EAST BAY MUNICIPAL UTILITY DISTRICT

REQUEST FOR PROPOSAL (RFP)

for Mokelumne River Hatchery Electrical Equipment Retrofit MOK26-01

ADDENDA

Prospective bidders are responsible for reviewing any published addenda regarding this bid at ebmud.com/business-center

CONTACT

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RESPONSE DUE

June 30, 2026
4:00 p.m. PST

SUBMIT ELECTRONICALLY TO*

I-Pei Hsiu, EBMUD
ipei.hsiu@ebmud.com
**Hardcopy proposals will not be accepted*

EAST BAY MUNICIPAL UTILITY DISTRICT

RFP for Mokelumne River Hatchery Electrical Equipment Retrofit

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I. STATEMENT OF WORK

A. SCOPE

The purpose of these specifications, terms, and conditions is to define the electrical equipment retrofit project at the Mokelumne River Fish Hatchery. The project includes replacing the existing 125 kW emergency generator and switchboard/control panel assembly with new electrical equipment capable of serving all facility loads. All work, products, and deliverables shall be completed in accordance with the project drawings, drawing notes, and specifications included in this RFP.

The existing 125 kW emergency generator, switchboard/control panel assembly, and associated concrete pad shall be demolished and legally disposed of off site. The work includes site preparation, grading, excavation, and construction of a new reinforced concrete pad. Existing underground conduit stub-outs serving the switchboard and control panel shall be retained and protected during demolition and construction for reuse with the new equipment installation.

The existing generator will be replaced with a new 500 kW emergency generator and 250 kW load bank, which will be furnished by the District under a separate contract. The Contractor shall be responsible for receiving, unloading, installing, testing, and commissioning the District-furnished equipment.

The Contractor shall furnish, deliver, install, test, and commission a new switchboard, automatic transfer switch (ATS), and control panel in accordance with the project specifications, in conjunction with the installation of the new 500kW generator.

The new switchboard, ATS, and control panel will also be integrated with operation of an existing 250 kW emergency generator for the York chillers, which will remain as part of the emergency electrical system and provide redundancy for the new 500 kW generator.

The Contractor shall also furnish and install all cables, conduits, fittings, appurtenances, pull boxes, switches, lighting, and other materials necessary to complete the emergency electrical system retrofit. The work includes trenching, fence removal and restoration, material handling and hauling, and all other construction activities required to provide a complete, operational, and fully functional system in accordance with the contract documents.

B. PROPOSER QUALIFICATIONS

1. Proposer Minimum Qualifications

a. The Bidder, the Bidder's principal, or the Bidder's staff shall have been regularly engaged for a minimum of ten (10) years in the construction,

installation, demolition, and commissioning of electrical power systems of similar type, size, and complexity to those specified in this RFP.

b. The Bidder shall possess all permits, licenses, and professional credentials necessary to supply the products and perform services as specified under this RFP.

c. The Bidder shall demonstrate the capability to provide technical support, coordination of submittals, field installation, startup, testing, and commissioning associated with the Work and the District-furnished equipment.

d. The Bidder shall demonstrate experience constructing and installing equipment of similar size and complexity by submitting at least three (3) references for comparable projects completed within the past ten (10) years. Project description for the references shall be outlined.

e. The District reserves the right to request additional information to verify the Bidder's qualifications and ability to successfully provide and install the equipment specified in this RFP.

f. If awarded, the Contractor shall notify the District in writing within five (5) days if any required certification lapses or expires during the term of the contract. Failure to notify the District within the specified time may constitute grounds for termination of the contract.

C. SPECIFIC REQUIREMENTS

1. **Project Location**

a. Mokelumne River Fish Hatchery: 25800 North McIntire Rd, Clements, CA 95227

2. **Schedule Requirements**

a. Except for potholing and preconstruction investigation activities, all demolition, construction, equipment installation, testing, and commissioning work at the Mokelumne River Fish Hatchery shall be performed between June 1, 2027, and August 30, 2027, to avoid impacts to critical hatchery operations. The new emergency generator system shall be fully installed, tested, commissioned, and operational no later than August 31, 2027, to support hatchery operations beginning September 1, 2027.

b. All Contractor-furnished equipment shall be delivered to the site no later than June 10, 2027.

c. The Contractor shall update the schedule on a weekly basis and identify any activities that may impact the critical path or project completion date.

3. **Summary of Contractor Responsibilities**

a. Perform all work in accordance with the Contract Drawings, Specifications, and other Contract Documents

b. Furnish all labor, supervision, materials, equipment, tools, transportation, and services necessary to complete the Work.

c. Coordinate all trades, suppliers, subcontractors, utilities, and regulatory agencies.

d. Verify all existing field conditions.

e. Protect ongoing hatchery operations throughout construction.

f. Maintain project schedule and budget compliance.

g. Provide complete project documentation, record drawings, operation and maintenance manuals, warranties, startup reports, testing reports, and commissioning documentation.

h. Deliver a complete, operational, and fully functional emergency power system in accordance with the Contract Documents.

4. **Contractor Responsibilities for District-Furnished Equipment**

a. Under a separate contract, the District has procured:

(1) Caterpillar 500 kW Tier 4 Final, 480/277V emergency diesel generator Model C18 T4F

(2) Avtron 250kW Roof Mounted Load Bank with Auto Load Control and Control Power Transformer

b. The Contractor shall:

(1) Receive, unload, inspect, and protect the equipment.

(2) Install, connect, test, commission, and integrate the equipment.

(3) Assume full responsibility for proper installation, integration and performance of District-furnished equipment once received on site.

5. **Contractor-Furnished Equipment**

a. Provide the following equipment as a fully assembled lineup, arrangement as shown in the Contract Drawings:

(1) Switchboard – SWBD-01 (per Contract Drawings) including the following components:

- Eaton UL 891 Pow-R-Line Xpert switchboard, or approved equal
- Front access, front and rear aligned
- Type 3R (non-walk-in) enclosure with flat roof
- 480Y/277V, 3-phase, 4-wire
- Minimum main bus rating: 1200A
- Silver-plated copper bus
- Minimum interrupting rating: 65 kA RMS symmetrical
- Bus bracing rating: 65 kA

(2) Automatic Transfer Switch – ATS-01 (per Contract Drawings) including the following components:

- ASCO 300 Series UL 1008 listed Automatic Transfer Switch, or approved equal
- Rated 480V, 3-phase, 4-wire
- 1000 A continuous rating
- Minimum interrupting rating: 65 kA RMS symmetrical
- Integral controls with dead-front construction
- NEMA 3R enclosure
- Controller with adjustable transfer delays, built-in test functions, and remote status/alarm contacts
- Factory tested

(3) Control Panel – CPNL-01 (per Contract Drawings) including the following components:

- PLC
- Ethernet switch
- Fans and thermostat
- Receptacle
- Power supplies
- Air conditioning unit
- Control relays
- Terminal blocks / DIN rail / wireway
- Other supporting hardware as required

(4) All additional necessary cables, hardware, pull boxes, fiber optic cables, lights, appurtenances, etc. required for a complete and operational installation.

b. The switchboard, ATS, and control panel shall be delivered as a fully assembled, factory-tested lineup, with all internal wiring, control wiring, and interconnections completed.

c. The Contractor-furnished switchboard, ATS, and control panel shall be fully compatible and suitable for integration into the overall emergency power system shown on the Contract Drawings and Specifications. The new emergency system shall be fully integrated with the existing 250 kW diesel-powered generator, including all required controls, interlocks, communications, and operational sequencing.

d. The Contractor shall ensure that the equipment provided is fully compatible with the specified Caterpillar Tier 4 Final 500 kW generator and Avtron 250 kW load bank and capable of proper operation within the complete emergency power system without requiring modification to the generator equipment.

e. Electrical materials shall be UL listed and shall bear a UL label where a UL listing has been established for the materials or devices in question.

f. Where no UL product category exists, materials shall comply with applicable IEEE standards, NEMA standards, and PG&E standards.

6. **Procurement and Delivery Requirements**

a. The Contractor shall coordinate with manufacturers and suppliers of all Contractor-furnished equipment and materials to determine lead times, including preparation and review of shop drawings, product data, and other submittals.

b. The Contractor shall submit a detailed procurement schedule demonstrating compliance with required delivery dates.

c. The Contractor is solely responsible for ensuring that all Contractor-furnished equipment is manufactured and delivered in accordance with the project schedule, regardless of manufacturer lead times.

d. The Contractor shall implement an early procurement strategy and may submit phased or partial submittals for long-lead equipment to expedite review and fabrication.

7. **Contractor Responsibilities Prior to Construction Start**

a. The Contractor shall complete the following:

(1) Schedule and Submittals

(a) Within 14 days of Notice to Proceed, prepare and submit a detailed Critical Path Method (CPM) construction schedule that includes:

i. Submittal preparation and review durations

ii. Procurement and fabrication durations for all equipment

iii. Delivery milestones

iv. Pre-construction activities

v. Demolition and removal activities

vi. Foundation pad construction, curing, and readiness for equipment installation

vii. Installation sequencing

viii. Utility outages, cutovers, and tie-in activities

ix. Testing and commissioning activities

x. Final completion milestone

(b) The Contractor shall clearly identify critical submittals requiring expedited review.

(2) Equipment and Coordination

(a) Review all District-furnished and Contractor-furnished equipment for familiarity, coordination, staging, and installation requirements.

(b) Coordinate with the District for any work requiring interruption of existing electrical service and perform such work only within approved outage windows.

(3) Site Investigation and Verification

(a) Complete all potholing, utility verification, and site investigations.

(b) Verify existing equipment dimensions, conduit routing, feeder routing, pad conditions, and all other field conditions affecting the Work.

(c) The Contractor shall verify all existing field conditions. Contract Drawings are diagrammatic and shall not relieve the Contractor of responsibility for accurate field verification.

(4) Planning and Submittals for Construction

(a) Submit demolition, outage, and cutover plans.

(b) Submit concrete foundation pad shop drawings, mix design data, and installation details.

(5) Construction Readiness

(a) Ensure all equipment, materials, permits, demolition planning, and pre-construction coordination are complete prior to May 2027.

(b) Ensure the project site is fully prepared to begin work with no outstanding dependencies.

(6) Agency Coordination

(a) Coordinate work with PG&E as specified on Contract Drawings.

(b) Conduct a pre-construction coordination meeting with PG&E no later than April 2027.

(c) The District-furnished 500 kW generator has been informally approved by the San Joaquin Valley Air Pollution Control District (SJVAPCD). Contractor will coordinate with SJVAPCD for final commissioning, inspection, and authorization to operate.

(d) All construction permitting and coordination shall be completed in advance of May 2027.

(e) California Department of Fish and Wildlife (CDFW) operates the facility and Contractor shall ensure that site activities do not impede hatchery operations.

8. **Demolition and Removals**

a. The demolition work shall be performed in coordination with PG&E and the District and shall be scheduled in accordance with the PG&E pre-construction meeting and de-energization requirements.

b. The Contractor shall demolish, remove, and legally dispose of the existing 125 kW generator, switchboard, switches, and associated electrical equipment, existing foundation elements as required, and all ancillary materials necessary to accommodate installation of the new system. Refer to the Contract Drawing demolition plans.

c. Demolition shall be performed in a controlled manner to minimize impacts to ongoing hatchery operations and existing facilities.

d. The Contractor shall protect all equipment, utilities, structures, and systems designated to remain.

e. The Contractor shall be responsible for verifying that demolition activities do not adversely impact existing systems required to remain in service.

f. The Contractor shall coordinate all required outages, temporary power arrangements, and cutovers with the District prior to demolition.

g. The Contractor shall coordinate demolition sequencing with foundation construction and equipment installation to avoid delays to the critical path.

h. The Contractor shall promptly remove demolished materials from the site unless otherwise directed by the District.

9. **Foundation Pad and Associated Civil Work**

a. The Contractor shall furnish and install a new concrete foundation pad and all associated excavation, formwork, reinforcing steel, anchor bolts, embeds, conduit stub-ups, grounding provisions, housekeeping pads, and related civil and structural work required for installation of the new equipment.

b. The Contractor shall verify all equipment support requirements, dimensions, and anchor bolt locations prior to construction.

c. Existing stub outs of underground conduits at the 125 kW generator/control panel site shall be protected and be reused for the new switchboard/ATS/control panel assembly if possible.

d. The Contractor shall sequence demolition and foundation construction to support installation of the new equipment within the allowed construction window.

e. Contractor shall coordinate with District to obtain approval of staked trench locations prior to commencing any trench work.

f. Concrete work shall be scheduled to allow sufficient curing time so as not to delay equipment installation, startup, or final completion.

g. The Contractor shall be responsible for concrete curing, protection, and verification that the foundation pad has achieved the required strength prior to equipment installation.

10. **Commissioning and Startup**

a. The Contractor shall be responsible for complete system commissioning and startup.

b. A detailed commissioning plan shall be submitted to the District no later than forty-five (45) days prior to startup and shall include:

(1) Sequence of operations

(2) Equipment startup procedures

(3) Functional performance testing

(4) Load bank testing of generator

(5) Automatic Transfer Switch (ATS) testing

(6) Integration testing of new 500kW generator and ATS with existing 250 kW generator

(7) Cutover and transition procedures from existing equipment to new equipment

(8) Verification of all alarms, controls, interlocks, and remote signals

(9) Testing following completion of demolition, replacement, and reconnection work

c. The Contractor shall coordinate all commissioning activities with the District and applicable regulatory agencies.

d. Final acceptance shall be contingent upon successful completion of all commissioning activities.

11. **Controls and System Integration**

a. The Contractor shall be responsible for all controls programming, system integration, and coordination between new and existing equipment.

(1) The District shall conduct programming required for the fiber connection between the new control panel and the existing valve house control panel, with Contractor assistance as needed. This shall include development of all data mapping, configuration of data transfer between the panels, and verification that all required information is properly communicated and displayed.

(2) Minimum Requirements

(a) Integration with existing generator systems

(b) Coordination of automatic transfer sequences

(c) Transferring data from loads to new control panel with programming completed using ladder logic

12. **Bid Submittals and Work Requirements**

The Contractor shall be responsible for work items described in each Bid Item.

(a) Bid Item 1 – Mobilization/Demobilization

(i) Mobilization and demobilization shall not exceed more than 5% of the entire project bid price.

(ii) The bid item includes but is not limited to the following:

1) Obtaining and paying for all bonds, insurance, and permits.
2) Moving on to the site all the Contractor's equipment.
3) Installing temporary facilities as may be required by the Contractor or for public and District staff safety.
4) Providing on-site sanitary facilities and potable water facilities as specified per Cal-OSHA.
5) Arranging for and erection of Contractor's work and storage yard as may be required by the Contractor.
6) Posting all OSHA required notices and execution of safety programs per Cal-OSHA.

7) Posting all required labor and EEOE notices.
8) Submittal and District Acceptance of the Construction Schedule to meet the District's electrical shutdown dates and project completion date.
9) Scheduling and attending project meetings for weekly construction updates, and preparation of agendas and minutes.
10) Maintaining record drawings and providing a clean marked set of as-built record drawings at Project completion.
11) Final cleanup of site and demobilization.

(b) Bid Item 2 – Electrical and Concrete Demolition
a. This bid item includes, but is not limited to the following:

1) Labor, materials, equipment, and incidentals needed to disconnect, remove, and properly dispose of existing equipment and appurtenances, and all site preparation work necessary to receive the new constructed facilities and equipment.
2) Transportation of construction debris and excess materials for disposal to a permitted site along with any tipping fees.
3) The protection of existing facilities to remain and all potholing necessary to locate existing utilities as shown on the plans and/or marked in the field.
4) Demolition, removal, and proper disposal of 125kW diesel engine generator, enclosure, concrete foundation pad, and all fluids.
5) Removal and proper disposal of existing switchboard, lighting panel (LP2), 30kVA step-down transformer, distribution panel (DP1), manual transfer switch (MTSS), automatic transfer switch (ATS-03), and manual transfer switch (MTSH).
6) Disconnection with removal and proper disposal of all cabling from existing 125kW generator and ATS and MTS units.
7) Disconnection, removal, and proper disposal of all above ground conduits associated with removed generator and associated electrical equipment cabling, which is to include capping of all abandoned underground conduit segments where necessary. **Note: below ground conduit segments are to be left with 3/16" poly pull rope installed.**
8) All necessary excavation to receive new conduits from new generator stub up locations to new switchboard, 120/240V panel, and control panel. Work to include backfill and compaction after duct installation.
9) Copy of any hazardous materials manifests.

(c) Bid Item 3 – Exterior Site Improvements for Generator and Electrical Equipment Infrastructure Installation
a. This bid item includes, but is not limited to the following:
1) All work associated with stormwater pollution prevention and erosion control, including but not limited to acquiring permits, preparing plans, installation,

maintenance, and removal of temporary prevention and control facilities.

2) All necessary clearing, grubbing, excavation, fill, grading and compaction necessary to receive new generator and electrical equipment foundation pad.

(d) Bid Item 4 – Generator and Electrical Equipment Foundation Pad

a. This bid item includes, but is not limited to the following:

1) All labor, materials, tools, equipment, and incidentals necessary for the construction of the concrete foundation in accordance with the plans and specifications.
2) Work shall consist of excavation of earthwork in trenches for foundation; construction of reinforced concrete foundation; installation of embedded anchors; installation of ground grid; refill of earth around foundation; and installation of ancillary equipment not identified as separate bid items.

(e) Bid Item 5 – Furnish Switchboard/ATS/Control Panel Assembly.

a. Includes procurement, fabrication, assembly, factory testing, delivery, and warranty of:
   1) Switchboard SWBD-01
   2) Automatic Transfer Switch ATS-01
   3) Control Panel CPNL-01
b. Includes procurement, fabrication, assembly, delivery, and warranty of all additional necessary cables, hardware, pull boxes, fiber optic cables, lights, appurtenances, etc. required for a complete and operational installation.

(f) Bid Item 6 – Install, Connect, Test, and Commission Contractor-furnished Switchboard, Automatic Transfer Switch, and Control Panel, and Diesel Engine Generator with Load Bank (District-furnished

a. This bid item includes, but is not limited to the following:

1) Installation, connection, testing, and commissioning of the Contractor-furnished Switchboard, Automatic Transfer Switch, and Control Panel, and District-Furnished emergency generator, including all anchors and supports; all connections to conduit and cable systems.
2) Generator testing and commissioning:
   a) Connect District-Furnished resistive roof-mounted load bank for 50%, 4-hour load test field-testing.
   b) Furnish factory-commissioning technician to oversee commissioning and field-testing.
   c) Furnish all fuel and fluids for field testing.
   d) Coordinate generator commissioning testing with the new and existing automatic transfer switches (ATS-01 and ATS-02) and existing 250kW generator.

e) Coordinate with local air board for generator commissioning.
f) Continued full-load testing and adjustments necessary to meet the operational performance specifications as further defined in the contract documents.

3) Switchboard and control panel testing and commissioning:
a) Install, connect, test, and commission new electrical equipment.
b) Testing of new CTs, PTs, and power meter
c) Verification of all Programmable Logic Controller Input/Output (PLC I/O) points and SCADA tags for accuracy, including scaling, ranges, and alarm functionality from field to SCADA.
d) End-to-end testing of all control and monitoring signals to confirm proper operation and communication between field devices, PLC, and SCADA.
e) Provide complete documentation, including PLC program files, I/O lists, and SCADA poll table with organized, contiguous tag structure.

(g) Bid Item 7 – Furnish and Install New Underground Conduit Segments from District-furnished New Generator to Contractor-furnished New Electrical Equipment
a. This bid item includes, but is not limited to the following:

2) Furnish, install, and terminate conduits from the new generator to the new electrical equipment (Switchboard, ATS, and Control Panel), and from the new electrical equipment by intercepting and extending existing power conduits to existing loads. Includes trench excavation, backfill, compaction, and disposing of surplus and objectionable materials.
3) Includes supply and installation of all conduit fittings, terminations, couplers, and junction/pull boxes.
4) Furnish, install, terminate, and test all new power, control, instrumentation, and communication cabling, necessary to complete the system.

(h) Bid Item 8 – Furnish and Install New Conduit Segments from New Electrical Equipment to Existing Facility Loads
a) This bid item includes, but is not limited to the following:

1) Furnish, install, and terminate control conduits from new control panel to UV Control Panel, York Chiller Control Panel, ATS-02, Emergency Generator EGEN-02, Filtration Control Panel, and Valve House APC cabinet. Includes trench excavation, backfill, compaction, and disposing of surplus and objectionable materials.
2) Includes supply and installation of all conduit fittings, terminations, couplers, and junction/pull boxes.
3) Furnish, install, terminate, and test all new power, control, instrumentation, and communication cabling, necessary to complete the system.
4) Ensure coordination of trench excavation depth with District's Lower Mokelumne River Project Surveillance Improvements Program.

D. DELIVERABLES/REPORTS

1. Both schematic and terminal wiring diagrams, as well as interconnection wiring of the engine and generator.

2. Scaled drawing showing all details of the engine generator, support base and mounting, fuel tank, silencer, circuit breaker, load bank, controller, battery, charger, and control panel.

3. Product data such as prototype test certification and specification sheet identifying all standard and optional accessories supplied. Schematic wiring diagram, dimensional plan and elevation drawing, and an interconnection diagram that clearly identifies by terminal number each required interconnection between the generator set and the transfer switch.

4. Certificate verifying that the generator set is listed to UL2200 or has been submitted to an independent third-party certification process for compliance as installed, including verification of air board emissions within the San Joaquin Air Quality Control Board jurisdiction.

5. Factory test and evaluation report, manufacturer's installation and operating instructions and report.

6. Source quality control documentation and any required field or site quality control report.

7. Supplier product manuals, warranties and guarantees.

II. CALENDAR OF EVENTS

EVENT	DATE/LOCATION	
RFP Issued	June 8, 2026	
Site Walk	June 18, 2026 at 10:00 AM	at: Mokelumne River Fish Hatchery. 25800 N McIntire Rd., Clements
Response Due	June 30, 2026 by 4:00 p.m.	
Anticipated Contract Start Date	August 12, 2026	

Note: All dates are subject to change **by District**.

Proposers are responsible for reviewing **https://www.ebmud.com/business-center/requests-proposal-rfps/** for any published addenda. Hard copies of addenda will not be mailed out.

A. SITE WALK

Site Walk will be held to:

1. Allow the District to discuss the scope of the project.

2. Provide Proposers an opportunity to view the project site, etc. necessary to respond to this RFP.

3. Provide an opportunity for Proposers to ask specific questions about the project and request RFP clarifications.

4. Provide the District with an opportunity to receive feedback regarding the project and RFP.

All questions deemed to be pertinent by the District will be addressed in Addenda following the Site Walk.

III. DISTRICT PROCEDURES, TERMS, AND CONDITIONS

A. RFP ACCEPTANCE AND AWARD

1. RFP responses will be evaluated by the Selection Committee and will be scored and ranked in accordance with the RFP section entitled "Evaluation Criteria/Selection Committee."

2. The Selection Committee will recommend award to the Proposer who, in its opinion, has submitted the RFP response that best serves the overall interests of the District. Award may not necessarily be made to the Proposer with the lowest overall cost.

3. The District reserves the right to award to a single or to multiple General or Professional Service Providers, dependent upon what is in the best interest of the District.

4. The District has the right to decline to award this contract or any part of it for any reason.

5. Any specifications, terms, or conditions issued by the District, or those included in the Proposer's submission, in relation to this RFP, may be incorporated into any purchase order or contract that may be awarded as a result of this RFP.

6. Award of contract. The District reserves the right to reject any or all proposals, to accept one part of a proposal and reject the other, unless the proposer stipulates to the contrary, and to waive minor technical defects and administrative errors, as the interest of the District may require. Award will be made, or proposals rejected by the District as soon as possible after proposals have been opened.

B. EVALUATION CRITERIA/SELECTION COMMITTEE

All proposals will be evaluated by a Selection Committee. The Selection Committee may be composed of District staff and other parties that have expertise or experience in this type of procurement. The Selection Committee will select a Proposer in accordance with the evaluation criteria set forth in this RFP. The evaluation of the RFP responses shall be within the sole judgment and discretion of the Selection Committee.

The Selection Committee will evaluate each RFP response meeting the qualification requirements set forth in this RFP. Proposer should bear in mind that any RFP response that is unrealistic in terms of the technical or schedule commitments, or unrealistically high or low in cost, will be deemed reflective of an inherent lack of technical competence or indicative of a failure to comprehend the complexity and risk of the District's requirements as set forth in this RFP.

RFP responses will be evaluated and scored according to the Evaluation Criteria below and scored according to a zero to five-point scale. The scores for all Evaluation Criteria will then be added to arrive at a weighted score for each RFP response. An RFP response with a high weighted total will be ranked higher than one with a lesser-weighted total.

The Evaluation Criteria are as follows:

	Evaluation Criteria
A.	**Cost: 25 pts. Possible** The points for Cost will be computed by dividing the amount of the lowest responsive RFP response received by each Proposer's total proposed cost. While not reflected in the Cost evaluation points, an evaluation may also be made of: 1. Reasonableness (i.e., does the proposed pricing accurately reflect the Proposer's effort to meet requirements and objectives?); 2. Realism (i.e., is the proposed cost appropriate to the nature of the products and services to be provided?); and 3. Affordability (i.e., the ability of the District to finance this project). Consideration of price in terms of overall affordability may be controlling in circumstances where two or more RFP responses are otherwise judged to be equal, or when a superior RFP response is at a price that the District cannot afford.

B.	**Implementation Plan and Schedule: 25 pts. possible** An evaluation will be made of the likelihood that the Proposer's implementation plan and schedule will meet the District's schedule. Additional credit will be given for the identification and planning for mitigation of schedule risks which the Proposer believes may adversely affect any portion of the District's schedule.
C.	**Relevant Experience: 20 pts. possible** RFP responses will be evaluated against the RFP specifications and the questions below: 1. Do the individuals assigned to the project have experience on similar projects? 2. Are résumés complete and do they demonstrate backgrounds that would be desirable for individuals engaged in the work the project requires? How extensive is the applicable education and experience of the personnel designated to work on the project?
D.	**Understanding of the Project: 25 pts. possible** RFP responses will be evaluated against the RFP specifications and the questions below: 3. Has the Proposer demonstrated a thorough understanding of the purpose and scope of the project? 4. How well has the Proposer identified pertinent issues and potential problems related to the project? 5. Has the Proposer demonstrated that it understands the deliverables the District expects it to provide? 6. Has the Proposer demonstrated that it understands the District's time schedule and can meet it?
E.	**Contract Equity Program: 5 pts. possible** Proposer shall be eligible for SBE or DVBE preference points if they are a certified small business entity, as described in the guidelines contained in Exhibit A-Contract Equity Program, and they check the appropriate box, requesting preference, in Exhibit A-Proposer Information and Acceptance. Qualified DVBEs and/or SBEs will receive an additional 5 points to their total score.

C. PRICING

1. Prices quoted shall be firm for the first six (6) months of any contract that may be awarded pursuant to this RFP.

2. All prices quoted shall be in United States dollars.

3. Price quotes shall include any and all payment incentives available to the District.

4. Proposers are advised that in the evaluation of cost, if applicable, it will be assumed that the unit price quoted is correct in the case of a discrepancy between the unit price and extended price.

5. Prevailing Wages:

   All Contractors proposing on a public works project and all Subcontractors of any tier shall be registered with the State Department of Industrial Relations pursuant to Section 1725.5 of the Labor Code.

   The Contractor shall post a copy of the general prevailing rate of per diem wages at the jobsite pursuant to Section 1773.2 of the Labor Code of the State of California.

   Pursuant to the provisions of Division 2, Part 7, Chapter 1, Article 2, and any amendments thereof of the Labor Code of the State of California, the Contractor and any Subcontractor shall pay not less than the specified prevailing rate of wages to all workers employed in the execution of the contract.

   The Contractor shall, as a penalty to the State or the District, forfeit Twenty-Five ($25.00) Dollars for each calendar day, or portion thereof, for each worker paid less than the stipulated prevailing rates for any work or craft in which such worker is employed under the contract by the Contractor or by any Subcontractor. The difference between such stipulated prevailing wage rates and the amount paid to such worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor. The Contractor shall comply with the provisions of Section 1776 of the Labor Code of the State of California. For all classes of work not specified herein, the minimum wage shall be that specified for general laborer.

   The specified wage rates are minimum rates only and the District will not consider and shall not be liable for any claims for additional compensation made by the Contractor because of payment by Contractor of any wage rate in excess of the general prevailing rates. All disputes in regard to the payment of wages in excess of those specified herein shall be adjusted by the Contractor at his own expense.

   The holidays upon which such rates shall be paid shall be all holidays recognized in the collective bargaining agreement applicable to the particular craft, classification, or type of worker employed on the project.

D. NOTICE OF INTENT TO AWARD AND PROTESTS

At the conclusion of the RFP response evaluation process, all entities who submitted a proposal package will be notified in writing by e-mail or USPS mail with the name of the Proposer being recommended for contract award. The document providing this notification is the Notice of Intent to Award.

Negotiations for a Consulting Services Agreement with a "not to exceed" contract price (for time and expenses) will be scheduled shortly after the Notice of Intent to Award. If an Agreement cannot be achieved, the District will proceed to negotiate with the next highest ranked Proposer.

Protests must be in writing and must be received no later than seven (7) workdays after the District issues the Notice of Intent to Award. The District will reject the protest as untimely if it is received after this specified time frame. Protests will be accepted from proposers or potential proposers only.

If the protest is mailed and not received by the District, the protesting party bears the burden of proof to submit evidence (e.g., certified mail receipt) that the protest was sent in a timely manner so that it would be received by the District within the RFP protest period.

Proposal protests must contain a detailed and complete written statement describing the reason(s) for protest. The protest must include the name and/or number of the proposal, the name of the firm protesting, and include a name, telephone number, email address and physical address of the protester. If a firm is representing the protester, they shall include their contact information in addition to that of the protesting firm.

Protests must be mailed, hand delivered, or emailed to the Manager of Purchasing, Mailstop 102, East Bay Municipal Utility District, 1010 Franklin St., Oakland, CA 94607 or P.O. Box 24055, Oakland, California 94623. Facsimile and electronic mail protests must be followed by a mailed or hand delivered identical copy of the protest and must arrive within the seven workday time limit. Any proposal protest filed with any other District office shall be forwarded immediately to the Manager of Purchasing.

In the event that the protest is denied, the protester can appeal the determination to the requesting organization's Department Director. The appeal must be submitted to the Department Director no later than five workdays from the date which the protest determination was transmitted by the District, to the protesting party. The appeal shall focus on the points raised in the original protest, and no new points shall be raised in the appeal.

Such an appeal must be made in writing and must include all grounds for the appeal and copies of the original protest and the District's response. The proposal protester must also send the Purchasing Division a copy of all materials sent to the Department Director.

The Department Director will make a determination of the appeal and respond to the protester by certified mail in a timely manner. If the appeal is denied, the letter will include the date, time, and location of the Board of Directors meeting at which staff will make a recommendation for award and inform the protester it may request to address the Board of Directors at that meeting.

