCC. When the SCADA system loses the RUN signal even though the conveyor is being command to run the command will be withdrawn and a shutdown of the de-watering operation will commence.

Power Permissive.

**Alarms:** Motor failure of the screw conveyor will send a Type 1 alarm to the SCADA system and shutdown de-watering operation. A zero speed switch will also be provided for alarm (Type 1).

## TREATMENT BUILDING

### Influent Flow Splitter Box (43-I-03)

The Influent Flow Splitter Box has splitter weirs to split the influent flow equally among the aeration trains in service. Manual slide gates are provided to allow flow to be shut off from one train for service. The Influent Flow Splitter Box is also equipped with an emergency overflow weir set at a level above the normal flow split weirs. Should the permeate flow not be adequate to keep up with the influent flow, the water level in the aeration basins will rise to a point where it will back up into the Influent Flow Splitter Box and begin to overflow the emergency overflow weir. A float-type level switch will be provided to generate a high water alarm (Type 1) when the level reaches the emergency overflow weir.

### HVAC (43-I-22, 43-I-23 & 43-I-24)

The HVAC system in the Treatment Building will be manually controlled either at the MCC, by thermostat or from the SCADA system. The fans that do not have a VFD either have ON/OFF controls at the MCC or have a circuit breaker that when made will start the fan. All of the fans have a RUN status that is transmitted to R I/O#3 for indication and runtime totalization at the SCADA Workstation. The fans that do have ON/OFF controls at the MCC also have power permissive interlocks and a FAIL alarm (Type 2) that is transmitted to R I/O#3.

The fans that have a VFD will also be manually controlled either at the VFD or by the Operator at the SCADA Workstation. If the LOCAL/REMOTE switch at the VFD is placed in LOCAL mode the fan will be controlled from start/stop and speed controls at the VFD. If the LOCAL/REMOTE switch at the VFD is placed in REMOTE mode the fan will be controlled from the SCADA Workstation. The operator based on a pressure reading at the Biofilter will manually set the fan VFD speed. Each of the VFD fans will have the RUN, READY and REMOTE status transmitted to R I/O#3 for indication and the RUN status used for runtime totalization. The VFD will also provide a speed signal and a VFD FAIL alarm (type 2) to R I/O#3.

An Electrical Room Air Conditioning Unit will be monitored by R I/O#3 for RUN status and a FAIL alarm.

## CS-43-01 PRE-ANOXIC BASINS

**Reference Drawing:** 43-I-03, 43-I-04 & 43-I-05

**General:** The influent flow from the splitter box will enter the pre-anoxic basins where it will be mixed with Mixed Liquor Recycle flow to promote de-nitrification. The flow will pass through two basins in series, each equipped with an overflow weir to maintain level in the basins. The pre-anoxic basins are equipped with submersible mixers (43-X-01-ML, 43-X-02-ML, 43-X-03-ML, 43-X-04-ML, 43-X-05-ML & 43-X-06-ML) to keep solids in suspension and maintain anoxic conditions for de-nitrification.

**Local Manual Control Mode:** Each submersible mixer will be provided with a local ON/OFF switch located outdoors above the basins. When placed in ON the mixer will run. A mixer will stop when placed in OFF.

**Local Automatic Control Mode:** No Local Automatic operation is provided.

**SCADA Control:** No SCADA control is provided for the mixers. A mixer RUN status is transmitted to the SCADA system from the MCC to R I/O#3, for indication and runtime totalization at the SCADA Workstation.

**Interlocks:** Power/Safety Permissive

**Alarms:** Each mixer will be equipped with a moisture sensor and a high temperature switch. Both switches provide alarms (Type 1) that will be transmitted to R I/O#3 from the mixer. When either alarm is detected the SCADA system will immediately shutdown the respective mixer by opening the power/safety permissive contact to the MCC. The contact will remake when the alarm condition is removed.

A mixer overload FAIL alarm shall be transmitted to R I/O#3 from the MCC for indication at the SCADA workstation.

## CS-43-02 AERATION BASINS

**Reference Drawing:** 43-I-03, 43-I-04 & 43-I-05

**General:** Each treatment train will consist of two pre-anoxic basins followed by an aeration basin that is divided into three zones using baffle walls. The water level in the aeration basins will be allowed to vary to equalize flow and maintain a more uniform flow to the membrane system.

**Normal Operation:** Aeration air will be supplied to the aeration zones using positive displacement blowers. The airflow to each of the three aeration zones will be controlled independently to maintain the desired dissolved oxygen level. RAS flow from the Membrane Batch Reactor (MBR) Basins will enter Zone 1 of the aeration basins to return solids back to the process. Mixed Liquor Recycle flow will be pumped from Zone 3 of the aeration basins back into Zone 1 of the pre-anoxic basins to return mixed liquor solids and nitrate for de-nitrification. Effluent from Zone 3 of the aeration basins will flow through a manually operated isolation gate into the aerobic effluent channel.

Airflow to each of the aeration basin zones will be controlled using motor operated butterfly valves. The valve operators shall modulate the position of the valves to maintain the desired dissolved oxygen level in each zone. Each zone will be equipped with a dissolved oxygen analyzer to measure the dissolved oxygen concentration in the mixed liquor and provide a control signal for control of the airflow. The following four dissolved oxygen control modes shall be provided:

1. **Independent Zone DO Control** – The air flow to each aeration basin zone shall be controlled independently using the modulating butterfly valves to maintain the setpoint DO in each zone. The valves to each zone shall be opened or closed in an attempt to maintain the setpoint DO concentration. The control system logic shall determine the “most open valve” controlling the airflow to all nine aeration zones in the aeration basins. Based on the position of the “most open valve” the air supply from the blowers shall be increased or decreased to try and maintain the “most open valve” position at a setpoint position (say 85% open).
2. **Selected Zone DO Control** – One of the three aeration zones in each basin shall be selected as the DO control zone. The air supply to the selected zone shall be controlled to maintain the setpoint DO concentration. The valve position in air lines going to the other two zones shall be manually set to give the desired DO concentration profile based on controlling the DO concentration in the selected zone. The control system logic shall determine the “most open valve” controlling the airflow to the three selected aeration zones in the three aeration basins. Based on the position of the “most open valve” the air supply from the blowers shall be increased or decreased to try and maintain the “most open valve” position at a set-point position (say 50% open).

3. **Parallel Independent Zone DO Control** – In this control mode, the valves in the three aeration basins will be operated so that the aeration zone valve positions in each basin are the same as the other basins. Either one aeration basin shall be selected as the “control basin”, or the DO concentration in the zones shall be averaged to generate a single DO control signal for each zone. For example, the DO concentration in Zone 1 of each of the three basins would be averaged, and then used to generate a single control signal that would be sent to the Zone 1 control valves in each basin. The air flow to each aeration basin zone shall be controlled independently using the modulating butterfly valves to maintain the setpoint DO in each zone of the “control basin” or the average DO in each zone of all three aeration basins. The valves to each zone shall be opened or closed in parallel in an attempt to maintain the setpoint DO concentration. The control system logic shall determine the “most open valve” controlling the airflow to the aeration zones in the aeration basins. Based on the position of the “most open valve” the air supply from the blowers shall be increased or decreased to try and maintain the “most open valve” position at a set-point position (say 85% open).
4. **Parallel Selected Zone DO Control** – Similar to the Parallel Independent Zone DO Control mode, either one of the aeration zones in a single basin shall be selected as the DO control zone or the DO concentrations in the selected zone of the three aeration basins shall be averaged to generate the control signal. The air supply to the selected zone in all three aeration basins shall be controlled using the same signal to all basins to maintain the setpoint DO concentration. The valve position in air lines going to the other two zones of each basin shall be manually set to give the desired DO concentration profile based on controlling the DO concentration in the selected zone. The air supply from the blowers shall be increased or decreased to try and maintain the position of the valves in the selected zone at a setpoint position (say 50% open).
5. **Alternating Aeration** – In addition to the modes of operation indicated above, provisions shall be provided to allow sequential on/off aeration of Zone 2 in each aeration basin, based on time. When this mode of operation is selected, the airflow to Zone 2 shall be set manually in the SCADA system and the Zone 2 valves shall not be considered in the DO control logic. The SCADA system shall open and close the air valves to Zone 2 of each basin, in sequence, based on an adjustable “Close” time cycle (0-30 min). The valve in Zone 2 of only one basin will be closed at a time. The remaining Zone 2 valves will remain at their set “Open” position. When the “Close” time cycle times out, the closed valve to Zone 2 shall open before the valve in the next basin in sequence closes. The closed valve sequence shall rotate from Basin 1 to Basin 2 to Basin 3 and then back to Basin 1. When this valve cycling occurs, the valve position of the Zone 1 and Zone 3 valves shall be held until after the first valve has opened

and the second valve has closed. In addition, the number of blowers on line shall not be changed during valve cycling.

## CS-43-03 AERATION BLOWERS

**Reference Drawing:** 43-I-01 & 43-I-02

**General:** Four positive displacement aeration blowers will be supplied (43-B-01-AA, 43-B-02-AA, 43-B-03-AA & 43-B-04-AA) on the second floor of the Treatment Building. These units will operate in parallel to deliver the required amount of process air to the aeration basins. Variable frequency drives will be used to control the speed of the blowers to vary the amount of air delivered.

**Local Manual Control Mode:** When the LOCAL/REMOTE switch at the blower VFD is placed in LOCAL the blower will be controlled from START/STOP and a speed controls at the VFD. Blower speed is transmitted from the VFD to R I/O#3 for indication at the SCADA Workstation.

**Local Automatic Control Mode:** No local Automatic controls are provided.

**SCADA Manual Control Mode:** When the LOCAL/REMOTE switch at the blower VFD is placed in REMOTE the blower will be controlled from the SCADA system. The blowers can be started and stopped and the speed adjusted manually by the operator when the blowers are placed in SCADA Manual mode. Blower speed is transmitted to the VFD from R I/O#3.

Individual RUN status for each blower is transmitted to R I/O#3 from the VFD for indication and runtime totalization at the operator workstations. Blower READY and in REMOTE is also transmitted to R I/O#3 from the VFD for indication.

**SCADA Automatic Control Mode:** When the blowers are placed in SCADA Auto mode the control of the blowers will be based on the air demand in the aeration basins. The control system logic shall determine the "most open valve" controlling the airflow to the aeration zones in the aeration basins. Based on the position of the "most open valve" the speed of the blowers shall be increased or decreased to try and maintain the "most open valve" position at a set-point position (say 85% open). All blowers in service shall operate at the same speed.

The total airflow to the aeration basins will be measured as well as the air pressure in the discharge line. The blowers shall be sequenced on and off line based on the total airflow. The operators shall set the blowers up in LEAD, LAG NO 1, LAG NO 2 and LAG NO 3 position in the SCADA system. The LEAD blower shall be manually placed into operation and the remaining blowers shall be turned on and off automatically.

The flow set points to bring the blowers on and off line shall be:

<b>Blower</b>	<b>On Flow</b>	<b>Off Flow</b>
Lead	Manual On	--
Lag 1	1,000 cfm	900 cfm
Lag 2	2,000 cfm	1,800 cfm
Lag 3	3,000 cfm	2,700 cfm

An adjustable time delay shall be provided to delay starting a blower once the "On Flow" set point is reached. If the air flow remains above the "On Flow" set point when the time delay times out, the next blower shall be placed into operation. A similar time delay shall be provided for the "Off Flow" sequencing of the blowers.

**Interlocks:** Power Permissive.

**Alarms:** Each blower will have a discharge low flow switch and a high temperature switch that will provide alarms (Type 1) to R I/O#3. The discharge low flow alarm will only be active when a blower is running. Both alarms will stop the blower only when the SCADA System is controlling the blower.

A blower overload will generate a FAIL (Type 1) alarm signal from the VFD to R I/O#3 to be displayed at the SCADA Workstation.

## CS-43-04 MIXED LIQUOR RECYCLE PUMPS

**Reference Drawing:** 43-I-03, 43-I-04 & 43-I-05

**General:** Mixed liquor from Zone 3 of each of the 3 aeration basins will be pumped back to the first zone of the pre-anoxic basins using submersible propeller pumps. The Mixed Liquor Recycle Pumps return solids and nitrates to the pre-anoxic basins to promote de-nitrification. The pumps will be equipped with variable frequency drives so that the pump speed can be varied as the water level in the aeration basin changes to maintain a constant rate of flow.

**Local Manual  
Control Mode:**

When the LOCAL/REMOTE switch at the pump VFD is placed in LOCAL the pump will be controlled from START/STOP and a speed controls at the VFD. Pump speed is transmitted from the VFD to R I/O#3 for indication at the SCADA Workstation.

**Local Automatic  
Control Mode:**

No local Automatic controls are provided.

**SCADA Manual  
Control Mode:**

When the LOCAL/REMOTE switch at the pump VFD is placed in REMOTE the pump will be controlled from the SCADA system. The pumps can be started and stopped and the speed adjusted manually by the operator when the pumps are placed in SCADA Manual mode. Pump speed is transmitted to the VFD from R I/O#3.

Individual RUN status for each pump is transmitted to R I/O#3 from the VFD for indication and runtime totalization at the operator workstations. Pump READY and in REMOTE is also transmitted to R I/O#3 from the VFD for indication.