The District may transmit copies of the protest and any attached documentation to all other parties who may be affected by the outcome of the protest. The decision of the District as to the validity of any protest is final. This District's final decision will be transmitted to all affected parties in a timely manner.

E. WARRANTY

1. Proposer expressly warrants that all goods and services to be furnished pursuant to any contract awarded it arising from the Proposal will conform to the descriptions and specifications contained herein and in supplier catalogs, product brochures, and other representations, depictions, or models, and will be free from defects, of merchantable quality, good material, and workmanship. Proposer expressly warrants that all goods and services to be furnished pursuant to such award will be fit and sufficient for the purpose(s) intended. This warranty shall survive any inspections, delivery, acceptance, payment, or contract termination for any reason, by the District. Proposer warrants that all work and services furnished hereunder shall be guaranteed for a period of 2 years from the date of acceptance by the District.

F. INVOICING

1. Following the Districts acceptance of product(s) meeting all specified requirements, and/or the complete and satisfactory performance of services, the District will render payment within thirty (30) days of receipt of a correct invoice.

2. The District will notify the General Service Provider of any invoice adjustments required.

3. Invoices shall contain, at a minimum, District purchase order number, invoice number, remit to address, and itemized services description.

4. The District will pay General Service Provider in an amount not to exceed the negotiated amount(s) which will be referenced in the agreement signed by both parties.

G. LIQUIDATED DAMAGES

1. A deduction for liquidated damages of $100 per day will be assessed for not meeting District-specified performance requirements as prescribed in this RFP after August 30, 2027.

2. It being impracticable or extremely difficult to fix the actual damage, the amount set forth above is hereby agreed upon as liquidated damages and will be deducted from any money due under the agreement arising from this RFP.

3. In the event performance and/or deliverables have been deemed unsatisfactory, the District reserves the right to withhold future payments until the performance and/or deliverables are deemed satisfactory.

H. BONDS

1. The successful Proposer will be required to post and maintain a Bidder's bond, Performance bond, and Payment bond for one hundred percent (100%) of the total contract amount with the District. Bonds must be on District forms attached to this RFP as **Exhibit E - Bond Forms**.

IV. RFP RESPONSE SUBMITTAL INSTRUCTIONS AND INFORMATION

A. DISTRICT CONTACTS

All contact during the competitive process is to be through the contact listed on the first page of this RFP. The following persons are to be contacted only for the purposes specified below:

FOR INFORMATION REGARDING TECHNICAL SPECIFICATIONS:
Attn: I-Pei Hsiu, Associate Engineer
EBMUD: Water & Natural Resources Administration
E-Mail: ipei.hsiu@ebmud.com
PHONE: (510) 287-0979
FOR INFORMATION ON THE CONTRACT EQUITY PROGRAM:
Attn: Contract Equity Office
PHONE: (510) 287-0114

AFTER AWARD:
Attn: I-Pei Hsiu, Associate Engineer
EBMUD: Water & Natural Resources Administration

E-Mail: ipei.hsiu@ebmud.com
PHONE: (510) 287-0979

B. SUBMITTAL OF RFP RESPONSE

1. At this time, no hardcopy proposals will be accepted. Upload your RFP response in pdf format and prior to the bid due date/time RFP submittals, in their entirety, shall be emailed to ipei.hsiu@ebmud.com. The District's email has limitations on attachment size. Make sure your response is less than 25 megabytes. If the file exceeds the limit, you will need to send multiple emails. Proposers are solely responsible for ensuring timely delivery of the proposals. The District shall not be responsible for any issues related to transfer of files through email. You may call at (510) 287-0979 to check receipt of the proposal.

2. All costs required for the preparation and submission of an RFP response shall be borne by the Proposer.

3. California Government Code Section 4552: In submitting an RFP response to a public purchasing body, the Proposer offers and agrees that if the RFP response is accepted, it will assign to the purchasing 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, materials, or services by the Proposer for sale to the purchasing body pursuant to the RFP response. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the Proposer.

4. Proposer expressly acknowledges that it is aware that if a false claim is knowingly submitted (as the terms "claim" and "knowingly" are defined in the California False Claims Act, Cal. Gov. Code, §12650 et seq.), the District will be entitled to civil remedies set forth in the California False Claim Act.

5. The RFP response shall remain open to acceptance and is irrevocable for a period of one hundred eighty (180) days, unless otherwise specified in the RFP documents.

6. It is understood that the District reserves the right to reject any or all RFP responses.

7.

C. RESPONSE FORMAT

1. **Proposers shall not modify the existing text for any part of Exhibits A, B, C, D, E, F, G or H or qualify their RFP responses. Proposers shall not submit to the District a re-typed or otherwise re-created version of these documents or any other District-provided document.**

2. RFP responses, in whole or in part, are NOT to be marked confidential or proprietary. The District may refuse to consider any RFP response or part thereof so marked. RFP responses submitted in response to this RFP may be subject to public disclosure. The District shall not be liable in any way for disclosure of any such records.

EXHIBIT A
RFP RESPONSE PACKET
RFP For – Mokelumne River Hatchery Electrical Equipment Retrofit MOK26-01

To: The EAST BAY MUNICIPAL UTILITY District ("District")

From: _____
(Official Name of Proposer)

RFP RESPONSE PACKET GUIDELINES

- **SUBMITTAL SHALL CONTAIN THE FOLLOWING:**
  - **EXHIBIT A – RFP RESPONSE PACKET**
    - **INCLUDING ALL REQUIRED DOCUMENTATION AS DESCRIBED IN "EXHIBIT A-REQUIRED DOCUMENTATION AND SUBMITTALS"**
  - **EXHIBIT D**
    - **Iran Contracting Act Certification**
  - **EXHIBIT E**
    - **Bidders Bond**
  - **EXHIBIT G**
    - **Information technology security information to be excluded from public records act requests**
  - **EXHIBIT H**
    - **Declaration of eligibility to work on public works projects**
    - **Declaration of non-collusion**

- **PROPOSERS THAT DO NOT COMPLY WITH THE REQUIREMENTS, AND/OR SUBMIT AN INCOMPLETE RFP RESPONSE MAY BE SUBJECT TO DISQUALIFICATION AND THEIR RFP RESPONSE REJECTED IN WHOLE.**

- **IF PROPOSERS ARE MAKING ANY CLARIFICATIONS AND/OR AMENDMENTS, OR TAKING EXCEPTION TO ANY PART OF THIS RFP, THESE MUST BE SUBMITTED IN THE EXCEPTIONS, CLARIFICATIONS, AND AMENDMENTS SECTION OF THIS EXHIBIT A – RFP RESPONSE PACKET. THE DISTRICT, AT ITS SOLE DISCRETION, MAY ACCEPT AMENDMENTS/EXCEPTIONS, OR MAY DEEM THEM TO BE UNACCEPTABLE, THEREBY RENDERING THE RFP RESPONSE DISQUALIFIED.**

- **PROPOSERS SHALL NOT MODIFY DISTRICT LANGUAGE IN ANY PART OF THIS RFP OR ITS EXHIBITS, NOR SHALL THEY QUALIFY THEIR RFP RESPONSE BY INSERTING THEIR OWN LANGUAGE OR FALSE CLAIMS IN THEIR RESPONSE. ANY EXCEPTIONS AND CLARIFICATIONS MUST BE PLACED IN THE "EXCEPTIONS/ CLARIFICATIONS" PAGE, NOT BURIED IN THE PROPOSAL ITSELF.**

PROPOSER INFORMATION AND ACCEPTANCE

1. The undersigned declares that all RFP documents, including, without limitation, the RFP, Addenda, and Exhibits, have been read and that the terms, conditions, certifications, and requirements are agreed to.

2. The undersigned is authorized to offer, and agrees to furnish, the articles and services specified in accordance with the RFP documents.

3. The undersigned acknowledges acceptance of all addenda related to this RFP. List Addenda for this RFP on the line below:

Addendum #	Date

4. The undersigned hereby certifies to the District that all representations, certifications, and statements made by the Proposer, as set forth in this RFP Response Packet and attachments, are true and correct and are made under penalty of perjury pursuant to the laws of California.

5. The undersigned acknowledges that the Proposer is, and will be, in good standing in the State of California, with all the necessary licenses, permits, certifications, approvals, and authorizations necessary to perform all obligations in connection with this RFP and associated RFP documents.

6. It is the responsibility of each Proposer to be familiar with all of the specifications, terms, and conditions and, if applicable, the site condition. By the submission of an RFP response, the Proposer certifies that if awarded a contract it will make no claim against the District based upon ignorance of conditions or misunderstanding of the specifications.

7. Patent indemnity: General or Professional Service Providers who do business with the District shall hold the District, its Directors, officers, agents, and employees harmless from liability of any nature or kind, including cost and expenses, for infringement or use of any patent, copyright or other proprietary right, secret process, patented or unpatented invention, article, or appliance furnished or used in connection with the contract or purchase order.

8. Insurance certificates are not required at the time of submission. However, by signing Exhibit A – RFP Response Packet, the Proposer agrees to meet the minimum insurance requirements stated in the RFP.

This documentation must be provided to the District prior to execution of an agreement by the District and shall include an insurance certificate which meets the minimum insurance requirements, as stated in the RFP.

9. The undersigned acknowledges that RFP responses, in whole or in part, are NOT to be marked confidential or proprietary. The District may refuse to consider any RFP response or part thereof so marked. RFP responses submitted in response to this RFP may be subject to public disclosure. The District shall not be liable in any way for disclosure of any such records.

10. The undersigned Proposer hereby submits this RFP response and binds itself to the District. The RFP, subsequent Addenda, Proposers Response Packet, and any attachments, shall be used to form the basis of a Contract, which once executed shall take precedence.

11. The undersigned acknowledges ***ONE*** of the following (please check only one box)*:

☐ Proposer is not an SBE nor a DVBE and is ineligible for any Proposal preference; **OR**

☐ Proposer is an SBE or DVBE as described in the Contract Equity Program (CEP) and Equal Employment Opportunity (EEO) Guidelines, and has completed the CEP and EEO forms at the hyperlink contained in the CEP and EEO section of this Exhibit A.

*If no box is checked it will be assumed that the Proposer is ineligible for Proposal preference, and none will be given. For additional information on SBE/DVBE Proposal preference please refer to the Contract Equity Program and Equal Employment Opportunity Guidelines at the above referenced hyperlink.

Official Name of Proposer (exactly as it appears on Proposer's corporate seal and invoice): _____

Street Address Line 1: _____

Street Address Line 2: _____

City: _____ State: _____ Zip Code: _____

Webpage: _____

Type of Entity / Organizational Structure (check one):

☐ Corporation ☐ Joint Venture

☐ Limited Liability Partnership ☐ Partnership

☐ Limited Liability Corporation ☐ Non-Profit / Church

☐ Other: _____

Jurisdiction of Organization Structure: _____

Date of Organization Structure: _____

Federal Tax Identification Number: _____

Department of Industrial Relations (DIR) Registration Number: _____

Primary Contact Information:

Name / Title: _____

Telephone Number: _____ Fax Number: _____

E-mail Address: _____

Street Address Line 1: _____

City: _____ State: _____ Zip Code: _____

Does proposer or any employee/representative/service provider have any relatives currently employed with EBMUD? (This does not impact award of a qualified proposal; required reporting purposes only.)

☐ YES ☐ NO

If so, please list :

CONTRACTOR OR CONTRACTOR EMPLOYEE FIRST AND LAST NAME	DISTRICT EMPLOYEE FIRST AND LAST NAME	RELATIONSHIP

SIGNATURE: _____

Name and Title of Signer (printed): _____

Dated this _____ day of _____ 20_____

EBMUD

PROPOSAL FORM

Cost shall be submitted on this Proposal Form as is. The prices quoted shall not include Sales Tax or Use Tax; said tax, wherever applicable, will be paid by the District to the General or Professional Service Provider, if licensed to collect, or otherwise directly to the State.

No alterations or changes of any kind to the Proposal Form(s) are permitted. RFP responses that do not comply may be subject to rejection in total. The cost quoted below shall be the cost the District will pay for the term of any contract that is a result of this RFP process.

Quantities listed herein are annual estimates based on past usage and are not to be construed as a commitment. No minimum or maximum is guaranteed or implied.

Description	**Cost**
Bid Item 1 – Mobilization/Demobilization	**$**
Bid Item 2 – Electrical and Concrete Demolition	**$**
Bid Item 3 – Exterior Site Improvements for Generator and Electrical Equipment Infrastructure Installation	**$**
Bid Item 4 – Construct Generator and Electrical Equipment Foundation Pad	
Bid Item 5 – Furnish Switchboard/Automatic Transfer Switch/Control Panel Assembly	**$**
Bid Item 6 – Install, Connect, Test, and Commission Contractor-furnished Switchboard, Automatic Transfer Switch, and Control Panel, and Diesel Engine Generator with Load Bank (District-furnished	**$**
Bid Item 7 – Furnish and Install New Underground Conduit Segments from District-furnished New Generator to Contractor-furnished New Electrical Equipment	**$**
Bid Item 8 – Furnish and Install New Conduit Segments from New Electrical Equipment to Existing Facility Loads	**$**
TOTAL COST OF THE ABOVE WORK ITEMS	**$**

REQUIRED DOCUMENTATION AND SUBMITTALS

All of the specific documentation listed below is required to be submitted with the Exhibit A – RFP Response Packet. Proposers shall submit all documentation, in the order listed below, and clearly label each section of the RFP response with the appropriate title (i.e., Table of Contents, Letter of Transmittal, Key Personnel, etc.).

1. **Letter of Transmittal**: RFP response shall include a description of the Proposer's capabilities and approach in providing its services to the District, and provide a brief synopsis of the highlights of the RFP response and overall benefits to the District. This synopsis should not exceed three (3) pages in length and should be easily understood.

2. **Relevant Experience**: RFP response shall include a complete list of all key personnel associated with the RFP. This list must include all key personnel who will provide services/training to District staff and all key personnel who will provide maintenance and support services. For each person on the list, the following information shall be included:

   (a) The proposing firms resume of relevant projects
   (b) The person's relationship with the Proposer, including job title and years of employment with the Proposer;
   (c) The role that the person will play in connection with the RFP;
   (d) The person's telephone number, and e-mail address;
   (e) The person's relevant experience, certifications, and/or merits

3. **Description of the Proposed Equipment/System**: RFP response shall include a description of the proposed equipment/system, as it will be finally configured during the term of the contract. The description shall specify how the proposed equipment/system will meet or exceed the requirements of the District and shall explain any advantages that this proposed equipment/system would have over other possible equipment/systems. The description shall include any disadvantages or limitations that the District should be aware of in evaluating the RFP response. Finally, the description shall describe all product warranties provided by the Proposer.

4. **Description of the Proposed Services**: RFP response shall include a description of the terms and conditions of services to be provided during the contract term including response times. The description shall contain a basis of estimate for services including its scheduled start and completion dates, the number of Proposer's and District personnel involved, and the number of hours scheduled for each person. The description shall identify spare or replacement parts that will be required in performing maintenance services, the anticipated location(s) of the spare parts, and how quickly the parts shall be available for repairs. Finally, the description must: (1) specify how the services in the RFP response will meet or exceed the requirements of

the District; (2) explain any special resources or approaches that make the services of the Proposer particularly advantageous to the District; and (3) identify any limitations or restrictions of the Proposer in providing the services that the District should be aware of in evaluating its RFP response to this RFP.

5. **Implementation Plan and Schedule**: The RFP response shall include an implementation plan and schedule. The plan for implementing the proposed equipment/system and services shall include an air permit plan and an Acceptance Test Plan. In addition, the plan shall include a detailed schedule indicating how the Proposer will ensure adherence to the timetables for the final equipment/system and/or services.

6. **Evidence of Qualification Testing**: RFP response provides evidence that the proposed equipment/system has successfully completed the qualification test standard requirements defined in this RFP. Evidence shall include a statement from an Independent Testing Authority (ITA) that both the hardware elements and the software elements of the proposed equipment/system comply with the requirements of the qualification standard. If the equipment/system specified requires the addition of components or features not previously tested by the ITA, the District will determine, in its sole discretion, whether qualification testing of such components or features will be required prior to the award of a contract.

7. **Sustainability Statement:** Contractors shall submit a statement regarding any sustainable, environmental or socially responsible initiatives or practices that they or their suppliers engage in. This information can be in relation to the specific services or work products solicited via this RFP, or in relation to the manufacture, delivery, or business practices of your firm.

8. **References:**
   (a) Proposers must use the templates in the "References" section of this Exhibit A – RFP Response Packet to provide references.
   (b) References should have similar scope, volume, and requirements to those outlined in these specifications, terms, and conditions.
      - Proposers must verify the contact information for all references provided is current and valid.
      - Proposers are strongly encouraged to notify all references that the District may be contacting them to obtain a reference.
   (c) The District may contact some or all of the references provided in order to determine Proposer's performance record on work similar to that described in this RFP. The District reserves the right to contact references other than those provided in the RFP response and to use the information gained from them in the evaluation process.

9. **Exceptions, Clarifications, Amendments:**

   (a) **The RFP response shall include a separate section calling out all clarifications, exceptions, and amendments, if any, to the RFP and associated RFP documents, which shall be submitted with the proposer's RFP response using the template in the**

"Exceptions, Clarifications, Amendments" section of this Exhibit A – RFP Response Packet. This includes any exceptions and amendments to the District's General Requirements, General Conditions, or Contract/Agreement Documents included in this RFP.

(b) **THE DISTRICT IS UNDER NO OBLIGATION TO ACCEPT ANY EXCEPTIONS, AND SUCH EXCEPTIONS MAY BE A BASIS FOR RFP RESPONSE DISQUALIFICATION.**

10. **Contract Equity Program:**

(a) Every proposer must fill out, sign, and submit the appropriate sections of the Contract Equity Program and Equal Employment Opportunity documents located at the hyperlink contained in the last page of this Exhibit A. Special attention should be given to completing Form P-25, "Employment Data and Certification". Any proposer needing assistance in completing these forms should contact the District's Contract Equity Office at (510) 287-0114 prior to submitting an RFP response.

REFERENCES

RFP For - Mokelumne River Hatchery Electrical Equipment Retrofit MOK26-01

Proposer Name: ________________________________

Proposer must provide a minimum of three references.

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

EXCEPTIONS, CLARIFICATIONS, AMENDMENTS
RFP For – MOKELUMNE RIVER HATCHERY ELECTRICAL EQUIPMENT RETROFIT MOK26-01

Proposer Name:_____

List below requests for clarifications, exceptions, and amendments, if any, to the RFP and associated RFP documents, and submit with your RFP response.

The District is under no obligation to accept any exceptions and such exceptions may be a basis for RFP response disqualification.

Reference to:			**Description**
Page No.	Section	Item No.	
p. 23	**D**	**1.c.**	***Proposer takes exception to…***

*Print additional pages as necessary

CONTRACT EQUITY PROGRAM & EQUAL EMPLOYMENT OPPORTUNITY

The District's Board of Directors adopted the Contract Equity Program (CEP) to enhance equal opportunities for business owners of all races, ethnicities, and genders who are interested in doing business with the District. The program has contracting objectives, serving as the minimum level of expected contract participation for the three availability groups: white-men owned businesses, white-women owned businesses, and ethnic minority owned businesses. The contracting objectives apply to all contracts that are determined to have subcontracting opportunities, and to all General or Professional Service Providers regardless of their race, gender, or ethnicity.

All Contractors and their subcontractors performing work for the District must be Equal Employment Opportunity (EEO) employers and shall be bound by all laws prohibiting discrimination in employment. There shall be no discrimination against any person, or group of persons, on account of race, color, religion, creed, national origin, ancestry, gender including gender identity or expression, age, marital or domestic partnership status, mental disability, physical disability (including HIV and AIDS), medical condition (including genetic characteristics or cancer), genetic information, or sexual orientation.

Contractor and its subcontractors shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity, or national origin in the performance of this contract. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, national origin, protected veteran status or disability.

All Contractors shall include the nondiscrimination provisions above in all subcontracts.
Please include the required completed forms with your proposal. Non-compliance with the Guidelines may deem a proposal non-responsive, and therefore, ineligible for contract award. Your firm is responsible for:

1) Reading and understanding the CEP guidelines.

2) Filling out and submitting with your proposal the appropriate forms.

   The CEP guidelines and forms can be downloaded from the District website at the following link: **https://www.ebmud.com/business-center/contract-equity-program**

If you have questions regarding the Contract Equity Program, please call (510) 287-0114.

EXHIBIT B
INSURANCE REQUIREMENTS

CONTRACTOR/COMPANY NAME: _____

PROPOSER shall take out and maintain during the life of the Agreement all insurance required and PROPOSER shall not commence work until such insurance has been approved by DISTRICT. The proof of insurance shall be on forms provided by DISTRICT directly following these Insurance Requirements.

PROPOSERS are not required to submit completed insurance verification documents with their bid but will be required to submit them upon notification of award. By signing Exhibit A – RFP Response Packet, the BIDDER agrees to meet the minimum insurance requirements stated in the RFP.

The following provisions are applicable to all required insurance:

A. Prior to the beginning of and throughout the duration of Services, and for any additional period of time as specified below, CONTRACTOR shall, at its sole cost and expense, maintain insurance in conformance with the requirements set forth below.

B. CONTRACTOR shall provide Verification of Insurance as required by this Agreement by providing the completed Verification of Insurance as requested below by signing and submitting Exhibit B ("Insurance Requirements") to the DISTRICT. The Insurance Requirements may be signed by the insurance broker or the insurance broker's agent (Insurance Broker/Agent) for the CONTRACTOR, or by an officer of the CONTRACTOR (Officer), or by the CONTRACTOR's risk manager (Risk Manager). The Notice to Proceed shall not be issued, and CONTRACTOR shall not commence Services until a signed Verification of Insurance evidencing the specific coverages and limits required by this Agreement has been received by the DISTRICT.

C. CONTRACTOR shall carry and maintain the minimum insurance requirements as defined in this Agreement. CONTRACTOR shall require any contractor/subcontractor to carry and maintain the minimum insurance required in this Agreement to the extent the insurance applies to the scope of the services to be performed by contractor/subcontractor.

D. Receipt of a signed Verification of Insurance by the DISTRICT shall not relieve CONTRACTOR of any of the insurance requirements, nor decrease liability of CONTRACTOR.

E. Insurance must be maintained, and an updated Verification of Insurance must be provided to the DISTRICT before the expiration of insurance by having the Insurance Broker/Agent, Officer, or Risk Manager update, sign and return the Insurance Requirements to the DISTRICT's contract manager. The updated Insurance Requirements shall become a part of the Agreement but shall not require a change order to the Agreement. It is the CONTRACTOR's sole responsibility to provide or to ensure that an updated Verification of Insurance is provided to the DISTRICT. The DISTRICT has no obligation to solicit, remind, prompt, request, seek, or otherwise obtain any updated Verification of Insurance, and any actual or alleged failure on the part of the DISTRICT to obtain any updated Verification of Insurance under this Agreement shall not in any way be construed to be a waiver of any right or remedy of the DISTRICT, in this or any regard.

F. The insurance required hereunder may be obtained by a combination of primary, excess and/or umbrella insurance, and all coverages shall be at least as broad as the requirements listed in this Agreement.

G. Any deductibles, self-insurance, or self-insured retentions (SIRs) applicable to the required insurance coverage must be declared to and accepted by the DISTRICT.

H. At the option and request of the DISTRICT, CONTRACTOR shall provide documentation of its financial ability to pay the deductible, self-insurance, or SIR.

I. CONTRACTOR is responsible for the payment of any deductibles or SIRs pertaining to the policies required under this Agreement. In the event CONTRACTOR is unable to pay the required SIR, CONTRACTOR agrees that such SIR may be satisfied, in whole or in part, by the DISTRICT as the additional insured at the DISTRICT's sole and absolute discretion, unless to do so would terminate or void the policy(ies).

J. Unless otherwise accepted by the DISTRICT, all required insurance must be placed with insurers with a current A.M. Best's rating of no less than A- V.

K. CONTRACTOR shall defend the DISTRICT and pay any damages as a result of failure to provide the waiver of subrogation from the insurance carrier required by this Agreement.

L. For any coverage that is provided on a claims-made coverage form (which type of form is permitted only where specified), the retroactive date must be shown, must be before the date of this Agreement, and must be before the beginning of any Services related to this Agreement.

M. For all claims-made policies the updated Verification of Insurance must be provided to the DISTRICT for at least three (3) years after expiration or termination of this Agreement.

N. If claims-made coverage is canceled or is non-renewed and if the claims-made coverage is not replaced with another claims-made policy form with a retroactive date prior to the effective date of this Agreement and prior to the start of any Services related to this Agreement, CONTRACTOR must purchase an extended reporting period for a minimum of three (3) years after expiration or termination of the Agreement.

O. In the event of a claim or suit, and upon request by the DISTRICT, CONTRACTOR agrees to provide a copy of the pertinent policy(ies) within 10 days of such request to the DISTRICT for review. Any actual or alleged failure on the part of the DISTRICT to request a copy of the pertinent policy(ies) shall not in any way be construed to be a waiver of any right or remedy of the DISTRICT, in this or any regard. Additionally, the DISTRICT may, at any time during CONTRACTOR's performance under this Agreement, request a copy of the Declarations pages and Schedule of Forms and Endorsements of any policy required to be maintained by CONTRACTOR hereunder, whether or not a suit or claim has been filed. Premium details may be redacted from any such documents requested.

P. The defense and indemnification obligations of this Agreement are undertaken in addition to, and shall not in any way be limited by, the insurance obligations contained herein.

Q. Where additional insured coverage is required, the additional insured coverage shall be primary and non-contributory and will not seek contribution from the DISTRICT's insurance or self-insurance.

R. CONTRACTOR agrees to provide immediate Notice to the DISTRICT of any loss or claim against CONTRACTOR arising out of, pertaining to, or in any way relating to this Agreement or to Services performed under this Agreement. The DISTRICT assumes no obligation or liability by such Notice but has the right (but not the duty) to monitor the handling of any such claim(s) if the claim(s) is likely to involve the DISTRICT.

S. It is the obligation of the CONTRACTOR to ensure all contractors/subcontractors performing services under this Agreement maintain the necessary coverages and limits. CONTRACTOR shall ensure that all contractors/subcontractors agree to the same indemnity obligation that CONTRACTOR agrees to in this Agreement based on the nature and scope of services being performed by each contractor/subcontractor. CONTRACTOR shall require that each contractor/subcontractor include the DISTRICT, its directors, officers, and employees as additional insureds on its liability policy(ies) (excepting Professional Liability and Workers' Compensation) for all ongoing and completed operations with coverage as broad as required of CONTRACTOR under this Agreement. Failure or inability to secure fully adequate insurance shall in no way relieve the CONTRACTOR or all contractors/subcontractors of the responsibility for its own acts or the acts of any contractors/subcontractors or any employees or agents of either. All contractors/subcontractors are to waive subrogation against the DISTRICT on all policies. CONTRACTOR shall be responsible for maintaining records evidencing contractors'/subcontractors' compliance with the necessary insurance coverages and limits, and such records shall be made available to the DISTRICT within 10 days upon request.

T. It is CONTRACTOR's responsibility to ensure its compliance with the insurance requirements. Any actual or alleged failure on the part of the DISTRICT to obtain proof of insurance required under this Agreement shall not in any way be construed to be a waiver of any right or remedy of the DISTRICT, in this or any regard.

U. Notice of Cancellation/Non-Renewal/Material Reduction**.** The insurance requirements hereunder are mandatory, and the DISTRICT may, at its sole and absolute discretion, terminate the services provided by CONTRACTOR, should CONTRACTOR breach its obligations to maintain the required coverage and limits set forth in this Agreement. No coverage required hereunder shall be cancelled, non-renewed or materially reduced in coverage or limits without the DISTRICT being provided at least thirty (30) days prior written notice, other than cancellation for the non-payment of premiums, in which event the DISTRICT shall be provided ten (10) days prior written notice. Replacement of coverage with another policy or insurer, without any lapse in coverage or any reduction of the stated requirements does not require notice beyond submission to the DISTRICT of an updated Verification of Insurance which shall be met by having the Insurance Broker/ Agent, or Officer, or Risk Manager update, sign and return the Insurance Requirements.

I. Workers' Compensation and Employer's Liability Insurance Coverage

A. Workers' Compensation insurance including Employer's Liability insurance with minimum limits as follows:

Coverage A.	Statutory Benefits Limits	
Coverage B.	Employer's Liability of not less than:	
	Bodily Injury by accident:	$1,000,000 each accident
	Bodily Injury by disease:	$1,000,000 each employee
	Bodily Injury by disease:	$1,000,000 policy limit

B. If there is an onsite exposure of injury to CONTRACTOR, and/or contractor/subcontractor's employees under the U.S. Longshore and Harbor Workers' Compensation Act, the Jones Act, or under laws, regulations or statutes applicable to maritime employees, coverage is required for such injuries or claims.

C. If CONTRACTOR is exempt from carrying Workers' Compensation Insurance, CONTRACTOR must return the completed Verification of Insurance confirming that CONTRACTOR has no employees and is exempt from the State of California Workers' Compensation requirements.

D. If CONTRACTOR is self-insured with respect to Workers' Compensation coverage, CONTRACTOR shall provide to the DISTRICT a Certificate of Consent to Self-Insure from the California Department of Industrial Relations. Such self-insurance shall meet the minimum limit requirements and shall waive subrogation rights in favor of the DISTRICT as stated below in section "E."

E. Waiver of Subrogation. Workers' Compensation policies, including any applicable excess and umbrella insurance, must contain a waiver of subrogation endorsement providing that CONTRACTOR and each insurer waive any and all rights of recovery by subrogation, or otherwise, against the DISTRICT, its directors, board, and committee members, officers, officials, employees, agents, and volunteers. CONTRACTOR shall defend and pay any and all damages, fees, and costs, of any kind arising out of, pertaining to, or in any way relating to CONTRACTOR's failure to provide waiver of subrogation from the insurance carrier.

Verification of Workers' Compensation and Employer's Liability Insurance Coverage

☐ **By checking the box and signing below, I hereby verify that the CONTRACTOR is exempt from the State of California's requirement to carry Workers' Compensation insurance.**

As the CONTRACTOR's Insurance Broker/Agent, Officer, or Risk Manager, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries Workers' Compensation insurance as required by this Agreement, including the relevant provisions applicable to all required insurance.

Self-Insured Retention: Amount: $ _____

Policy Limit: $ _____

Policy Number: _____

Policy Period: from _____ **to** _____

Insurance Carrier Name: _____

Insurance Broker/Agent or Officer or Risk Manager - Print Name: _____

Insurance Broker/Agent or Officer or Risk Manager's Signature: _____

II. Commercial General Liability Insurance ("CGL") Coverage

A. CONTRACTOR's insurance shall be primary, and any insurance or self-insurance procured or maintained by the DISTRICT shall not be required to contribute to it.

B. The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the CONTRACTOR.

C. Minimum Requirements. CGL insurance with minimum per occurrence and aggregate limits as follows:

Bodily Injury and Property Damage	$2,000,000 per occurrence & $4,000,000 aggregate
Personal Injury/Advertising Injury	$2,000,000 per occurrence &
Products/Completed Operations	$2,000,000 per occurrence & $4,000,000 aggregate

D. Coverage must be on an occurrence basis and be as broad as Insurance Services Office (ISO) form CG 00 01.

E. Coverage for Products, and Completed Operations, and Ongoing Operations must be included in the insurance policies and shall not contain any "prior work" coverage limitation or exclusion applicable to any Services performed by CONTRACTOR and/or contractor/subcontractor under this Agreement.

F. There will be no exclusion for explosions, collapse, or underground liability (XCU).

G. Insurance policies and Additional Insured Endorsement(s) shall not exclude liability and damages to work arising out of, pertaining to, or in any way relating to services performed by contractor/subcontractor on CONTRACTOR's behalf.

H. Contractual liability coverage shall be included and shall not limit, by any modification or endorsement, coverage for liabilities assumed by CONTRACTOR under this Agreement as an "insured contract."

I. Waiver of Subrogation. The policy shall be endorsed to include a Waiver of Subrogation ensuring that the CONTRACTOR and its insurer(s) waive any rights of recovery by subrogation, or otherwise, against the DISTRICT, its directors, board, and committee members, officers, officials, agents, volunteers, and employees. CONTRACTOR shall defend and pay any and all damages, fees, and costs, of any kind, arising out of, pertaining to, or in any way resulting from CONTRACTOR's failure to provide the waiver of subrogation from its insurance carrier(s).

J. Independent Contractor's Liability shall not limit coverage for liability and/or damages arising out of, pertaining to, or in any way resulting from Services provided under this Agreement.

K. To the fullest extent permitted by law, the DISTRICT, its directors, board, and committee members, officers, officials, employees, agents, and volunteers must be covered as Additional

Insureds on a primary and noncontributory basis on all underlying, excess and umbrella policies that shall be evidenced in each case by an endorsement. Coverage for the Additional Insureds must be as broad as ISO forms CG 20 10 (ongoing operations) and CG 20 37 (completed operations) for liability arising in whole, or in part, from work performed by or on behalf of CONTRACTOR, or in any way related to Services performed under this Agreement.

L. A severability of interest provision must apply for all the Additional Insureds, ensuring that CONTRACTOR's insurance shall apply separately to each insured against whom a claim is made or suit is brought, except with respect to the policies' limit(s).

Verification of Commercial General Liability (CGL) Insurance Coverage

As the CONTRACTOR'S Insurance Broker/Agent, Officer, or Risk Manager, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries Commercial General Liability insurance, as required by this Agreement, including the relevant provisions applicable to all required insurance:

Self-Insured Retention: Amount: $_____

Policy Limit: $ _____

Policy Number: _____

Policy Period: from _____ **to** _____

Insurance Carrier Name: _____

Insurance Broker/Agent or Officer or Risk Manager - Print Name: _____

Insurance Broker/Agent or Officer or Risk Manager's Signature: _____

III. Installation Floater/Inland Marine Property Coverage

At all times during the performance of services under this Agreement, Contractor shall maintain Installation Floater/Inland Marine Property written on an "all risk" (special form) basis covering direct physical loss of, or damage to, all District-furnished and Contractor-furnished materials, equipment, machinery, components, and supplies while in Contractor's care, custody, or control, including during transit, unloading, handling, staging, storage, installation, testing, and commissioning until final acceptance by the District. Such coverage shall be maintained in an amount not less than the full replacement cost of the property insured. The District shall be named as loss payee with respect to the District-furnished property. Contractor's procurement of such insurance shall not limit Contractor's responsibility for loss of, or damage to, property while in Contractor's care, custody, or control.

Verification of Installation Floater/Inland Marine Property Insurance Coverage

As the CONTRACTOR'S Insurance Broker/Agent, Officer, or Risk Manager, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries Pollution Liability insurance, as required by this Agreement, including the relevant provisions applicable to all required insurance.
Self-Insured Retention: Amount: $ _____
Policy Limit: $ _____
Policy Number: _____
Policy Period: from _____ to _____
Insurance Carrier Name: _____
Insurance Broker/Agent or Officer or Risk Manager - Print Name: _____
Insurance Broker/Agent or Officer or Risk Manager's Signature: _____

IV. Business Auto Liability Insurance Coverage

A. CONTRACTOR's insurance shall be primary, and any insurance or self-insurance procured or maintained by the DISTRICT shall not be required to contribute to it.

B. The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the CONTRACTOR.

C. Minimum Requirements. Auto insurance with minimum coverage and limits as follows:

Each Occurrence Limit (per accident) and in the Aggregate:	$2,000,000
Bodily Injury and Property Damage:	$2,000,000

D. Coverage must include either "owned, non-owned, and hired" autos or "any" automobile. This provision ensures the policy covers losses arising out of use of company-owned vehicles ("owned autos"), employee's personal autos ("non-owned autos" meaning not owned by company/insured) or autos that are rented or leased ("hired autos").

E. If CONTRACTOR is transporting hazardous materials or contaminants, evidence of the Motor Carrier Act Endorsement-hazardous materials clean-up (MCS-90, or its equivalent) must be provided.

F. If CONTRACTOR's Scope of Services under this Agreement exposes a potential pollution liability risk related to transport of potential pollutants, seepage, release, escape or discharge of any nature (threatened or actual) of pollutants into the environment arising out of, pertaining to, or in any way related to CONTRACTOR's and/or contractor's/subcontractor's performance under this Agreement, then Auto Liability Insurance policies must be endorsed to include Transportation Pollution Liability insurance. Alternatively, coverage may be provided under the CONTRACTOR's Pollution Liability Policies if such policy has no exclusions that would restrict coverage under this Agreement. Coverage shall also include leakage of fuel or other "pollutants" needed for the normal functioning of covered autos.

G. To the fullest extent permitted by law, the DISTRICT, its directors, board, and committee members, officers, officials, employees, agents, and volunteers must be covered as Additional Insureds on a primary and noncontributory basis on all underlying and excess and umbrella policies.

H. A severability of interest provision must apply for all the Additional Insureds, ensuring that CONTRACTOR's insurance shall apply separately to each insured against whom a claim is made or suit is brought, except with respect to the insurer's limits of liability.

Verification of Business Auto Liability Insurance Coverage

As the CONTRACTOR'S Insurance Broker/Agent, Officer, or Risk Manager, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries Business Automobile Liability insurance, as required by this Agreement, including the relevant provisions applicable to all required insurance:

Self-Insured Retention: Amount: $_____

Policy Limit: $_____

Policy Number: _____

Policy Period: from _____ **to** _____

Insurance Carrier Name: _____

Insurance Broker/Agent or Officer or Risk Manager – Print Name: _____

Insurance Broker/Agent or Officer or Risk Manager's Signature: _____

V. Professional Liability (also known as Errors and Omissions) Insurance Coverage

A. The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the CONTRACTOR.

B. Minimum Requirements: Professional Liability Insurance with minimum limits as follows:

Each Claim:	$2,000,000
Aggregate Limit:	$2,000,000

If Coverage is written on a claims-made form, the following shall apply:

1. The retroactive date must be shown and must be before the date of the Agreement or the beginning of the Services.

2. Insurance must be maintained, and evidence of insurance must be provided for a minimum of three (3) years after completion of the Services.

3. If claims-made coverage is canceled or non-renewed, and not replaced with another claims-made policies form with a retroactive date prior to the effective date of the Agreement, CONTRACTOR must purchase an extended reporting period for a minimum of three (3) years after completion of the Services.

C. Insurance shall include prior acts coverage sufficient to cover the services under this Agreement.

Verification of Professional Liability (Errors and Omissions) Insurance Coverage

As the CONTRACTOR'S Insurance Broker/Agent, Officer, or Risk Manager, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries Professional Liability insurance as required by this Agreement, including the relevant provisions applicable to all required insurance.

Self-Insured Retention: Amount: $ _____

Policy Limit: $ _____

Policy Number: _____

Policy Period: from _____ **to** _____

Insurance Carrier Name: _____

Insurance Broker/Agent or Officer or Risk Manager- Print Name: _____

Insurance Broker/Agent or Officer or Risk Manager's Signature: _____

VI. Pollution Liability Insurance Coverage

A. CONTRACTOR's insurance shall be primary, and any insurance or self-insurance procured or maintained by the DISTRICT shall not be required to contribute to it.

B. The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the CONTRACTOR.

C. Minimum Requirements: Pollution Liability Insurance with minimum limits, as follows:

Each Claim or Occurrence Limit:	$2,000,000
Aggregate Limit:	$2,000,000

D. Coverage must be included for bodily injury and property damage, including coverage for loss of use and/or diminution in property value, and for clean-up costs arising out of, pertaining to, or in any way related to the actual, alleged or threatened discharge, dispersal, seepage, migration, release or escape of contaminants or pollutants, arising out of, pertaining to, or in any way resulting from any Services performed by CONTRACTOR under this Agreement; including any transportation of hazardous wastes, hazardous materials, or contaminants.

E. If Coverage is written on a claims-made form, the following shall apply:

1. The retroactive date must be shown and must be before the date of the Agreement or the beginning of the Services.

2. Insurance must be maintained, and evidence of insurance must be provided for a minimum of three (3) years after completion of the Services.

3. If coverage is canceled or non-renewed and not replaced with another claims-made policy form with a retroactive date prior to the effective date of the Agreement, CONTRACTOR must purchase an extended reporting period for a minimum of three (3) years after completion of the Services.

F. Insurance written on a claims-made basis shall include prior acts coverage sufficient to cover the services provided by CONTRACTOR under this Agreement.

Verification of Pollution Liability Insurance Coverage

As the CONTRACTOR'S Insurance Broker/Agent, Officer, or Risk Manager, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries Pollution Liability insurance, as required by this Agreement, including the relevant provisions applicable to all required insurance.

Self-Insured Retention: Amount: $_____

Policy Limit: $_____

Policy Number: _____

Policy Period: from _____ **to** _____

Insurance Carrier Name: _____

Insurance Broker/Agent or Officer or Risk Manager - Print Name: _____

Insurance Broker/Agent or Officer or Risk Manager's Signature: _____

VII. Excess and/or Umbrella Liability Insurance Coverage (*Optional* – See Paragraph A below)

A. The insurance requirements set forth above may be satisfied by a combination of primary and excess or umbrella policies. Where excess or umbrella policies are used the following shall apply:

B. CONTRACTOR's insurance shall be primary, and any insurance or self-insurance procured or maintained by the DISTRICT shall not be required to contribute to it.

C. The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the CONTRACTOR.

D. Minimum Requirements: It is expressly understood by the parties that CONTRACTOR's Excess and/or Umbrella Liability policies shall, at minimum, comply with all insurance requirements set forth within this Agreement, and shall be at least as broad as coverage required of the underlying policies required herein.

1. Coverage for Products, Completed Operations, and Ongoing Operations must be included in the insurance policies and shall not contain any "prior work" coverage limitation or exclusion applicable to any Services performed under this Agreement and, if it is a claims-made policy, it must be maintained for a minimum of three (3) years following final completion of the Services.

2. There will be no exclusion for explosions, collapse, or underground damage (XCU).

3. Insurance policies and Additional Insured Endorsements shall not exclude coverage for liability and damages from services performed by contractor/subcontractor on CONTRACTOR's behalf.

4. Contractual liability coverage shall be included and shall not limit, by any modification or endorsement, coverage for liabilities assumed by CONTRACTOR under this Agreement as an "insured contract."

5. Independent Contractor's Liability shall not limit coverage for liability and/or damage arising out of, pertaining to, or in any way related to Services provided under this Agreement.

6. To the fullest extent permitted by law, the DISTRICT, its directors, officers, officials, agents, volunteers, and employees must be covered as Additional Insureds on a primary and noncontributory basis on all excess and umbrella policies. The Additional Insureds must be covered for liability arising in whole or in part from any premises, Products, Ongoing Operations, and Completed Operations by or on behalf of CONTRACTOR, in any way related to Services performed under this Agreement.

7. A severability of interest provision must apply for all the Additional Insureds, ensuring that the CONTRACTOR's insurance shall apply separately to each insured against whom a claim is made or suit is brought, except with respect to the policy's limits.

8. CONTRACTOR and its excess and/or umbrella Liability insurance coverage must waive any rights of subrogation against the DISTRICT, its directors, officers, officials, employees, agents, and volunteers, and CONTRACTOR shall defend and pay any damages as a result of failure to provide the waiver of subrogation from the insurance carrier(s).

Verification of Excess and/or Umbrella Liability Insurance Coverage

As the CONTRACTOR'S Insurance Broker/Agent, Officer, or Risk Manager, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries Excess and/or Umbrella Liability insurance, as required by this Agreement, including the relevant provisions applicable to all required insurance.

Excess/Umbrella Limits: Amount $_____

Policy Limit: $_____

Policy Number: _____

Policy Period from _____ **to** _____

Insurance Carrier Name: _____

Underlying Policy(ies) listed above to which Excess/Umbrella applies:

_____

Insurance Broker/Agent or Officer or Risk Manager - Print Name: _____

Insurance Broker/Agent or Officer or Risk Manager's Signature: _____

EXHIBIT C
GENERAL SERVICES AGREEMENT

EAST BAY MUNICIPAL UTILITY DISTRICT
GENERAL SERVICES AGREEMENT
for
Mokelumne River Fish Hatchery Electrical Retrofit

This General Services Agreement ("Agreement") is made and entered into on this _____ day of (month), 20__, by and between the East Bay Municipal Utility District ("DISTRICT"), and _____ ("CONTRACTOR") (each individually a "Party" and collectively "the Parties").

DISTRICT desires to obtain electrical equipment retrofit services ("the Services") which are more fully described in Exhibit A to this Agreement; and

CONTRACTOR represents and warrants that it is professionally and legally qualified to provide the Services and is willing to provide them to DISTRICT; and

DISTRICT's Board of Directors has authorized this Agreement by Motion Number _____ ;

DISTRICT and CONTRACTOR therefore agree as follows:

1. Provision of Services; Contents of Agreement. It is agreed that DISTRICT retains CONTRACTOR to provide the Services, and CONTRACTOR accepts such engagement based on the requirements described in this Agreement and the following Exhibits, all of which are incorporated into this Agreement by this reference:

Exhibit A	Scope of Services
Exhibit B	Payment Terms and Procedures
Exhibit C	Insurance Requirements
Exhibit D	CEP Compliance
Exhibit E	General Conditions
Exhibit F	Additional Requirements
Exhibit G	Public Works Forms
Exhibit H	Bond Requirements

2. Compensation. The compensation payable to CONTRACTOR shall not exceed *Dollar Amount Written Out* ($_____) for the term of this Agreement including any option periods exercised by the DISTRICT. Payment will be made in accordance with Exhibit B (Payment Terms and Procedures) to this Agreement.

3. Independent Contractor.

   a. CONTRACTOR is an independent contractor and not an employee of DISTRICT. CONTRACTOR expressly warrants that it will not represent that it is an employee or servant of DISTRICT.

      i. CONTRACTOR is retained to render services only and all payments made are compensation solely for such services as it may render and recommendations it may make in carrying out the work.

      ii. It is further understood and agreed by the Parties that CONTRACTOR, in the performance of its obligations under this Agreement, is subject to the direction of DISTRICT as to the designation of services to be performed and the results to be accomplished, however, DISTRICT shall have no control over the means, methods, or sequence used by CONTRACTOR for accomplishing the results.

   b. It is further understood and agreed that as an independent contractor, CONTRACTOR and/or CONTRACTOR's assigned personnel shall not have: (1) any entitlement to any compensation or benefit provided to DISTRICT employees; (2) right to act on behalf of DISTRICT in any capacity whatsoever as agent: or (3) the right to bind DISTRICT to any obligation whatsoever. CONTRACTOR shall not be covered by DISTRICT's worker's compensation insurance; nor shall CONTRACTOR be entitled to compensated sick leave, vacation leave, retirement entitlement, participation in group health, dental, life or other insurance programs, or entitled to other fringe benefits payable by DISTRICT to employees of DISTRICT.

4. Notices.

   Any notice from DISTRICT to CONTRACTOR shall be directed to:

   (CONTRACTOR's firm's name)
   (address)
   Attention: (contact, usually the CONTRACTOR's project manager)
   Email: (contact's email)

Any notice from CONTRACTOR to DISTRICT shall be directed to:

East Bay Municipal Utility District
375 11th Street, MS _____
Oakland, CA 94607-4246
Attention: (DISTRICT Project Manager)
Email: (Project Manager's email)

Personal delivery or mailing with receipt of acceptance shall constitute a good, sufficient and lawful notice.

5. Insurance. CONTRACTOR shall take out and maintain during the life of the Agreement all of the insurance required, as set forth in Exhibit C (Insurance Requirements) to this Agreement. CONTRACTOR shall not commence work until such insurance has been approved by DISTRICT. Acceptance of the certificates shall not relieve CONTRACTOR of any of the insurance requirements, nor decrease the liability of CONTRACTOR.

6. Contract Equity. CONTRACTOR expressly agrees that this Agreement is subject to DISTRICT's Contract Equity Program ("CEP"). CONTRACTOR is familiar with the DISTRICT's CEP and Equal Opportunity Guidelines, and has read and understood all of the program requirements. CONTRACTOR understands and agrees to comply with the CEP and all requirements therein, including each of the Good Faith Efforts. CONTRACTOR further understands and agrees that non-compliance with the CEP requirements may result in termination of this Agreement.

7. Non-Discrimination.

   a. **CONTRACTOR shall abide by the requirements of 41 CFR §§ 60-1.4(b), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity, or national origin in the performance of this contract. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, national origin, protected veteran status or disability.**

   b. CONTRACTOR shall include the bolded nondiscrimination provisions above in all subcontracts. CONTRACTOR shall not establish or permit any such discrimination. Contractors determined to be in violation of this section shall be deemed to be in material breach of this Agreement.

8. Entire Agreement. This Agreement represents the entire understanding of DISTRICT and CONTRACTOR as to those matters contained herein. No prior oral or written understanding shall be of any force or effect with respect to those matters contained in this Agreement. This Agreement may only be modified by amendment in writing signed by each Party.

9. Governing Law and Venue. This Agreement, including but not limited to formation, interpretation, performance, and the rights and obligations of each Party, shall be governed by the laws of the State of California without regard to the conflict of laws principles of California. Venue for any dispute arising out of or related to this Agreement, including but not limited to formation, interpretation, and performance, and the rights and obligations of each Party, shall be in Alameda County, California.

10. Authority; Effective Date. Each Party executing this Agreement warrants that he or she has authority to enter into this Agreement on behalf the Party for whom he or she signs. This Agreement shall become effective as of the date of the second signature.

11. Term.

    a. Unless earlier terminated, this Agreement shall commence on the Effective Date and [pick one: shall expire when all tasks have been completed and final payment has been made by DISTRICT [OR] shall continue in effect until [number in words (number) [year[s]/months] from such date (the "[Initial] Term")].

12. Signatures.

The Parties agree to execute this Agreement using digital signatures via DocuSign.

The Parties intending to be legally bound now execute this Agreement on the dates noted below.

CONTRACTOR

By:_____
Signature

Name:_____
(Printed)

Title:_____

Date:_____

DIR Registration No._____

Contractor's California License No. _____

Class_____ Expiration Date _____

EAST BAY MUNICIPAL UTILITY DISTRICT

By:_____
Signature

Name:_____
(Printed)

Title:_____

Date: _____

Approved as to Form:

By:_____
for the Office of General Counsel

EXHIBIT A
SCOPE OF SERVICES

EXHIBIT A
SCOPE OF SERVICES

East Bay Municipal Utility District
(insert Project Title)

I. CONTRACTOR SERVICES

CONTRACTOR shall provide the following:

Contracted Services

(State each task with associated task number; specifically call out any survey work)

Optional Services

(State each task with associated task number)

II. PROJECT SCHEDULE

(List schedule milestones and completion dates)

EXHIBIT B
COMPENSATION

EXHIBIT C
INSURANCE REQUIREMENTS

EXHIBIT D
CEP COMPLIANCE

EXHIBIT E
GENERAL CONDITIONS

GENERAL CONDITIONS

TABLE OF CONTENTS

GENERAL CONDITIONS

ARTICLE 1 - GENERAL PROVISIONS

1.1 Interpretation

1.1.1 The following interpretative rules apply throughout the Contract Documents.

.1 The provisions of the Contract Documents are complementary and should be interpreted viewing the Contract Documents as a whole.

.2 A concept phrased in the singular should be interpreted in the plural as required.

.3 Masculine includes feminine, and feminine includes masculine.

.4 The words "shall," "will" and "must," in any of their tenses, indicate mandatory requirements.

.5 The use of examples like "such as" or "including" does not limit or exclude examples not specifically mentioned.

.6 The words "provide," "perform," "construct," and "install" mean, unless preceded by the word "only," that the Contractor shall provide, perform, construct, and install and include all services necessary to provide, perform, construct and install.

1.2 Definitions

1.2.1 Throughout the Contract Documents, the terms below will have the following defined meanings:

.1 **Addendum:** A written change, clarification, or correction to the Contract Documents issued by the East Bay Municipal Utility District prior to bid opening.

.2 **Bidder:** Any individual, partnership, joint venture, or corporation submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.

.3 **Board or Board of Directors:** The Board of Directors of the East Bay Municipal Utility District.

.4 **Change Order:** A Change Order is a written instrument used for modifying the contract with regards to the scope of Work, Contract Sum**,** and/or Contract Time. An approved Change Order is a Change Order signed by the District. An

executed Change Order is a Change Order signed by both the District and the Contractor.

.5 Compensable Delay: A period of delay to the Contractor's performance of the Work that meets all of the following criteria:

- **a)** the delay directly prevents the Contractor from performing critical path Work;
- **b)** the delay is caused directly and solely by the District or by causes within the exclusive control of the District;
- **c)** the delay is not concurrent with any other type of delay;
- **d)** the delay could not have been avoided by the Contractor through work-arounds, rescheduling or other mitigation measures; and
- **e)** the Contractor gave timely notice of the delay to the District in compliance with the terms of this contract.

.6 Concurrent Delay: Two or more independent causes of delay to the Contractor's performance of the Work that meet all of the following criteria:

- **a)** the delays occur at the same time during all or a portion of the delay period being considered;
- **b)** the delays directly prevent the Contractor from performing critical path Work;
- **c)** each of the delays would have delayed the Contractor's performance of critical path work even in the absence of any of the other delays;
- **d)** none of the delays could have been avoided by the Contractor through work-arounds, rescheduling or other mitigation measures required under this contract; and
- **e)** the Contractor gave timely notice of the delays to the District in compliance with the terms of this contract.

.7 Contract Completion: The Work has been fully completed in accordance with the Contract Documents as determined by the Engineer and all governmental authorities with jurisdiction over the project have issued acceptance or a certificate of occupancy.

.8 Contract Documents: See Article 1.3.

.9 Contract Sum: The contract price stated in the contract form (Document 00 52 00) plus all Approved Change Orders.

.10 Contract Time: The number of days set forth in the contract to achieve Contract Completion. The required completion date is computed by adding the number of days to the effective date of the Notice to Proceed. If the required completion date falls on a District holiday or non-Work Day, that day is excluded and the following Work Day is counted. The Contract Time may only be adjusted by approved Change Order.

.11 Contractor: The individual, partnership, joint venture, or corporation with whom the contract is made by the District.

.12 Critical Path: The sequence of schedule activities that determines the duration of the Work.

.13 Day: Unless otherwise specified, days are calendar days, measured from midnight to the next midnight.

.14 Deficiency Notice: A written notice issued by the Engineer informing the Contractor of non-conforming Work.

.15 District: The East Bay Municipal Utility District.

.16 Engineer: The Director of Engineering and Construction or the Director of Wastewater of the District acting directly or through authorized agents acting within the duties entrusted to them.

.17 Excusable Delay: A period of delay to the Contractor's performance of the Work that meets all of the following criteria:

- **a)** the delay prevents the Contractor from performing critical path work;
- **b)** the delay is directly caused by events beyond the control of both the District and the Contractor (including, but not limited to, adverse weather);
- **c)** the delay is not concurrent with an Inexcusable Delay as defined in this contract;
- **d)** the delay could not have been avoided by the Contractor through work-arounds, rescheduling or other mitigation measures required under the contract; and
- **e)** the Contractor gave timely notice of the delay to the District in compliance with the terms of this contract.

.18 Fixed Costs (also known as **Fixed Price**)**:** Any necessary labor, material, and equipment costs directly expended which remain constant regardless of the quantity of work done.

.19 Force Account: Method of compensation for Work performed that is billed at actual cost for labor, materials, equipment, taxes and other costs plus a specified percentage of markup for overhead and profit. Compensation rate for certain cost elements may be specified in the contract.

.20 Free Float (also known as **Activity Float**)**:** The amount of time that a scheduled activity can be delayed without delaying the early start of any immediately following schedule activity.

.21 Inexcusable Delay: A period of delay to the Contractor's performance of the Work caused by circumstances within the Contractor's control or within the scope of the Contractor's contract responsibilities. Delays attributable to or

within the control of a Subcontractor of any tier, or a Supplier, shall be deemed to be delays within the control of the Contractor. Inexcusable Delays include, but are not limited to, any of the following:

- **a)** delays caused by the Contractor's failure to perform its cooperation and coordination responsibilities required by this contract;
- **b)** delays caused by the District's enforcement of any government act or regulation, or the provisions of the contract;
- **c)** delays caused by the District's right to sequence the Work in a manner that would avoid disruption to the District's tenants, customers, contiguous property owners, and their contractors or other prime contractors and their respective Subcontractors;
- **d)** any delay that is neither a Compensable Delay nor Excusable Delay as defined in this contract; and
- **e)** delays of any kind that the Contractor fails to give timely notice to the District in compliance with the terms of this contract.

.22 Lump Sum Price: Pricing arrangement where the Contractor agrees to perform the scope of work for a fixed price that cannot be adjusted unless there is a Change Order. For the purpose of this contract, the terms Lump Sum Price and Fixed Price adjustment are used interchangeably.

.23 Notice to Proceed: A written directive, issued by the District, authorizing the Contractor to start performance of the work and establishing date of commencement of the work. The effective date is the date the Contractor acknowledges receipt of the Notice to Proceed or five days from mailing, whichever is earlier.

.24 Shop Drawings: Includes all drawings, specifications, diagrams, calculations, illustrations, product samples, brochures, catalog cuts, schedules, and other data which are prepared by the Contractor, a Subcontractor, tier-subcontractor, manufacturer, Supplier, or distributor, illustrating how specific portions of the Work shall be fabricated or installed.

.25 Shoring: A temporary structural system designed to support any and all loads for the purposes of excavation. Sloping of the soil shall not be considered as shoring.

.26 Subcontractor: The person or persons, co-partnership, firm or entity in direct contract with the Contractor or with any other Subcontractor for the purpose of furnishing materials, equipment, and/or performing a part of the contract Work.

.27 Superintendent: The Contractor's authorized on-site representative in charge of supervising the Work. Instructions and information given by the Engineer to the Superintendent shall be considered to have been given to the Contractor.

.28 Supplier: A manufacturer, fabricator, distributor, or any person or organization who supplies materials or equipment for the contract Work, including that

fabricated to a special design, but who does not ordinarily perform labor at the jobsite.

.29 Total Float: The amount of time that a schedule activity may be delayed from its early start without delaying the Contract Completion date, or violating a schedule constraint.

.30 Underground Utilities: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities that are installed underground to furnish any of the following services or materials: water, sewage and drainage removal, electricity, gases, steam, liquid petroleum products, telephone or other communication systems, cable television, traffic, or other control or information systems.

.31 Unit Price: Pricing arrangement in which the total amount of compensation for performance of the work is computed by multiplying the actual quantity of Work performed by the line item unit price except as noted in Article 7.5. Measurement of the quantity of work performed shall be determined by the Engineer.

.32 Work: All labor, material, equipment, submittal, and appurtenances required to be furnished to properly complete construction of the work under the Contract Documents.

.33 Work Day: Unless specified elsewhere, work day includes all days of the year except Saturdays, Sundays, and District Holidays.

1.3 Contract Documents

1.3.1 The Contract Documents comprise the entire agreement between the District and the Contractor concerning the Work. The Contractor shall properly perform all requirements of the Contract Documents.

1.3.2 The Contract Documents include the District's contract form and any exhibits attached thereto, including the Notice to Contractors, Instructions to Bidders, Bidding Form, Proposal, General Conditions, Supplementary General Conditions, Designation of Subcontractors, Contract Equity Program Forms, specifications, addenda, appendices, and approved Change Orders, if any.

1.3.3 The Contract Documents are intended to be complementary and include all items necessary for the Contractor's proper execution and completion of the Work. Anything mentioned in the specifications and not shown on the drawings or shown on the drawings and not mentioned in the specifications shall be as if shown or mentioned in both. Any part of the Work not shown or mentioned on the drawings or in the specifications that is reasonably implied by either, or is necessary or usual

for proper performance of the Work, shall be provided by the Contractor at its expense.

.1 In the case of conflicts, errors, or discrepancies in any of the Contract Documents, the order of precedence is as follows. Within the same order of precedence, specific requirements shall take precedence over general requirements.

1. Change Orders
2. Contract Forms
3. Addenda
4. Contractor's Bid (Bid Form)
5. Supplementary General Conditions
6. General Conditions
7. Specifications (Divisions 01 - 49)
8. Drawings/Plans
9. Referenced Standard Specifications
10. Remainder of Specifications (Division 00)

.2 With reference to the Drawings:

1. Numerical dimensions govern over scaled dimensions
2. Detailed drawings govern over general drawings
3. Addenda/Change Order drawings govern over contract drawings
4. Contract drawings govern over standard drawings
5. Notes apply only to the drawing where the notes appear, unless classified as "typical" or intended to apply elsewhere in which case they apply to all drawings where the conditions or circumstance noted occurs
6. Typical details apply to all drawings unless a specific different detail is shown

1.3.4 "Related Sections" are referenced solely for the convenience of the Contractor and its Subcontractors and Suppliers, but does not, whether by omission or otherwise, lessen the requirements of the specification section where the related section is referenced.

1.3.5 Command type sentences used in the specifications refer to and are directed to the Contractor.

1.3.6 No interest in the contract shall be transferred to any other party without permission of the Board of Directors.

ARTICLE 2 - RIGHTS-OF-WAY AND PROPERTY

2.1 Provided by the District

2.1.1 The District will provide reasonable access to the site for performance of the Work. Upon approval by the Engineer, the Contractor may use a suitable portion of the District's rights-of-way or property for working space and for storage of equipment and materials. The Contractor is responsible for any damage resulting from its use of the District's rights-of-way or property and shall return and restore it to its pre-existing condition. The District will not be responsible for any loss or damage to equipment or materials stored on the work site or on the District's rights-of-way or property.

2.1.2 The Contractor does not have exclusive use of the site or the rights-of-way and must coordinate its use with the District and others.

2.2 Additional Property

2.2.1 If the Contractor's operations cause the contractor to require additional property that is not within the District's rights-of-way or property for its operations, the Contractor shall, at its own expense, arrange with the property owners to use the additional property.

2.2.2 Agreements with property owners for storing materials and equipment, or other purpose related to the Work shall be made in writing with a copy submitted to the Engineer.