**SCADA Automatic  
Control Mode:**

When the pump is placed in SCADA Auto mode a speed control algorithm or look-up table shall vary the speed of the pumps based on the water level measurement (43-LI-102 or 43-LI-103) in the post-anoxic channel. The operator will select which level signal will be used for control at the SCADA Workstation (See Post-Anoxic Basin control strategy). The goal shall be to maintain a constant set-point pump discharge flow as the TDH of the pump changes. The algorithm shall be developed based on the certified pump curves and the affinity laws that allow adjusting the pump curve at one speed to an adjusted pump curve at a second speed.

**Interlocks:** Power Permissive.

**Alarms:** Each pump will be equipped with a moisture sensor and a high temperature switch. Both switches provide alarms (Type 1) that will be transmitted to R I/O#3 from the pump.

A pump overload FAIL alarm shall be transmitted to R I/O#3 from the VFD for indication at the SCADA workstation.

## CS-43-05 POST-ANOXIC BASINS

**Reference Drawing:** 43-I-03, 43-I-04 & 43-I-05

**General:** Flow from the aeration basins will be collected in the aeration effluent channel and will flow to the post-anoxic basin. The post-anoxic basin will be divided into three cells using baffle walls. Each cell will contain a submersible pump (43-P-01-ML, 43-P-02-ML & 43-P-03-ML), the pumps will be constant speed and will re-circulate flow within each cell to maintain solids in suspension and promote anoxic conditions for denitrification. Level in the post-anoxic basin will be measured using redundant bubbler level transmitters to generate control signals used to control the Mixed Liquor Return pumps, WAS Control Gate, and Permeate/Filtrate pumps. Three manual slide gates are provided to isolate the post-anoxic basin for maintenance.

**Local Manual  
Control Mode:**

Each submersible pump will be provided with a local ON/OFF switch located on the ground floor of the Treatment Building adjacent to the basins. When placed in ON the pump will run. A pump will stop when placed in OFF.

**Local Automatic  
Control Mode:**

No Local Automatic operation is provided.

**SCADA Control:**

No SCADA control is provided for the pumps. A pump RUN status is transmitted to the SCADA system from the MCC to R I/O#2, for indication and runtime totalization at the SCADA Workstation.

A bubbler with two differential pressure level transmitters will be provided in the Mixed Liquor Transfer Pump wet well area to ensure reliability of level measurement. The control system shall check the 2 level signals to see if they are the same and signal an alarm if the deviation is greater than a given amount. One of the level signals will normally be selected for control. In addition to generating a level signal (4-20mA), a high level alarm (Type 2) and high-high level alarm (Type 1) shall be generated.

**Interlocks:** Power/Safety Permissive

**Alarms:** Each pump will be equipped with a moisture sensor and a high temperature switch. Both switches provide alarms (Type 1) that will be transmitted to R I/O#2 from the pump. When either alarm is detected the SCADA system will immediately shutdown the respective pump by opening the power/safety permissive contact to the MCC. The contact will remake when the alarm condition is removed.

A pump overload FAIL alarm shall be transmitted to R I/O#2 from the MCC for indication at the SCADA workstation.

## CS-43-06 MIXED LIQUOR TRANSFER PUMPS

**Reference Drawing:** 43-I-06

**General:** The mixed liquor flow will be transferred from the post-anoxic basin to the MBR basins using submersible pumps equipped with variable frequency drives. The amount of flow to be pumped will vary depending on the influent flow to the plant to ensure that there is adequate total flow to the MBR system to maintain the desired RAS solids concentration. In addition, the pump discharge flow will tend to vary due to changes in the water level in the post-anoxic basin. Magnetic flow meters will be supplied in the pump discharge to measure the flow and generate a signal to control the speed of the pumps.

**Local Manual Control Mode:** When the LOCAL/REMOTE switch at the pump VFD is placed in LOCAL the pump will be controlled from START/STOP and a speed controls at the VFD. Pump speed is transmitted from the VFD to R I/O#3 for indication at the SCADA Workstation.

**Local Automatic Control Mode:** No local Automatic controls are provided.

**SCADA Manual Control Mode:** When the LOCAL/REMOTE switch at the pump VFD is placed in REMOTE the pump will be controlled from the SCADA system. The pumps can be started and stopped and the speed adjusted manually by the operator when the pumps are placed in SCADA Manual mode. Pump speed is transmitted to the VFD from R I/O#3.

Individual RUN status for each pump is transmitted to R I/O#3 from the VFD for indication and runtime totalization at the operator workstations. Pump READY and in REMOTE is also transmitted to R I/O#3 from the VFD for indication.

**SCADA Automatic Control Mode:** When the pumps are placed in SCADA Auto mode the pumps will be controlled to maintain a setpoint flow. The mixed liquor transfer pump controls shall enable the following types of control:

1. **Flow Proportional** – The speed of the mixed liquor transfer pumps shall be varied to maintain the total mixed liquor flow (total of MLT Pump 1-4 flow) in proportion to the total permeate filtrate flow (MLT flow = 400 – 600% of Permeate/Filtrate flow). All pumps shall be operated to maintain the same flow.
2. **Constant Flow** – The speed of the mixed liquor transfer pumps shall be varied to maintain the mixed liquor flow from each pump to a constant setpoint flow (1,500 – 2,300gpm).

**Interlocks:** Power Permissive

**Alarms:**

Each pump will be equipped with a moisture sensor and a high temperature switch. Both switches provide alarms (Type 1) that will be transmitted to R I/O#3 from the pump. Each of the alarms will stop the respective pump when the pumps are controlled from the SCADA system.

A pump overload FAIL alarm shall be transmitted to R I/O#3 from the VFD for indication at the SCADA workstation.

## CS-43-07 WASTE SLUDGE CONTROL GATE

**Reference Drawing:** 43-I-05

**General:** Sludge will be wasted from the post-anoxic basin to the WAS wet well using a downward opening slide gate equipped with a modulating electric motor operator (43-G-05-ML).

**Local Manual Control Mode:** When the gate actuator LOCAL/REMOTE switch is placed in LOCAL the gate will be controlled from a OPEN/STOP/CLOSE switch on the actuator.

**Local Automatic Control Mode:** No local Automatic controls are provided.

**SCADA Manual Control Mode:** When the LOCAL/REMOTE switch at the actuator is placed in REMOTE the gate will be controlled from the SCADA system. The operator will manually control the gate position when the gate is placed in SCADA Manual mode. Gate position is transmitted from the gate actuator to R I/O#3 for indication at the SCADA Workstations.

Gate in REMOTE status is transmitted to R I/O#3 from the gate actuator for indication at the SCADA Workstations.

**SCADA Automatic Control Mode:** When the actuator is placed in SCADA Auto mode the gate operation will be controlled to deliver WAS flow and scum to the wet well to match the desired WAS or scum return flow pumped to the Residuals Building. WAS flow will normally be set at a constant rate during the operation of the centrifuges or will be set at a constant rate to remove scum for recycle to the drum screens. To effectively remove scum from the surface, it will be necessary to modulate the gate position such that the water level in the wet well is below the water surface in the post-anoxic basin. If the WAS pumps are not in operation, it will not be necessary to operate the control gate and the wet well can be filled or left empty depending on conditions at the time of shutdown.

Bubbler-type level sensing systems will be provided in both the post-anoxic basin and the WAS wet well. Since the water level in the post-anoxic basin will vary over a four foot operating range, the upstream level measurement will provide a reference point, or "zero" point, for gate operation. Based on the upstream level as a starting point, the gate shall modulate to maintain the level in the WAS wet well within the normal operating range of 3-15 feet. The gate control logic will be as follows:

1. The "closed" position or "up" position of the gate, shall be variable and shall be the same as the water level in the post-anoxic basin.

2. The water level in the WAS wet well shall then be used to adjust the gate position below the “closed” position to vary the head over the weir and control the WAS flow to the wet well. The maximum “open” level below the water level in the post-anoxic basin is estimated to be 0.5 ft.
3. The gate control logic can utilize the water level in the WAS wet well to vary the gate position proportional to the level (4-20 mA signal) in the wet well. For example, a 4 mA signal would correspond to the minimum level in the WAS wet well and this would mean that the gate would be in its maximum “open”, 0.5 ft below the level in the post-anoxic basin. A 20 mA signal would correspond to the maximum WAS wet well level and at this point the gate would be in its “closed” position, equal to the level in the post-anoxic basins.

**Interlocks:** Power Permissive

**Alarms:** A gate actuator overload FAIL alarm shall be transmitted to R I/O#3 from the actuator for indication at the SCADA workstation.

## CS-43-08 WASTE ACTIVATED SLUDGE PUMPS

**Reference Drawing:** 43-I-07

**General:** The WAS pumps will be submersible pumps equipped with variable frequency drives. Three pumps will be provided (43-P-01-WAS, 43-P-02-WAS & 43-P-03-WAS) and these pumps will deliver WAS to the centrifuges for de-watering or will return WAS to the influent for screening to remove scum or other solids.

**Local Manual  
Control Mode:**

When the LOCAL/REMOTE switch at the pump VFD is placed in LOCAL the pump will be controlled from START/STOP and a speed controls at the VFD. Pump speed is transmitted from the VFD to R I/O#3 for indication at the SCADA Workstation.

**Local Automatic  
Control Mode:**

No local Automatic controls are provided.

**SCADA Manual  
Control Mode:**

When the LOCAL/REMOTE switch at the pump VFD is placed in REMOTE the pump will be controlled from the SCADA system. The pumps can be started and stopped and the speed adjusted manually by the operator when the pumps are placed in SCADA Manual mode. Pump speed is transmitted to the VFD from R I/O#3.

Individual RUN status for each pump is transmitted to R I/O#3 from the VFD for indication and runtime totalization at the operator workstations. Pump READY and in REMOTE is also transmitted to R I/O#3 from the VFD for indication.

**SCADA Automatic  
Control Mode:**

When the pumps are placed in SCADA Auto mode normally, one pump will be designated to operate with each centrifuge and the third pump will be used to return flow to the plant inlet box. Magnetic flow meters are provided to measure the flow from each of the 3 pumps. The speed of the pumps shall be varied to deliver a setpoint flow.

Sludge wasting will be initiated using the SCADA system from the Residuals Building in conjunction with startup of the centrifuges. When wasting is initiated, the WAS pumps shall turn on to deliver flow to the centrifuges in operation. The desired waste sludge flow rate (gpm) will be manually set together with the desired time of operation or total desired sludge volume (Gallons) to be wasted for the day. Once initiated, the control system shall maintain the desired flow rate until a Stop signal is received from the SCADA system.

**Interlocks:** The WAS Pumps will start in conjunction with the Centrifuges through the SCADA System.

Power Permissive

**Alarms:**

Each pump will be equipped with a moisture sensor and a high temperature switch. Both switches provide alarms (Type 1) that will be transmitted to R I/O#3 from the pump. Each of the alarms will stop the respective pump when the pumps are controlled from the SCADA system.

A pump overload FAIL alarm shall be transmitted to R I/O#3 from the VFD for indication at the SCADA workstation.

## CS-43-09 MEMBRANE BIO-REACTOR SYSTEM

**Reference Drawing:** 43-I-08A & 43-I-08B

**General:** The MBR system supplier will provide a MBR PLC-based control system that will contain all of the control logic for the operation of the MBR system equipment, including the MBR basins, Permeate/Filtrate pumps, Backpulse pumps, Drain/Recirculation pumps, Membrane Aeration Blowers, Vacuum pumps, control valves, and chemical cleaning equipment. This system will be a workstation type system, similar to the plant SCADA workstations, with operator interface, screen, computer and communication hardware.

**Normal Operation:** It is anticipated that the MBR process operation control logic will be "proprietary". The goal shall be to have the MBR PLC receive commands from the plant SCADA system to set MBR operating requirements, that are then used by the MBR PLC system to control the equipment as part of an integrated control logic package. Adjustable set points in the MBR PLC control logic shall generally be duplicated in the plant SCADA system. Analog and digital outputs from the MBR PLC shall be transmitted to the plant SCADA system.

Overall, control of the MBR system is based on producing the desired permeate/filtrate flow that generally matches the influent flow. In addition to producing the required flow, the MBR PLC system must automatically operate various other pieces of equipment to initiate and conduct relax, backpulse, backpulse chemical clean, and other chemical cleaning cycles required to maintain the permeate flux necessary to sustain the required flow rates through the membranes. The MBR system operation will require automatic operation of valves and equipment in a coordinated manner to accomplish the desired goals.

The logic for the desired flow and basins in operation will reside in the plant SCADA system. The plant SCADA system will download this information to the MBR PLC control system that is responsible for controlling the operation of the entire MBR system and associated equipment. The MBR PLC will be responsible for turning equipment on and off, changing pump speed, initiating and controlling membrane relax, backpulse, back pulse/chemical clean, and chemical cleaning cycles. The MBR PLC shall also monitor the MBR system operation and performance in terms of trans-membrane pressure and effluent turbidity.

The CONTRACTOR shall coordinate with the MBR vendor so that the graphics provided at the MBR workstation are duplicated as much as possible at the SCADA Workstation.

## CS-43-10 PERMEATE/FILTRATE PUMPS

**Reference Drawing:** 43-I-09 & 43-I-10

**General:** Five permeate/filtrate pumps will be provided (43-P-01-PF thru 43-P-05-PF). Normally, one pump is dedicated to pumping from one MBR basin. The operator will enter into the SCADA system which MBR basins are in operation and which pump is operating with each basin. The plant SCADA system will download this information to the MBR PLC control system that is responsible for controlling the operation of the entire MBR system.