ARTICLE 3 - ADMINISTRATION OF THE CONTRACT

3.1 Authority of the Engineer

3.1.1 The decision of the Engineer will be final and binding on both parties with respect to all questions concerning the intent of the Contract Documents, the acceptability of material or equipment, the classification of material, the execution of the Work, and/or conflicting interests of separate contractors performing related work.

3.2 Inspection and Non-Conforming Work

3.2.1 All materials furnished and Work completed under the contract is subject to inspection by the Engineer. The Engineer's inspections are solely for the District's benefit and do not constitute acceptance of any of the Contractor's work or waiver of the requirement that the Contractor's work conform to the requirements of the Contract Documents. The Contractor shall furnish, without extra charge, all necessary test pieces and samples, including facilities and labor for obtaining those pieces, as requested by the Engineer. The Engineer will have safe access to the work site or shop where the work, material or equipment subject to inspection is

being performed or manufactured or where any off-site work is being performed, including shops, sites, and assembly facilities of Subcontractors and Suppliers.

3.2.2 All material, equipment or Work that does not conform to the Contract Documents is non-conforming work and will be rejected regardless of whether it may have been inspected by the Engineer or its representative. Installation of unapproved materials and equipment is non-conforming work until the materials or equipment are approved by the Engineer. Deficiency Notices may be issued by the Engineer to advise the Contractor of non-conforming work. However, lack of a Deficiency Notice shall not waive the Contractor's obligation to correct any and all non-conforming work, patent or latent, through the expiration of the warranty period, or other such longer period as specified in the Contract Documents.

3.2.3 Within 10 Work Days after receipt of a Deficiency Notice, the Contractor shall submit its proposal and schedule for correcting all non-conforming work. The District may withhold 150% of the installed value identified or such reasonable costs as determined by the Engineer until the non-conforming work is completed in accordance with the requirements of the Contract Documents. Additional costs for engineering, observation, administrative, clerical or other work associated with or resulting from the Contractor's failure to perform its work in conformance with the Contract Documents shall be borne solely by the Contractor, and the Engineer may elect to deduct the District's additional costs from any future payments to the Contractor. If the Contractor refuses or neglects to replace the non-conforming work, the District may correct or replace the non-conforming work at the Contractor's expense. The District's expenses in correcting any non-conforming work will be calculated as fully burdened costs for labor, plus actual costs for materials and equipment, plus a 15% markup on materials and equipment.

3.2.4 Work completed without the Engineer's inspection and approval may be required to be reconstructed or replaced upon the Engineer's inspection. Work covered without prior approval of the Engineer may be required to be uncovered to the extent necessary for the Engineer to determine if the covered Work is satisfactory. The entire cost of replacing or uncovering and re-covering the Work, including the cost of materials furnished by the District, shall be borne by the Contractor, whether or not the Work uncovered or replaced is found to be defective.

3.3 Lines, Grades, and Measurements

3.3.1 Lines and grades will be established by the Engineer, unless otherwise noted, and the Contractor shall provide such assistance and materials as may be required. The Contractor shall be responsible for transferring grades from the survey stakes provided by the Engineer. The Contractor shall carefully preserve all stakes and reference points. Should any stakes, points or monuments be removed or destroyed without the approval of the Engineer, the stakes, points or monuments shall be reset, as necessary, at the Contractor's expense.

3.3.2 The Contractor shall inform the Engineer at least four full Work Days in advance of the times and places that the Contractor requires establishment of lines, grades, or quantity surveys.

3.3.3 If the Contractor fails to provide timely notice to the Engineer regarding its survey requirements, no compensation will be made for the impact to the Contractor for resulting delays.

3.4 Disputes and Claims

3.4.1 Disputes

.1 If the Engineer issues an order or decision that requires the Contractor to perform Work that the Contractor believes is not required by the Contract Documents, the Contractor shall, within 48 hours of the order or decision, notify the Engineer in writing that it disputes the order or decision. The Contractor's notice shall include the date and circumstances of the Engineer's order or decision and the detailed basis for disputing the order or decision. Regardless of the basis of the dispute, the Contractor shall immediately perform the disputed Work or conform to the Engineer's order or decision.

.2 Notice of Intent To File a Claim: The Engineer will consider and investigate the dispute and issue a written and final decision regarding the dispute. If the Contractor disagrees with the Engineer's final decision, the Contractor shall, within 10 days of receipt of the decision, send the Engineer a written Notice of Intent To File a Claim.

.3 Waiver: Failure of the Contractor to comply with the notifications of Articles 3.4.1.1 and 3.4.1.2 within the specified time constitutes a waiver of the Contractor's right to assert a Claim concerning such matter.

3.4.2 Claims

.1 Time to Submit Claim: The Contractor shall submit a written Claim within 30 days after submitting a Notice of Intent to File a Claim. The Claim shall relate directly to the circumstances addressed in the Notice of Intent to File a Claim, must identify the date of the Notice of Intent to File a Claim to which the Claim relates, and may not raise new issues or circumstances that were not identified in the Notice of Intent to File a Claim. The Claim shall clearly state that it is a Claim being submitted under this Article. Failure to submit a written Claim within the 30-day period waives any right to recover compensation or obtain an extension of Contract Time due to the issues referenced in the Notice of Intent to File a Claim.

.2 Contents of Written Claim: The written Claim shall provide detailed information sufficient to allow the Engineer to evaluate entitlement and value of the Claim, including:

a) Description of the event or events giving rise to the Claim;
b) Identification of the date or dates of the event, or events giving rise to the Claim;
c) Identification of all statutory or contractual support for the Claim; and
d) Detailed analysis of the asserted effect on the Contract Sum and the Contract Time.

.3 Extensions in Contract Time: The Claim shall provide an analysis of schedule impact that describes how the Contractor will incorporate the alleged changed Work in the schedule and how that Work impacts the current accepted schedule. The analysis of schedule impacts shall contain a written narrative and a schedule diagram per Construction Progress Documentation set forth in Section 01 32 00 of the specifications depicting how the alleged changed Work affects other schedule activities and an analysis of the potential mitigation efforts. The written narrative shall describe the sequence of events surrounding the alleged change, the affect the events had or will have on the progress of the Work, an explanation regarding the cause of delay, the Contractor's mitigation efforts taken to minimize time impacts to the project, and the Contractor's determination whether additional compensation and/or an extension of the Contract Time is sought for delay. If the Contractor is requesting an extension in the Contract Time, the magnitude and cause of the delay shall be demonstrated in the analysis of schedule impacts.

.4 Delay Analysis Diagrams: The same scheduling software used for the project schedule and schedule update shall be used to create the analysis diagram. The analysis diagram shall be provided in an editable, electronic, file format as well as a printed copy. The results of the analysis diagram shall be tied to the affected sequence of schedule activities to enable the Engineer to evaluate the impact to the critical path as a result of the alleged changed work. The schedule diagram shall also show logic relationships and durations of new activities associated with the alleged change and logic and duration revisions to existing schedule activities due to the alleged change and mitigations taken to minimize impacts to the project. The Contractor is responsible for requesting extensions to its Contract Time based on the analysis of schedule impact.

.5 Adjustments to Contract Sum: The Claim shall also provide adequate financial data supporting any request for a change in Contract Sum. The Claim shall include a detailed cost breakdown of all items claimed, including all costs associated with delays, acceleration, overhead and profit, and the computations used in determining such costs. The Contractor's proposal shall include detailed estimates with cost breakdowns for each Subcontractor whose break down will include the following categories: labor, material, equipment, overhead, and profit. Labor shall be broken down into hours and rate per hour. If applicable, the proposal shall include a breakdown for off-site labor (including factory labor, engineering, etc.). If the exact amount of a Claim is not ascertainable at the time the claim is made, the available supporting data

shall be submitted and any supplemental data supporting the exact amount of the Claim shall be submitted as soon as available.

.6 Claim Format:

a) The Contractor shall submit the claim in the following format:

1) Cover letter and certification.

2) Summary of claim including:

(a) Underlying Facts.

(b) Entitlement.

(c) Mitigation Efforts.

(d) Calculations.

(e) Contract Provisions Supporting Relief.

3) List of documents relating to claim:

(a) Specifications.

(b) Drawings.

(c) Clarifications/Requests For Information.

(d) Schedules.

(e) Other.

4) Chronology of Events and Correspondence.

5) Analysis of Claim Merit.

6) Analysis of Claim Cost.

7) Analysis of Schedule Impact.

8) Attachments:

(a) Specifications.

(b) Drawings.

(c) Clarifications/Requests For Information.

(d) Correspondence.

(e) Schedules.

(f) Other.

b) The Contractor, through a corporate officer or general partner, shall certify under penalty of perjury pursuant to the laws of the State of California for any Claim filed on behalf of itself or its Subcontractors or Suppliers, that:

1) The Claim is made in good faith;

2) Supporting data are accurate and complete to the best of the Contractor's knowledge and belief; and

3) The amount requested accurately reflects the contract adjustment for which the Contractor believes the District is liable.

.7 If Contractor does not certify the Claim as required above, the Claim will be denied without any further recourse by, or remedy to, the Contractor.

.8 Condition Precedent (Government Code, Sections 930, et seq.):

a) The Disputes and Claims procedures set forth in Article 3.4 are the exclusive procedures for presenting any Claims exceeding $375,000 and are a condition precedent to filing a Government Code Claim, which, in turn, is a condition precedent to the right to initiating any action against the District related to the Claim. Claims may not be divided into amounts less than $375,000 to avoid the requirements of this Article 3.4 and any claims arising from the same facts or circumstances, or related facts or circumstances, will be deemed a single claim valued as the sum of all related claims. Failure to comply with the Disputes and Claims procedures offset forth in Article 3.4 is a waiver of any Claim arising from or related to the facts and circumstances described in the Claim or the Notice of Intent to File a Claim.

.9 For claims less than or equal to $375,000, the Contractor shall comply with Public Contract Code, Section 20104, et seq., which is set forth below in relevant part (as used therein, the term "local agency" means East Bay Municipal Utility District). This Public Contract Code section on Claim resolution does not supersede the Claim documentation requirements in this Article 3.4 and only becomes operative upon the timely notice and submittal of a Claim under the contract.

“20104. (a) (1) This article applies to all public works claims of three hundred seventy-five thousand dollars ($375,000) or less which arise between a contractor and a local agency.

(2) This article shall not apply to any claims resulting from a contract between a contractor and a public agency when the public agency has elected to resolve any disputes pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2.

(b) (1) "Public work" means “public works contract” as defined in Section 1101 but does not include any work or improvement contracted for by the state or the Regents of the University of California.

(2) "Claim" means a separate demand by the contractor for (A) a time extension, (B) payment of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (C) an amount the payment of which is disputed by the local agency.

20104.2. For any claim subject to this article, the following requirements apply:

(a) 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 in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims.

(b) (1) For claims of less than fifty thousand dollars ($50,000), the local agency 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 to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency’s written response to the claim, as further documented, shall be submitted to the claimant within 15 days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.

(c) (1) For claims of over fifty thousand dollars ($50,000) and less than or equal to three hundred seventy-five thousand dollars ($375,000), the local

agency 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 to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.

(d) If the claimant disputes the local agency's written response, or the local agency fails to respond within the time prescribed, the claimant may so notify the local agency, in writing, either within 15 days of receipt of the local agency's response or within 15 days of the local agency's 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 local agency shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(e) Following the meet and confer conference, if the claim or any portion remains in dispute, the claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) or Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

(f) This article does not apply to tort claims and nothing in this article is intended nor shall be construed to change the time periods for filing tort claims or actions specified by 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.**"**

All civil actions filed to resolve claims under this Act are subject to the provisions of Public Contract Code Section 20104.4 and 20104.6(b).

.10 The parties specifically and expressly agree that Government Code, Section 12650, et seq., applies. If a false claim is knowingly submitted (as the terms "claim" and "knowingly" are defined in the California False Claims Act, Government Code, Section 12650, et seq.), the District will be entitled to civil

remedies set forth in the California False Claim Act. It may also be considered fraud and the Contractor may be subject to criminal prosecution.

.11 Under no circumstances will the Contractor be entitled to indirect, consequential, special and incidental damages.

ARTICLE 4 - CONTRACTOR'S RESPONSIBILITIES

4.1 Responsibility of the Contractor

4.1.1 Means and Methods. The Contractor shall complete the entire Work to the satisfaction of the Engineer in accordance with the Contract Documents. The Contractor is solely responsible for the means, methods, techniques, sequence, scheduling, workforce, and procedures of construction unless otherwise specified. The Contractor is solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with performance of Work under the contract and shall comply and enforce all Cal/OSHA requirements on this project. The Contractor is the "controlling employer" for this project as defined by Cal/OSHA.

4.1.2 Work. The Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, transportation, utilities, and other facilities and services required for the proper execution and completion of the Work included in this contract.

4.1.3 Permit, Fee and Licenses. Unless otherwise specified**,** the Contractor shall secure and pay for all licenses, royalties, government fees, and permits necessary for proper execution and completion of the Work. The Contractor shall give notices as required by permits prior to commencement of the Work, and provide copies of all permits to the Engineer before starting on the Work.

4.1.4 Contractor's Licensing Requirements. The Contractor shall have all required California State and local licenses and certificates for performance of the Work, and shall furnish satisfactory proof of licensing and certifications to the Engineer upon request. All required licenses and certificates shall be valid throughout construction of the project.

4.1.5 Taxes. The Contractor shall pay all State, Federal, and local taxes applicable to the project, including all sales, use, gross receipts and similar taxes properly assessed against its equipment, materials, or property used or required in connection with the Work.

4.1.6 Compensation for Employees. In accordance with the provisions of Section 3700 of the Labor Code, the Contractor shall secure the payment of compensation to its employees, Subcontractors and Suppliers.

4.2 Supervision of the Work

4.2.1 Superintendent. The Contractor shall provide a qualified, competent superintendent at the project site to supervise and direct all Work being performed by the Contractor, Subcontractors, and their respective agents and employees to ensure that the Work is being carried out in accordance with the Contract Documents. The Contractor shall designate, in writing, the scope and authority of the superintendent before the Work begins. Instructions and information given by the Engineer to the Contractor's superintendent about the Work are binding on the Contractor.

4.2.2 Coordination of the Work. Before starting each portion of the Work, the Contractor shall: (i) review and compare the various Contract Documents relative to that portion of the Work, as well as any additional information furnished by the Engineer and approved Subcontractor submittals that may affect proper installation of the Work; (ii) field measure existing conditions related to that portion of the Work; and (iii) observe any conditions at the site that may directly impact that portion of the Work, promptly reporting any improper or defective Work to the Engineer. Any errors or inconsistencies in the Contract Documents shall be promptly reported to the Engineer in writing as a request for information or clarification.

4.2.3. **Duty of Care.** All Work shall be performed in a workmanlike manner meeting construction industry standards for a similar project located in California, regardless of any omission from the Contract Documents**.**

4.3 Contractor's Employees

4.3.1 The Contractor shall employ competent qualified personnel to construct the Work and shall maintain discipline and order at the project site.

4.3.2 Substitution of Key Personnel. The Contractor cannot substitute key personnel, lessen their level of effort, or reduce the amount of time key personnel are assigned to the project without written consent from the Engineer. If the Contractor proposed specific key personnel during prequalification, or in response to an invitation to bid, the Contractor shall provide the same personnel at the same level of effort and for the same duration and amounts of time per week.

4.3.3 Removal of Personnel. The Contractor shall not remove or replace any key personnel without the prior written consent of the Engineer, which will not be unreasonably withheld. When required by the Engineer, the Contractor shall remove from the project any person who, in the Engineer’s opinion, is unfit, disorderly, dangerous, insubordinate, incompetent, or otherwise objectionable. Removed personnel may not be reemployed on the project without the Engineer’s prior written consent. Such removal shall not be the basis of any claim for compensation or damages against the District or any of its officers, directors or employees. Within one week of removal, the Contractor shall propose a replacement to the Engineer. The replacement person shall hold the same position

or title and have approximately the same number of years of experience or more as the person that was removed from the project.

4.4 Materials and Workmanship

4.4.1 Materials and Workmanship. All materials and equipment incorporated into the Work shall be new, unexpired, of good quality, and of current manufacture unless otherwise specified. All materials shall be of the specified quality and equal to approved samples, if samples were required.

4.4.2 Substitution of Materials or Equipment. Materials, products, services or equipment specified or designated in the Contract Documents are intended to indicate the measure of quality and utility. Unless the Contract Documents specifically state that there are no substitutions, the Contractor may submit other brands of the specified product provided that the submitted product is of equal or better quality, possesses the required characteristics for the purpose intended and shall not involve additional cost to the District. By proposing a substitute, the Contractor warrants that it is equal to that specified and takes complete responsibility for any errors, omissions, conflicts, all modifications to existing piping, ductwork or electrical connections, or inconsistencies caused by using the substitute, including any additional costs of engineering or inspection, or necessary coordination with connections to make the substitute perform as specified. All submittals shall receive written approval from the Engineer prior to installation.

4.4.3 Procurement and Storage. All materials and equipment shall be furnished in ample quantities and procured in a timely manner to ensure uninterrupted progress of the Work. All materials and equipment shall be properly stored and protected and any loss or damage due to improper storage or protection shall be borne by the Contractor.

4.4.4 Site Logistics. The Contractor shall maintain its storage area and shall keep its storage areas clean, safe and secure. Any materials or equipment stored offsite shall be insured. The risk of loss shall remain on the Contractor for all materials and equipment stored off-site.

4.5 District's Right to Perform Separate Work

4.5.1 Separate Work. The District reserves the right to perform separate work at or near the project site at any time by the use of its own forces or other contractors. The Contractor shall coordinate its Work with the District and/or the District's other contractors and shall cooperate with the District to avoid any delay or hindrance to the project schedule and the other's work.

4.5.2 Delays and Defective Construction. The District shall be reimbursed by the Contractor for costs incurred by the District that are payable to its separate contractors as a result of the Contractor caused delays, improperly timed activities, damaged work, or defective construction.

4.6 Patents and Copyrights

4.6.1 The Contractor shall pay all license fees and royalties and all other costs incidental to use in the Work of any patented or copyrighted design, process, or product. The Contractor shall indemnify and hold harmless the District, its officers, agents, and employees against all costs and claims arising from any infringement of patents or copyrights incidental to use in the Work of any design, process, or product not specified in the Contract Documents.

4.7 Contractor's Responsibility for Losses and Liabilities

4.7.1 Risk of Loss. Until acceptance of the Work by the District, the Contractor bears all risk of loss or damage to the Work or to any part of the Work and to any materials or equipment ordered or purchased for the Work whether located at the project, suitably stored off-site or in transit regardless of the cause of loss or damage. However, the Contractor is not responsible for the cost of repair or restoration of damage to the Work caused by an Act of God as that term is defined in Section 7105 of the Public Contract Code.

4.7.2 Protection of Materials and Facilities

.1 The Contractor is responsible for the preservation, protection and care of equipment, materials and facilities whether located on the project site or elsewhere and if it does not do so, the District may, at its option, do so at the Contractor’s expense.

.2 The Contractor is responsible for any District-furnished material upon receipt and for protection of the Work until it is completed and accepted. The Contractor shall at its own expense replace damaged or lost material and repair damaged parts of the Work.

.3 The Contractor shall protect District facilities from damage resulting from its Work. District facilities damaged by or as a result of the Contractor's Work shall be repaired or replaced, at the Contractor's expense.

.4 The Contractor shall maintain the project site in a clean, safe and orderly condition. Upon completion of the Work, the Contractor shall remove all temporary buildings and structures, rubbish, debris, abrasive blast media, unused material, concrete forms, and other materials used during construction that are not part of the completed work.

.5 The Contractor shall provide fire watch and be responsible for all fire prevention in connection with the Work. Open fires will not be permitted on the project site. The Contractor shall notify the Engineer before undertaking any torch cutting and welding operations. The Contractor shall take all necessary safety precautions during torch cutting and welding operations including, but not limited to, fire watch, providing fire extinguishers and fire blankets at the location where the operations are occurring. The Contractor shall be

responsible for any damages caused by the Contractor or Subcontractor during such operations.

4.7.3 Laws and Regulations

.1 The Contractor, its agents and employees shall observe and comply with all Federal, State, Municipal and local laws, ordinances, rules, regulations, building codes and standards, orders, notices and requirements applicable to its Work on this project. Nothing in these Contract Documents may be construed to permit Work not conforming to such laws, ordinances, and regulations. If the Contractor should discover any aspect or portion of the Contract Documents that conflicts with any law, ordinance, regulation, order, or decree, the Contractor shall immediately report the conflict in writing to the Engineer. Where the applicable legal requirements of public authorities differ from those of the Contract Documents, the more stringent requirements shall apply.

.2 If an applicable law requirement was not in effect on the date of submission of bids, the Contract Sum and the Contract Time will be adjusted, if necessary, as provided in Article 7. Under no other circumstance will the Contract Sum or Contract Time be adjusted because of the effect of any applicable law, ordinance, regulation, order, decree or other legal requirement of public authorities in effect on the date of bid submission.

4.7.4 Duty to Defend. Notwithstanding assertions that the District, the Board, any member of the Board, or the District's officers, agents, or employees may have been actively or solely negligent, the Contractor shall assume the defense of the District, the Board, each member of the Board, and the District's officers, agents, and employees from all claims of any kind arising directly or indirectly out of the performance of, or on account of, the Work.

4.7.5 Indemnity

.1 To the fullest extent allowed by law (including, but not limited to, Civil Code Section 2782), the Contractor shall indemnify and save harmless the District, the Board, each member of the Board, and the District's officers, agents, and employees (collectively “Indemnitees”) from all liability, claims, damage and loss, of any kind, including attorneys' fees, subject to the limitations set forth by law, that arise out of, on account of, or in connection with the performance of the Work, including, but not limited to, liability or claims arising out of or resulting from:

a) Any act or omission of the Contractor, its Subcontractors and Suppliers, or anyone directly employed by any of them for whom the Contractor may be liable, during the performance of the Work; in guarding or maintaining the Work; or from any improper materials, implement, or appliances used in construction of the Work;

b) Violation of any law, ordinance, regulation, order, or decree, whether by the Contractor, its Subcontractors, Suppliers or anyone directly employed by any of them for whom the Contractor may be liable;

c) The use or manufacture by the Contractor, its agents, or the District of any copyrighted composition, secret process, patented invention, article, or appliance, unless specifically specified in the Contract Documents;

d) Any breach of warranties, whether express or implied, made to the District by the Contractor, its Subcontractors, Suppliers or anyone directly employed by any of them for whom the Contractor may be liable;

e) The willful misconduct of the Contractor, its Subcontractors, Suppliers or anyone directly employed by any of them for whom the Contractor may be liable;

f) Any breach or default of the obligations assumed by the Contractor under this contract;

g) Injuries, sickness, disease or death of employees of the Contractor or its Subcontractors, Suppliers or anyone directly employed by any of them for whom the Contractor may be liable in connection with performance of the Work; and

h) Destruction of tangible property (other than the Work itself).

.2 The Contractor's duty to indemnify is not affected or in any way diminished because the District, the Board, any member of the Board, or the District's officers, agents, or employees jointly caused or contributed to the liability or claim by their acts, omissions, conduct, or negligence, except that the Contractor is not obligated to indemnify an Indemnitee against its sole or active negligence, willful misconduct, or for defects in designs furnished by the Indemnitee. The Contractor's indemnification obligation is not limited by the Contractor's insurance, if any, 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 the Workers' Compensation Act, Disability Benefit Act, or other employee benefit act. Said duty to indemnify shall not apply to the District's active negligence, consistent with Civil Code Section 2782.

4.8 Protection of Property

4.8.1 The Contractor shall take all necessary precautions to provide for the safety and protection of all persons who may come in contact with the Work and for all property within and adjacent to the project site including, but not limited to, adequate precautions to protect existing sidewalks, curbs, pavements, utilities, shrubs, trees, and other adjoining property and structures. Should any facility,

structure, or property be damaged by the operations of the Contractor, the Contractor shall immediately notify the proper owners or authorities and the Engineer. The precautionary measures shall apply continuously and not be limited to normal work hours.

4.8.2 If damage to persons or property occur as a result of the Work, the Contractor shall be responsible for proper investigation, documentation, including video or photography, to adequately memorialize and make a record of what transpired. The Contractor, at its own expense, shall rebuild, repair and restore, to the Engineer's satisfaction, all damage resulting from its operations as a condition of contract acceptance.

4.8.3 Pursuant to Public Contract Code, Section 9201, the District will provide timely notification to the Contractor of the receipt of any third-party claims relating to damaged property.

4.9 Contractor Use of Premises

4.9.1 The Contractor shall confine operations at the project site to areas permitted by the Contract Documents and shall not encumber the site with excessive material or equipment. The Contractor shall not impose load on any structure that will damage or endanger the structure. The Contractor shall take all actions necessary to prevent annoyance to occupants adjacent to or in the vicinity of the Work and shall not hinder access or operations of District personnel or equipment.

4.10 Documents On-site

4.10.1 Contract Documents. The Contractor shall maintain a copy of all Contract Documents at the project site, including but not limited to, subcontracts; Change Orders; requests for information; site, health and safety plan; material safety data sheets; the current construction progress schedule; updated as-built drawings; all approved submittals and samples pertaining to the Work; and any governing authority required documents. The Engineer shall have access to the Contract Documents during the Contractor’s normal business hours.

4.11 Review of Contract Documents and Field Conditions

4.11.1 The Contractor shall carefully study and compare the Contract Documents for any errors, omissions, or discrepancies; and shall take field measurements and carefully compare such field measurements with the Contract Documents. The Contractor shall immediately inform the Engineer in writing of any apparent errors, omissions, or discrepancies and shall await instructions before proceeding with the Work. Instructions given by the Engineer, which are manifestly necessary to carry out the intent of the Contract Documents or which are customarily performed, shall be performed by the Contractor as if fully and correctly set forth in the Contract Documents at no additional cost to the District.

4.11.2 If the Contractor performs any construction activity that it either knows or should have known involves an error, omission, or discrepancy referred to in Article 4.11.1 without notifying and receiving written instructions from the Engineer, the Contractor shall be responsible for resultant losses, including without limitation, the costs and time of correcting the defective Work.

4.11.3 Drawings indicate general and typical details of construction. Where conditions are not specifically indicated but are of similar character to details shown, similar details for construction shall be used, subject to review by the Engineer.

ARTICLE 5 – SUBCONTRACTORS AND SUPPLIERS

5.1.1 The Contractor is fully responsible to the District for the acts and omissions of Subcontractors, Suppliers, and of persons and/or persons or entities employed by the Contractor to the same extent the Contractor is responsible for its own acts and omissions.

5.1.2 All Subcontractors shall posses the appropriate California State contractor's license and certifications at time of bid and during the performance of the Work. The Contractor shall comply with all requirements of the Subletting and Subcontracting Fair Practices Act commencing with Public Contract Code, Section 4100, et seq. Violation of the Subletting and Subcontracting Fair Practice Act are grounds for cancellation of the Contract under Public Contract Code, Section 4110, and disciplinary actions under Section 4111.

5.1.3 The Contractor shall coordinate all Subcontractors and Suppliers engaged in the Work. The Contractor shall ensure that all of its Subcontractors commence their respective work at the proper time and proceed with due diligence to avoid delays and/or damage to the Work. Any property damage caused by Subcontractors or Suppliers during the Work shall be repaired or paid for by the Contractor.

5.1.4 Nothing contained in the Contract Documents shall be construed as creating any contractual relationship between any Subcontractor, or Supplier, and the District. The District will not undertake to settle differences between the Contractor and its Subcontractors or Suppliers.

ARTICLE 6 - SAFETY OF PERSONS AND PROPERTY

6.1 Contractor's Responsibility

6.1.1 Notwithstanding any other provision of the specifications, the Contractor is solely and completely responsible for conditions of the jobsite, including safety of all persons and property, during performance of the Work. This requirement applies continuously and is not limited to normal work hours. Health and safety provisions shall conform to applicable Federal, State, County, and local laws, regulations, ordinances, standards, and codes, including the Federal Occupational Safety and

Health Act of 1970 (29 U.S.C., Section 651, et seq.) and California Code of Regulations, Title 8, Industrial Relations Division 1, Department of Industrial Relations, Chapter 4. Where any of these are in conflict, the more stringent requirement shall be followed.

6.2 Public Safety

6.2.1 During the performance of the Work, the Contractor shall erect and maintain necessary temporary fences, bridges, railings, lights, signals, barriers, or other safeguards as appropriate under the circumstance for the prevention of accidents. In addition, the Contractor shall take other precautions as necessary for public safety including, but not limited to, traffic control.

6.3 Engineer's Responsibility

6.3.1 The Engineer's review of the Contractor's construction performance and submittal documents is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the construction site.

6.3.2 The Engineer may suspend operations if it determines that an imminent safety hazard exists.

6.4 Emergency Work

6.4.1 During Work Hours. The Contractor shall act, without previous direction from the Engineer in case of an emergency arising from the performance of the Work that threatens loss or injury to property and/or safety of life. The Contractor shall notify the Engineer of the emergency as soon as possible. Any compensation claimed by the Contractor, together with substantiated documents in regard to expense, shall be submitted to the Engineer within 15 calendar days after the emergency. Additional compensation, if allowed, will be paid for through Article 7.

6.4.2 Outside of Work Hours. The Engineer will notify the Contractor of all emergencies for which it is aware that arise outside of regular work hours as a result of the Work. The Contractor shall respond to the emergency immediately without delay and shall, with the least practicable inconvenience, make the necessary repairs, replacements, or perform other necessary work. If the Contractor does not act promptly in accordance with this requirement, or should the circumstances of the case require repairs, replacements, or performance of other necessary work before the Contractor can be notified or can respond, the District may, at its option, make the necessary repairs, replacements, or perform the necessary work and deduct its cost of labor, materials and equipment from the Contractor’s next progress payment. Performance of emergency work by District forces will not relieve the Contractor of any of its responsibilities, obligations, or liabilities under the contract.

ARTICLE 7 - CHANGES

7.1 General

The District reserves the right to make such alterations, deviations, additions to or deletions from the drawings and specifications, including increases or decreases to the quantity of any item or portion of work or omitting any item or portion of the work or any other changes in the Work that the Engineer determines to be necessary or advisable for proper completion or construction of the whole work. No change in the scope of work shall be authorized, and the Contractor shall not be eligible for compensation for any extra work performed, unless the change is ordered by the Engineer in writing.

7.2 Change Orders

7.2.1 Changes in the Work can only be made through a written contract Change Order issued by the Engineer. If the change causes an increase or decrease in the Contractor's Contract Sum, or a change in the Contract Time, an adjustment may be made as determined by the Engineer. The approved Change Order will specify increase or decrease to the Contract Sum and adjustment to the Contract Time, if any.

7.2.2 Prior to issuing an approved Change Order, the Engineer may request that the Contractor submit a proposal covering the changes. The Change Order request will include a description of the work or revised drawings or specifications reflecting the proposed changes. Within 10 Work Days after receiving the request, the Contractor shall submit its proposal to the Engineer of all costs associated with the proposed change and any request for an extension of Contract Time. Contractor's proposal shall include detailed estimates with cost breakdowns for each Subcontractor, including labor, material, equipment, overhead, and profit. Labor shall be broken down into hours and rate per hour. If applicable, the proposal shall include a breakdown for off-site labor (including factory labor, engineering, etc.). The Contractor's proposal shall include an Analysis of Schedule Impact (See Article 3.4.2) when the Contractor is requesting an adjustment in Contract Time. Costs associated with preparation of the proposal, including the Analysis of Schedule Impact, are considered to be covered in the markup allowances in Article 7.3.4. The Contractor shall be responsible for any delay associated with its failure to submit its change proposal within the time specified. If the Engineer decides not to issue an approved Change Order after requesting a proposal from the Contractor, the Contractor will be notified in writing. The Contractor is not entitled to reimbursement for Change Order preparation costs for cancelled Change Order requests.

7.2.3 If the Contractor agrees with the terms and conditions of the approved Change Order, the Contractor shall indicate its acceptance by signing the original copy and returning it to the Engineer within 10 Work Days after receipt or with reasonable promptness and in such sequence as to not delay the Work or activities of the District or of separate contractors, whichever is sooner. If notice of any change is

required to be given to a surety by the provisions of any bond, the Contractor shall provide notice and the amount of each applicable bond shall be adjusted separately. Payment in accordance with the terms and conditions set forth in the executed Change Order shall constitute full compensation for all Work included in the Change Order and the District will be released from any and all claims for direct, indirect, and impact expenses and additional time impact resulting from the Work. If the Contractor disagrees with the terms and conditions of the approved Change Order, the Contractor shall indicate specific areas of disagreement and return the approved Change Order to the Engineer. The Contractor shall submit a written dispute in accordance with Article 3.4. No payment will be made on the disputed work until the approved Change Order is returned to the Engineer. However, whether or not the Contractor agrees with the terms and conditions of an approved Change Order, the Contractor shall immediately revise its sequence of operations as required to facilitate timely completion of the changed work and shall proceed with the revised work sequence.

7.2.4 The Engineer may, after having received a written cost quotation from the Contractor, order the Contractor, in writing, to proceed with the work prior to issuance of an approved Change Order through a change directive. The change directive will authorize the Contractor to proceed with the work subject to the cost quotation submitted by the Contractor. Within five days following receipt of the change directive, the Contractor shall submit a detailed change proposal as described in Article 7.2.2 documenting the amount of compensation. The Engineer will review the change proposal and, at its option, will either issue an approved Change Order for the work or direct the Contractor to perform the work through Force Account. Until the method of compensation is determined and the approved Change Order is received, the Contractor shall keep full and complete time and material records of the cost of the ordered work and shall permit the Engineer to have access to such records. An approved Change Order shall supersede any previously issued written change directive covering the same Work.

7.2.5 Accord and Satisfaction and Reservations of Rights: Every executed Change Order shall constitute a full accord and satisfaction, and release of all Contractor (and, if applicable, Subcontractor) claims for additional time, money or other relief arising from or relating to the subject matter of the change including, without limitation, impacts of all types, cumulative impacts, inefficiency, overtime, delay, and any other type of claim.

7.3 Determination of Costs for Force Account Change Order Work

7.3.1 Labor. The cost of labor used in performing the Change Order work, whether the employer is the Contractor and/or its Subcontractor, shall be the sum of the following:

.1 Actual Wages: Actual wages paid to workers, including foremen devoting their exclusive attention to the work in question. The actual wages shall include payments to, or on behalf of, workers for health and welfare, pension, vacation,

travel, subsistence**,** and similar purposes, and shall be paid at the wage rate demonstrated by submitted certified payrolls or, if the certified payrolls were not available, at the rate set forth in the pertinent prevailing wage determinations issued by the Director of Industrial Relations for the wage class common to the work performed. Superintendent's wages are included under the allowance for overhead and profit and shall not be included as part of these computations.

.2 Labor Surcharge: To the actual wages, as defined in Article 7.3.1.1 above less those for travel and subsistence, will be added 27 percent, which shall constitute full compensation for all payments imposed by State and Federal laws, such as taxes, and for insurance and all other payments made to, or on behalf of, the workers, other than actual wages as defined in Article 7.3.1.1 above.

7.3.2 Materials. Only materials incorporated in the Change Order work will be paid for, the cost of which shall be the cost to the purchaser, including sales tax, if applicable, whether the Contractor and/or its Subcontractor, from the Supplier thereof, except as the following are applicable:

.1 If a cash or trade discount by the actual Supplier is offered or available to the purchaser, it shall be credited to the District notwithstanding the fact that such discount may not have been taken.

.2 If materials are procured by the purchaser by any method which is not a direct purchase from a direct billing by the actual Supplier to such purchaser, the cost of such materials shall be deemed to be the price paid to the actual Supplier as determined by the Engineer. No markup except for actual costs incurred in the handling of such materials will be permitted, and only application of one common markup to cover multiple handling.

.3 If the materials are obtained from a supply or source owned wholly or in part by the purchaser, payment therefor will not exceed the price paid by the purchaser for similar materials furnished from said source on contract items or the current wholesale price for such materials delivered on the job site, whichever price is lower.

.4 If the cost of such materials is excessive in the opinion of the Engineer, then the cost of such materials shall be deemed to be the lowest current wholesale price at which such materials are available in the quantities concerned and timely delivered to the job site, less any discounts as provided in Article 7.3.2.1 above.

7.3.3 Equipment. The Contractor and/or its Subcontractor will be paid for the use of equipment at the rental rates established as provided in Articles 7.3.3.1 and 7.3.3.2 below, which rates shall include the cost of fuel oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals. Operators of rented equipment will be paid for as provided in Article 7.3.1 above.

Unless otherwise specified, manufacturers' ratings shall be used to classify equipment for the determination of applicable rental rates.

.1 Equipment on the Work: For the use of any equipment normally required for the contract regardless of whether the equipment is already on the work or is to be delivered to the project, the Contractor and/or its Subcontractor will be paid for the use of such equipment as follows:

a) If equipment is owned by the Contractor and/or its Subcontractor, payment will be at the rental rates listed for such equipment in the State of California's Department of Transportation publication titled "Labor Surcharge and Equipment Rental Rates" that is in effect on the date that the Work is performed. The rental rates for equipment not listed under the schedules of rental rates set forth by the State of California shall be those agreed upon by the Contractor and/or its Subcontractor, and the Engineer, except that in no case shall the rental rates exceed those of established distributors or equipment rental agencies within the locality of the project. The Contractor and/or its Subcontractor shall provide full documentation to the satisfaction of the Engineer to support any proposed equipment rental rates. Documentation shall include a breakdown of costs per Article 7.3.3, including amortized depreciation versus wear and tear, and maintenance expenses versus operating expenses.
Compensation for idle time of equipment through delays caused by the District will be made by applying the delay factor listed in the Caltrans User's Guide for Labor Surcharge and Equipment Rental Rates (current version), or if unlisted at 50 percent of the rental rates listed in the State of California Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates." Compensation for idle time shall not exceed eight (8) hours per day and forty (40) hours per week.

b) If equipment is rented, payment will be the actual rental cost as indicated on the rental invoice.

Individual pieces of equipment or tools not listed and having a replacement value of $1,000 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made for their use on the Work.

In computing the rental of equipment, the minimum rental time to be paid per day shall be one hour. Rental time shall not be allowed while equipment is inoperative due to breakdowns or non-Work Days. Loading and transporting costs shall be allowed when the equipment is moved by means other than its own power.

.2 Equipment for Change Order Work: For the use of equipment not required under the Contract Documents, moved on the Work and used exclusively for Change Order work, the Contractor will be paid at the rates agreed upon by the

Contractor and/or Subcontractor, and the Engineer through the Change Order process, except that in no case shall the rental rates paid exceed those of established distributors or equipment rental agencies.

The rental period shall begin at the time the equipment is required and unloaded at the site and shall terminate on the day that the Change Order work is completed, except that the minimum total rental time to be paid for shall be not less than four hours.

The Contractor and/or its Subcontractor will be reimbursed for the cost of transporting the equipment to and from the Work. Should the equipment be transported by low bed trailers, hourly rates charged by established haulers will be paid. Also, the District will pay for loading and unloading costs. Should the Contractor and/or its Subcontractor desire the return of the equipment to a location other than its original location, the District will pay the cost of transportation in accordance with the above provisions, provided such cost does not exceed the cost of moving the equipment to the project.

7.3.4 Markup Allowances. The Contractor and/or its Subcontractors or Suppliers that perform on-site work are entitled to compensation for overhead and profit for the performance of Change Order work. This compensation shall be in the form of markup percentages applied to the costs computed as provided for in Articles 7.3.1 through 7.3.3 and is full and complete payment for overhead and profit. Overhead includes, but is not limited to, superintendent costs, bond and insurance premiums, financing costs, project engineer, project manager, scheduler, estimator, drafting, small tools, home office expenses, field office expenses, and utilities (gas, electricity, sewer, water, telephone, fax, copier, etc.). The Contractor shall not receive payment for itemized costs which are considered to be included under the profit and overhead percentage markup.

.1 For work by the Contractor's own organization or by its Subcontractor's own workforce, the Contractor may apply, as a maximum, the following markup percentages as overhead and profit:

1. Labor	20 percent
2. Materials	15 percent
3. Equipment (owned or rented)	15 percent

.2 Under a fixed price adjustment basis, if work is performed by a Subcontractor with its own workforce, the Contractor may apply an additional 5 percent markup to the total which has been computed in accordance with Article 7.3.4.1. The Contractor shall reach agreement with the Subcontractor and any intermediate Subcontractor as to the division of the markup percentages between them.

.3 Under a force account basis, if work is performed by a Subcontractor with its own workforce, the Contractor may not apply an additional 5 percent markup, as provided for under Article 7.3.4.2, to the total which has been computed in accordance with Article 7.3.4.1. The Contractor shall reach agreement with the Subcontractor and any intermediate Subcontractor as to the division of the markup percentages between them.

7.4 Lump Sum or Force Account Adjustments

7.4.1 Change Order work will be paid for by either a Lump Sum adjustment of the Contract Sum or on a Force Account basis, or a combination of both, as determined by the Engineer. Change Order work will not be paid for unless ordered in writing by the Engineer.

7.4.2 In the event the Contractor fails to submit its proposal within 15 days after receipt of a written request for proposal, or the Engineer and the Contractor fail to agree upon a negotiated Lump Sum adjustment, within a reasonable time, or if in the judgement of the Engineer, it is impracticable because of the nature of the Work or for any other reason to fix the price for completion before the work order is issued, the Engineer has the option of authorizing payment on the basis of a Force Account.

7.4.3 The Contractor shall notify the Engineer in writing of the day and time on which Force Account work will commence prior to beginning work. All Force Account work shall be reported daily on daily extra work reports furnished by the Engineer to the Contractor and signed by both parties, which daily reports shall thereafter be considered the true record of Force Account work completed. Completely detailed invoices covering the Force Account work shall be submitted for payment consideration not later than 15 days after the completion of the work. The charges for Work performed by the Contractor or a Subcontractor shall be reported separately. Substantiating invoices from Suppliers and Subcontractors shall be included with the Contractor's invoices. The Contractor shall permit examination of accounts, bills, and vouchers relating to the Force Account work when requested by the Engineer. Payment for the Work done under Force Account will be made after receipt of an executed Change Order issued to cover the increase in the Contract Sum.

7.4.4 Payment for the Work completed under Lump Sum adjustment will be made after receipt of an executed Change Order issued to cover the change in the Contract Sum and/or Contract Time.

7.5 Variation in Quantity in Unit Price Work

7.5.1 **General.** The estimated quantities for Unit Price work listed in the Bid Form are established for the sole purpose of bid comparison and do not constitute a guarantee to the Contractor of the quantities of work to be performed under this contract. The Contractor shall be compensated only for the actual quantities of work performed which were directed by the Engineer. The amount of compensation for each item of

Work shall be computed by multiplying the actual quantity by the appropriate bid Unit Price except as follows:

.1 Increases of more than 20 percent: If the actual quantity of work performed on an item of Work exceeds the estimated quantity by more than 20 percent, the quantity in excess of 120 percent of the estimated quantity shall be paid for based upon (a) actual unit cost or (b) as mutually agreed to by the Contractor and the Engineer. The Engineer will determine which method is to be utilized. If the actual unit cost method is utilized, the actual unit cost is determined by calculating the total cost incurred for completing 120 percent of the estimated quantity using the markups allowed under Article 7.3.4, which is then divided by the quantity of work performed, i.e., 120 percent of the estimated quantity. If costs applicable to the Work performed include fixed costs, such fixed costs shall be deemed to have been recovered by the Contractor by the payments made to the Contractor for 120 percent of the estimated quantity at the bid Unit Price. In computing the actual unit cost, such fixed costs shall be excluded.

At the discretion of the Engineer, the Engineer can make payment on the quantity in excess of 120 percent of the estimated quantity using exactly the provisions and procedures in the "Force Account" Articles 7.3 and 7.4.3.

.2 Decreases of more than 20 percent: If the actual quantity of work performed on an item of Work is less than 80 percent of the estimated quantity, the quantity shall be paid for (a) based upon actual cost using the markups allowed under Article 7.3.4, or (b) as mutually agreed to by the Contractor and the Engineer.

Payment for the actual quantity of work performed shall, in no case, exceed the payment which would have been made for performance of 80 percent of the estimated quantity at the bid Unit Price.

7.6 Deleted Work

7.6.1 Deleted Work. If work is deleted, payment will be made to the Contractor for costs incurred in connection with the deleted work if incurred prior to notification of deletion by the Engineer.

If approved material is ordered by the Contractor for the deleted work prior to the notification by the Engineer, and if orders for such materials cannot be canceled, payment for such material will be the actual cost to the Contractor. In such case, the material shall become the property of the District. If the material can be returned to the vendor, and if the Engineer so directs, the material shall be returned and the Contractor will be paid for the actual costs or charges made by the vendor for returning the material including any stocking charges.

The costs incurred or charges paid to the Contractor for Work completed prior to deletion shall be computed using the markups allowed in Article 7.3.4. Payment for

deleted work will be based on the approved schedule of costs or other mutually agreed value. A minimum of a 10 percent credit shall be provided to the District for overhead, profit and markup associated with the deleted work.

7.7 Differing or Unusual Site Conditions

7.7.1 Pursuant to Public Contract Code, Section 7104, the Contractor shall promptly, and before such conditions are disturbed, notify the Engineer in writing of: (1) material that the Contractor believes may be hazardous waste, as defined in Section 25117 of the Health and Safety Code (other than material indicated in the Contract Documents) and that is required by law to be removed to a Class I, Class II, or Class III disposal site; (2) subsurface or latent physical conditions at the site differing materially from those indicated in this contract; or (3) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this contract.

7.7.2 The Engineer will promptly investigate the conditions. If the Engineer finds that the conditions do materially differ, or do involve hazardous waste, and do cause an increase or decrease in the Contractor's Contract Sum and/or the Contract Time a contract adjustment will be made through the Change Order process, as determined by the Engineer.

7.7.3 If the Contractor and the Engineer disagree whether the conditions do materially differ or whether a hazardous waste is involved or whether the conditions cause an increase or decrease in the Contractor's Contract Sum and/or Contract Time, the Contractor shall nevertheless proceed with all Work to be performed under the contract and shall comply with the completion dates required by the contract. The Contractor waives any rights to an increase in Contract Time, or an increase in Contract Sum, unless it timely follows the Disputes and Claims procedures in Article 3.4.

ARTICLE 8 - TIME

8.1 Commencement, Prosecution, and Completion of Work

8.1.1 **Notice to Proceed.** The Notice to Proceed will not be issued until the contract is properly executed, bonds are furnished, proof of insurance submitted by the Contractor, and both the bonds and the insurance are approved by the District. The Contract Time will not be extended, and the Contractor will not receive any additional compensation, because of delays caused by receipt, review and approval by the District of the Contractor’s bonds and insurance. Except as required elsewhere, the Contractor is not authorized to perform any Work under this contract until it has received an official Notice to Proceed.

8.1.2 Prosecution of the Work. Work shall proceed at all times with such force and equipment as will be sufficient to complete the Work within the Contract Time.

8.1.3 Required Contract Completion. The Contractor expressly agrees that it will complete the Work within the Contract Time, subject to approved Change Orders that impact time.

8.1.5 Early Completion. The Contractor shall not be entitled to claim damages for expenses due to the District not authorizing early completion.

8.2 Liquidated Damages

8.2.1 Should the Contractor fail to complete all or any portion of the Work within the specified time therefor or within such extra time as may be allowed for delays by formal extensions granted by the District, deductions will be made from the Contractor's earnings for the time that the Work remains incomplete beyond the specified completion time. Liquidated damages will be apportioned such that the Contractor will be responsible for all delays not otherwise properly subject to time extensions.

8.2.2 Liquidated damages cover only certain damages and are limited to the cost of administration, overhead, and general loss of use of the facility by the District as a result of a delay, and does not cover any other type of damages set forth in Section 8.2.3. It being impracticable or extremely difficult to fix the actual amount of damage for the above-referenced categories of damages, the parties agree that the amounts set forth in this Contract as liquidated damages will be deducted from any money due the Contractor under the contract. Should the amount of the damages exceed the amount due the Contractor, the Contractor and its sureties shall be liable for the excess.

8.2.3 Liquidated damages shall not be deemed to include within their scope additional damages or administrative costs arising from defective work, lost revenues, interest expenses, cost of completion of the Work, cost of substitute facilities, claims and fines of regulatory agencies, damages suffered by others or other forms of liability claimed against the District as a result of delay (e.g., delay or delay-related claims of other contractors, Subcontractors or tenants), and defense cost thereof. The Contractor shall be fully responsible for the actual amount of any such damages it causes, in addition to the liquidated damages otherwise due the District.

8.3 Use of Facilities Prior to Completion of Contract

8.3.1 If the Contractor has received and provided to the District a temporary certificate of occupancy from governmental authorities having jurisdiction over the project and/or in the Engineer’s opinion, the Work under the contract, or any portion of the Work, is in a condition suitable for the District’s use, the District may, after written notice from the Engineer to the Contractor, use (which includes, but is not limited

to, taking over or placing into service) any portion or portions of the project designated by the Engineer.

8.3.2 Even if the District elects to use the Work or a portion of the Work prior to Contract Completion, the Contractor will nonetheless make all necessary repairs, renewals, changes, or modifications in the Work or any portion of the Work that does not meet the requirements of the Contract Documents or is deficient due to defective materials or workmanship, unless the deficiency is solely caused by ordinary wear and tear.

8.3.3 The use of any portion of the Work by the District does not relieve the Contractor of any of its responsibilities or liabilities under the Contract Documents or constitute a waiver by the District of any claims. Said use shall not cancel liquidated damages as of the first date of use, or any continuance thereof, nor impair, reduce, or change the amount of liquidated damages.

8.4 Delays and Extensions of Time

8.4.1 The Contractor shall take reasonable precautions to foresee and prevent delays to the Work including, but not limited to, maintaining construction schedules that are properly updated to reflect current conditions and the actual critical path, and continuous monitoring of critical and dependent activities of the Contractor, Subcontractors, Suppliers, the District, agencies and other third parties. When the Contractor foresees a delay event, and in any event upon the occurrence of a delay event, the Contractor shall immediately notify the Engineer in writing of the probability or the actual occurrence of a delay in the Contract Time, and its cause. With respect to all delays (compensable, excusable and/or inexcusable), the Contractor shall reschedule its Work and/or revise its operations, to the extent possible under the terms of the contract, to mitigate the effects of the delay through work-arounds, overtime and acceleration of the project schedule, re-sequencing the Work, or other methods commonly utilized in the construction industry.

8.4.2 For Inexcusable Delay (as defined in Article 1.2.1.21), the Contractor shall not be entitled to an extension of time or compensation for any loss, cost, damage, expense or liability resulting directly or indirectly from the Inexcusable Delay including, but not limited to, extended field or home office overhead, field supervision, cost of capital, interest, escalation charges, labor costs, materials expense, or acceleration costs.

8.4.3 For Excusable Delay (as defined in Article 1.2.1.17), the Engineer will grant the Contractor an extension of time in an amount equal to the period of Excusable Delay based on the analysis of schedule impact and delay analysis diagram, which shall be the Contractor's sole and exclusive remedy for such delay. Excusable Delays shall include labor strikes, adverse weather as defined in Article 8.5, and Acts of God.

8.4.4 For Compensable Delay (as defined in Article 1.2.1.5), the Engineer will grant the Contractor an extension of Contract Time with compensation in an amount that represents the Contractor's actual direct costs incurred as a direct result of the Compensable Delay. The Contractor may recover its direct costs only and may not recover (and waives) all other types of indirect, consequential, special and incidental damages.

8.4.5 For Concurrent Delay (as defined in Article 1.2.1.6), the following rules apply: if one or more of the Concurrent Delays are excusable or compensable, then the District will treat the period of Concurrent Delay as an Excusable Delay; and if all of the Concurrent Delays are inexcusable, then the District will treat the Concurrent Delay as inexcusable. These rules for Concurrent Delay shall be the Contractor's sole and exclusive remedy for periods of Concurrent Delay, and the Contractor's entitlement shall be limited to the measures of recovery defined herein for Inexcusable, Excusable and Compensable Delay, as applicable.

8.4.6 No time extension will be granted to the Contractor for encountering delays while performing Work after the specified or formally extended Contract Completion date, except for causes of delay specified in Article 8.4.4.

8.4.7 The Contractor shall provide notice and documentation of delays in accordance with the following rules:

.1 Within five days of knowing about an event that may cause a delay in the project schedule, the Contractor shall notify the Engineer in writing about the delay in the Work, the impact it may have on the project schedule, and the causes of the delay. The Contractor's notice shall set forth the anticipated impact of the delay on the critical path, specify any additional time requested, and provide a detailed description of the cause or causes of the delays.

.2 If the Contractor intends to request an extension of time or compensation for damages resulting from delay, then the Contractor shall make the request in writing to the Engineer not more than 15 days after the end of such delay. If any delay exceeds 30 days, however, then the request shall be made monthly and then updated every month after that (as applicable). The Contractor shall provide an Analysis of Schedule Impact of the delay (see Article 3.4.2.3 and 3.4.2.4) and update it monthly (as applicable). The Contractor shall also provide documentation showing that the delay was either excusable or compensable and that the Contractor has revised its construction schedule, to the extent possible, to mitigate the delay. No compensation for damages resulting from delay will be granted unless supported by cost records justifying the costs claimed in connection with the delay.

8.4.8 The Contractor's failure to give written notice of a delay or to submit or document a request for an extension of time or for damages resulting from delay in the manner and within the times stated above shall constitute a waiver of all rights thereto.

8.4.9 An extension in Contract Time must be approved by the Engineer to be effective. An extension of Contract Time with or without consent of the sureties, shall not release the sureties from their obligations, which shall remain in full force until the discharge of the contract.

8.4.10 The Engineer will investigate the facts and ascertain the extent of the delay, and issue a written statement regarding its findings. If the Contractor disagrees with any decision of the Engineer regarding delays and extensions in Contract Time, the Contractor may dispute the Engineer's decision in accordance with Article 3.4.

8.5 Weather Conditions Unfavorable for Prosecution of Work

8.5.1 The Engineer may suspend the Work whenever weather conditions or conditions resulting from inclement weather are unfavorable for the prosecution of the Work. The delay caused by such suspension may entitle the Contractor to an extension in Contract Time, but not to any other compensation.

8.5.2 If the Contractor believes that the Work should be suspended under this Article, the Contractor may request such suspension. The delay caused by the suspension may entitle the Contractor to an extension of Contract Time, but not to any other compensation. The Contractor's request for suspension must be agreed to by the Engineer in order to be granted an extension of Contract Time.

8.5.3 No extension of time will be granted for suspension of Work unless the suspension impacts the Contract Completion date or the timely completion of a milestone completion date for a portion of the Work. Determination that suspension of the Work for inclement weather conditions or conditions resulting from inclement weather impacts timely completion and entitles the Contractor to an extension of Contract Time shall be made and agreed to in writing by the Engineer and the Contractor for each day that work is suspended. In the event of failure to agree, the Contractor may protest under the provisions of Article 3.4.

8.5.4 If the Work is suspended and an extension of Contract Time is granted under this Article, the Contractor will be entitled to a one Work Day extension of time for each Work Day that the Contractor is unable to perform the Work for at least one-half of its current normal Work Day; and if the Work is suspended at the regular starting time on any Work Day and the Contractor's workforce is dismissed as a result of the suspension, then the Contractor will be entitled to a one Work Day extension of Contract Time whether or not conditions change thereafter and the major portion of the day is suitable for work.

8.5.5 The Contractor shall use best available technologies to secure the site to mitigate/minimize the effects of inclement weather in conformance with applicable Federal, State, and regional regulatory requirements.

ARTICLE 9 - INSURANCE AND BONDS

9.1 Faithful Performance and Payment Bonds

9.1.1 The Contractor shall furnish to the District a Faithful Performance Bond, and maintain it in an amount not less than 100 percent of the current Contract Sum, conditioned upon the faithful performance by the Contractor of all covenants and stipulations in the contract.

9.1.2 The Contractor shall furnish to the District a Payment Bond and maintain it, in an amount not less than 100 percent of the current Contract Sum.

9.1.3 The Payment Bond and the Faithful Performance Bond shall be on the forms of the District as provided for in Documents 00 61 13.16 and 00 61 13.13 and shall be properly executed as described therein.

9.1.4 If, at any time, during the performance of the Work any of the sureties, in the opinion of the District, are or become financially irresponsible, the District may require the Contractor to furnish other or additional sureties to the satisfaction of the District within 10 days after receipt of notice. If the Contractor fails to provide satisfactory sureties within the 10-day period, the contract may be terminated for cause under Article 11, and the materials purchased or the Work completed as provided in Article 11.

9.1.5 The Contractor and its sureties understand and agree that no modifications or alterations made in the Contract Documents shall operate to release any surety from liability on any bond or bonds required to be provided in this contract.

9.2 Insurance Requirements

9.2.1 The Contractor shall procure and maintain during the period of the contract all required insurance and shall submit certificates of insurance and additional insured endorsements to the policies to the Engineer for review and approval. The certificates of insurance shall be on the forms provided by the District. The insurance requirements must be met within the same period allowed for contract execution, as provided for in the Instructions to Bidders.

9.2.2 The Contract will not be executed until the certificates of insurance and endorsements to the policies have been received and accepted by the District. Acceptance of the certificates of insurance and endorsements by the District shall not relieve the Contractor from compliance with any of the insurance requirements or liability arising from said failure.

9.2.3 The District may require the Contractor to provide insurance policies to the Engineer for review. If requested, the Contractor agrees to provide the District with complete copies of the policies within 10 days following the request.

9.2.4 If the Contractor does not maintain all of the required insurance, or fails to timely deliver requested insurance policies to the District, the District reserves the right to stop the Work, and/or terminate the Contractor's right to proceed under the contract, in whole or in part. Any delay caused by the Work stoppage is an Inexcusable Delay.

ARTICLE 10 - WARRANTY

10.1 The Contractor warrants that any Work performed under the contract shall be performed in a competent manner in accordance with the duty of care set forth in Section 4.2.3; that any material furnished will be the best of its class; and that the Work shall fully meet the requirements of the Contract Documents.

10.2 The Contractor warrants workmanship, including subcontracted work, against defects for a period of one year from the date of Contract Completion unless a longer period of time is required by the Contract Documents.

10.3 The Contractor shall provide a similar one-year warranty for all materials and equipment provided under this contract unless a longer period of time is required by the Contract Documents.

10.4 If the District elects to use any portion or portions of the Work before Contract Completion, the warranty for those portions shall begin upon commencement of such use. The warranty for the remainder of the Work shall begin on the Contract Completion date.

10.5 If the District notifies the Contractor, within one year from the Contract Completion, or within any longer period of time required by the Contract Documents or another warranty period for partial occupancy as established under Section 10.4, that any portion of the Work fails to fulfill any of the requirements of the Contract Documents, the Contractor shall repair or replace the defective, non-conforming or otherwise unsatisfactory Work, without delay or further cost to the District in a manner that least inconveniences the District's operations. With regard to any defective work or material repaired or replaced by the Contractor, the one-year warranty will be measured from the date of the latest repair or replacement.

10.6 Should the Contractor fail to act promptly in accordance with this requirement, or should the exigencies of the case require repairs or replacements to be made before the Contractor can be notified or can respond to the notification, the District may, at its option, make the necessary repairs or replacements, or perform the necessary Work, and the Contractor shall pay to the District the actual cost of such repairs plus the markup percentages shown in Article 3.2.3.

10.7 If equipment has repeatedly malfunctioned, is unreliable, requires excessive maintenance, or if repair of the equipment will not result in equipment that is equivalent to that required by the Contract Documents (both in functionality and useful life), the Contractor shall replace, rather than repair, the equipment under the warranty.

10.8 The Contractor is responsible for all costs incidental to making good any and all of its warranties and agreements. These warranties and agreements are covenants that are binding on the Contractor and its sureties.

ARTICLE 11 - TERMINATION OR SUSPENSION OF THE CONTRACT

11.1 Termination by the District for Cause or Default

11.1.1 The District may terminate the Contractor's right to proceed under the contract, in whole or in part, for cause at any time after the occurrence of any of the following events:

.1 The Contractor becomes insolvent or files for relief under the bankruptcy laws of the United States.

.2 The Contractor makes a general assignment for the benefit of its creditors or fails to pay its debts as the same become due.

.3 A receiver is appointed to take charge of the Contractor's property.

.4 The Contractor abandons the Work. Abandonment is conclusively presumed when the District requests a written plan to cure a default and the Contractor does not submit the plan within five Work Days of the District's request.

11.1.2 If any of the following events occur, the District may require that the Contractor submit a written plan to cure its default:

.1 The Contractor fails to supply skilled supervisory personnel, an adequate number of properly skilled workers, proper materials, or necessary equipment to prosecute the Work in accordance with the Contract Documents.

.2 The Contractor fails to make progress so as to endanger performance of the Work within the Contract Time.

.3 The Contractor disregards legal requirements of agencies having jurisdiction over the Work, the Contractor, or the District.

.4 The Contractor materially fails to execute the Work in accordance with the Contract Documents.

.5 The Contractor is in default of any other material obligation under the Contract Documents.

11.1.3 The District may terminate the Contractor's right to proceed under the contract in whole or in part for default if the written plan is not received by the District within five days after the District's request or if the District does not accept the Contractor's plan for curing its default.

11.1.4 Upon any of the occurrences referred to in Articles 11.1.1, 11.1.2 and 11.1.3, the District may, at its election and by notice to the Contractor, terminate the contract in whole or in part; accept the assignment of any or all of the subcontracts; and then complete the Work by any method the District may deem expedient. If requested by the District, the Contractor shall remove any part or all of the Contractor's materials, supplies, equipment, tools, and construction equipment and machinery from the Work within seven days of such request; and, if the Contractor fails to do so, the District may remove or store, and after 90 days sell, any of the same at the Contractor's expense.