### **Local Manual**

**Control Mode:** When the LOCAL/REMOTE switch at the pump VFD is placed in LOCAL the pump will be controlled from START/STOP and a speed controls at the VFD. Pump speed is transmitted from the VFD to the MBR PLC for indication at the MBR Workstation and the SCADA Workstation.

### **Local Automatic**

**Control Mode:** No local Automatic controls are provided.

### **MBR/SCADA Manual**

**Control Mode:** When the LOCAL/REMOTE switch at the pump VFD is placed in REMOTE the pump will be controlled from the MBR system. The pumps can be started and stopped and the speed adjusted manually by the operator at the MBR Workstation. Pump speed is transmitted to the VFD from the MBR PLC.

Individual RUN status for each pump is transmitted to the MBR PLC from the VFD for indication and runtime totalization at the MBR and SCADA Workstations. Pump READY and in REMOTE is also transmitted to the MBR PLC from the VFD for indication at the MBR Workstation and the SCADA Workstation.

### **MBR/SCADA Automatic**

**Control Mode:** The permeate/filtrate pumps will be operated to produce the desired total effluent flow. While the total effluent flow for a day must effectively be the same as the plant influent flow, the permeate pumps will be operated so that influent flow variations are minimized by using the equalization volume available in the aeration basins to store flow. The plant SCADA system shall provide a "desired" set-point flow control signal that will be communicated to the MBR PLC control system. Based on this "desired" flow, the MBR PLC system will control the operation of the permeate/filtrate pumps, control valves, and other systems to produce the desired production of treated effluent.

The primary variables affecting control of the permeate/filtrate pumps are influent flow, aeration basin water level, and the required relax and backpulse requirements of the MBR system. The goal of the permeate/filtrate pump control system shall be to produce a "constant" flow that parallels the total plant influent flow for the day. The control

logic that determines the desired flow shall reside in the plant SCADA control system and shall include the following operating modes:

1. **Manual Constant Flow Control** – The operator will manually enter a desired constant flow value into the plant SCADA system. Based on this value, the plant SCADA system shall communicate the flow set point to the MBR PLC. In turn, the MBR PLC control system shall operate the MBR process to maintain the desired flow through the MBR system.
2. **Programmed Constant Flow Control** – The operator will program a step-type flow pattern in the SCADA system to generally follow the diurnal influent flow pattern to the plant. This pattern will represent a percentage of total average flowrate for the day. For each programmed period, the desired percentage flow rate shall be a constant value. The operator will then enter a value for the total desired daily flow rate into the SCADA system. The system shall calculate the desired flow rate for each period (desired daily flow (mgd) x percent for period = desired flow for period (mgd) and generate a setpoint signal to communicate to the MBR PLC. In turn, the MBR PLC control system shall operate the MBR process to maintain the desired flow through the MBR system.
3. **Variable Level Flow Control** – In this control mode, the water level in the aeration basins will be used to vary the desired flow through the permeate/filtrate pumps and effectively utilize the equalization capacity of the aeration basins. Normally, the water level in the aeration basins will vary from EI 82 to EI 86 (4 ft operating range). The plant SCADA system shall provide a set point signal to communicate to the MBR PLC based on the following logic:
  - The operator shall set a desired average flow rate for the day (mgd).
  - A “dead” operating band shall be set (say EI 83 low, EI 85 high) where the flow is maintained at the “average” value.
  - If the level drops below the minimum level set in the dead band, the permeate/filtrate flow shall be reduced proportionally to the deviation of the actual water level from the minimum level set point (12-inch band below EI 83).
  - Similarly, if the level increases above the maximum level set in the dead band, the permeate/filtrate flow shall be increased proportionally to the deviation of the actual water level from the maximum level set point (12-inch band above EI 85).
  - High level/high flow and low level/low flow alarms shall be generated if the deviation from “normal” is too great.

**4. Low Flow/Relax Control** – During initial operation of the treatment plant, influent flow to the plant may be so low that it will not be possible to match the influent flow by simply turning down the speed of the permeate pumps. At other times, it may be desirable to operate the permeate pumps in an on/off cycle mode to allow time for the membranes to relax and clean themselves. In this mode of operation, the goal shall be to operate the permeate pumps in an on/off cycle to match the influent flow and produce adequate water for utility water use and screening washwater. Excess flow will be pumped to disposal. The plant SCADA system shall provide a set point signal to communicate to the MBR PLC based on the following logic:

- Under initial operating conditions, when the influent flow is very low, it will be necessary to operate the permeate pumps in an on/off manner to provide adequate effluent for screenings washwater and utility water use. Under minimum flow conditions, control logic will cycle the pumps to maintain the level in the Broderson and Area wet wells within a “normal” range (say EI 80 – EI 87) and also maintains the level in the aeration basins at a set level (say EI 83.5 ± 0.25 ft). The “ON” cycle of the pumps shall be based on maintaining the level in the effluent wet well, and the on time duration shall be to try and maintain the level in the aeration basin. The speed of the permeate pumps can be manually set by the operators, or, if the level in the aeration basins deviates above the set level band, the speed of the pumps shall be increased. If the cycle time for the pumps is too short, the MBR PLC system shall cycle two pumps, and associated valves, on and off with one MBR basin to minimize the number of starts. The cycle time criteria and basin/pumps in operation shall be set in the plant SCADA system for communication to the MBR PLC. If the level in the effluent wet wells rises above a maximum level, the effluent pumps shall be turned on to pump effluent to disposal.
- With higher flows, it still may be desirable to cycle the permeate pumps on/off. With higher flows, the MBR PLC control system shall rotate the “OFF” permeate pump, and associated valves, through those in operation based on a time cycle set in the plant SCADA system. Each basin in sequence will undergo a “relax” cycle before the permeate pump is started again. The permeate pump flow shall be increased or decreased as required to maintain the desired level in the aeration basins.

In general, each permeate pump/MBR basin shall be operated to maintain the same flow. Depending on the trans-membrane pressure, the pumps in operation may vary in speed from basin to basin. In addition, relax and backpulse cycles may interrupt the normal pumping cycle. In any case, the goal of the MBR PLC control logic shall be to

maintain as constant a rate of flow as possible to the UV disinfection system while maintaining the “desired” total flow rate based on the set point signal from the plant SCADA system.

In addition to maintaining the desired flow, the permeate/filtrate pumps will be controlled by the MBR PLC system to facilitate routine “relax” cycles and backpulse cycles, with or without chemical addition. When these cleaning cycles are initiated, the operation of the permeate/filtrate pumps shall be sequenced and coordinated with the operation of the control valves, backpulse pumps, and chemical feed systems.

Each permeate pump discharge is equipped with a meter to independently measure the flow through each train and provide a signal for pump control. In addition, a turbidity analyzer is provided to monitor the discharge of each pump and assess if there is a problem with the membranes.

**Interlocks:** Power Permissive.

**Alarms:** A pump common FAIL alarm shall be transmitted to the MBR PLC for indication at the MBR and SCADA Workstations.

A high turbidity alarm (Type 2) shall be transmitted to R I/O#3.

## CS-43-11 DRAIN AND RECIRCULATION PUMPS

**Reference Drawing:** 43-I-11

**General:** Two drain and recirculation pumps will be provided (43-P-01-BD & 43-P-02-BD). The pumps are provided as part of the MBR package

### **Local Manual**

**Control Mode:** When the LOCAL/REMOTE switch at the pump VFD is placed in LOCAL the pump will be controlled from START/STOP and a speed controls at the VFD. Pump speed is transmitted from the VFD to the MBR PLC for indication at the MBR Workstation and the SCADA Workstation.

### **Local Automatic**

**Control Mode:** No local Automatic controls are provided.

### **MBR/SCADA Manual**

**Control Mode:** When the LOCAL/REMOTE switch at the pump VFD is placed in REMOTE the pump will be controlled from the MBR system. The pumps can be started and stopped and the speed adjusted manually by the operator at the MBR Workstation. The pumps are generally used for infrequent manually controlled/initiated chemical cleaning cycle at the MBR Workstation. Pump speed is transmitted to the VFD from the MBR PLC.

Individual RUN status for each pump is transmitted to the MBR PLC from the VFD for indication and runtime totalization at the MBR and SCADA Workstations. Pump READY and in REMOTE is also transmitted to the MBR PLC from the VFD for indication at the MBR Workstation and the SCADA Workstation.

### **MBR/SCADA Automatic**

**Control Mode:** No Automatic functions are provided.

**Interlocks:** Power Permissive.

**Alarms:** A pump common FAIL alarm shall be transmitted to the MBR PLC for indication at the MBR and SCADA Workstations.

## CS-43-12 BACKPULSE PUMPS

**Reference Drawing:** 43-I-18

**General:** Two backpulse pumps will be provided (43-P-01-BP & 43-P-02-BP). The pumps are provided as part of the MBR package

**Local Manual Control Mode:** When the LOCAL/REMOTE switch at the pump VFD is placed in LOCAL the pump will be controlled from START/STOP and a speed controls at the VFD. Pump speed is transmitted from the VFD to the MBR PLC for indication at the MBR Workstation and the SCADA Workstation.

**Local Automatic Control Mode:** No local Automatic controls are provided.

**MBR/SCADA Control Mode:** When the LOCAL/REMOTE switch at the pump VFD is placed in REMOTE the pump will be controlled from the MBR system. The pumps can be started and stopped and the speed adjusted manually by the operator at the MBR Workstation. The pumps are generally switched on/off and the speed set to meet demands for backpulse flow to the membranes on a periodic basis at the MBR Workstation. Pump speed is transmitted to the VFD from the MBR PLC.

Individual RUN status for each pump is transmitted to the MBR PLC from the VFD for indication and runtime totalization at the MBR and SCADA Workstations. Pump READY and in REMOTE is also transmitted to the MBR PLC from the VFD for indication at the MBR Workstation and the SCADA Workstation.

**Interlocks:** Power Permissive.

**Alarms:** A pump common FAIL alarm shall be transmitted to the MBR PLC for indication at the MBR and SCADA Workstations.

## CS-43-12 UTILITY WATER PUMPS

**Reference Drawing:** 43-I-20

**General:** Two utility water pumps (43-P-01-UW & 43-P-02-UW) will be provided that will operate in conjunction with a hydro-pneumatic tank (43-T-01-UW). The pumps will supply water taken from the Area Wetwell and feed it to the hydro-pneumatic tank and from there it will be distributed throughout the WWTF, see drawing 43-GM-02 and 42-M-12 for details. The utility water will also be used for irrigating the WWTF landscape.

### **Local Manual**

**Control Mode:** A HAND/OFF/AUTO switch is provided for local manual control of each pump. When set to HAND each pump will run.

### **Local Automatic**

**Control Mode:** No Local Automatic control is provided.

### **SCADA Manual**

**Control Mode:** When the HAND/OFF/AUTO switch at each pump is placed in AUTO and the operator at the SCADA workstation has set the operation for SCADA manual the operator can start and stop the pumps manually. Individual RUN status for each pump is transmitted to R I/O#3 for indication and runtime totalization at the SCADA Workstations. Pump in AUTO is also transmitted to R I/O#3 for indication at the SCADA Workstations.

### **SCADA Automatic**

**Control Mode:** When the operator at the SCADA workstation has set the operation for SCADA Auto the pumps will turn on and off based on water level in the hydro-pneumatic tank. The operator shall assign each pump with either lead or a standby mode. The lead pump shall turn on when a low-level setpoint (5ft) in the hydro-pneumatic tank is reached and shall stop when the high-level setpoint (6.75ft) is reached.

Plant air will be supplied to the hydro-pneumatic tank to maintain the desired pressure. A pressure sensor in the discharge shall monitor system pressure and shall be used to provide control signals for operation of the air supply solenoid valve and to generate a low-pressure alarm. When the pressure reaches a low-pressure setpoint, the solenoid valve on the air supply shall open to supply air to the hydro-pneumatic tank. A timer function shall allow the valve to remain open for a set period of time before the valve closes. A backpressure control valve on the top of the tank shall be used to release any excess air when the pressure reaches a high point. In addition, a high-pressure alarm shall be provided should the pressure rise above the backpressure control valve setting.

A meter in the utility water discharge line is provided to measure the flow.

**Interlocks:** If the discharge pressure remains low after the air solenoid valve has closed, an alarm (Type 1) shall be generated and the standby pump shall be placed into operation.

Power Permissive.

**Alarms:**

A pump common FAIL (Type 1) alarm shall be transmitted to R I/O#3 for indication at the SCADA Workstations.

The level sensing system in the hydro-pneumatic tank shall also provide high water (7.25ft) and low water (4.5ft) alarm signals (Type 2) to R I/O#3.

## CS-43-13 UTILITY WATER HYPOCHLORITE PUMP

**Reference Drawing:** 43-I-15

**General:** One hypochlorite metering pump (43-P-02-H) will be provided to allow hypochlorite to be fed into the utility water system. The pump will be used on an as needed basis.

**Local Manual  
Control Mode:**

An ON/OFF switch is provided for local manual control of each pump. When set to ON the pump will run if the SCADA System start command enables the receptacle associated with the pump.

**Local Automatic  
Control Mode:**

No Local Automatic control is provided.

**SCADA Manual  
Control Mode:**

When the ON/OFF switch at the pump is set to ON and the operator at the SCADA workstation has set the operation for SCADA manual the operator can start and stop the pump using the start/stop command. The pump will run at the speed set at the pump.