11.1.5 If the contract is terminated by the District as provided in Article 11.1, the Contractor shall not be entitled to receive any further payment until the expiration of 35 days after acceptance of all Work by the District.

11.1.6 No termination or action taken by the District after termination shall prejudice any other rights or remedies of the District provided by law or by the Contract Documents.

11.1.7 If, after termination for default, it is determined that the Contractor was not in default, or that default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for convenience pursuant to Article 11.2.

11.2 Termination by the District for Convenience

11.2.1 The District may, at its option, and for its convenience, terminate this contract at any time by giving written notice to the Contractor specifying the effective date of termination. Upon such termination, the Contractor agrees to comply with the notice and further agrees to waive any claims for damages, including loss of anticipated profits, on account of the termination in accordance with Article 11.2.5; and, as the sole right and remedy of the Contractor, the District shall pay the Contractor in accordance with Article 11.2.4.

11.2.2 Upon receipt of notice of termination under Article 11.2, the Contractor shall, unless the notice directs otherwise, do the following:

.1 Immediately discontinue the Work to the extent specified in the notice.

.2 Place no further orders or subcontracts for materials, equipment, services, or facilities, except as may be necessary for completion of a portion of the Work that is not discontinued or is necessary to secure the project site.

.3 Promptly cancel, on the most favorable terms reasonably possible, all subcontracts to the extent they relate to the performance of the discontinued portion of the Work.

.4 Thereafter, do only such Work as may be necessary to preserve and protect Work already in progress and to protect materials, plants, and equipment in transit to or on the project site.

11.2.3 Upon termination, the obligations of the contract shall continue as to portions of the Work already performed and, subject to the Contractor's obligations under Article 11.2.2, as to bona fide obligations assumed by the Contractor prior to the date of termination.

11.2.4 Upon such termination, the District will pay to the Contractor the sum of the following:

.1 The amount of the Contract Sum allocable to the portion of the Work properly performed by the Contractor as of the effective date of termination, less sums previously paid to the Contractor.

.2 Previously unpaid costs of any items delivered to the project site that were already fabricated for subsequent incorporation into the Work.

.3 Any proven losses with respect to materials and equipment directly resulting from the termination.

.4 Reasonable demobilization costs.

11.2.5 The above reimbursement is the sole and exclusive remedy to which the Contractor is entitled in the event the contract is terminated for convenience; and the Contractor expressly waives any other claims, damages, demands, compensation or recovery related to this contract or project. The Contractor agrees to sign a general release incorporating this waiver.

11.3 Termination of the Contract - Act of God or Force Majeure

11.3.1 "Act of God" has the meaning set forth in Section 7105 of the Public Contract Code. "Force Majeure" shall solely have the meaning set forth in Section 1511, Subparagraph 2 of the Civil Code. If an Act of God or Force Majeure occurs, the Engineer may, by written notice, suspend or terminate this contract. If the contract is not suspended or terminated, or if the contract is resumed after suspension, the Contractor shall fully restore the work except as limited by Public Contract Code, Section 7105(a), in the case of an "Act of God."

11.3.2 If the contract is terminated because of an Act of God or Force Majeure, the Contractor will be paid for Work performed prior to the Act of God or Force Majeure at either (i) the Unit Prices named in the contract; or (ii) in the event no unit prices are named, a sum equal to the percentage that the Contract Sum for the Work completed, at the time of occurrence of the Act of God or Force Majeure bears to the Contract Sum for all Work to be performed under the contract as determined by the Engineer. In no event will the District be liable to the Contractor for breach of contract, extra work, or damages because the contract is terminated due to an Act of God or Force Majeure.

11.4 Suspension by the District

11.4.1 The Engineer may, in his or her sole discretion, order the Contractor, in writing, to suspend, delay, or interrupt the Work in whole or in part for as long as 90 days from the date of delivery of a written order of suspension. The order shall be specifically identified as a "suspension order" under this Article. The work may be suspended for a longer period or periods if the parties agree. Upon receipt of a suspension order, the Contractor shall comply with its terms and take all reasonable steps to minimize costs related to the suspension of the Work or the portion of the Work. Within 90 days after the issuance of the suspension order, or such extension to that period as is agreed upon by the Contractor and the District, the District will either cancel the suspension order or delete the suspended Work.

11.4.2 If a suspension order is canceled or expires, the Contractor shall resume the suspended Work. A Change Order may be issued to cover any adjustments of the Contract Sum or an extension of Contract Time necessarily caused by the suspension. If the Contractor disputes the adjustment of the Contract Sum or the Contract Time, the Contractor shall submit a claim per Article 3.4.

11.4.3 Costs directly associated with the suspension will be at the District’s expense if the suspension is not due to any fault of the Contractor.

11.4.3 A suspension order shall not be required to stop the Work as permitted or required under any other provision of the Contract Documents.

ARTICLE 12 - LABOR PROVISIONS

12.1 Prevailing Wages

12.1.1 Pursuant to Section 1773 of the Labor Code, the District has obtained from the Director of Industrial Relations of the State of California, the general prevailing rates of per diem wages and the general prevailing rates for holiday and overtime work in the locality in which the Work is to be performed, for each craft, classification, or type of worker needed to execute the contract. A copy of the prevailing wage rates is on file and available for inspection by any interested party on request at the District's Specifications and Engineering Support Section.

12.1.2 The holidays upon which such rates shall be paid shall be all holidays recognized in the collective bargaining agreement applicable to the particular craft, classification, or type of worker employed on the Work.

12.1.3 The Contractor shall post a copy of the general prevailing rate of per diem wages at the jobsite pursuant to Section 1773.2 of the Labor Code.

12.1.4 Pursuant to Section 1774 of the Labor Code, the Contractor and any of its Subcontractors shall not pay less than the specified prevailing rate of wages to all workers employed in the execution of the contract.

12.1.5 As set forth with more specificity in Section 1773.1 of the Labor Code, "per diem" wages include employer payments for health and welfare, pension, vacation, travel, subsistence and, in certain instances, apprenticeship or other training programs, and shall be paid at the rate and in the amount spelled out in the pertinent prevailing wage determinations issued by the Director of Industrial Relations.

12.1.6 The Contractor shall, as a penalty to the State or the District, forfeit not more than the maximum set forth in Section 1775 of the Labor Code for each calendar day, or portion thereof, for each worker paid less than the prevailing rates for the work or craft in which the worker is employed under the contract by the Contractor or by any Subcontractor under him. The difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which such worker was paid less than the stipulated prevailing wage rate shall be paid to such worker by the Contractor.

12.1.7 The specified wage rates are minimum rates only and the District will not consider and shall not be liable for any claims for additional compensation made by the Contractor because of its payment of any wage rate in excess of the general prevailing rates. All disputes in regard to the payment of wages in excess of those specified herein shall be adjusted by the Contractor at its own expense.

12.1.8 General prevailing wage determinations have expiration dates with either a single asterisk or a double asterisk. Pursuant to California Code of Regulations, Title 8, Section 16204(b), the single asterisk means that the general prevailing wage determination shall be in effect for the specified contract duration. The double asterisk means that the predetermined wage modification shall be paid after the expiration date. Notwithstanding what is stated in Article 3.4 and Article 4.7 of the General Conditions, no adjustment in the Contract Sum will be made for the Contractor’s payment of these predetermined wage modifications.

12.2 Payroll Records

12.2.1 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 in connection with the Work. The payroll records shall be certified and shall be available for inspection in accordance with the provisions of Section 1776 of the Labor Code.

12.2.2 The Contractor shall submit for each week in which any contract Work is performed a copy of all payroll records to the Engineer. The Contractor shall be responsible for submission of copies of payroll records of all Subcontractors. Payroll records shall be completed and submitted by the 25th of the month for the previous 30-day period which started on the 15th of the previous month to the 15th of the current month.

12.2.3 Certified payroll records shall be on the forms provided by the Department of Industrial Relations (reduced size sample in Appendix A) or contain the same information required on the Department's form. Copies of the form may be obtained from:

Division of Labor Standards Enforcement
Bureau of Field Enforcement
2031 Howe Avenue, Suite 100
Sacramento, CA 95825-5378
(916) 263-1811
(916) 263-5378

The Contractor or Subcontractor shall certify the payroll records as shown on the reverse of the State form. In addition, the records shall be accompanied by a statement signed by the Contractor or Subcontractor certifying that the classifications truly reflect the Work performed and that the wage rates are not less than those required to be paid.

12.2.4 In the event of noncompliance with the requirements of Section 1776 of the Labor Code, the Contractor shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects such Contractor must comply with said Section. Should noncompliance still be evident after such 10-day period, the Contractor shall, as a penalty to the State or the District, forfeit the amount set forth in Section 1776(h) of the Labor Code 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, such penalties shall be withheld from progress payments then due.

12.3 Hours of Labor

12.3.1 Pursuant to the provisions of Sections 1810, et seq. of the Labor Code and any amendments thereof:

.1 Eight hours of labor constitutes a legal day's Work under the contract.

.2 The time of service of any worker employed upon the work shall be limited and restricted to eight hours during any one calendar day, and forty hours during any one calendar week except as provided in Article 12.3.1.4 below.

.3 The Contractor shall, as a penalty to the State or the District, forfeit the amount set forth in Section 1813 of the Labor Code 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 eight hours in any calendar day and forty hours in any one calendar week in violation of this Article and the provisions of Labor Code, Sections 1810, et seq.

.4 Work performed by employees of the Contractor in excess of eight hours per day, and forty hours during any one calendar week, shall be permitted upon compensation for all hours worked in excess of eight hours per day at not less than one and one-half times the basic rate of pay.

.5 The Contractor and every Subcontractor shall keep an accurate record showing the name of and the actual hours worked each calendar day and each calendar week by each worker employed by him in connection with the Work; the record shall be kept open at all reasonable hours to the inspection of the District and to the Division of Labor Standards Enforcement of the State of California.

12.4 Employment of Apprentices

12.4.1 In the performance of the contract, the Contractor and any Subcontractor shall comply with the provisions concerning the employment of apprentices in Section 1777.5 of the Labor Code and any amendments thereof.

12.4.2 In the event the Contractor or any Subcontractor willfully fails to comply with the aforesaid section, such Contractor or Subcontractor shall be subject to the penalties for noncompliance in Labor Code, Section 1777.7.

ARTICLE 13 - MISCELLANEOUS PROVISIONS

13.1 Governing Law

The contract is governed by the laws of the State of California.

13.2 Antitrust Claims

By entering into the contract, the Contractor offers and agrees to assign to the District 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 contract. The Contractor shall

include in each subcontract a provision corresponding to the foregoing binding the Subcontractor to offer and agree to assign to the District such rights, title, and interest held by the Subcontractor. Such assignment shall be made and become effective at the time the District tenders final payment to the Contractor without further acknowledgment by the parties.

13.3 Non-Discrimination Clauses

13.3.1 There shall be no discrimination against any person, or groups of persons, per Government Code Section 12940, Labor Code Section 1735, or any other applicable law or regulation in the performance of this contract.

13.3.2 There shall be no discrimination in the performance of this contract, against any person, or group of persons, on account of race, color, religion, religious creed, national origin, ancestry, gender including gender identity or expression, age, marital or domestic partnership status, mental disability, physical disability (including HIV and AIDS), medical condition (including genetic characteristics or cancer), genetic information, sexual orientation, or military and veteran status. The Contractor shall not establish or permit any such practice(s) of discrimination with reference to the contract. Contractors determined to be in violation of this section will be deemed to be in material breach of the contract.

13.3.3 **Contractor and its subcontractors shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, or national origin in the performance of this contract. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, national origin, protected veteran status or disability.**

13.3.4 The Contractor shall include the nondiscrimination and compliance provisions of these clauses in all subcontracts.

13.4 Trenching and Shoring

The Contractor shall comply with Labor Code, Sections 6500, 6705, and 6707, and Public Contract Code, Section 7104, regarding trenching and shoring, and not withstanding any other provisions of the Contract Documents.

13.5 Third Party Claims

Pursuant to Public Contract Code, Section 9201, the District will provide Contractor with timely notification of the receipt of any third-party claims relating to this contract.

END OF DOCUMENT

EBMUD

EXHIBIT D
IRAN CONTRACTING ACT CERTIFICATION

Pursuant to Public Contract Code (PCC) § 2204, an Iran Contracting Act Certification is required for solicitations of goods or services of $1,000,000 or more.

To submit a bid or proposal to East Bay Municipal Utility District (District), you must complete **ONLY ONE** of the following two paragraphs. To complete paragraph 1, check the corresponding box **and** complete the certification for paragraph 1. To complete paragraph 2, check the corresponding box and attach a copy of the written permission from the District.

☐ 1. We are not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services ("DGS") pursuant to PCC § 2203(b), and we are not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person, for 45 days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

CERTIFICATION FOR PARAGRAPH 1:

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY, that I am duly authorized to legally bind the proposer/bidder to the clause in paragraph 1. This certification is made under the laws of the State of California.

Firm: _____

By: _____ Date: _____
(Signature of Bidder)

Title: _____

Signed at: _____ County, State of: _____

OR

☐ 2. We have received written permission from the District to submit a bid or proposal pursuant to PCC § 2203(c) or (d). *A copy of the written permission from the District is included with our bid or proposal.*

EXHIBIT E
BOND FORMS

EBMUD

DATE _____

FAITHFUL PERFORMANCE BOND

CONTRACTOR (Name and California address where service may be effected)
SURETY (Name and California address where service may be effected)
AMOUNT OF BOND (Sum in words and figures)
CONTRACT DOCUMENTS (As named in the Contract)

KNOW ALL PERSONS BY THESE PRESENTS:

THAT, the contractor named above, hereinafter called the Contractor, as Principal, and the Surety named above, as Surety, are held and firmly bound unto the East Bay Municipal Utility District, hereinafter called the District, in the sum entered above, lawful money of the United States of America, for the payment of which sum well and truly to be made to the District, we, and each of us, bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

The condition of the above obligation is such that whereas the Contractor and the District entered into a Contract of even date herewith, by the terms and conditions of which the Contractor agreed to perform and complete the work, or manufacture, complete, and deliver the material or equipment, set forth in the Contract Documents named in the Contract, all now on file in the office of the Secretary of the District, as will more fully appear by reference to said Contract, which is made a part of this bond;

NOW, THEREFORE, if the Contractor shall well and truly carry out, execute and perform all things by the Contractor to be carried out, executed and performed, according to the terms and conditions of said Contract, including any and all warranty and guaranty obligations contained therein, then this obligation shall become null and void, otherwise to remain in full force and effect throughout the period of performance, including any warranty or guaranty period.

No prepayment or delay in payment, and no change, extension, addition, or alteration of any provision of said Contract or Contract Documents agreed to between the Contractor and the District, and no forbearance on the part of the District shall operate to release the Surety from liability on this Bond, and consent to make such alterations without further notice to or consent by the Surety is hereby given, and the Surety hereby waives the provisions of Section 2819 of the Civil Code and Section 359.5 of the Code of Civil Procedure of the State of California.

Each signator to this bond hereby declares under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated the day and year entered on the first page hereof.

_____
Contractor

By _____

*Title _____

By _____

**Title _____

(SEAL OF SURETY)

_____
Surety

By _____

Title _____

Note: The signature of the Surety on this bond must be acknowledged before a Notary Public. An executed Power of Attorney indicating that the Surety's representative is authorized to bind the Surety must accompany this bond.

The foregoing Bond was accepted and approved this _____ day of _____ , 20 _____

_____ , East Bay Municipal Utility District

Specifications / Proposal No. _____

*If corporation, Corporate President or CEO; if Partnership, Partner.
**Corporate Secretary or financial officer.

EBMUD

DATE _____

PAYMENT BOND

CONTRACTOR (Name and California address where service may be effected)
SURETY (Name and California address where service may be effected)
AMOUNT OF BOND (Sum in words and figures)
CONTRACT DOCUMENTS (As named in the Contract)

KNOW ALL PERSONS BY THESE PRESENTS:

THAT, WHEREAS, the contractor named above, hereinafter called the Contractor, has this day entered into a Contract with East Bay Municipal Utility District, hereinafter called the District, to perform and complete the work set forth in the Contract Documents named in the Contract, all now on file in the office of the Secretary of the District, as will more fully appear by reference to said Contract, which is made a part hereof; and

WHEREAS, Sections 9550 to 9566 inclusive of the Civil Code of the State of California, and any amendments thereof, require contractors upon public work to file with the body by whom such contract was awarded a good and sufficient bond to secure the claims to which reference is made in said sections, NOW THESE PRESENTS

WITNESSETH: That the Contractor, as Principal, and the Surety named above, as Surety, are held and firmly bound unto any and all materialmen, persons, firms, or corporations furnishing materials, provisions, or other supplies used in, upon, for, or about the performance of the work contracted to be done, and to all persons, firms or corporations renting or hiring implements or machinery for or contributing to the said work to be done and to all persons who perform work or labor of any kind or nature thereon, or in connection therewith, and to all persons who supply both work and materials, in the sum entered on the first page hereof, lawful money of the United States of America, being not less than the total amount payable by the terms of said Contract, for which payment well, truly and promptly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly, and severally, firmly by these presents.

PAYMENT BOND

The condition of the above obligation is such that if the Contractor, or the Contractor's subcontractors, fail to pay for any materials, provisions or other supplies used in, upon, for, or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, the Surety will pay for the same, in an amount not exceeding the sum specified in this Bond, provided that any and all claims hereinunder shall be filed and proceedings had in connection therewith as required by the provisions of said Sections 9550 to 9566 inclusive of the Civil Code of the State of California, and any amendments thereof: PROVIDED ALSO, that in case suit is brought upon this Bond a reasonable attorney's fee shall be awarded by the court to the prevailing party in said suit, said attorney's fee to be fixed as costs in said suit, and to be included in the judgment therein rendered.

No prepayment or delay in payment and no change, extension, addition, or alteration of any provision of said Contract or Contract Documents agreed to between the Contractor and the District, and no forbearance on the part of the District, shall operate to release the Surety from liability on this Bond, and consent to make such alterations without further notice to or consent by the Surety is hereby given, and the Surety hereby waives the provisions of Section 2819 of the Civil Code of the State of California.

Dated the day and year entered on the first page hereof.

Each signator to this bond hereby declares under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

_____
Contractor

By _____

*Title _____

By _____

**Title _____

(SEAL OF SURETY)

_____
Surety

By _____

Title _____

Note: The signature of the Surety on this bond must be acknowledged before a Notary Public. An executed Power of Attorney indicating that the Surety's representative is authorized to bind the Surety must accompany this bond.

The foregoing Bond was accepted and approved this _____ day of _____ , 20 _____

_____ , East Bay Municipal Utility District

Specifications / Proposal No. _____

*If corporation, Corporate President or CEO; if Partnership, Partner.
**Corporate Secretary or financial officer.

EXHIBIT F
INFORMATION TECHNOLOGY SECURITY INFORMATION TO BE EXCLUDED FROM PUBLIC RECORDS ACT REQUESTS

EBMUD is required to respond to California Public Records Act (CA PRA) requests. Request for Proposals (RFP) are subject to CA PRA requests. If you are submitting sensitive security information about your products or services as part of your response to an RFP for software services, you must submit it as part of Exhibit F for it to be categorized as exempt from CA PRA requests. Any information submitted outside of Exhibit F may be released in response to a CA PRA request.

If you are submitting any information as an attachment, be sure to add the phrase EXHIBIT F to the title and/or filename.

EXHIBIT G
PUBLIC WORKS FORMS

DECLARATION OF NONCOLLUSION

The undersigned declares, under penalty of perjury under the laws of the State of California, that the bid submitted to the East Bay Municipal Utility District for

SPEC 21xx - PROJECT NAME (ALL CAPS)

is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

Firm: _____

By: _____ Date: _____
(Signature of Bidder)

Title: _____

Signed at: _____ County, State of: _____

DECLARATION OF ELIGIBILITY TO WORK ON PUBLIC WORKS PROJECTS

The undersigned hereby certifies under penalty of perjury under the laws of the State of California that in connection with bidding on:

SPEC 21xx - PROJECT NAME (ALL CAPS)

The bidder is eligible to bid on public works projects in the State of California;

The bidder is not barred from bidding on or being awarded a contract for public works pursuant to California Labor Code Sections 1725.5, 1777.1 or 1777.7;

The bidder has obtained from each and every sub-contractor it intends to employ on this project, a statement of eligibility to work on public works projects in the State of California indicating that the subcontractor is not barred from performing work on a public works project pursuant to California Labor Code Sections 1725.5, 1777.1 or 1777.7;

If at any time during the course of performing work for East Bay Municipal Utility District, the contractor (formerly known as the bidder) becomes, or any of its sub-contractors become, ineligible to work on public works projects in the State of California, the contractor will immediately notify East Bay Municipal Utility District of this fact in writing.

Firm: _____

By: _____ Date: _____
(Signature of Bidder)

Title: _____

Signed at: _____ County, State of: _____

EXHIBIT H
PROJECT SPECIFICATIONS

SECTION 01 14 00

WORK RESTRICTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes special requirements and construction constraints that may affect the Work. These requirements and constraints are in addition to those appearing elsewhere in the specifications.

B. Related sections:

1. Section 01 35 24 – Project Safety Requirements

2. Section 01 35 44 – Environmental Requirements

1.2 WORK HOURS

A. Work or activity of any kind shall be limited to the hours from 6:00 a.m. to 7:00 p.m. 7 days a week.

1.3 COOPERATION WITH OTHER WORK FORCES

A. Other contractors, other utilities and public agencies or their contractors, other District contractors, and District personnel may be working in the vicinity during the project construction period.

B. Any costs for providing cooperation with other work forces shall be considered as included in the bid price for the various contract items of Work and no separate payment will be made therefor.

1.4 CONSTRAINTS

A. All Work shall be in accordance with local ordinances.

B. All Work shall be in accordance with Section 01 35 44 – Environmental Requirements.

1.5 OUTSIDE AGENCY PERMITS

A. The Contractor shall comply with all requirements of any permits and be responsible for all associated costs.

B. Where requirements of the permits differ from those of the drawings and specifications, the more stringent requirements shall apply.

C. Contractor Fees and Permits

1. Terms and Conditions: Contractor shall apply for, obtain, and comply with all the terms, conditions, and requirements attached to all permits, bonds and licenses required by any local, state, or federal agencies to perform work for this Contract. The Contractor shall give all notices necessary and incidental to the due and lawful prosecution of the Work.

2. Performance of Work: Any permits, bonds, licenses, and fees therefore required for the performance of work under this Contract and not specifically mentioned herein as being reimbursed by the District shall be included in the Contractor's Bid price. The Contractor shall apply for and obtain all safety permits for trenches, construction, and demolition required by CAL/OSHA.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

PROJECT UTILITY SOURCES AND SITE CONDITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Contractor shall pay attention to the existing (known and unknown) utilities at or near the project site and site conditions.

1.2 SITE INVESTIGATION AND REPRESENTATION

A. The Contractor acknowledges that it has satisfied itself as to the nature and location of the work, the general and local conditions, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, tide stages, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during the prosecution of the work and all other matters which can in any way affect the work or the cost thereof under this Contract.

B. The Contractor further acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials to be encountered from inspecting the site and from evaluating information derived from exploratory work that may have been done by the District or included in these Contract Documents. Any failure by the Contractor to become acquainted with all the available information will not relieve the Contractor from responsibility for properly estimating the difficulty or cost of successfully performing the work.

C. Before undertaking each part of the work, the Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. The Contractor shall field verify the depth and location of all buried utilities and existing systems. The Contractor shall promptly report in writing to the Engineer any conflict, error, or discrepancy which the Contractor may discover and shall obtain a written interpretation or clarification from the Engineer before proceeding with any work affected thereby.

1.3 EXISTING UTILITIES AND IMPROVEMENTS

A. All overhead and underground utilities may not be shown on the Contract Drawings. The Contractor shall take all necessary precautions to avoid damage to existing utilities.

B. The Contractor shall notify Underground Service Alert (USA) at least four (4) days prior to excavation, telephone 811. The Contractor shall also contact all utility owners not registered with USA but known to have utilities in the project area to field locate underground utilities at least four (4) days prior to excavation.

C. Known existing underground conduits, pipelines and other utilities have been shown on the Contract Drawings in their approximate locations with reasonable accuracy. However, the accuracy or completeness of utilities indicated on the Contract Drawings is not guaranteed. It shall be the responsibility of the Contractor to determine the exact location of all utilities and their service connections. All potholing or other procedures for verifying utility location shall be performed by the Contractor as necessary to prepare for its excavation at least four (4) work days in advance of scheduled excavation and/or prior to fabrication of any appurtenances. The Contractor shall immediately notify the Engineer as to any utility located by the Contractor which has been incorrectly shown or omitted from the Contract Drawings.

D. Existing utilities that are shown, or that are made known and located, to the Contractor prior to excavation and that are to be retained and all utilities that are constructed during excavation operations shall be properly supported and protected from damage during the progress of the work.

E. As-builts shall be updated to reflect all utilities encountered whether indicated on the Contract Drawings or not.

F. Attention is directed to the possible existence of underground utilities not indicated on the plans and to the possibility that underground utilities may be in a location different from that indicated on the plans. The Contractor shall ascertain the exact locations of underground utilities whose presence is indicated on the plans, the locations of their service laterals and the location of any other underground utilities and service laterals which can be inferred from the presence of visible facilities such as buildings, meters and junction boxes prior to doing work that may damage such utilities or interfere with their service. All potholing or other procedures for verifying underground utility locations shall be performed by the Contractor by April 2027 in advance of scheduled excavation.

1. If the Contractor cannot locate an underground utility whose presence is indicated on the plans, the Engineer shall be notified in writing. If the Engineer determines that the underground utility for which such notice has been given has not been depicted on the plans with reasonable accuracy (within 36-inches horizontally of actual location), the additional cost incurred in locating the utility will be paid for as extra work as provided in Article 7 of Document 00 72 00 General Conditions.

2. If the Contractor discovers underground utilities not indicated on the plans, Contractor shall immediately give the Engineer and the Utility Company written notification of the existence of such utility. Such utilities shall be located and protected from damage as directed by the Engineer and the cost of such work will be paid for as extra work as provided in Article 7 of Document 00 72 00 General Conditions.

G. The Contractor shall notify all Owners of utilities when its work is in progress and shall make arrangements as are necessary to make any emergency repairs. Known utilities in the area are listed in Article 1.5 of this Section.

H. Should any damage to a utility occur during the progress of the work, the Contractor shall notify the District and the utility at once and render every assistance possible to repair the damage and restore the service. No extra compensation nor extension of project time will be made for the repair of any services or utility damaged by the Contractor nor for any damage incurred through neglect or failure to provide adequate protection to existing utilities. The provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

I. In the event that the Contractor damages any underground utilities not shown on the plans or not depicted on the plans with reasonable accuracy (within 36-inches horizontally of actual location) or any lateral service the location of which could not be inferred by the Contractor, a written report thereof shall be made immediately to the Engineer. The Contractor's report shall also advise the Engineer of any schedule delays. Compensation for such delays will be determined in accordance with Article 8 of Document 00 72 00 General Conditions. The Contractor shall be entitled to no other compensation for any such damage.

J. All utilities encountered along the line of the work shall remain continuously in service during all work under the Contract, unless otherwise shown on the Contract Drawings, or unless other arrangements satisfactory to the Engineer are made with the Owner of said utilities.

1.4 CONTRACTOR'S RESPONSIBILITY FOR UTILITY FACILITIES AND SERVICE

A. Where the Contractor's operations could cause damage or inconvenience to utilities (e.g., railway, telegraph, telephone, television, power, oil, gas, water, sewer, fuel lines or irrigation systems), the Contractor shall make all arrangements necessary for the protection of these utilities and services.

B. The Contractor shall be solely and directly responsible to the owner and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage which may result from the construction operations under this Contract.

C. Neither the District nor its officers or agents shall be responsible to the Contractor for damages as a result of the Contractor's failure to protect utilities encountered in the work.

D. In no event shall interruption of any utility service be allowed outside work hours unless granted by the Utility owner.

E. No sand, mud, rocks or other construction debris shall be disposed of in the sanitary sewers, storm sewers, waterways, or creeks.

F. The Contractor shall replace, at its own expense, any and all existing utilities or structures removed or damaged during construction, to their pre-existing condition unless otherwise provided for in these Contract Documents.

G. The Contractor shall repair or replace, at its own expense, all pavement damaged during the construction, to its pre-existing condition unless otherwise provided for in these Contract Documents.

H. Provisions of this Section shall also apply to temporary utilities.

1.5 NAMES OF KNOWN UTILITIES SERVING THE AREA

A. The following is a list of the known utilities serving the area, but is not limited to:

Name of Utility:
East Bay Municipal Utility District (water)
East Bay Municipal Utility District (electric, primary)
PG&E (electric and gas)
AT&T (telephone)

1.6 NOT USED

1.7 INTERFERING STRUCTURES

A. The Contractor shall take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground. An attempt has been made to show major structures on the plans. While the information has been compiled from the best available sources, its completeness and accuracy cannot be guaranteed, and it is presented as a guide to avoid possible difficulties.

B. The Contractor shall protect all existing structures, trees, shrubs, and other items on the project site that are to be preserved, by substantial barricades (or as required by the Owner), or other devices commensurate with the hazard, from injury or destruction by vehicles, equipment, workers, or other agents.

C. Where existing curb/gutter, fences, gates, landscaping, buildings, or any other structure must be removed to properly execute the work, or are damaged during the work, they shall be restored at the Contractor's expense to their original condition or better.

D. Without additional compensation, the Contractor may remove and replace in a condition as good as or better than original, any small structures such as fences, and signposts that interfere with the Contractor's operations. The Contractor shall obtain written acceptance of their removal and replacement plan by the Engineer and the item(s) Owner.

1.8 FIELD RELOCATION

A. During the progress of construction, it is expected that minor relocations of the work will be necessary. Such relocations shall be made only with approval of the Engineer. If existing structures are encountered that will prevent construction as shown, notify the Engineer before continuing with the work in order that the Engineer may make such field revisions as necessary to avoid conflict with the existing structures.

B. If the Contractor fails to notify the Engineer when a structure which interferes with construction is encountered, and proceeds with the work despite this obstruction, the Contractor shall do so at its own risk with no additional compensation nor extension of Contract Time.

C. Any Contractor request(s) for additional compensation or extension of Contract Time resulting from necessary field relocations will be considered as set forth in Articles 7 and 8 of Document 00 72 00 General Conditions.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 01 29 00

PAYMENT PROCEDURES

1.1 GENERAL

A. Payment will be made at the price bid for each item listed on the bid form or as extra work as provided in the General Requirements.

B. Initial progress payment will not be made prior to approval by the Project Lead of the Schedule of Costs, and the Subcontractor Payment Report (Form P-047)

C. No subsequent progress payment will be made prior to receipt by the Project Lead of the monthly Subcontractor Payment Report (Form P-047) as specified in Article 1.3 below.

D. No subsequent progress payment will be made prior to receipt by the Project Lead of Certified Payrolls for the previous month. If the Certified Payrolls are not complete or contain errors, the Project Lead will withhold from payment the gross amount of the portion of previous month's payroll that is in question until the matter is resolved.