**SCADA Automatic  
Control Mode:**

When the operator at the SCADA workstation has set the operation for SCADA Auto the pump will turn on whenever a utility water pump is running.

**Interlocks:** See Auto mode.

**Alarms:** None

## CS-43-14 BRODERSON EFFLUENT DISPOSAL PUMPS

**Reference Drawing:** 43-I-17

**General:** Three vertical turbine pumps (43-P-06-PF, 43-P-07-PF & 43-P-08-PF) will be provided to pump WWTF effluent after it has passed through the MBR System permeate pumps to either to the Broderon effluent disposal site or provides backup utility water to the WWTF.

**Local Manual  
Control Mode:**

When the LOCAL/REMOTE switch at the pump VFD is placed in LOCAL the pump will be controlled from START/STOP and a speed controls at the VFD. Pump speed is transmitted from the VFD to R I/O#3 for indication at the SCADA Workstation.

**Local Automatic  
Control Mode:**

No local Automatic controls are provided.

**SCADA Manual  
Control Mode:**

When the LOCAL/REMOTE switch at the pump VFD is placed in REMOTE the pump will be controlled from the SCADA system. The pumps can be started and stopped and the speed adjusted manually by the operator when the pumps are placed in SCADA Manual mode. Pump speed is transmitted to the VFD from R I/O#3.

Individual RUN status for each pump is transmitted to R I/O#3 from the VFD for indication and runtime totalization at the operator workstations. Pump READY and in REMOTE is also transmitted to R I/O#3 from the VFD for indication.

**SCADA Automatic  
Control Mode:**

When the pumps are placed in SCADA Auto mode the pumps will operate in one of the following modes:

1. **Flow Proportional** – The speed of the Broderon Effluent Pumps shall be varied to maintain the flow pumped in proportion to the total permeate filtrate flow. (The Broderon effluent flow will normally be 40 – 80% of PF flow).
2. **Constant Flow** – The speed of the Broderon Effluent Pumps shall be varied to maintain a constant effluent flow. The operators at the SCADA Workstation shall set the desired flowrate.
3. **Baseline UV Flow** – The speed of the Broderon Effluent Pumps shall be varied to maintain a constant flow to the UV system. The operator at the SCADA Workstation shall set the desired flow rate to the UV system. The Broderon Effluent Pumps shall then be operated such that the Broderon effluent flow is equal to the total permeate flow minus the desired UV flow.

The wetwell level, effluent flow and discharge pressure will be measured using an ultrasonic level sensor, magnetic flowmeter and a discharge pressure transmitter respectively.

The pumps will be operated such that all pumps receive the same speed signal. The number of pumps in operation will be determined based on flow. Adjustable "ON" and "OFF" flow set points shall be provided for one pump operation and two-pump operation in the SCADA system.

**Interlocks:** Power Permissive.

**Alarms:** A pump common FAIL (Type 1) alarm shall be transmitted to R I/O#3 for indication at the SCADA Workstations.

The pumps will be equipped with discharge high-pressure switches to signal a high discharge pressure alarm (Type 1) that will transmit an alarm to R I/O#3 and result in the shutdown of the pump. A time delay shall be provided to delay activation of the alarm so that nuisance alarm conditions are prevented on pump startup.

The Broderson wet well will be provided with a level transmitter and separate high-level and low-level float switches shall be provided to signal high-level (Type 2) and low-level (Type 1) alarm conditions, the low level switch when reached and after an adjustable time delay will shut down all operating pumps.

## CS-43-15 AREA EFFLUENT DISPOSAL PUMPS

**Reference Drawing:** 43-I-19

**General:** Three vertical turbine pumps (43-P-01-FE, 43-P-02-FE & 43-P-03-FE) will be provided to pump effluent water from the UV System to the Los Osos area disposal main. The area disposal main is a pipeline that feeds multiple effluent disposal sites located throughout the Los Osos area. The effluent disposal sites are part of the Area Wastewater Project and is covered in a separate contract.

**Local Manual  
Control Mode:**

When the LOCAL/REMOTE switch at the pump VFD is placed in LOCAL the pump will be controlled from START/STOP and a speed controls at the VFD. Pump speed is transmitted from the VFD to R I/O#3 for indication at the SCADA Workstation.

**Local Automatic  
Control Mode:**

No local Automatic controls are provided.

**SCADA Manual  
Control Mode:**

When the LOCAL/REMOTE switch at the pump VFD is placed in REMOTE the pump will be controlled from the SCADA system. The pumps can be started and stopped and the speed adjusted manually by the operator when the pumps are placed in SCADA Manual mode. Pump speed is transmitted to the VFD from R I/O#3.

Individual RUN status for each pump is transmitted to R I/O#3 from the VFD for indication and runtime totalization at the operator workstations. Pump READY and in REMOTE is also transmitted to R I/O#3 from the VFD for indication.

**SCADA Automatic  
Control Mode:**

When the pumps are placed in SCADA Auto mode the area effluent disposal pumps will be operated to maintain a desired level setpoint in the area wet well. The operator at the SCADA Workstation will assign each pump either with a LEAD, LAG NO 1 or LAG NO 2 designation.

When the level in the wetwell rises to the level setpoint the lead pump will turn on and the speed will vary to maintain the level in the wetwell at the level setpoint. When the speed of the lead pump reaches 95% the lag No. 1 pump will turn on. The speed of the lead pump will be ramped down and the speed of the lag pump will ramped up until they are both running at the same speed then both will run at the same speed to maintain the level. When the speed of the combined pumps reaches 95% the lag No. 2 pump will turn on. The speed of the combined pumps will be ramped down and the speed of the lag No. 2 pump will ramped up until they are all running at the same speed then all pumps will run at the same speed to maintain the level.

If the speed of one pump or a combination of multiple pumps reaches 50%, the last pump started will stop and speed of any remaining pumps

will vary to maintain the level setpoint. This will continue until no pumps are operational.

The wetwell level, effluent flow and discharge pressure will be measured using an ultrasonic level sensor, magnetic flowmeter and a discharge pressure transmitter respectively.

**Interlocks:** Power Permissive.

**Alarms:** A pump common FAIL (Type 1) alarm shall be transmitted to R I/O#3 for indication at the SCADA Workstations.

The pumps will be equipped with discharge high-pressure switches to signal a high discharge pressure alarm (Type 1) that will transmit an alarm to R I/O#3 and result in the shutdown of the pump. A time delay shall be provided to delay activation of the alarm so that nuisance alarm conditions are prevented on pump startup.

The Area wet well will be provided with a level transmitter and separate high-level and low-level float switches shall be provided to signal high-level (Type 2) and low-level (Type 1) alarm conditions, the low level switch when reached and after an adjustable time delay will shut down all operating pumps.

## CS-43-16 SCREENINGS WASHWATER PUMPS

**Reference Drawing:** 43-I-20

**General:** Two screenings washwater pumps (43-P-01-SW & 43-P-02-SW) will be provided. The screen washwater pumps will pump effluent from the Area effluent wet well to the rotary drum screens in the Residuals Building.

### **Local Manual**

**Control Mode:** A HAND/OFF/REMOTE switch is provided for local manual control of each pump. When set to HAND each pump will run.

### **Local Automatic**

**Control Mode:** No Local Automatic control is provided.

### **SCADA Manual**

**Control Mode:** When the HAND/OFF/REMOTE switch at each pump is placed in REMOTE and the operator at the SCADA workstation has set the operation for SCADA manual the operator can start and stop the pumps manually.

Individual RUN status for each pump is transmitted to R I/O#3 for indication and runtime totalization at the SCADA Workstations. Pump in REMOTE is also transmitted to R I/O#3 for indication at the SCADA Workstations.

### **SCADA Automatic**

**Control Mode:** When the operator at the SCADA workstation has set the operation for SCADA Auto the pumps will be in operation and the second pump will serve as standby. A high-pressure switch is provided on the pump discharge to signal an alarm and shut down the pump.

The pumps shall be operated together with the drum screens. Whenever a drum screen is running the SCADA System shall call for the screening washwater pump to turn on to meet the demand for spray water. The pumps will be provided with two automatic options either a lead-standby with no alternation or an alternation mode that will alternate the pumps after each operation both modes will be selected in the plant SCADA system.

**Interlocks:** Power Permissive.

**Alarms:** A pump common FAIL (Type 1) alarm shall be transmitted to R I/O#3 for indication at the SCADA Workstations.

The pumps will be equipped with discharge high-pressure switches to signal a high discharge pressure alarm (Type 1) that will transmit an alarm to R I/O#3 and result in the shutdown of the pump. A time delay shall be provided to delay activation of the alarm so that nuisance alarm conditions are prevented on pump startup.

A low-pressure switch is provided in the discharge line to signal an alarm (Type 2) and turn on the back up pump.

## CS-43-17 PLANT AIR SYSTEM

**Reference Drawing:** 43-I-16

**General:** Two air compressors (43-E-01-PA & 43-E-02-PA) are provided to supply compressed air for the plant air system. Each compressor will be a packaged air compressor that will feed air into a common air header that is then passed through packaged refrigerated air dryers (43-E-03-PA & 43-E-04-PA), then distributed throughout the WWTF. For details of the plant air system see contract drawings 42-M-13 & 43-GM-02.

### **Local Manual**

**Control Mode:** A HAND/OFF/AUTO switch is provided at the compressor LCP. When set to HAND a compressor will run.

### **Local Automatic**

**Control Mode:** When the HAND/OFF/AUTO at the LCP is placed in AUTO the LCP will start and stop the compressor automatically based on a start command from the SCADA system. When the start command is present the compressor will operate.

### **SCADA Manual**

**Control Mode:** When the operator at the SCADA workstation has set the operation for SCADA manual the operator can initiate a start command to the compressor LCP.

### **SCADA Automatic**

**Control Mode:** No automatic SCADA operation is provided other than a low-pressure interlock described below.

A plant air supply pressure transmitted is provided to monitor the plant air supply.

### **Interlock:**

When a low pressure alarm (Type 2) is detected by R I/O#3 at the common header (43-PSL-243) the SCADA system assumes that a compressor is failing to meet a minimum pressure requirement and will initiate a start of the backup compressor. The start command will be removed from both compressors as part of the load restriction program.

### **Alarms:**

A high discharge temperature switch provided as part of the compressor package will shutdown a running compressor and initiate a common fail alarm (Type 1) to R I/O#3.

A common Air Dryer FAIL alarm (Type 2) is transmitted to R I/O#3 for indication at the SCADA Workstation.

A low plant air supply alarm (Type 1) will be derived from the plant air pressure signal.

## CS-43-18 MBR BLOWERS

**Reference Drawing:** 43-I-13 & 43-I-14

**General:** The operators shall set which blowers are operating into either the SCADA system or the MBR system LCP. Five positive displacement aeration blowers will be supplied for the MBR (43-B-01-MA, 43-B-02-MA, 43-B-03-MA, 43-B-04-MA & 43-B-05-MA) and will be located in the blower room on the second floor of the Treatment Building. One blower shall be provided to supply air for each MBR basin, and one standby unit. Variable frequency drives will be used to control the speed of the blowers to vary the amount of air delivered.

**Local Manual Control Mode:** When the LOCAL/REMOTE switch at the blower VFD is placed in LOCAL the blower will be controlled from START/STOP and a speed controls at the VFD. Blower speed is transmitted from the VFD to the MBR PLC for indication at the MBR and SCADA Workstations.

**Local Automatic Control Mode:** No local Automatic controls are provided.

**MBR/SCADA Control Mode:** When the LOCAL/REMOTE switch at the blower VFD is placed in REMOTE the blower will be controlled from the MBR/SCADA system.

The operators shall set which blowers are operating into either the SCADA system or the MBR system LCP. A LOCAL/REMOTE switch in the MBR LCP shall be used to determine which location is used for blower operation.

The airflow is carried from the blowers to the MBR basins in a single pipe. Automatic control valves at each MBR basin are used to control the airflow to each MBR basin based on the MBR system control logic. The membrane blowers will normally be sequenced on and off based on the operation of the MBR basins. The control logic for actual blower operation shall reside in the MBR LCP.

The total airflow to the MBR basins will be measured as well as the air pressure in the discharge line. The flow and pressure signals shall be displayed at the MBR LCP and shall be transmitted to the SCADA system. The blowers will be equipped with a pressure release valve, pressure switch, and temperature switch.

Individual RUN status for each blower is transmitted to the MBR PLC from the VFD for indication and runtime totalization at the MBR and SCADA Workstations. Blower READY and in REMOTE is also transmitted to the MBR PLC from the VFD for indication.

**Interlock:** Power Permissive

**Alarms:**

Alarms shall be generated from both the high pressure (Type 1) and high temperature switches (Type 1) and this alarm condition shall shut down the blower. All alarm signals shall be displayed at the MBR LCP and shall be transmitted to the SCADA system.

## CS-43-19 MBR VACUUM PUMPS

**Reference Drawing:** 43-I-10

**General:** Two vacuum pumps will be supplied as part of the MBR system (43-P-01-VAC & 43-P-02-VAC). Normally, one unit will operate and the second unit will serve as a standby. The vacuum pumps are designed to remove entrained air from the air/water separators on the permeate/filtrate pump suction piping to maintain a negative pressure and prevent air locking of the centrifugal permeate pumps.

**Local Manual  
Control Mode:**

When the HAND/OFF/AUTO switch at the MCC is placed in HAND a vacuum pump will run continuously. When the HAND/OFF/AUTO switch is placed in OFF the pump will stop.