E. The Contractor and its subcontractors of any tier shall also furnish the payroll records specified in Labor Code Section 1776 directly to the Labor Commissioner.

1.2 SCHEDULE OF COSTS FOR PAYMENTS

A. Submit to the Project Lead, within 10 work days after Notice to Proceed, one (1) physical copy and one (1) digital copy of a Schedule of Costs.

B. The total of the price breakdown shall agree with the lump-sum price bid. The price breakdown shall not be unbalanced, shall be subject to adjustment between the Project Lead and the Contractor, and will be used as a basis for progress payments.

C. Acceptance of the Schedule of Costs by the Project Lead shall not relieve the Contractor of the responsibility of performing all the work needed to complete the project at the price bid.

1.3 SUBCONTRACTOR PAYMENT REPORT (FORM P-047)

A. List all subcontractors on Subcontractor Payment Report (Form P-047, Appendix A). Furnish the following information:

1. Name, address, phone number, and type of work to be performed

2. Contact name

3. White Men (WM), White Women (WW), or Ethnic Minority (EM) composition of ownership

4. Original dollar amounts, revised dollar amounts, total payments to date, and projected total payments

B. Submit an updated Subcontractor Payment Report (Form P-047) showing dollars expended for each listed subcontractor no later than the 25th day of each month thereafter.

1.4 PROGRESS PAYMENTS

A. The Project Lead along with the Contractor will make an approximate measurement of all approved materials delivered to the jobsite and work performed by the Contractor through the 25th day of each calendar month for the purpose of making a progress payment. No payment will be made for the fabrication or production of materials off the jobsite, or for materials stored off the jobsite. However, at the discretion of the Project Lead, payment may be made for approved materials that have been properly stored and insured off the jobsite. The Project Lead will classify the work according to items listed on the Bid Form and will estimate the value thereof on the basis of the prices shown, or as extra work. The classification of the work performed and the value thereof will be based on the Schedule of Costs submitted by the Contractor.

B. From the amount thus determined, five percent thereof will be deducted as retention by the District for performance security. The amount of all payments previously made to the Contractor and any amounts due the District from the Contractor for supplies, materials, services, damages, or otherwise deductible under the terms of the contract will be deducted from the remainder.

B. In addition to the retention under Paragraph B above, the whole or part of any payment of the estimated amount due the Contractor may be withheld as an additional retention if such course be deemed necessary to protect the District from loss due to the Contractor's failure to perform any of the following: (1) meet its obligations; (2) expedite the work; (3) correct rejected work; (4) settle damages as provided; or (5) produce substantial evidence that no claims will or have been filed, and/or if it has been determined that unpaid balances may be insufficient to complete the work.

C. The remaining amount, after the deductions given above, will be paid as a progress payment by the District to the Contractor. Payment will normally be made on the third Friday of the succeeding month. If payment is not made within 30 days from the 25th day of the month for undisputed progress payments, then the District will pay interest to the Contractor in accordance with Section 20104.50 of the Public Contract Code.

D. All material and work covered by progress payments thereupon become the sole property of the District, but this provision shall not be construed as relieving the Contractor from sole responsibility for all materials and work upon which payments

have been made or the restoration of any damaged work or as a waiver of the District's right to require fulfillment of all of the contract terms.

1.5 FINAL PAYMENT AND RELEASE OF CLAIMS

A. Notice of acceptance and final payment:

Upon the completion of the work as determined by the Project Lead, a notice of Contract Acceptance will be issued and recorded by the District. The District will pay to the Contractor within 35 calendar days after Contract Acceptance, or as soon thereafter as practicable, the remaining amount due the Contractor, less all prior payments and advances withheld whatsoever to or for the account of the Contractor for supplies, materials, services, damages, or otherwise deductible under the terms of the contract. All prior estimates and payments including those relating to extra work shall be subject to correction by this payment, which throughout this contract is called "final payment".

B. Release of claims:

Neither the final payment nor any part of the retained percentage shall become due until the Contractor shall have delivered to the Project Lead a complete release of all claims against the District arising under and by virtue of this contract and related to undisputed amounts, including claims of subcontractors and suppliers of either materials or labor. If disputed contract claims in stated amounts are unresolved 35 calendar days after filing of the notice of Contract Acceptance, a progress payment of undisputed amounts and retained funds will be made by the Project Lead upon receipt of a release specifically excluding the disputed contract claims. Upon resolution of disputed claims, the Contractor shall execute a supplemental release and, upon delivery, the District will make final payment. A copy of the release form is included in Appendix A.

PART 2 – DESCRIPTION OF BID ITEMS

A. **General**

Base Bid Items 1-8 for the EBMUD Mokelumne River Fish Hatchery are presented to indicate major categories of the work for purposes of comparative bid analyses and payment breakdown for monthly progress payments.

Bid items are not intended to be exclusive descriptions of work categories and the Contractor shall determine and include in its pricing all materials, labor, and equipment necessary to complete each Bid Item (work phase) as shown and specified.

The below eight (8) bid items shall include all costs including mark-ups, sales taxes, and shipment costs.

B. **Bid Items**

1. Bid Item 1 – Mobilization/Demobilization

   Payment for Mobilization/Demobilization will be made as a percentage of the costs incurred according to the schedule for values submitted, except that not more than 75% of the bid price for mobilization/demobilization shall be paid prior to the final estimate for payment being due. Said remaining 25% shall be paid upon completion of cleanup and removal and made with final payment.

   Mobilization and demobilization shall not exceed more than 5% of the entire project bid price.

2. Bid Item 2 – Electrical and Concrete Demolition

   Lump sum bid item includes demolition, removal, transportation, and legal disposal of:
   - Existing generator
   - Existing foundation pad
   - Existing switchboard and panels
   - Existing transfer switches
   - Existing cabling and conduit
   - Associated excavation and site preparation materials

   Measurement and payment for Bid Item 2 shall be paid upon completion and acceptance of the work described above.

3. Bid Item 3 – Exterior Site Improvements for Generator and Electrical Equipment Infrastructure Installation

   Lump sum bid item includes:
   - Stormwater compliance
   - Erosion control
   - Clearing and grubbing
   - Excavation
   - Grading
   - Fill and Compaction

   Measurement and payment for Bid Item 3 shall be based on a percentage of completion for the work described above.

4. Bid Item 4 – Generator and Electrical Equipment Foundation Pad

   Lump sum bid item includes construction of:

- Reinforced concrete foundation with step
- Grounding system
- Embeded materials
- Anchor bolds
- Conduit stub-ups
- Earthwork and backfill

Measurement and payment for Bid Item 4 shall be 50% upon completion of excavation, reinforcing steel, grounding system, and concrete placement. The remaining 50% upon concrete curing, testing, and acceptance for equipment installation.

5. Bid Item 5 – Furnish Switchboard/ATS/Control Panel Assembly.
   a. Includes procurement, fabrication, assembly, factory testing, delivery, and warranty of:
      1) Switchboard SWBD-01
      2) Automatic Transfer Switch ATS-01
      3) Control Panel CPNL-01
   b. Includes procurement, fabrication, assembly, delivery, and warranty of all additional necessary cables, hardware, pull boxes, fiber optic cables, lights, appurtenances, etc. required for a complete and operational installation.

   Measurement and payment for lump sum Bid Item 5 shall be up to 80% upon approved shop drawings, factory completion, successful factory testing, and delivery to project site.
   The remaining 20% will be upon installation startup, testing, and final acceptance.

6. Bid Item 6 – Install, Connect, Load Test, and Commission New Distrct Furnished Diesel Engine Generator with Load Bank, Switchboard, Automatic Transfer Switch, and Control Panel.

   Measurement and payment for Bid Item 6 shall be lump sum for the completed work described above with 50% upon the installation and completion of all mechanical and electrical connections, 25% upon successful startup and functional testing on site, and 25% upon successful commissioning, load testing and final acceptance.

7. Bid Item 7 – Furnish and Install New Underground Conduit Segments from New Generator to New Electrical Equipment

   Measurement and payment for Bid Item 7 shall be paid on installed quantities and percentage complete.

8. Bid Item 8 – Furnish and Install New Conduit Segments from New Electrical Equipment to Existing Facility Loads

Measurement and payment for Bid Item 8 shall be paid on installed quantities and percentage complete.

PART 3 – NOT USED

END OF SECTION

SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Submit an Initial Critical Path Method (CPM) Construction Schedule for the work.

2. Submit updated Monthly Construction Progress Schedules after Notice to Proceed until contract completion.

B. By submitting the Initial CPM Construction Schedule and each Monthly Construction Progress Schedule, the Contractor certifies that in the progress of preparing the initial contract schedule and the monthly updates, it has consulted with all key Subcontractors and suppliers, has incorporated all relevant scheduling information from the Subcontractors and suppliers, and has obtained their agreement that they will comply with the planned start dates, sequencing, durations and completion dates reflected in the Initial Construction Schedule and each monthly update. The Contractor, alone, is responsible for coordinating and scheduling all Work and is solely responsible for any claims from Subcontractors or suppliers arising from or related to the coordination and scheduling of their work.

C. Related Sections:

1. Section 01 33 00 – Submittal Procedures

1.2 SUBMITTALS

A. The Initial Construction Schedule shall be submitted within 14 days after the Notice to Proceed.

B. The Monthly Construction Progress Schedules shall be submitted before the 25th day of each month beginning with the month after submission of the Initial Construction Schedule.

C. Submit all required schedules to the Project Lead for review. Project Lead will review the schedules and if unacceptable, return the review copy. If required by Project Lead, Contractor shall make any changes or corrections required by Project Lead and resubmit the schedule within 5 workdays after receiving it from the Project Lead. Contractor is solely responsible for any means, methods, coordination or scheduling of the Work regardless of any review or comment by Project Lead.

1.3 DESCRIPTION

A. Initial Construction Schedule:

1. Prepare an Initial Construction Schedule with details as noted below.

2. The Initial Construction Schedule shall be a time-scaled detailed task level diagram. A clear delineation of construction activities shall be shown on the Initial Construction Schedule.

a. The Construction Schedule shall be provided digitally and be sized for printing on 11" x 17" paper with title block indicating:

1) Contract name and specification number

2) Data and plot dates

3) Contractor name

4) Schedule revision number and update number

B. The work activities comprising the Initial Construction Schedule shall be of sufficient detail to ensure adequate planning and execution of the Work and such that the schedules provide an appropriate basis for monitoring and evaluating the progress of the Work. A work activity is defined as a singular task that requires time and resources (manpower, equipment, and/or material) to complete in a continuous operation. Work activities shall be clearly labeled to identify the scope of work involved and shall have measurable beginning and ending points. No activity shall be less than one (1) nor more than fifteen (15) days in duration for any on-site operation unless otherwise accepted in writing by the Project Lead.

1. In the preparation of Initial Construction Schedule, Contractor shall take into account all constraints and requirements specified.

2. Show the complete sequence of construction by activity.

3. The project critical path consisting of Critical Work Activities shall be clearly shown and highlighted in red. Duration and logic connections for each activity shall be identified.

a. Critical Work Activities are defined as Work activities which, if delayed or extended, will delay the scheduled completion date of the Work. All other Work activities are defined as non-critical Work activities and are considered to have float.

4. Show the dates for the beginning and completion of each major element of construction conforming to all limitations listed.

5. Identify District activities necessary for completion of the Work.

6. Contractor shall provide the following information for all activities on the network diagram or in associated printouts and supporting information:

    a. Activity identification numbers and description

    b. Activity start and finish dates

    c. The predecessor and successor activities for each individual activity

7. The schedule shall include the project calendar(s) indicating all non-working periods.

8. Failure by Contractor to include any element of the work required for the performance of this Contract and completion of the Work shall not excuse Contractor from completing all work required within the time for completion, notwithstanding Project Lead's acceptance of the Initial Construction Schedule.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 BASELINE SCHEDULE AND DELAY ANALYSIS

A. If approved by the Project Lead, the Initial Construction Schedule (including any revisions required based upon the Project Lead's review), will be the Baseline Construction Schedule for the Project. Project Lead's Approval of the Baseline Construction Schedule is for conformance with contract requirements and does not relieve Contractor from its sole responsibility for means, methods, coordination or scheduling of the Work.

B. The Baseline Construction Schedule shall be used by Contractor for executing the Work of the Contract, including planning, organizing and directing the Work, and reporting its progress until subsequently revised by a Monthly Construction Progress Schedule. No unilateral changes shall be made to the Baseline Construction Schedule or Monthly Construction Progress Schedule logic and activities without the prior approval and consent of the Project Lead, excepting only the reporting of Actual Start, Actual Finish, and Activity Progress.

3.2 MONTHLY CONSTRUCTION PROGRESS SCHEDULES

A. Revise and submit Monthly Construction Progress Schedules to reflect actual progress to date and any changes in the plan to complete the work. Identify the first Monthly Construction Progress Schedule update as Revision 1 and number sequentially thereafter. The Monthly Construction Progress Schedule will contain all of the information required in the Initial Construction Schedule and the following:

1. Actual progress to date for each activity based on agreed percentage complete used for calculation of Monthly Progress Payments as described in Section 01 29 00.

2. Actual Start and Finish dates for each activity started or finished since the last monthly update.

B. For Monthly Construction Progress Schedules, include:

1. A comparison between the current update and the Baseline Construction Schedule or previously accepted Monthly Construction Progress Schedule. Revisions and updated information shall be clearly highlighted.

2. Submittal of the monthly schedule updates by Contractor are required regardless of the approval status of the Baseline Construction Schedule or any monthly revision to the Baseline Construction Schedule.

C. Provide a printed listing of any activities that have been added or deleted, or modifications to the schedule logic and dependencies, changes to planned activity durations, resources and quantities, and early-start and late finish dates or other change in the means and methods for performing the work which result in changes to the order, sequence, duration, or number of planned activities, or to the planned schedule logic. Do not change activity IDs or reuse activity IDs from deleted activities.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. The requirements of this section apply to all submittals in the Contract Documents.

2. Submit samples, drawings, and data for the Engineer's review which demonstrate fully that the construction, and the materials and equipment to be furnished will comply with the provisions and intent of this Specification. All submittals shall be written in Standard American English and all numerical data, whether in drawings, test reports, engineering calculations, manufacturer's literature, or maintenance manuals, shall be in United States Customary System (USCS) measuring units (foot, pound, gallons, etc). If original design work was completed in metric units, their equivalent USCS dimension and unit shall be indicated. All submittals, in printed or electronic format, shall be original quality and completely legible. Any obfuscation or loss of clarity of original which may result in ambiguous interpretation is not acceptable.

3. Specific items to be covered by the submittals shall include, as a minimum, the following:

a. For equipment which requires electrical service, submit detailed information to show power supply requirements, wiring diagrams, control and protection schematics, shop test data, operation and maintenance procedures, outline drawings, and manufacturer's recommendation of the interface/interlock among the equipment.

b. For mechanical equipment submit all data pertinent to the installation and maintenance of the equipment including shop drawings, manufacturer's recommended installation procedure, detailed installation drawings, test data and curves, maintenance manuals, and other details necessary.

c. Substitutions

4. Additional submittals required: O&M Manuals

5. For mechanical or electrical equipment that require submittals: provide separate submittals for each piece of equipment to be installed at each site. Title the submittals to denote which site the equipment pertains to.

1.2 PRODUCT HANDLING

A. Submittals shall be accompanied by a cover page and shall be in strict accordance with the provisions of this section.

B. Submit priority of processing when appropriate.

C. Submit materials to the EBMUD Materials Testing Laboratory when so specified. Submit other submittals to Construction Division, EBMUD, in accordance with Article 3.1 unless specified otherwise.

D. Proposals for "or equal" substitutions made prior to bid opening, pursuant to PCC Section 3400 (see Instructions To Bidders, Article 3), shall be delivered after coordinating the delivery with the District. Supplier shall coordinate with the District's Purchasing Division at the following telephone numbers: (510) 287-1253 or (510) 287-2017.

1.3 SUBMITTALS

A. Submittals shall include the following information:

1. A copy of the applicable section(s), with addendum updates included as appropriate, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.

2. A check mark shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Supplier, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer is the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Supplier with the specifications.

B. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

C. Any deviation from the contract documents not specifically requested and clearly identified, although accepted through oversight, may be rejected at any stage of the Work. The Supplier shall, at its own expense, reconstruct all work affected by the later rejection of a contract deviation that was not specifically called out and explained for review and acceptance by the District as detailed above.

PART 2 - PRODUCTS

2.1 SCHEDULE OF SUBMITTALS

A. Schedule of Submittals shall be in the form of a submittal log similar to that shown in Appendix A.

B. Complete columns (a) through (l) showing all submittals required by the specifications.

1. Dates in columns (h) through (l) shall be coordinated with the construction progress schedule to ensure sufficient time is allowed for processing of submittals and procurement of material prior to start of a construction activity.

C. A Schedule of Submittals is not required for proposals for “or equal” substitutions made prior to bid opening pursuant to PCC Section 3400 (see Instructions To Bidders, Article 3).

2.2 SHOP DRAWINGS

A. Scale required:

1. Make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the work.

B. Type of prints required:

1. Provide electronic copies of all drawings, specifications, and cut sheets complied into a single organized PDF file.

2.3 COLORS

A. General:

1. Unless the precise color and pattern are specified elsewhere, submit accurate color charts and pattern charts to the Engineer for review and selection whenever a choice of color or pattern is available in a specified product. Label each chart naming the source, the proposed location of use on the project, and the project name itself.

2.4 MANUFACTURERS' LITERATURE

A. Where contents of submitted literature from manufacturers include data not pertinent to the submittal, clearly show which portions of the contents are being submitted for review.

B. Clearly mark the literature with the materials and options being provided to illustrate conformance with the specification details.

C. Provide the complete part number and include the legend containing the descriptive details that define the meaning of each digit of the number.

2.5 SUBSTITUTIONS

A. Engineer's approval required:

1. The contract is based on the materials, equipment, and methods described in the Contract Documents. Any Supplier-proposed substitutions are subject to the Engineer's approval.

2. The Engineer will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data, and all other information required by the Engineer to evaluate the proposed substitution.

3. Where substitutions are proposed for consideration, Supplier shall submit a written request for the substitution and shall show that it is equal to the specified item. The proposed substitution shall be identified separately and included with the required submittal for the item. When submitting a variation or substitution the Supplier warrants that:

   a. The contract has been reviewed to establish that the substitution, when incorporated, will be compatible with other elements of work.

   b. The Supplier shall perform all necessary work for making substitutions workable and shall bear any additional cost necessary because of the proposed substitution.

4. Substitutions not specifically requested, although accepted through oversight, may be rejected at any stage of the work. The Supplier shall, at its own expense, reconstruct all work affected by the later rejection of a substitution that was not specifically requested.

B. Trade names and "or equal as approved by the Engineer" provision:

1. See Article 4.4 of the General Conditions.

2. See Instructions To Bidders, Article 3, for proposals for “or equal” substitutions made prior to bid opening as permitted pursuant to PCC Section 3400.

2.6 OPERATIONS AND MAINTENANCE MANUALS

A. See “Table 1: O&M Manual Summary” at the end of this section.

B. The provisions of this article are considered minimal requirements and do not supersede any requirements in individual sections of this specification.

C. When O&M manuals are required to be submitted covering items included in this work, prepare all such manuals in approximately 8-1/2" x 11" format in durable, three ring plastic binders. Each manual shall be identical and include at a minimum information identified on the O&M Manual Review Checklist attached in Appendix A. In addition, furnish the following:

1. Binder Cover: Identification on, or readable through, the front cover stating the District's specification (project) number and project title, District facility or facilities where the equipment will be installed, specification section number, and the system or equipment described in the manual.

2. Binder Spine Label: Include the system or equipment name as shown on the binder cover along with the specification section number.

3. Title page including applicable equipment tag numbers and equipment manufacturer's name, address, telephone number, and the submittal date. In addition, provide name, address and telephone number of the local manufacturer's representative.

4. Table of contents organized and referenced to manual section dividers

5. Complete instructions regarding storage, handling, installation, operation, servicing, and maintenance of all equipment involved

6. Comprehensive replacement parts list, with complete nomenclature of all replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts

7. Detailed description of handling, replacement, and disposal of all fluids and replacement parts

8. Copies of Safety Data Sheets (SDS) as required

9. Copies of all guarantees and warranties issued including the start and end dates for the warranty period or conditions for the initial start date and the duration

10. Copies of drawings with all data concerning changes made during construction

11. Copies of calculations or reports appropriately prepared including sketches, given or known information with the source of the data, equations with each variable defined and applicable units, cross-references, code/standard references, annotations and footnotes

12. All field and factory test data

13. Engineering calculations or reports pertinent to the content of the O&M manual. See Article 2.8 Engineering Calculations or Reports.

14. Provide a separate section with tab divider for documents developed in the field after the O&M manual has been accepted. These documents include, but not limited to the following: manufacturer's certificate of proper installation, field test results, etc.

D. Materials shall be word-processed.

E. For mechanical or electrical equipment that require O&M manuals: provide separate O&M manuals for each piece of equipment installed at each site. Title the O&M manuals to denote which site the equipment pertains to.

F. Manufacturer's literature shall be originals, or original quality copies. Specifically identify all equipment models and features being provided. Delete or cross out any extra information provided in standard manufacturer's literature that does not apply to the equipment furnished.

G. Operating and Testing Procedures, and Diagrams: All manufacturers' standard procedures shall be customized or rewritten as necessary to accurately describe the system as it is installed and operated for the project. Procedures shall include District device tag numbers (as shown on the P&IDs) whenever available. All diagrams illustrating the system shall be customized to show installed conditions, and shall include District device tag numbers whenever available.

H. Three-hole punch shall not obliterate any information. Reduce original material as necessary to provide a suitable margin for three-hole punching or provide three-hole punched clear plastic pockets for inserting single sheet material.

I. O&M Manual Review Checklist:

1. The manufacturer's representative shall fill out a minimum of one O&M Manual Review Checklist form per submittal (See Appendix A) and include a copy in each submitted manual. Provide more than one checklist when specified in the technical specification sections. Clearly identify the location in the O&M Manual for each element in the Technical Content section (O&M tab number and page number). If the content is in multiple locations or on multiple pages, identify each location in the space provided or in the Comments column on the form.

2. All portions of the form shall be completed prior to submittal, or the submittal may be returned unreviewed. Submittals may also be returned unreviewed if the O&M Manual Checklist form contains multiple errors and/or omissions.

J. O&M Manual Review Process

1. Preliminary O&M Manuals: Submit preliminary O&M manuals as searchable Portable Document Format (PDF) for review. The District will return the submittals to the Supplier along with comments identifying necessary corrections or additions to the manuals. The District reserves the right to keep possession of all O&M manuals, and have the Supplier arrange to correct the manuals to comply with the reviewer comments.

a. Preliminary O&M manuals shall be submitted and accepted prior to the delivery of the respective equipment or system.

2. Final O&M Manuals:

a. The manuals shall not be considered final until the submittal has received a review status of "No Exceptions Taken".

1) Once a manual has received a review status of "No Exceptions Taken", the front cover (and other places of the manual, as applicable) shall have all working revision numbers removed. The cover of the manual (both electronic and printed hardcopies) shall then be updated to include the word "FINAL" to indicate that this copy is the final version.

2) Submit the Final O&M Manuals per the requirements of Paragraph 2.6.C.

3) Submit requested number of Final O&M Manual hard copies as shown in Table 1 at the end of this section.

4) Final O&M manuals shall be submitted and accepted prior to RFS milestone.

K. Electronic Files:

1. After the District has accepted each O&M Manual, an electronic version shall be supplied in addition to the required number of hard copies.

2. Electronic files shall be created in both searchable Portable Document Format (PDF) compatible with Adobe Acrobat version XI and Word format compatible with Microsoft Word 2010 or later. The security features (e.g. password protection) of all submitted files shall be disabled so that the District can perform future editing without restriction. Custom-developed drawings included in the O&M manuals (i.e. loop diagrams, system interconnection diagrams, etc.) shall also be submitted electronically in both PDF and the native CAD file format for future editing of the drawings by the Engineer. For CAD files, the associated PDF files shall be saved such that all CAD layering is preserved in the PDF file.

3. Electronic versions shall match the hard copy page for page with blank pages deleted. Electronic files shall be converted to PDF directly rather than using optical scanning. For any document not already in electronic format, the documents shall be scanned using optical character recognition to provide searching capability in the document.

L. Maintenance Summary Forms

1. Furnish a completed Maintenance Summary Form (see Appendix A for typical format) as part of the O&M Manual. Include all typical, routine, or preventive maintenance required to ensure satisfactory performance during warranty period

and longevity of the equipment. Manufacturer's representative shall sign and date the form certifying accuracy of the information.

2. Briefly summarize each maintenance activity on the form. Specific references to more detailed maintenance information located elsewhere in the O&M manual may be placed in the "Comments" column. However, simply referencing other sections in the O&M manual without a brief description of the maintenance activity is not acceptable.

3. Information on the form shall be word-processed, or typewritten.

4. Maintenance Summary Forms shall be on 8-1/2 inch by 11-inch paper and may be as many pages as required to completely summarize the required maintenance. However, the order and format shall be in accordance with the supplied form. The Maintenance Summary Forms will be provided in electronic format (MS Word) upon request.

2.7 ENGINEERING CALCULATIONS OR REPORTS

A. Engineering calculations/reports required by this specification shall be based on well-established engineering theories and principles. Each calculation/report shall be a complete and independent package.

B. The Supplier (or Manufacturer) shall provide the signing Engineer all necessary reference drawings and data required for completion of the calculations.

C. The calculations/reports shall be comprehensive for each structure or item, in that all calculations/reports are contained within the individual structure or item's calculation/report document (i.e., no calculation/report references to other calculation documents).

D. Presentation format shall be similar to that described in Article 2.6 – Operations and Maintenance Manuals. As a minimum, all calculations/reports shall be bound in an appropriately labeled binder, and contain the following elements:

1. Facility title, including substructure number, equipment description, applicable equipment tag number(s), and applicable specification section.

2. Table of Contents

3. Introduction, including description of structure or item, purpose of calculation/report, design assumptions with justification, software utilized for the analysis including the version, and codes/standards used

4. A list of references used to provide the bases for assumptions, equations, or data used in the calculation/report

5. Calculations or reports appropriately prepared, including sketches and reference drawings, given or known information with the source of the data, equations with

each variable defined and applicable units, cross-references, code/standard references, annotations and footnotes

6. When spreadsheets are used, provide referenced equations and the formulas used in the calculations.

7. Results shall be clearly identified. Summary tables shall be used for large amounts of data (especially if a software application is used)

8. Final design details, ready for transmittal to design drawings or shop drawings

9. Seal or signature of Professional Engineer registered in the State of California, as appropriate, of the individual(s) who prepared the calculations/reports

10. Appendices, including input and output files from computer design, and photocopies of catalog sheets for any special material or equipment (e.g., manufacturer sheet for equipment, ICBO reports for anchors, etc.), and checker markups

E. When any part of the calculation/report has been prepared by computer software, a copy of the input and output files shall be included as part of the final design calculation.

F. Shop drawings shall not be submitted until all design calculations/reports have been appropriately reviewed, checked and signed. The checker markups and comments shall also be included in an appendix to each calculation.

2.8 SUBMITTAL QUANTITIES

A. Submit one (1) electronic copy of the scanned data and drawings in searchable PDF format (compatible with Adobe Acrobat version XI), with organized tabs and a table of contents listing all supplied equipment.

B. Submit one (1) electronic copy of each sample, unless specified otherwise.

C. Submit one (1) electronic copy of each manual, unless specified otherwise.

D. Submit quantity specified of materials submitted to the EBMUD Materials Testing Laboratory.

2.9 ELECTRONIC SUBMITTALS

A. Provide electronic submittals in searchable PDF (compatible with Adobe Acrobat version XI). All portions of the electronic submittals shall be legible and shall be in full color identical to the original material. Provide manufacturer's literature in original electronic file, if available.

B. Provide one electronic submittal file for each submittal except as noted hereinafter. The electronic submittal file name shall use the following format: submittal number –

specification section number - description (e.g.: “001.1-01 33 00-Coating of Widgets”). Providing multiple electronic files for a single submittal (except as noted hereinafter) is not acceptable. The Supplier shall merge multiple files into a single electronic file.

C. For larger submittals containing multiple volumes, submit one electronic file for each hardcopy volume and each electronic submittal file name shall include the corresponding hard copy volume number (e.g. “001.1-01 33 00-Coating of Widgets – Volume 3”).

D. Exceptions requiring hardcopy material initially, are:

1. O&M processing, per Article 2.6

E. The Supplier is solely responsible for verifying that the hardcopy submittal and accompanying electronic submittal are identical and address/incorporate prior Engineer review comments.

F. All portions of the electronic submittals shall be provided with text searching capabilities whenever possible. For any document not already in electronic format, the documents shall be scanned using optical character recognition to provide text searching capability in the document.

1. Submittals and RFIs shall be linked to at least one drawing within the File Manager application of the CMIS that provides the most relevant details regarding the subject equipment, material, item, or work. Linking shall be accomplished using the CMIS’s “pin” feature. Submittals and RFIs received without at least one linked drawing or with a linked drawing that is not relevant will be Returned Without Review.

2.10 REVIEW CHECKLISTS

A. Review Checklists are required for some specification sections (when specified in the section) and for all O&M manual submittals.

B. Each submittal requiring review checklists shall comply with the following:

1. Each page of the submittal shall include a unique and sequential page number. The page numbers shall be located in the same general location on each page.

2. Page numbering may include “point numbers” (10.1, 10.2, etc.) to facilitate inserting pages without renumbering an entire submittal. However, all pages in the submittal shall be in numerical order.

3. The review checklists shall be completed in its entirety with accurate page number references for each checklist item. Submittals with inaccurate review checklists may be returned without review for correction.

4. The review checklist shall be inserted at the beginning of the submittal.

PART 3 - EXECUTION

3.1 GENERAL

A. Prepare and use a transmittal form for submittals that includes the following information:

1. *Project name and specification number

2. *Date of submittal

3. *“To:
East Bay Municipal Utility District
P.O. Box 24055
Oakland, CA 94623-1055
ATTN: I-Pei Hsiu MS 901”

Or

If and only if, this submittal is a proposal for “or equal” substitutions made prior to bid opening pursuant to PCC Section 3400 (see Instructions To Bidders, Article 3), use the following address (envelope shall be marked: “Submittal Request for Substitution, Specification No. 2617”):

“To: Purchasing Division, Contract Supervisor, MS #102
East Bay Municipal Utility District
P.O. Box 24055
Oakland, CA 94623-1055

4. *"From:" Name and address of Supplier

5. Name and address of subcontractor

6. Name and address of supplier

7. Name of manufacturer

8. *Spec. Section, Article Number, Paragraph and Subparagraph Number and/or drawing number and detail references

9. Location of use

10. *Submittal number

11. *Signature and title of transmitter

12. *Original submittal or resubmittal

Note: All transmittals shall include asterisked items as a minimum to be acceptable for review.

B. Use the "Item Number" on the Schedule of the Submittal for the corresponding submittal number. On a resubmittal, add a numerical suffix to the original submittal number. For example, 6.1 indicates the first resubmittal of submittal Number 6.