**Local Automatic  
Control Mode:**

No local Automatic controls are provided.

**MBR/SCADA  
Control Mode:**

Control of the vacuum pumps will be performed by the MBR system PLC. In addition to turning the vacuum pumps on and off as required, the control system must control the operation of automatic (pneumatic) valves to remove water collected in the knock-out tank located in the suction piping to the vacuum pumps. This control system will operate the control valves to isolate the knock-out tank and open a vent line to atmosphere to allow accumulated water to drain out of the tank based on a high level switch in the tank. The level switch shall also generate an alarm signal.

**Interlock:** Power Permissive

**Alarms:** Individual RUN status for each pump is transmitted to the MBR PLC from the MCC for indication and runtime totalization at the MBR and SCADA Workstations. Pump in AUTO is also transmitted to the MBR PLC from the MCC for indication at the MBR and SCADA Workstations.

## CS-43-20 UV DISINFECTION SYSTEM

**Reference Drawing:** 43-I-12

**General:** An open channel, gravity fed ultraviolet (UV) disinfection system, containing multiple banks of UV lamps, shall be provided on the second floor of the treatment building. The UV system effectively disinfects the effluent from the MBR prior to discharge into the Area wetwell. For equipment specification refer to specification 11289.

**Local Manual  
Control Mode:**

The control for the UV system shall be provided by a vendor supplied main UV control panel located next to the UV System on the Treatment Building. Contained within the panel is the UV system's own PLC. The control for the UV system shall be accomplished either by utilizing a flow pace signal transmitted through the SCADA system based upon the operation of the Broderson Pump Station and the MBR effluent flowmeter 43-FI-206 or by a dosed based setpoint. The flow signal along with a continuous transmittance sample taken from the UV channel shall set the "dose" or UV light intensity provided by the UV system. The main control panel shall contain a Local Operator Interface (LOI) that shall allow for all the monitoring and maintenance of the UV system. Each bank shall have a LOCAL/OFF/REMOTE (or HAND/OFF/AUTO) switch associated with it, in LOCAL the UV bank shall be on continuously.

**Local Automatic  
Control Mode:**

When each bank's LOCAL/OFF/REMOTE switch is placed in AUTO the system shall operate based on a flow signal and the UV transmittance of the UV channel. The control of the UV system shall be either an automatic flow-paced or dose-based system. The systems' external flow signals shall be transmitted to the SCE/SCC PLC from the main plant SCADA system.

- **Received Dosage Control.** A UV Disinfection Management System shall control the On-Off cycling as well as the adjustable lamp power setting to each bank of UV lamps based upon a Received UV Dosage pacing philosophy:
  - a. On power up, all lamps should turn on for a preset minimum time period.
  - b. The Management System shall utilize a UV intensity sensor located within the UV bank(s) to accurately sense any change in lamp power, lamp fouling, effluent transmittance, or other factor and compensate for any reduction in the UV-C output due to lamp aging or lamp fouling.
  - c. The UV Disinfection Management System shall receive inputs from each of the UV intensity sensors (one per UV bank) and effluent flow meters and shall automatically adjust the Received UV dose to maintain the required levels under all operation conditions.

- **Automatic Flow Pacing:** The automatic flow pacing system shall operate as follows:
  - a. UV system shall be designed to allow for bank-by-bank flow pacing. The flow pacing system shall respond to a signal from the effluent flow meter (by others). The effluent flow signal shall be transmitted to the PLC in the SCE/SCC via the SCADA system. The UV system shall adjust the number of UV banks in operation to correspond to flow conditions identified in Paragraph 2.13.E above.
  - b. At least one bank shall always stay on-line if there is an effluent flow signal, regardless of the total effluent flow.
  - c. When the flow increases to an adjustable preset value, the channels lag UV bank shall automatically be turned on. After receiving indications that the bank has been turned on, an adjustable “bank warm up” delay shall begin timing. The time delay initial setting shall correspond to the warm-up time required by the banks. After timing out, when flow increases to a second adjustable preset value, the channel’s next lag bank shall automatically be turned on and the sequence repeated until all banks in the channel are operating.
  - d. The above control scheme shall continue as flow continues to increase. Flow setpoints and dead-bands shall be easily adjustable by plant operators.
  - e. When an “Off” command is given by the PLC, the lamps shall turn off.
  - f. If a bank fails during operation (upon loss of power, H-O-A turned to “Off”, or L-O-R turned to “Off” or equipment failure), the PLC shall automatically switch to the next bank in the sequence.
  - g. A low intensity alarm shall not cause any bank to turn off.
  - h. To avoid cycling of banks, an adjustable “bank time off” time delay shall be provided so that when the flow decreases below any setpoint, no bank shall turnoff until the adjustable time delay times out. If flow increases above the setpoint during this delay period, the timer shall stop and reset itself to zero. Initial setting shall be 120 minutes. Timer range shall be adjustable 0 to 300 minutes through the LOI or SCADA.
  - i. A “lead bank rotation” timer shall be provided such that the lead bank shall rotate service even when flow does not vary. The initial setting shall be 336 hours, shall be operator adjustable via the LOI or SCADA.

Each bank of lamps shall have a minimum of one ultraviolet intensity sensor that shall respond only to the germicidal portion of light generated. Sensors shall be calibrated to NBS standards and the PLC shall be

equipped for transmission of alarm signals to a remote location. A “push to test” system shall be supplied for the UV intensity monitoring system. The test button shall allow the operator to check on the operating status of each of the UV intensity sensors.

**Interlock:** Operation of the UV System shall be in conjunction with the Broderson Effluent Pumps and the MBR System Permeate/Filtrate Pumps. Refer to relevant control strategies for details.

Power Permissive

**Monitoring and Alarms:**

The UV system shall transmit all data and alarms required by NWRI guidelines to the plant PLC and SCADA networks, including:

- a. UV intensity – continuous monitoring
- b. UV Transmittance – continuous monitoring
- c. Operational UV dose – continuous monitoring
- d. UV reactor – on/off status
- e. UV lamp – on/off status
- f. UV intensity measured by at least one probe per reactor
- g. Lamp age in hours
- h. Cumulative number of reactor on/off cycles
- i. Cumulative UV disinfection system power consumption
- j. Reactor power set point
- k. Liquid level in UV system
- l. GFI
- m. High Priority (Type 1) Alarms for the following
  - 1) Adjacent lamp failure
  - 2) Multiple lamp failure
  - 3) Low-low UV intensity
  - 4) Low-low UV transmittance
  - 5) Low-low operational UV dose
  - 6) High-high turbidity
  - 7) High water level

- 8) Low water level
- 9) GFI
- n. Low Priority (Type 3) Alarms for the following
  - 1) Individual lamp failure
  - 2) Low UV intensity
  - 3) Low UV transmittance
  - 4) High turbidity
  - 5) Low operational UV dose

## CS-43-21 EMERGENCY POWER LOAD RESTRICTION PROGRAM

### Reference Drawings: All

**General:** The emergency power control system shall restrict the operation of most process equipment during periods when the engine generator is providing electrical power. Refer to CS-40-01 for a description of the operation of the generators. Although the anticipated load at the WWTF will not reach the maximum capacity of the engine generator the load restriction program will be implemented now primarily for future operation.

**Local Manual Control Mode:** No manual control is provided locally.

**Local Automatic Control Mode:** No automatic control is provided locally.

**SCADA Manual Control Mode:** The SCADA system will receive an engine generator run status input and an engine generator common alarm. It will also receive status information from the utility and generator breakers that will determine the status of the Automatic Transfer Switch for normal, utility power not available and emergency modes. Signals will also be received from the generator EMAP for generator current and generator power output.

Manual control from the SCADA system is integrated with the automatic control. A description of both modes is provided below.

**SCADA Automatic Control Mode:** The emergency power control system does not directly control process equipment. Instead, it operates output contacts that are permissives that allows various pieces equipment to operate. In many cases these permissives are logically combined with the safety shutdown(s) and become a single output contact that will permit or prohibit operation of that device in both automatic and manual modes.

The following operation for the engine generator, 43-GEN-01, shall occur when utility power is lost after the plant has been operating normally. First when the utility power not available status is determined when the utility breaker and the generator breakers are both open all power permissive outputs shall be immediately disabled. The ATS will first switch from its normal position to the power unavailable position and then to its emergency position. When the SCADA system detects that the engine generator is running and determines that the ATS is in the emergency position by the closed status of the generator breaker it initiates the default startup sequence for the emergency power mode automatically.

The SCADA system will retain the commands for each piece of equipment so when the permissive contact is remade the equipment will automatically restart. The first step in this sequence is a five second time delay to allow uncontrolled electrical loads to be energized. Then the SCADA system

sequentially enables the permissive contacts for the following equipment in list order with a two second delay between each start;

- Aeration blowers and associated valves in the Treatment Building
- Aeration Basin pumps and mixers
- Area Effluent pumps, Broderson pumps and two utility water pumps
- UV System
- Mixed Liquor Transfer pumps
- MBR related equipment including Permeate, Chemical and Backpulse pumps.
- Influent Pump Station
- Plant Drain Pump Station
- Drum Screens and associated pumps
- Washer Compactors
- Grit System

At this point, the plant operator may choose to enable or disable other equipment not listed manually at the SCADA Workstation such as the Centrifuge System including WAS pumps and associated Polymer pumps. The operator shall have a display screen available that will include a list of all of the equipment listed above, plus the additional equipment that is not automatically enabled along with the horsepower of each item. The SCADA Workstation shall also indicate the generator power and current values and will show the total horsepower of all enabled loads listed and the total horsepower of those loads actually running.

The plant operator may choose to enable additional equipment or to disable some of the equipment that was automatically enabled.

When utility power is restored the ATS will switch back to its normal position. When this occurs, the same sequence of enabling power system permissives will occur, but it shall continue, with three second delays between each item, through all off the equipment listed above, both the default and the optional, in the order listed. This same restart sequence shall be followed after a short duration utility power failure wherein the utility power unavailable input is received, but is subsequently cleared before the ATS changes position.

## **OPERATIONS BUILDING**

### **HVAC (44-I-01)**

The HVAC system in the Treatment Building will be controlled through an HVAC LCP. The fans that have a circuit breaker that when made will start the fan. All of the fans have a RUN status that is transmitted to R I/O#3 for indication and runtime totalization at the SCADA Workstation.

An Operations Building Air Conditioning Unit, Roof Top Heat Pump and a Condensing unit will each be monitored by R I/O#1 for RUN status and a FAIL alarm.

**- END OF CONTROL STRATEGIES -**

## SECTION 17520 - PLC-BASED CONTROL SYSTEMS SOFTWARE

### PART 1 -- GENERAL

#### 1.1 THE REQUIREMENT

- A. The CONTRACTOR, through the use of a pre-qualified Instrumentation Supplier shall furnish, install, assemble, configure, program, and place into service all programmable logic control system (PLCS) software in this Section.

#### 1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS.

- A. PLC-based control systems-software reference specifications, codes, and standards shall be in accordance with Section 17100.

#### 1.3 CONTRACTOR SUBMITTALS

- A. **Shop Drawings:** PLCS submittals shall be in accordance with Section 17100. PLCS software submittals shall, however, be made separately from other process control and instrumentation system submittals.
- B. **Software Submittal:** The Software Submittal shall be a singular all inclusive submittal which shall include at least the following:
  1. Complete description of the standard application software programs, operating system, and utility program to be furnished, including modifications and explanation of how the specific functional requirement will be met. A cross reference between the specification and the software submittal shall be provided in order to provide the ENGINEER the ability to identify how each specified section or function is being met by the CONTRACTOR.
  2. A complete set of all available software algorithms with:
    - Individual coil register and variable description.
    - Program, group of program, subroutine, and complete rung detail comments.
    - Memory, coil, register, and variable usage mapping.
    - Source code of all high level program language which is specifically created by the CONTRACTOR for this project.
  3. A complete set of control strategies which depict all monitoring and control functions on a loop by loop basis.
  4. An English language narrative of each data acquisition or control loop mission and anticipated action. Narratives shall enumerate the signal point name, signal description, associated PLC number, associated graphic displays, system functions activated by the signal (i.e., interlocks, alarms, logs, etc.).
  5. A complete set of module configuration sheets depicting each loop linkage.

6. A complete listing of the PLC data base for each data point with relevant parameters such as range, active state, contact orientation, limits, incremental limits, I/O card byte, I/O hardware address and PLC assignment. The list shall be divided and grouped by PLC, and divided into type of I/O. In addition to the active I/Os, the list shall also include implemented spare I/Os. Final format shall be approved by the ENGINEER.
  7. Detailed descriptions of procedures used to implement and modify control strategies and data base construction.
  8. One complete set of all workstation accessible displays which are unique to this project. These displays shall be a full size color graphic format arranged in hierarchical order.
- C. **Display and Report Submittals:** After all Software Submittals have been approved by the ENGINEER, the CONTRACTOR shall submit the following items. Favorable review and implementation of these submittals is required prior to the start of system testing (i.e. the DCS must be operational prior to any process system test).
1. All workstation display (both graphic displays and trend displays) submittals shall be in full color as they will appear on the CRT. This submittal shall be prepared after the requisite Graphics Meetings in this Section.
  2. Each display shall be uniquely titled. Locations for process data shall be clearly identified either through the use of simulated data or by showing variables on the displays and providing a reference list describing those variables. All dynamic points shall be identified by tag number as a minimum and their operation shall be described on separate sheets (color change, symbol change, etc)). Three sets of submittals (with screen prints in color) are required for review by the ENGINEER. One set will be returned with comments.
  3. All periodic reports for the entire PLC system. Locations for process data shall be clearly identified, either through the use of simulated data or by showing variables on the report and providing a reference list describing those variables. Three sets of reports shall be submitted for review by the ENGINEER. One set will be returned with comments.
- D. **Operations Reference Manual:** The CONTRACTOR shall prepare and submit an Operations Manual for the workstation system for use by the plant operators. This manual shall be a white view binder, K&M VS11-20WE, or equal and shall contain the following:
1. An index to the manual.
  2. Software – Related: Submit 15 days prior to the plant operational test
    - a. All program manuals supplied by the manufacturer(s) with the standard software packages.
    - b. All original program disks supplied by the manufacturer(s) with the standard software packages, including any program revisions or updates issued by the manufacturer(s) during the construction period.

- c. All PLC program and workstation configuration program files stored on labeled disks. The PLC program and workstation configuration file disks shall also be updated as required if any changes or corrections are required in this programming prior to project completion.
  - d. A change of ownership registration form for each standard software package supplied under this project to allow the OWNER to register the software with the manufacturer.
3. A list of workstation display screens, trends, and reports, with display name and description.
  4. A list of the control screens with the display names and description. It shall also provide a summary of possible commands and operator inputs to these screens including setpoints. All control actions shall be included.
  5. A PLC block diagram with names and locations of major components.
  6. Instructions for manually printing screens or reports, both real time and historical as applicable.
  7. A summary of security levels and their privileges and limitations.
  8. Spaces for operators to make notes.
  9. A copy of this manual shall be provided to each operator during training on the workstation operations. The training class shall include a review of this manual with the operators in addition to more detailed instruction on the workstation configuration and its use.
- 1.4 SERVICES OF MANUFACTURER'S REPRESENTATIVE
- A. PLC-based control systems-software manufacturer's representative services shall be provided in accordance with Section 17510 - PLC-Based Control Systems-Hardware.

## **PART 2 -- PRODUCTS**

### **2.1 GENERAL**

- A. This Section covers the furnishing of standard software fully installed and configured in the control system specified herein. It is the intent of this Specification to have the CONTRACTOR furnish the latest generation, standard, field proven, fully debugged and supported PLC software package for this application with a minimum of additions or changes. Customized or specially written software shall be furnished if required to meet all of the functional requirements indicated. Any custom applications software required shall be fully integrated into the basic software and shall not require unique command structures. No attempt has been made to list all software or list all characteristics of software required by the instrumentation supplier to meet the functional requirements specified herein.
  1. Software is described in broad, functional categories. The Instrumentation Supplier shall furnish a complete software package including the functional requirements

along with whatever additional software is required for proper and efficient operation of the SCADA System.

2. The software package shall provide a system capable of controlling system level activities, and a higher level process control language allowing the operator to monitor and control the process through an interactive human interface. The software environment shall support a multi-programming atmosphere allowing concurrent execution of more than one program in a background/foreground mode or multi-tasking mode.
3. Throughout the execution of all software modules, the operator shall be presented with all of the command or operation choices available at that point in the program using sufficient verbiage or symbols to make the choices self-explanatory and unambiguous. Question and answer or fill-in-the-blank requests shall only be permitted where file names, tag names, or other unique text or numerical information is required.

## 2.2 HARDWARE

- A. **General:** All PLC's, remote I/O systems, workstations, communication equipment, etc., shall be provided under Section 17510 - PLC-Based Control Systems-Hardware.

## 2.3 PLC SOFTWARE

- A. **PLC Programming Software:** All PLC programming shall be accomplished using a standard software package developed for this purpose. The software package shall be installed on the hard disk of the portable computer serving as the PLC programming terminal. The PLC Programming Software shall be either **Modicon Concept** or **Rockwell Software RSLogix**.

All programming, monitoring, searching, and editing shall be accomplished using this PLC programming software. It shall be useable both on-line (while directly connected to the PLC's) and off-line. The PLC programming software shall display multiple series and parallel contacts, coils, timers, counters, and mathematical function blocks. The software shall be able to monitor the status of all inputs, outputs, timers, counters, and coils. It shall have the capability to disable/force all inputs, outputs, and coils to simulate the elements of the ladder logic by means of color change. It shall include a search capability to locate any address or element and its program location. PLC status information, such as error indication and amount of memory remaining shall be shown on the CRT screen.

The PLC programming software shall have the capability to generate a PLC program printout that is fully documented. Fully documented program listings shall have appropriate rungs, address, and coils shown with comments to clarify to a reader what that segment of the program accomplishes. A fully documented listing shall also include a cross-reference report of program addresses. The PLC programming software shall be suitable for the PLC's furnished under Section 17510 - PLC-Based Control System - Hardware.

- B. **System Level Software:** System level software shall include a complete and unmodified operating system furnished by the CONTRACTOR that provides system level functions as specified herein. Operating system software shall function automatically without operator intervention, except as required to establish file names and similar information. System level software shall include a real time operating

system, a calendar/time program, a file management program and a system of diagnostic routines in addition to any compilers, editors, loaders, or assemblers required to support the PLC software.

1. **Operating System Software:** The real-time operating system software shall be the standard uncorrupted product of the PLC and shall provide the following minimum functions:
  - a. Respond to demands from a program request.
  - b. Dynamic allocation of the resources available in the PLC. These resources shall include main memory usage, computation time, peripheral usage, and I/O channel usage.
  - c. Allotment of system resources on the basis of task priority levels such that a logical allocation of resources and suitable response times are assured.
  - d. Queuing of requests in order of priority if one or more requested resources are unavailable.
  - e. Resolution of contending requests for the same resource in accordance with priority.
  - f. Service requests for execution of one program by another.
  - g. Transfer data between programs as requested.
  - h. Management of all information transfers to and from peripheral devices.
  - i. Control and recovery from all program fault conditions.
  - j. Diagnose and report real-time hardware device errors.
2. **Program Execution:** Program execution shall be scheduled on a priority basis. A multilevel priority interrupt structure is required. A program interrupted by a higher priority program shall be entered into a list of pending programs. Its execution shall be resumed once it becomes the currently highest priority program. The system shall allow periodic programs to be scheduled. The allocation of resources to a time-scheduled program shall be based on its relative priority and the availability of resources. Initiation of programs shall, as a minimum, be activated in the following ways:
  - a. In response to external interrupts.
  - b. At a scheduled time of the day.
  - c. On an elapsed time interval basis.
  - d. On request by another program.
3. **Startup and Restart:** Software shall be provided which initializes and brings a PLC or any microprocessor based hardware unit from an inactive condition to a state of operational readiness. Initialization shall include determination of system status prior to startup of initializing operating system software and initializing application

software. Initialization shall also include the loading of all memory resident software, initializing timers, counters, and queues, and initialization of all dynamic database values.

4. **Shutdown:** The software shall provide an orderly shutdown capability for shutdowns resulting from equipment failure, including PLC processor failure, primary power failure, or a manually entered shutdown command. When the loss of primary power is sensed, a high-priority hardware interrupt shall initiate software for an immediate, orderly shutdown. When a shutdown occurs in response to a command or malfunction, the software shall control the affected hardware quickly and automatically to a secure state. The failure of the PLC shall be detected at the workstation level.
  5. **Diagnostics:** Diagnostic programs shall be furnished with the PLC software package to detect and isolate hardware problems and assist maintenance personnel in discovering the causes for system failures. The manufacturer's standard diagnostic routines shall be used as much as possible. Diagnostic software and test programs shall be furnished for each significant component in the Control System. Diagnostic routines shall test for power supply, central processing unit, memory, communications and I/O bus failures as a minimum.
- C. **Calendar/Time Program:** The calendar/time program shall update the second, minute, hour, day, month, and year in the operating system and transfer accurate time and date information to all system level and application software. Variations in the number of days in each month and in leap years shall be handled automatically by the program. The operator shall be able to set or correct the time and date from any the data access panel, only at the highest security level.
- D. **Algorithms:** PLC software shall support the implementation of algorithms for the determinations of control actions and special calculations involving analog and discrete data. These algorithms shall be capable of outputting positional or incremental control outputs or providing the product of calculations. The algorithms shall include alarm checks where appropriate. As a minimum, the following types of algorithms shall be provided:
1. A calculator algorithm that performs functions such as summing several variables, raising to a power, roots, dividing, multiplying, and subtracting.
  2. A switch algorithm that reads the current value from its input address and stores it as the value of its output address. Two types of switches shall be accommodated, 2 outputs with 1 input and one output with two inputs.
  3. A three-mode Proportional-Integral-Derivative (PID) controller algorithm with each of the 3 modes independently adjustable. The algorithm shall support both direct and reverse acting modes.
  4. Algorithms for lead, lag, dead time, and ratio compensators.
  5. Algorithms to perform integration and totalization of analog process variables.
- E. **Operator Control:** All programming commands related to changing system configuration or controlling field devices shall be performed only through the Control System and shall require more than one keystroke to protect against inadvertent

operation. Control System configuration commands shall require operator confirmation of a requested action before any change is made. This shall apply to changes in the algorithms, control sequences, and similar configuration related actions, as well as file copy and file delete commands. If any sequence requiring operator conformation, the operator shall be able to cancel the operation at any point prior to executing the command.

## 2.4 WORKSTATION SOFTWARE

- A. **Workstation Software Package:** The base workstation software package shall be provided by the CONTRACTOR, and it shall consist of either the latest version of **Rockwell Automation RS View SE, Invensys Wonderware In-Touch or USDATA FactoryLink**. The software package shall include sufficient licenses for one (1) development and four (6) runtime systems. The licenses shall be for the two Operations Building operator workstations that shall also utilize the development license and the four remote workstations located at the Residuals and Treatment Buildings of the Wastewater Treatment Facility and at the LOCSD's 9<sup>th</sup> Street offices and Water Yard maintenance building respectively. The licenses shall be purchased to enable twice the amount of internal and external I/O that will be required to complete this project. The CONTRACTOR shall be responsible to provide any upgrade that is required to any license if the purchased license does not meet the project requirements.

The CONTRACTOR shall provide a customer support contract with the software that will be transferable to the OWNER with the selected software vendor or a preferred distributor that will extend up to the end of the first year of plant operation. The contract shall enable the OWNER to have full access to technical support from the software vendor or preferred distributor.

The workstation software package shall monitor and/or control PLC's via the communication network. It shall diagnose and collect troubleshooting and performance data and display it in easy to understand graphs and tables. It shall also monitor devices at each facility site for proper communication.

The software package shall scan all points in the configured database in a background mode that shall be invisible to the user. This background program shall perform all alarming and data logging functions automatically. Data selected during configuration shall be logged to disk file(s) on the workstation in a transparent manner and be available to generate historical trend displays and reports on the CRT when desired by the user. Logged data shall be convertible by the software package to a format useable by commercial spreadsheet programs. Reports of logged data shall not only be able to be displayed, but shall be printed automatically based on the configured schedule, or when requested by the user. The report shall appear on the display exactly as it is printed.

The program shall have provisions for 3 levels of user access with security passwords or numbers. Each level shall be configurable as to program access and editing limitations.

The software packages shall support and provide capability to communicate over a Netbios compatible network to transfer data and files. The software packages shall be configurable to prevent the failure of the Operations Building workstations from affecting the operation of the SCADA system. It shall be configurable to meet all functional requirements specified.

The software package shall monitor all analog values, both real and computed, for alarms. Alarm setpoints for HI-HI, HI, LO, LO-LO, and Rate of Change shall be able to be entered or adjusted for each analog value in the SCADA System database without special programming. Alarms for an analog value shall be able to be disabled at the users discretion and later re-enabled without having to change alarm setpoints.

The software package shall support the ability to modify the configured displays or add new displays without interrupting the continuous collection of data from the PLC network, data logging, alarming, or requiring programming ability.

- B. **SCADA System Graphics:** The CONTRACTOR shall configure the workstation and PLC systems that make up the SCADA System.
- C. **SCADA System Database:** The workstation software shall incorporate a disk memory resident database which shall store all software elements necessary to implement all data acquisition, calculation, logging and reporting functions. The system database shall be comprised of the following elements:
  - 1. Current database includes process status information.
  - 2. Historical database; includes non-current process status information.
- D. **SCADA System Documentor:** Subsequent to system configuration or configuration updates, all information which defines the hardware, control and display configuration of the SCADA System shall be stored in mass memory within the workstation. The workstation shall be provided with all of the intelligence and printing/plotting capabilities to enable the automatic generation of system documentation. All documentation shall be printed/plotted in both a text and graphic format. All documentation shall be accessible in report formats. It is not acceptable to utilize screen prints as a documentation report method. The workstation shall provide the means to produce the following documentation.
  - 1. Current control system databases, (including tags, descriptors, alarm limits, engineer in units, associated alarm priority, logical states, etc.) control loops, and ladder logic.
  - 2. Definition of the current hardware configuration including locations and associated PLC numbers.
  - 3. Definition of the current display hierarchy and all displays currently in the system.
- E. **Database Generation:** All software shall be provided to enable historical database generation to be accomplished by a conversational fill-in-the-blanks technique on CRT display formats in which operational characteristics (i.e., name, scan class, alarm limits, etc.) are inserted into linkable prewritten software modules which perform scanning, computational, and collection functions. Once the information is transcribed into data records, the database software shall:
  - 1. Read and interpret the information.
  - 2. Manage all process input and output hardware assignments.
  - 3. Generate data files.

4. Perform self documenting functions such as producing hard copies of listings, main and disk memories, and data sorts by analog input, analog output, contact input and contact output.
- F. **Data Acquisition:** Scan blocks shall extract data from the communications network at specifiable rates, condition the signals, convert the data to engineering units in a floating point format, and store the data to produce a SCADA System database. Typical input signals to be scanned include:
1. Limit, status, or position information from open/close valves, motors and process monitoring devices such as flow, temperature, and pressure switches.
  2. Measured variables such as flows, pressures, levels, temperatures, etc.
  3. Measurements, set points, and outputs from all PLC's.
  4. Computed values such as inferential measurements.
  5. Operational commands from workstations keyboards.
- G. **SQL (Structured Query Language) Package.** This package shall consist of 2 database tag-types, the SQL Data and SQL Trigger, which facilitate the transfer of information bi-directionally between the data acquisition system and a relational (or other) database management system. It shall utilize Microsoft's Open Database Connectivity (ODBC) for connection to the external ODBC-compliant database. The capability to transact among multiple databases and multiple rows within a database is required. Also, "Stored Procedures" shall be able to be invoked in the relational database.

In the event that the database server is "down" (not available) at the moment that a query is executed, the system shall provide a built-in capability to back up the data to user-definable primary or secondary hard drives. The system shall automatically detect when the database server comes back on-line, and, at that time, shall execute all of the transactions that it has backed up.

1. SQL Data. This tag defines the data that is to be transferred between the data acquisition system and the relational database, and also, the direction of information flow.
2. SQL Trigger. This tag defines the conditions (triggers) under which the transfer of data will take place.
3. Historical records shall be transferred to a magnetic tape drive supplied as part of the server and shall be an automatic function.

## 2.5 NETWORKING AND DISTRIBUTED OPERATION

- A. The system must have a distributed, client/server system architecture. This architecture shall employ a local area network (LAN) as the method for communicating among stations. Each computer may be assigned one or more tasks. For example, computer "A" may be used simply for graphic display, computer "B" may be connected to a programmable controller and used for data collection, and computer "C" may be used both for display and data collection.

- B. Configurations shall be available that provide complete functionality, others that provide read/write access to the data (but do not perform I/O communications themselves), and still other information nodes that provide read-only access to all data on the network.
- C. Data shall be available to all computers and individuals on the network that have been provided access. Real-time data shall be available directly across the network from the computer that acquired it from the process hardware. Configurations that require each computer to contain copies of database tags it needs to access are not acceptable.
- D. The system shall be configured such that the failure of any one computer will not affect the operation of others on the network. It is recognized that data contained in a failed machine will be unavailable to other machines requesting it. However, the system shall offer the provision for re-starting or re-configuring other stations to take over.

1. Configuration and Expansion

- a. The system shall provide an on-line installation and configuration program for configuring the various computers on the network. This configuration program shall allow assigning unique node names to each computer as well as selecting the functions that the machine will perform.
- b. The system will allow additional computers to be added to the network while on-line, without disrupting the operations of the other machines.

2. Local Area Network (LAN) Architecture and Use

- a. The system shall be capable of supporting the following network configurations:
  - 1) Network Adapters:
    - . Ethernet
    - . Token Ring
  - 2) Network Protocols:
    - . NetBIOS
    - . TCP/IP
- b. The vendor shall provide specific details as to the manufacturers and model or version numbers of currently supported adapters and protocols upon request.
- c. The system must provide session-oriented communications for data transfer. Each computer station must be capable of establishing up to 100 sessions with other stations.
- d. The system must also be capable of running simultaneously with other LAN users who are not operating the data acquisition system software (but who might be using a LAN manager or file transfer software).
- e. The application program interface used by all system program modules and by user-written applications shall make MMS-like (Manufacturing Message Specification) Variable Access Service function calls.

3. Error Detection, Recovery, and Diagnostics:

- a. The system shall provide on-line diagnostics that display the current status and operation of the local area network and its nodes. The diagnostic display shall include the LAN adapter status for the machine showing the display, as well as the current number of messages, errors and retries.
- b. An additional display shall show the current session status (established, pending, off-line) of all stations on the network. A session monitor program that automatically monitors and recovers communications shall be supplied with the system.
- c. Should network communications errors be detected, the software shall automatically indicate that the data (on graphic displays, in historical files, etc.) is no longer valid and shall replace the invalid data with other characters. The system shall automatically attempt to re-establish communications, and, if successful, shall then replace the characters with valid data. This capability shall be built-in to the software and shall not require any user programming or other user-dependent actions to implement.

#### 4. Remote Access

- a. **Via the Network:** The system shall have the capability of creating and modifying tags in one node by operating the graphics editor or database builder program in another node. This operation shall be performed on-line, while the destination node is operating. This new or modified tag data shall immediately be available to all other nodes on the network. The security system will restrict access to the database to authorized users.
- b. **Via Modems:** Configuration shall also be available via a computer connected remotely via modems. When a remote computer is connected via a modem, the user shall have the same access as though he or she were at a computer directly attached to the network. The following functions shall be supported:
  - . Configuring the database tags throughout the network
  - . Viewing graphic displays being updated with real-time data
  - . Viewing historical trend data
  - . Copying files from/to the network

## 2.6 ALARM HANDLING

### A. Alarm Summary Displays

1. The system must offer an alarm summary display as a pre-defined dynamic link within the graphics package. This alarm summary display must show a list of the pending alarms in the system. As new alarms are detected, entries are made to the display list. As the alarm conditions clear, the entries are removed from the list.
2. In addition to being able to configure the placement of the information (tag name, current value, descriptor, time of alarm, and alarm status), the user shall be able to specify the color codes to be used to indicate the various alarm conditions.

3. Alarms can be acknowledged from the alarm summary display either individually (by clicking on an alarm acknowledgment field) or by a full page using a menu pull-down.
4. The alarm summary display must provide sorting and filtering capabilities. The user shall be able to filter on node name, alarm area(s), alarm status and alarm priority. The user must be able to sort on time, tag, alarm area, alarm priority and alarm status.

## B. REMOTE ALARM MONITORING

1. The alarm system shall support operator notification via the workstation fax/modem to dial out and report designated alarm conditions using text to speech synthesis or pre-recorded audio files via telephone. Configuration shall allow the recording of custom audio files. Dial out option shall be able to be turned on and off based on operator commands or automatic time of day scheduling. Dial out option shall incorporate multiple configurable calling sequences and phone numbers that can be automatically scheduled for specific times and/or days. The alarm system shall support operator notification via telephone, cell phone, pager, fax, local public address system, scrolling marquees, and email as configured and scheduled.

## 2.7 SECURITY MANAGEMENT

- A. The software shall provide a user-based security system. The security system must allow for the creation of users with certain rights and/or privileges. These rights must include the ability to run any combination or all of the applications in the data acquisition system. The ability to allow or disallow users access to change values, such as setpoints and machine-setups, on an individual tag basis shall be supported.
- B. Groups of users, such as Operators and Supervisors, will be created and granted rights. All users assigned to a group obtain the rights of the group, although they are still tracked by the system by their individual ID. Individual members of a group may also be assigned additional rights. The CONTRACTOR shall coordinate with LOCSD operations staff to assign the user groups prior to the final graphics meeting.
- C. The security system will support either centralized or distributed security file management.
- D. When user-based security is enabled, an audit trail will be generated in the system that will tag every operator action with a user identification (ID).
  1. Security Areas
    - a. The system must support up to 254 separate security areas. Security areas shall be assignable on a per tag basis. Each tag can be assigned all of the available security areas, none of the available security areas, or up to 3 individual security areas. Only users with clearance for those security areas shall have the ability to change parameters.
    - b. Security area names may be up to 20 characters in length.
    - c. Securing the Windows GUI Environment

- 1) The ability to “lock” an operator or other user into the runtime graphics environment shall be provided. Specifically, disabling any combination of the following shall be supported, as configured by the user:
  - a) Rebooting (<Ctrl><Alt><Del>) of the computer
  - b) Task switching under Windows
  - c) Menu bar
  - d) Title bar and Menu bar
- 2) Items a), and b) above shall be tied into the user-based security system so that an authorized user can log in and have the ability to reboot the computer and/or access other tasks.

## **PART 3 -- EXECUTION**

### **3.1 INSTALLATION**

- A. The PLC-based control systems-software installation shall be provided in accordance with Section 17510.

### **3.2 FACTORY TEST**

- A. General: The PLC-based control systems-software factory test shall be provided in accordance with Section 17510.

### **3.3 PROGRAMMING, TESTING, AND INSTRUCTION**

- A. General: The PLC-based control systems-software calibration, testing, and instruction shall be provided in accordance with Section 17510 - PLC.

### **3.4 SOFTWARE LICENSE AND REGISTRATION:**

- A. All software provided shall be installed and used within the terms of the software manufacturer’s license agreement. All software purchased by the CONTRACTOR shall be registered to the CONTRACTOR during the construction phase of this project. During that time, the CONTRACTOR shall be responsible for providing and incorporating minor software package updates issued by the software manufacturer. For example, if version 3.1 of a program is purchased, and version 3.2 and 3.3 were released prior to project completion, the CONTRACTOR shall be responsible for incorporating these later versions into the final project. The CONTRACTOR would not be responsible for incorporating major software revisions such as the release of a version 4.0 or 4.1.
- B. Prior to substantial completion of this project, the CONTRACTOR shall re-register all provided software packages to the OWNER and provide the ENGINEER and OWNER with written confirmation of having done so.

### **3.5 WORKSTATION SOFTWARE APPLICATION CONFIGURATION (PROGRAMMING)**

- A. **Workstation Graphics Generation:** The workstations that will display the graphics for the whole Los Osos Wastewater Projects will be located at the Wastewater Treatment

Facility and the LOCSD 9<sup>th</sup> Street and Water Yard remote sites. If the contract for the Los Osos Area Collection Facilities is awarded to a different CONTRACTOR than the Wastewater Treatment Facility then the software application programming shall be performed per Los Osos Wastewater Project Area A, Area B, Area C & Area D Volume IIB, specification section 17520. If the contract is awarded to the same CONTRACTOR then the application programming for the Area Facilities will be completed as part of this project.

- B. It is the responsibility of the CONTRACTOR to configure the workstations and to develop, design, engineer, configure and test all of the CRT-based graphic displays required for this project. All of this work shall take into account the specific needs of the end user. For continuity it is the intention of these contract documents that the graphic conventions developed for the Wastewater Treatment Facility be the same graphic conventions used for the LOCSD Area Collection Facilities:
- C. In order to facilitate this work the CONTRACTOR shall conduct the following meetings with the OWNER groups:

1. Graphics Meeting No. 1

- a. The CONTRACTOR shall chair and develop an agenda for a meeting that shall address the basic criteria to be adhered to in the configuration and development of CRT-based graphic displays. At this meeting, which shall be attended by plant managerial personnel, the CONTRACTOR shall distribute sample display formats for illustration purposes. As a minimum, this meeting shall address the following issues:
- b. All In-plant and remote site areas and conventions for identifying tag names and descriptors.
- Designation of groups within each plant area along with tag names and descriptors.
  - The assignment of individual control loops and inputs to specific groups.
  - Organization of the systems universal display hierarchy.
  - Paging schemes to be used to enable the movement from one display to another.
  - An itemization of the type of display to be used at each level in the graphic hierarchy (e.g., pre-formatted displays, templates, custom graphics, etc.)
  - Color convention to be employed on all graphics for the annotation of various status information, differentiation between alarms on the basis of alarm priority, background colors, static field colorization and dynamic field colorization.
  - The utilization of blinking and conditional text.
  - Definition of graphic symbolism to be used on the project. This listing shall include but not be limited to symbols to be used for process

instrumentation, process equipment, piping, vessels and valves. All symbolism must be specific as opposed to generic in that shapes must define both function and type (e.g., specific symbols for each valve design, each pump design, each type of flow meter, etc.). If the CONTRACTOR's library of shapes does not adequately describe plant or pipeline conditions, the CONTRACTOR shall develop additional shapes to meet the plants or pipelines requirements.

- Definition of all display select commands that enable the operator to move within the display hierarchy.
  - The utilization of cursor movement commands which enable the operator to move within a display.
  - Definition of control input commands that enable the operator to interact with faceplates control stations and custom graphic displays to implement control outputs/functions.
  - Definition of data input commands that enable the operator to enter numeric values into the PLC system.
  - Definition of the utilization of "poke" points or fields that are dynamically sensitive to operator inputs to facilitate operator entry directly into graphic displays.
  - A review of graphic generation procedures.
- c. Subsequent to the adjournment of graphics meeting No. 1 the CONTRACTOR shall prepare and formalize a document titled "GRAPHICS CRITERIA" which shall contain detailed meeting minutes and a definition of all graphic guidelines to be adhered to. This report shall be supplemented by graphic examples which illustrate the incorporation and application of each graphic criteria. The report shall be submitted within 30 calendar days of the meeting's adjournment.

## 2. Graphics Meeting No. 2

- a. Subsequent to the finalization of the overall system-wide graphics criteria, the CONTRACTOR shall develop graphic packages for all of the workstations being furnished under this project. At this meeting the CONTRACTOR shall submit 5 copies including:
- A review of the graphic package developed for the process areas for content and completeness.
  - A review of all data fields that display automatically updated process information
  - A review of all required input commands associated with the graphic access and control manipulation.
  - Finalized security management for facility staff

- b. Subsequent to the adjournment of graphics meeting No. 2 the CONTRACTOR shall prepare a formalized submittal of the graphic package for review along with the detailed meeting minutes. The report shall be submitted within 30 calendar days of the meeting adjournment.
3. The CONTRACTOR shall allow 1 day for each meeting.
4. The following CRT based graphic displays shall be developed for this project (as minimum):
  - a. All plant process includes all existing interfacing to the PCIS of this project.
  - b. All group alarm displays.
  - c. All control loop tuning displays.
  - d. All analog faceplate displays.
  - e. All key macro icon displays.
  - f. All database archiving control displays.
  - g. All customer displays for operator to enter all set points and recipe displays.
  - h. All historical trending display.
  - i. Control system network configure and diagnostic.
  - j. Redundant communication diagnostic and control.
  - k. Redundant master nodes diagnostic and control.
  - l. All local nodes diagnostic (include PLC's, Operator Interfacing Units and Instruments).

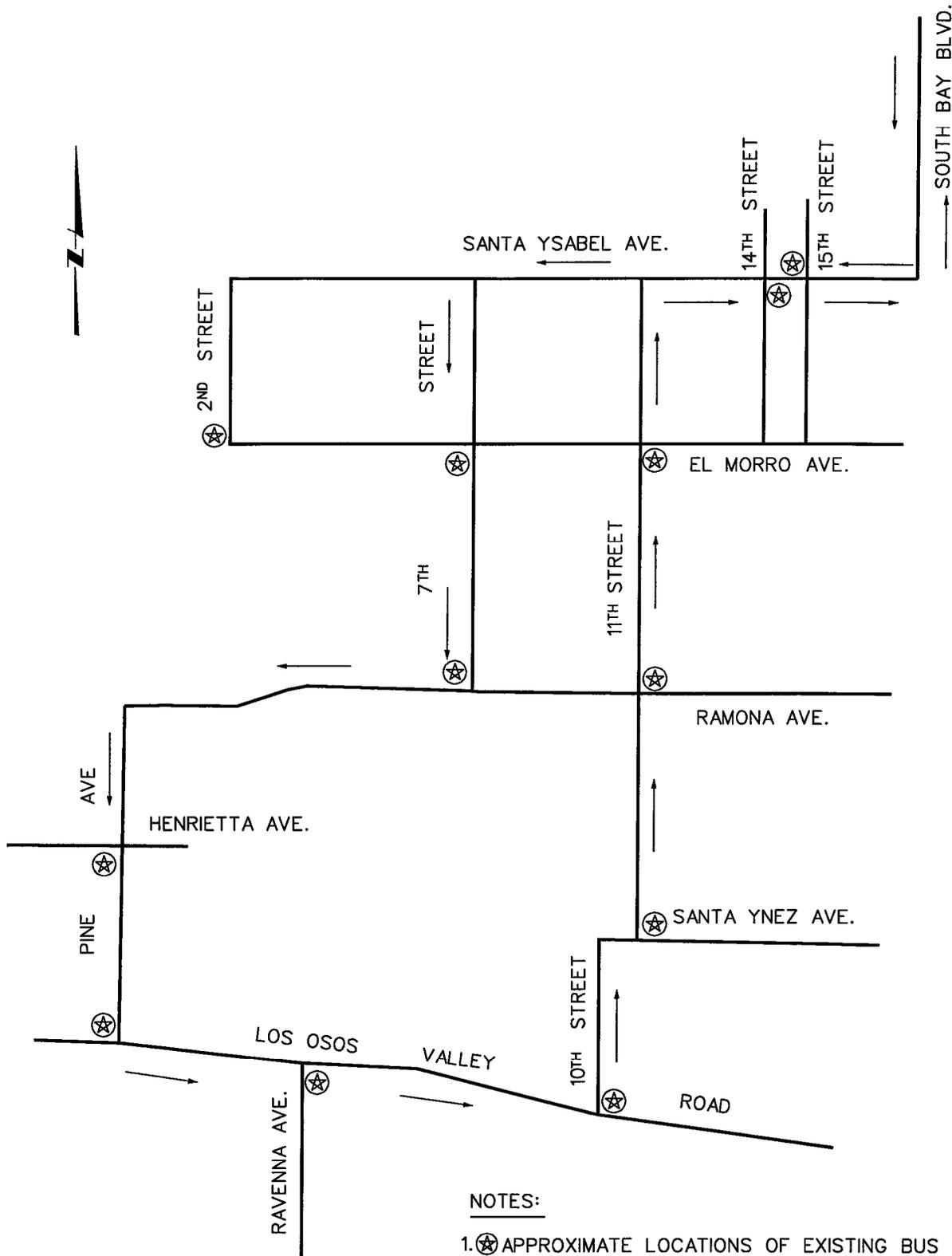
### 3.6 REPORTS

- A. **General:** The PLC system shall support 2 distinct types of report generation: (a) process reporting which generates logs based on processes scanned or on manually substituted data and (b) management reports which are comprised of lab derived data and process data. The CONTRACTOR shall provide software resources which process all requests for data collecting, reporting, and translating of data to ASCII, for assembling of data to predefined formats and merging data with appropriate heading information, for storage of data in output files associated with an output device and initiation of the appropriate output handling routine. The workstations shall provide for manually-initiated reports via an operator interface at each workstation. Reporting functions shall be designed to effectively and clearly report the historical data. The package shall automatically print the accumulated value and, when necessary, automatically scale the value. The reporting package shall automatically flag any value that was not valid during any part of the reporting interval. Valid output devices shall be line printer, character printers, and interactive workstations. ASCII data shall be made available to other software packages for producing reports containing bar charts, pie charts etc.

- B. **Process Reporting:** The reporting package shall use the process database to provide historical records for an average of 1,000 selected variables. The software as a minimum shall:
1. Collect process data and make available historical information for a minimum of 40 pages of logs, each page containing up to 10 log points described by individual column headers.
  2. Automatically print any combination of up to 20 separate periodic reports consisting of selected pages of the 40 pages noted above.
  3. Period reports shall include an End-of-Day Report, printed at end of the third shift each day, an End-of-Week Report, printed at the end of the third shift on the last day of the week, and an End-of-Month Report, printed at end of third shift on the last day of the month. Although the Daily, Weekly and Monthly Reports shall be printed at the same time, they are different reports and may be structured to satisfy different needs. Each of these five reports shall have its own selection of pages and historical data, chosen independently of the remaining reports.
- C. **Overall Management System Reporting:** The reporting package shall provide historical records for a minimum of 1,000 selected variables to generate the following data to meet system reporting requirements.
1. Collect process data and make available historical information for a minimum of 40 pages of logs, each page containing up to 10 log points described by individual column headers.
  2. Automatically print any combination of up to 20 separate periodic reports consisting of selected pages of the 40 pages noted above. The periodic reports shall include: an End-of-Day Report, printed at end of the third shift each day, an End-of-Week Report, printed at the end of the third shift on the last day of the week, and an End-of-Month Report, printed at end of the third shift on the last day of the month. Although the Daily, Weekly and Monthly Reports shall be printed at the same time, they are different reports and may be structured to satisfy different needs. Each of these five reports shall have its own selection of pages and historical data, chosen independently of the remaining reports.
- D. **Configuration of Reports:** It is the sole responsibility of the CONTRACTOR to configure the workstations and to develop, design, engineer, configure and test all of the reports. All of this work shall take into account the specific needs of the end user. In order to facilitate this work the CONTRACTOR shall conduct the following meetings with user groups:
1. **Report Meeting No. 1:** The CONTRACTOR shall chair and develop an agenda 3 weeks in advance for a meeting which shall address the basic criteria to be adhered to in the configuration and development of the reports. At this meeting, which shall be attended by plant managerial personnel, the CONTRACTOR shall distribute sample formats for illustration purposes. As a minimum, this meeting shall address the following issues:
    - a. All In-plant and remote site data and conventions for identifying tag names and descriptors.

- b. Designation of groups within each plant area along with tag names and descriptors.
  - c. The assignment of inputs to specific categories.
  - d. Organization of the systems universal report categories.
  - e. An itemization of the type of report available.
  - f. Definition of terms to be used on the reports.
  - g. Definition of all report commands that enable the operator to move within the report editor.
  - h. The utilization of cursor movement commands which enable the operator to move within a report.
  - i. Definition of data input commands that enable the operator to enter numeric values into the system.
  - j. A review of report generation procedures.
2. Subsequent to the adjournment of the Report Meeting No. 1 the CONTRACTOR shall prepare and formalize a document titled "REPORT CRITERIA" which shall contain detailed meeting minutes and a definition of all report guidelines to be adhered to. This report shall be supplemented by report examples. The report shall be submitted within 30 calendar days of the meeting's adjournment.
  3. Report Meeting No. 2 - Subsequent to the finalization of the overall report format criteria, the CONTRACTOR shall develop report packages for review. At this meeting the CONTRACTOR shall submit 5 copies including:
    - a. A review of the report package developed for the process area(s) for content and completeness.
    - b. A review of all data fields for process information.
    - c. A review of all required input commands associated with the report access and control manipulation.

- END OF SECTION -



NOTES:

1. (★) APPROXIMATE LOCATIONS OF EXISTING BUS STOPS. CONTRACTORS SHALL VERIFY BUS STOP LOCATIONS WITH TRANSIT AUTHORITY.
2. CONTRACTOR SHALL PROVIDE ACCESS TO BUS STOPS AT ALL TIMES OR PROVIDE TEMPORARY BUS STOP LOCATION AND SIGNAGE.

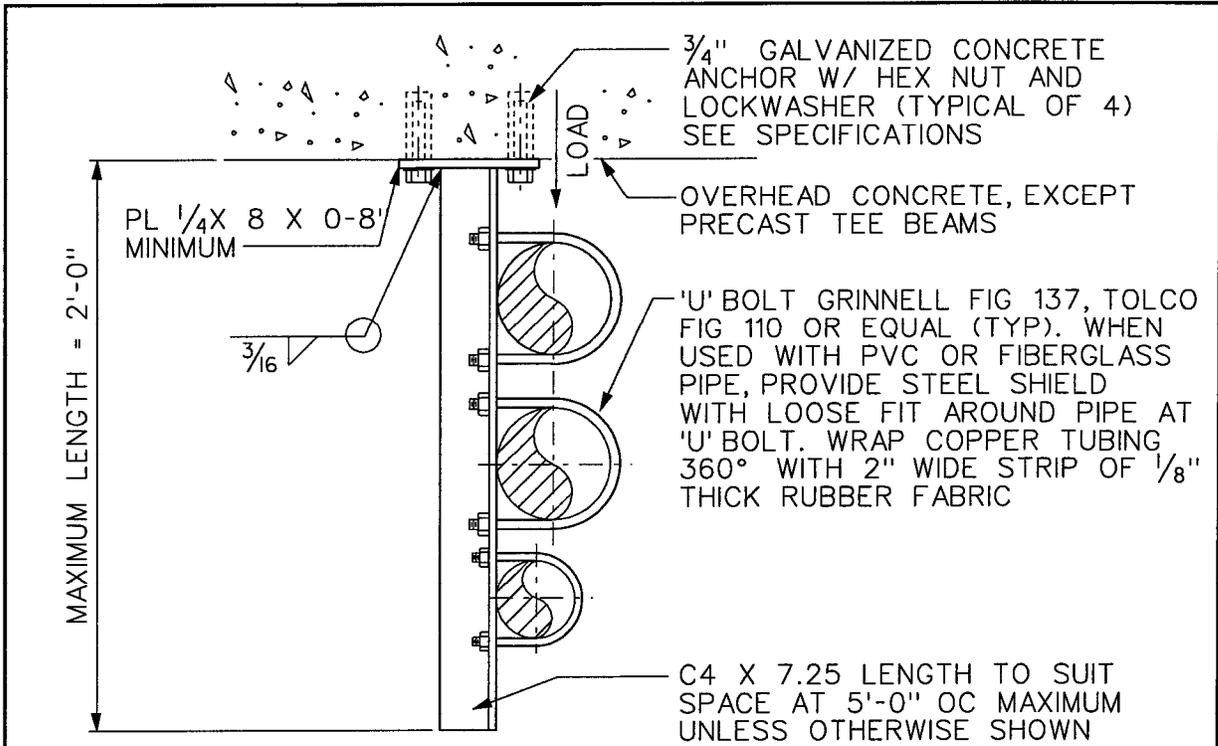


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LOS OSOS WASTEWATER PROJECT  
BUS STOP LOCATIONS

FIGURE

x



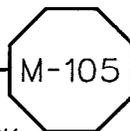
NOTES:

1. FOR ADDITIONAL REQUIREMENTS SEE SPECIFICATION SECTION 'PIPE SUPPORTS'.
2. THIS PIPE SUPPORT IS LIMITED TO PIPE SIZES 1/2" THRU 12" DIAMETER.
3. GALVANIZE ALL PARTS AFTER FABRICATION.

## OVERHEAD PIPE SUPPORT

(FOR PIPE 12" DIAMETER AND SMALLER)

REV 072501



THIS DETAIL FOR CONCRETE A MINIMUM OF 10" THICK.



LOS OSOS WASTEWATER PROJECT

DETAIL M-105

ADDENDUM 2 - APRIL 2, 2004

FIGURE

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