C. Use a separate transmittal form for each specific item or class of material or equipment within a division for which a submittal is required. Transmittal of a submittal of multiple items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or when items are so functionally related that review of the group as a whole is appropriate.

D. If a submittal contains multiple items, then each item shall be clearly labeled throughout the submittal or indexed in a manner eliminating confusion in identifying how each item relates to the whole. When submittal items have been assigned a “District equipment tag number” in the contract documents, each tag number shall be included throughout the submittal to clearly associate the specific submittal information to specific tag numbers.

E. Stamp or permanently print on each submittal the following certification statement.

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated into Specification Number 2617 is in compliance with the Contract drawings and specifications, can be installed in the allocated spaces, and is submitted for District (record/review).

Certified by _____Date _____"

3.2 SCHEDULE OF SUBMITTALS

A. Submit initial Schedule of Submittals within 15 days after Notice to Proceed. Submit weekly updates thereafter.

B. If specifically requested, submit revised Schedule of Submittals within 7 days after date of request from the Engineer.

C. The Engineer will review Schedule of Submittals and will notify Supplier that schedule is acceptable or not acceptable within 10 days after receipt.

D. The Schedule of Submittals shall identify Supplier “or equal” substitution proposals made prior to bid opening (see Instructions To Bidders, Article 3), which have been accepted by the Engineer.

3.3 COORDINATION OF SUBMITTALS

A. General:

1. Prior to submittal for Engineer's review, use all means necessary to fully coordinate all material, including the following procedures:

    a. Determine and verify all field dimensions and conditions, materials, catalog numbers, and similar data.

    b. Coordinate as required with all trades and with all public agencies involved.

    c. Secure all necessary approvals from agencies having jurisdiction and signify with agency stamp, or other means, that approvals have been secured.

    d. Clearly indicate all deviations from the Contract Documents.

B. Grouping of submittals:

1. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items; the Engineer may reject partial submittals as not complying with the provisions of the Contract Documents.

C. Resubmittals:

1. The Supplier shall include a Comment and Response sheet with each resubmittal. The Comment and Response sheet shall be the first item after the submittal transmittal form. The Comment and Response sheet shall include each review comment (word for word) from the previous submittal cycle, followed by the Supplier's response clarifying how the comment has been addressed in the resubmittal. All responses shall at a minimum have a general description of what new information in the resubmittal addresses the review comment; and where in the resubmittal this new information can be located (tab number, page number, etc).

2. Resubmittals that do not comply with the requirements set forth in subparagraph C.1 above will be returned to the Supplier without review. The Supplier shall resubmit with an appropriate Comment and Response sheet as specified herein.

3. If the Supplier requires more than 2 rounds of review for a specific submittal before being accepted by the Engineer, the cost of District review time and administrative costs for the 3rd round of review and beyond will be deducted from progress payments due to the Supplier.

3.4 TIMING OF SUBMITTALS

A. Article 3.4 – Timing of Submittals, is not applicable for proposals for "or equal" substitutions made prior to bid opening pursuant to PCC Section 3400 (see Instructions to Bidders, Article 3).

B. General:

1. Make all submittals far enough in advance of the scheduled date of beginning of installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.

2. In scheduling, unless otherwise noted, allow at least ten (10) workdays for each submital after the time of receipt for the Engineer's review. No time extension will be allowed for the Contract due to time loss in the review process.

3. The construction schedule shall allow the minimum number of work days shown for each of the sections listed:

Specification Section	Minimum Work Days for Submittal Review
16 70 00 – Control Panels	7
16 80 00 – Programmable Logic Controllers and Associated Equipment	7
26 22 13 – Low-Voltage Distribution Transformers	7
26 32 13.13 – Diesel Engine Driven Generator Sets	5
26 24 13 - Switchboards	7
26 36 23 – Automatic Transfer Switches	7

3.5 REVIEW BY ENGINEER

A. Acceptance of each submittal by the Engineer will be general only and shall not be construed as:

1. Permitting any departures from the contract requirements.

2. Relieving the Supplier of the responsibility for any errors and omissions in details, dimensions, or of other nature that may exist.

3. Approving departures from additional details or instructions previously furnished by the Engineer.

B. Submittals (excluding manuals and as-built drawings) will be returned to the Supplier marked "No Exceptions Taken", "Make Corrections Noted", "Revise and Resubmit", "Acknowledged Receipt", or “Rejected”, except that in some cases, all copies of a submittal may be returned to the Supplier marked "Returned Without Review". See paragraph 3.5.E for proposals for “or equal” substitutions made prior to bid opening pursuant to PCC Section 3400 (see Instructions To Bidders, Article 3).

1. "No Exceptions Taken" indicates that item covered by the submittal may proceed provided it complies with requirements of the specifications. Final acceptance will depend upon that compliance.

2. "Make Corrections Noted" indicates that item covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the specifications. Final acceptance will depend on that compliance.

3. "Revise and Resubmit" indicates that the Supplier shall not proceed with any phase of the item covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations and requirements of the specifications.

4. "Acknowledged Receipt" indicates that the item is required to be submitted to the Engineer primarily for information or record purposes, and is not subject to Engineer's review.

5. "Returned Without Review" indicates that the submittal was not reviewed by the Engineer due to the submittal being incomplete, illegible, inadequate, or otherwise failing to conform to the requirements of the specification. Supplier shall prepare a new submittal for this item.

6. "Rejected" indicates that the submittal proposes an action of which the Engineer does not approve, makes an assertion with which the Engineer disagrees, appears to show intent to violate the terms of the Contract, or is otherwise objectionable to the Engineer and is returned to the Supplier with prejudice.

C. Resubmit revised drawings or data as indicated unless otherwise specified.

D. Work requiring the Engineer's review and acceptance shall not begin until the submittals for that work have been returned as "No Exceptions Taken" or "Make Corrections Noted".

E. Proposals for "or equal" substitutions made prior to bid opening pursuant to PCC Section 3400 (see Instructions To Bidders, Article 3) will be evaluated by the Engineer, and if accepted, bidders will be notified by addenda.

3.6 CHANGES TO ACCEPTED SUBMITTALS

A. A resubmittal is required for any proposed change to a submittal that has been marked "No Exceptions Taken" or "Make Corrections Noted". Changes which require resubmittal include, but are not limited to, drawing revisions, changes in materials and equipment, changes to installation procedures and test data. All resubmittals shall include an explanation of the necessity for the change.

B. Minor corrections to an accepted submittal may be accomplished by submitting a "Corrected Copy".

C. For changes to submittals proposed by the Supplier for their own convenience, the District reserves the right to back charge for the associated Engineer review time and administrative costs.

3.7 O&M MANUAL SUMMARY LIST

A. Table 1 is a summary of equipment/systems that require O&M manuals. Additional O&M manuals might be required when specified elsewhere.

Table 1: O&M Manual Summary (Additional O&M manuals might be required in other Sections)		Number of Hard Copy(ies) to Print
Section	System / Equipment, or Facility	
16 70 00	Control Panels	
16 80 00	Programmable Logic Controllers and Associated Equipment	
26 22 13	Low-Voltage Distribution Transformers	
26 24 13	Switchboards	
26 24 16	Panelboards	
26 36 23	Automatic Transfer Switches	

END OF SECTION

APPENDIX A

Submittal Log

O&M Manual Review Checklist

Typical Maintenance Summary Form

EBMUD

SUBMITTAL LOG

SPEC. NO.	PROJECT TITLE	DATE

(a)	(b)	(c)	(d)							(e)	(f)	(g)	(h)	(i)
ITEM NO.	SPEC. SECTION	DESCRIPTION	TYPE OF SUBMITTAL							PLANNED SUBMIT DATE	ACTUAL DATE REC'D.	O.E.S. NO.	DATE RTND.	REMARKS
			Shop Dwg.	Catalog	Sample	Certificate	Test Data	Manual	Other					

A-1

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SUBMITTAL NO. _____

O&M MANUAL REVIEW CHECKLIST

SUBMITTAL NO. _____ DATED: _____
SPEC. SECTION: _____ REVIEW DATE: _____
SUBJECT: _____ REVIEWER: _____
EQUIP. ITEM: _____ SUPPLIER: _____
MANUFACTURER: _____
ACCEPTABLE: _____
UNACCEPTABLE: _____ PROJECT NO.: SD- _____

DISPOSITION	ACCEPTABLE YES	NO	NA	COMMENTS
GENERAL FORMAT				
• Minimum four copies				
• Three ring hard back cover				
• Cover label				
System/equipment names				
Equipment numbers				
Building				
Specification section				
• Title page				
• Typed table of contents				
• Sections parallel equipment specifications				
• Heavy section dividers w/numbered plastic tab				
• Pages punched for 3 ring binder (punching does not obliterate data)				
• Info larger than 8-1/2x11 folded showing title block				
OPTIONAL plan pockets				
• Identify applicable model nos. and data				
• Legible copies				
TECHNICAL CONTENT				
• Equipment descriptions:				
Equipment names, model nos. & tag nos.				
Equipment & major component functions				
Diagrams & illustrations				
• Performance information				
Nameplate data				
Performance test data/curves				
• Installation instructions				
Installation procedures & drawings				
Engineering data				

SUBMITTAL NO. _____

Wiring diagrams				
Alignment tolerances				
Adjustment procedures				
• Test procedures				
• Operating instructions				
Startup procedures				
Normal & routine operations				
Control functions				
Shutdown procedures				
Emergency operations				
• Troubleshooting guide				
• Safety precautions:				
Safety procedures				
Lockout discussion				
CAUTION, WARNING, DANGER text				
Special safety equipment				
• Maintenance summary forms				
(MFR's standard form is not acceptable)				
• Preventive maintenance instructions				
• Lubrication information:				
Location of lube points & frequency				
Recommended type & grade, MFR, temperature range				
• Overhaul instructions:				
Detailed assembly drawings w/parts list & numbers				
Teardown/rebuild instructions				
• Spare parts for equipment and components:				
Recommended spare parts list w/part numbers				
Instructions for ordering (motors, etc.)				
Long-term storage requirements				
• Electrical information:				
Nameplate data				
Relay, control, alarm contact settings				
Interconnection wiring diagram				
Motor standard test data & performance curves				
Motor space heaters				
• Instrumentation and control:				
Control diagrams				
Panel layout drawings				
Instrument data sheets				
Wiring and terminal strip diagrams				
Pneumatic piping drawings				
• Long-term shutdown protection				

TYPICAL MAINTENANCE SUMMARY FORM

1. EQUIPMENT ITEM _____
2. MANUFACTURER _____
3. EQUIPMENT IDENTIFICATION NUMBER(S) _____
4. WEIGHT OF INDIVIDUAL COMPONENTS (over 100 pounds) _____
5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____
6. MANUFACTURER'S LOCAL REPRESENTATIVE _____

   Name _____ Telephone Number _____

   Address _____
7. MAINTENANCE REQUIREMENTS

Maintenance Operation List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable.	Frequency List required frequency of each maintenance operation.	Lubricant (If Applicable) Refer by symbol to lubricant list required.	Comments

8. LUBRICANT LIST

Reference Symbol	Shell	Chevron	Texaco	Arco	Or Equal
List symbols used in Item 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. SPARE PARTS. Include your recommendations regarding what spare parts, if any, should be kept on the job

MAINTENANCE SUMMARY DATABASE TEMPLATE

Columns A through H:

	A	B	C	D	E	F	G	H
1	**MAINTENANCE SUMMARY DATABASE TEMPLATE (DRAFT)**							
2							**Manufacturer's Local**	
3	**Equipment ID No.[1]**	**Equipment Description**	**Manufacturer**	**Nameplate Data[2]**	**Units**	**Weight (lbs)[3]**	**Name**	**Company**
4	WRA-MFS-PMP-101-CFG	MF Feed Pump No. 1	Goulds	100	hp	250	James Beam	Wastewater Equipment Sales
5								
6								
7	WRA-SE-TNK-101	Influent Tank	Pacific Tank	1,000,000	gallons	NA	Jack Daniels	Big Tanks for Sale
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19	**NOTES**							
20	[1] Equipment numbers may be found in the instrumentation ("I") drawings for the project. All equipment numbers begin with an area code prefix of "W__" followed by the alphanumeric designations shown on the drawing. Please inc							
21	[2] Nameplate data rating for the equipment may be in a variety of units including horsepower, voltage, speed, etc. Please include units in the adjacent column.							
22	[3] For equipment items over 100 lbs, please provide weight.							
23	[4] List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. **Multiple operations or tasks should be listed individually under a single piece**							
24	[5] Provide information for number of times the maintenance task is to be repeated. List the frequency (number of times in a given period) and the duration (period units, e.g., per day, week, month) in separate columns adjacent to or							
25	[6] Include recommendations regarding what spare parts, if any, should be kept on the job.							

Columns I through P:

	I	J	K	L	M	N	O	P
1								
2	**Representative**		**Maintenance Requirements**					
3	**Phone**	**e-mail**	**Maintenance Task[4]**	**Frequency[5]**	**Duration[5]**	**Lubricant**	**Comments**	**Spare parts[6]**
4	408.926.2258	jbeam@wwequip.com	(1) Grease main bearing	1	month	Mobil EZ Greazy	Your hands will get dirty	Main bearing
5			(2) Check oil fill level	2	week	Mobil Synthetic No. 2	Refill as necessary to maintain level between indicated markers.	
6			(3) Inspect for noise and vibration	1	month	NA		
7	510.256.9632	jdaniels@bigtanks.com	Inspect exterior coating	1	year		Look for flaking and chipping	can of spray paint
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20	lude the W__ prefix with the equipment numbers.							
21								
22								
23	**of equipment, see example above.**							
24	e another.							
25								

SECTION 01 35 13

SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.1 WORK INVOLVED WITH EXISTING PLANT

A. General:

1. The work shall be executed during the scheduled outage established for this construction, with all Fish Hatchery loads not in operation.

2. Critical events in the sequence of construction are described in this Section and shall be utilized by the Contractor as a guideline. The construction constraints presented do not include all items affecting the completion of the work, but are intended to describe critical events necessary to complete the construction on schedule and ensure the facility becomes operational on schedule for fish safety . It shall be understood and agreed by the Contractor that the critical events described are not all inclusive and that additional constraints not described may be required to minimize disruption and ensure compliance. Deviation from or modification of this suggested sequence may be permitted by the Engineer if techniques and methods known to the Contractor will result in earlier completion of the project in adherence to the specifications and are approved in advance by the Engineer in writing.

3. The construction constraints described in this Section shall be incorporated into the Contractor's construction progress schedule. See Section 01 32 00 Construction Progress Documentation.

B. Interruption of Hatchery Operations:

1. The making of connections to existing facilities or other Contractor operations that interfere with the operation of the existing equipment shall be thoroughly planned in advance and reviewed and approved by the Engineer. All required equipment, materials, and labor shall be on hand at the time of the connections. Additional spare equipment and materials shall be on hand and available for use in the event of equipment malfunction. Work shall be completed as quickly as possible and with as little delay as possible, and shall proceed continuously if deemed necessary by the Engineer in order to complete modifications and/or connections in the minimum time.

2. The maximum duration of the onsite construction activities including commissioning is from June 1, 2027, to August 30, 2027.

3. The emergency generator and new electrical system must be fully operational and capable of serving all Hatchery electrical loads by August 31, 2027.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 01 35 24

PROJECT SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Contractor is solely and exclusively responsible for maintaining job-site safety and compliance with all pertinent Groups and Articles set forth in Title 8, California Code of Regulations (Cal/OSHA), and Title 29, Code of Federal Regulations (OSHA; where applicable).

B. Contractor shall be the Creating, Controlling, and Correcting Employer for purposes of compliance with Cal/OSHA's multi-employer worksite rule (8 CCR 336.10) for all work and workers associated with the project.

C. Contractor and subcontractor workforce shall have sufficient experience and training to perform the work of the contract demonstrated by training, certifications, licensing, and permits. This includes specialized work related to OSHA and EPA requirements.

D. Obtain and post permits required by 8CCR section 341.

E. Site Activities

1. Physically delineate and assign work areas and restrict access by unauthorized persons during the course of work.

2. Provide and post safety signs at project/property entrances and hazard control areas including but not limited to:

a. Requirements for personal protective equipment (hard hats, safety shoes, reflective vests, safety glasses, respiratory protection, etc.)

b. Access or prohibition to demolition work areas

3. Unsafe tools, equipment, or machinery shall not be brought onto the project. Unsafe tools, etc. shall be considered as those tools which are in need of repair, replacement, lacking proper maintenance, or are unsuitable for the task. This also includes tools and equipment not used in accordance with manufacturer guidance.

4. Assemble, install, erect, and prepare safety related equipment, devices, and products in accordance with manufacturer specifications and recommendations. Manufacturer documentation shall be provided to the Project Lead upon request.

5. Comply with:

a. Department of Transportation (DOT) testing regulations (49 CFR Part 32)

b. CA State Vehicle Code (Section 34520)

c. All applicable legally valid rules and regulations regarding drug and alcohol misuse, including consumption, sale or possession

6. Firearms, explosive devices, and other dangerous weapons are prohibited on District property or while engaged in contract Work.

7. Safe access shall be provided for construction inspectors and other authorized District employees in order to inspect or review Work in progress.

F. Submit a Project Injury & Illness Prevention Plan (IIPP).

G. Submit an Emergency Action Plan that prepares responses to employee accident/injury events, or any serious unplanned event (e.g.: utility break, fire, structure collapse, etc.) that requires notifying any first aid provider or response agencies (e.g.: fire departments, utility agencies, rescue teams, etc.)

1. Plan shall include a map to medical facilities that are capable of caring for worker accidents & injury.

2. Plan shall include emergency contact numbers.

H. Accident Reports

1. Complete and submit a report when any injury or event described in section 1.3E occurs. See Article 3.3 for report requirements.

1.2 TRAINING AND QUALIFICATIONS REQUIREMENTS

A. Ensure that all personnel who, as the result of work on this contract, will likely be exposed to hazardous conditions or hazardous substances at the site have received the appropriate training for the hazards they may encounter. Establish minimum training requirements and do not allow untrained workers to enter or perform Work at the site.

B. Submit certification of current training & qualification for each worker engaged in work with hazardous conditions or hazardous substances.

PART 2 - PRODUCTS

2.1 SAFETY EQUIPMENT

A. General

1. Safety equipment and systems shall be not less effective than the requirements of Title 8, California Code of Regulations and related recognized authority standards such as NFPA, NEC, ASTM, etc.

PART 3 - EXECUTION

3.1 HAZARD CONTROL

A. General

1. The Project Lead or District Safety representative may suspend or stop Work, notify Cal/OSHA, or both if observations/inspection of project work and work locations are in not in conformance with Title 8CCR Code of Regulations, and/or safety submittals, work plans and job hazard analyses.

B. Meet and satisfy the requirements outlined in the checklists identified herein and at the end of this section for project safety controls.

C. Vibration and Noice Control (Biological Sensitivity)

1. Contractor shall coordinate with Hatchery staff via project lead 48 hours prior to any high-decibel testing or heavy compaction work.

D. Water Safety and Drowning Prevention

1. Since Work is adjacent to the Camanche Dam water source, Contractor shall comply with 8 CCR 1602.

E. Hydrocarbon and Spill Management

1. The generator installation must include a Spill Prevention, Control, and Countermeasure (SPCC) plan to protect the hatchery water source and Camanche Dam watershed.

F. Concrete Washout

1. No concrete washout is permitted on the ground or into any storm drain or waterway.

2. A designated, leak-proof washout container must be maintained on-site and removed upon completion of the foundation pours.

G. Demolition

1. Limit access to demolition areas.

2. Ensure structural demolition adheres to demolition plan.

3. Ensure access and work on structures planned for demolition or in progress of demolition are evaluated by a qualified person for safety.

H. Fire Prevention and Protection

1. Perform all Work in a firesafe manner and supply and maintain on the site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable federal, local, and state fire prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standards for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

2. A long-handled, round-point shovel, or a fire extinguisher shall be kept at an accessible (unlocked) location on the construction site at all times.

3. Earthmoving and portable equipment with internal combustion engines shall be equipped with a spark arrestor to reduce the potential for igniting a wildfire. Such equipment shall be maintained to ensure proper functioning of spark arrestor.

4. For all work occurring between April 1 and December 1, or any other periods during which a high fire danger has been identified:

   a. Equipment that could produce a spark, fire, or flame shall not be used within 10 feet of any flammable materials.

   b. Portable tools powered by gasoline-fueled internal combustion engines shall not be used within 25 feet of any flammable materials.

5. Vegetation management for fire prevention and protection

   a. Prior to and during construction:

      1) Neatly stack all combustible materials away from structures within construction site and have all combustible growth cleared 15-feet around the stack.

6. During construction, maintain an unobstructed horizontal clearance at access drives of not less than the required width of the access drives, and an unobstructed vertical clearance of not less than 13 feet 6 inches above all roadways.

3.2 ACCIDENT REPORTS

A. Report injuries to the Project Lead upon occurrence and incident response. Examples of reportable injuries include but are not limited to: broken limbs, amputation, chemical exposure, etc.

1. Contractor is solely and exclusively responsible for notifying Cal/OSHA within 8-hours of the occurrence of a serious injury or fatality. Copies of all related Cal/OSHA correspondence shall be reported to the Project Lead.

2. Reports shall document the root cause(s) of the accident, and how the accident will be prevented from reoccurring. Furnish further information to the Project Lead as requested.

B. Report all accidents/incidents to the Project Lead arising out of, or in connection with, the performance of the Work whether on, or adjacent to the site, giving full details and statements of witnesses. Examples include but are not limited to property damage, heavy equipment accidents, trench collapse, structural failure, chemical release or spill, accidentally water release.

1. Reports shall document the root cause(s) of the accident, and how the accident will be prevented from reoccurring. Furnish further information to the District as requested.

C. If a claim is made by anyone against the Contractor or any subcontractor on account of any accident/incident, arising out of or in connection with the performance of the contract, the Contractor shall promptly report the facts in writing to the Project Lead, giving full details of the claim.

D. Notify the Project Lead if Cal/OSHA arrives at the job-site for any purpose, including inspections, consultations, or investigations.

E. Notify the Project Lead if any other regulatory agency arrives at the job-site for any purpose, including inspections, consultations, or investigations.

F. Notify the Project Lead if any emergency response agency or first aid provider is summoned or arrives on the project site.

END OF SECTION

SECTION 01 35 44

ENVIRONMENTAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- Work includes:

    1. Comply with applicable Federal, State and Local environmental regulations in the execution of the Work.

    2. Procure and pay for all necessary local, state, and federal permits to perform the Work.

    3. Implement all required environmental plans, procedures, and controls during performance of the Work.

    4. Characterize all wastes per Contract Documents.

    5. Handle and dispose of all wastes, including Hazardous Wastes, in a proper and lawful manner.

    6. Compliance with EBMUD Biological Best Management Practices specified herein.

    7. In the event of a conflict or inconsistency between this Section and any provisions of the Contract Documents, the more stringent provision shall prevail.

- Site Activities

    1. Protect storm drains and surface waters from impacts of project activity.

    2. Store materials and wastes such as demolition material, soil, sand, asphalt, rubbish, paint, cement, concrete or washings thereof, oil or petroleum products, or earthen materials in a manner to prevent it from being washed by rainfall or runoff outside the construction limits.

    3. Reuse or dispose of excess material consistent with all applicable legal requirements and disposal facility permits.

    4. Prevent visible dust emissions from leaving the work areas.

    5. Maintain construction equipment in good operating condition to reduce emissions.

- Related Sections

1. Section 01 14 00 – Work Restrictions

2. Section 01 35 24 – Project Safety Requirements

3. Section 01 50 00 – Temporary Facilities and Controls

1.2 SUBMITTALS

- Storm Water Management

    1. Local Storm Water Permits

        a. Obtain any local storm water permits (e.g. city, county, etc.), submit copies, and comply with their requirements.

- Waste Management:

    1. Prepare a Waste Management Plan and submit a copy of the plan for the Engineer's acceptance prior to start of work. The Waste Management Plan shall address all Construction and Demolition Waste, universal wastes, Hazardous Wastes, Excavation Soils, and any other solid debris intended to be removed from the project site(s).

        a. Identify each type of material that will be generated during the project for disposal, recycling, salvage, or other management and estimate the volume/weight of each.

        b. Identify how the Contractor will handle, transport, dispose of, or otherwise divert each type of material required to be removed under this contract in a safe, appropriate, and lawful manner in compliance with all applicable regulations of local, state, and federal agencies having jurisdiction over the removed materials.

        c. Identify diversion goals for all Construction and Demolition Wastes generated during the project. The specified diversion goals shall meet the minimum requirements of the local ordinances in the City/County/jurisdiction where each project site is located.

        d. Include a list of recycling facilities and processing facilities that will be receiving recyclable or recoverable materials, including, but not limited to concrete, asphalt, and metals.

        e. Identify materials that are not recyclable or not recovered which will be disposed of in a landfill (or other means acceptable by the State of California and local ordinance and regulations). List the permitted landfill, or other permitted disposal facilities, which will be accepting the disposed waste materials.

2. The following additional waste management provisions shall be included in the Waste Management Plan to demonstrate compliance with San Joaquin County requirements.

    a. Include a good faith quantity estimate of each type of Construction and Demolition Waste that would be generated if no diversion methods were implemented. Submit estimate with calculations based on weight of each material. The following materials are subject to the estimate requirement:

        1) Asphalt

        2) Concrete

        3) Aggregates

        4) Brick, masonry, clay products, and ceramic tile

        5) Excavation Soils

        6) Wood products, including clean dimensional wood, palette wood, plywood, OSB, and particleboard

        7) Metals, including banding, ductwork, flashing, piping, rebar, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass and bronze

        8) Plant and tree trimmings (may be included in wood products if accepted by recycling service)

        9) Cardboard, paper products, and packaging

        10) Treated Wood Waste

        11) Drywall

        12) Mixed waste, including, but not necessarily limited to the following:

            a) Beverage containers

            b) Insulation

            c) Roofing

            d) Glass, excluding that used for containers

            e) Gypsum board

            f) Acoustical ceiling materials

            g) Plastics, including ABS, PVC, and piping

h) Latex paint

i) Other materials

b. Specify the haulers that will be used to transport or haul waste to landfills and disposal/reuse/recycling sites.

c. Include an example of a waste log or other tracking mechanism that will clearly show each load and its destination. The record shall clearly distinguish between anything sent to landfill or recycling/reuse or salvage.

1) Include in log the type of load, load weight, name of hauling service, recycling service or landfill, and date accepted by recycling service or by landfill (or other service).

d. Submit copies of any submittals to San Joaquin County required by their local ordinance. This includes permit applications, Waste Reduction and Recycling Plans, Construction and Demolition Summary Reports, or other similar documents. The permit application and Waste Reduction and Recycling Plan shall be submitted as an Appendix to the Waste Management Plan when possible.

- Spill Prevention and Response Plan

1. Submit plan detailing the means and methods for preventing and controlling the spilling of known hazardous substances used on the jobsite or staging areas.

a. Include a list of the hazardous substances proposed for use or generated by the Contractor on site, including petroleum products.

b. Define measures that will be taken to prevent spills, monitor hazardous substances, and provide immediate response to spills.

c. Include provisions for notification of the Engineer or alternate contact and appropriate agencies including phone numbers; spill-related worker, public health, and safety issues; spill control, and spill cleanup.

d. Map showing hazardous materials project-related storage locations, names of the hazardous materials, and volumes/quantities.

e. Submit a Safety Data Sheet (SDS) for each hazardous substance proposed to be used prior to delivery of the material to the jobsite.

- Waste Disposal Records

1. Copies of waste management and disposal records including bills of lading, manifests, weight tickets, and receipts from waste management facilities shall

be submitted to the Project Lead. This provision applies to Hazardous Wastes, universal wastes, treated wood wastes, solid wastes disposed at landfills, and radioactive wastes.

PART 2 - BIOLOGICAL BEST MANAGEMENT PRACTICES (BMPS)

2.1 GENERAL BMPS

- General Site Operation Best Management Practices

    1. Comply with applicable federal and state laws that provide protection to plants and animals.

    2. Do not intentionally "take" (meaning harm, harass, pursue, hunt, shoot, wound, trap, kill, capture, or collet) any species that are listed as threatened, endangered, or special status. Protection extends to animals, dead or alive, and all their body parts.

    3. Prior to working within the District watershed, all equipment will be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life. Petroleum products, or any other substances which could be hazardous to aquatic life, resulting from project related activities, will be prevented from contaminating the soil and/or entering the waters of the state.

    4. All vehicles and equipment working on District lands will be sufficiently cleaned prior to arrival at the project site so that the introduction of invasive species is not a concern.

    5. Due to concerns with invasive species, particularly golden mussels, quagga mussels, and zebra mussels, any equipment that has come in contact with a water bodies (including lake, rivers, streams, delta, and/or estuary) are required to be clean, not contain any plant material or organisms, and have had a minimum dry-out period of 5 weeks before they are allowed to enter the Mokelumne River Fish Hatchery. Alternative decontamination procedure for equipment that has come in contact with a water body within the previous 5 weeks include washing equipment with ≥140°F water or freezing equipment for a minimum of 8 hours. Decontamination procedures must be verified and approved by a qualified biologist before the affected equipment is allowed to enter the hatchery facility.

    6. Staging and equipment storage areas will be established away from waterways. All equipment, maintenance materials and other items considered to be pollutants will be stored away from water systems. All spills of hazardous materials, petroleum products or other pollutant materials will be reported immediately to the appropriate agency without delay.

7. Cliff swallow nest will need to be cleared of bats by a qualified biologist before they can be removed.

8. Care will be taken not to disturb or remove the non-targeted terrestrial and aquatic vegetation and sediment necessary to complete operations.

9. Dust and debris must be controlled and not allowed to enter the river or hatchery raceways.

10. All impacted /disturbed areas, roads, and access points will be returned to their original preconstruction state. Areas left barren of vegetation as a result of the activities shall be restored to its natural state by seeding with a blend of native and non-native erosion control grass seeds approved by a District biologist. Re-vegetation shall be completed as soon as practical after construction activities cease in those areas. If needed, the seeded areas may be covered with a wildlife friendly plastic free erosion resistant covering such as jute netting, coconut fiber blanket or similar erosion control blanket. No plastic netting of any type, even those considered biodegradable, shall be used within or on top of the erosion control material.

11. Products with plastic monofilament or cross joints in the netting that are bound/stitched (such as found in straw wattles/fiber rolls and some erosion control blankets), which may cause entrapment of wildlife, shall not be used.

12. Prior to the start of the project, all personnel will be briefed on how to avoid harm to special status species and their habitat.

13. All food and food-related trash will be enclosed in sealed trash containers at the end of each workday and removed completely from the construction site once every three days to avoid attracting wildlife.

14. Hazardous materials such as fuels, oils, solvents, etc. will be stored in sealable containers in a designated location that is at least 100 feet from wetlands or drainages. If it is not feasible to store hazardous materials 100 feet from wetlands and the river channel, then spill containment measures will be implemented to prevent the possibility of accidental discharges to wetlands and waters.

15. Trenches and holes will be covered or have a escape ramps (maximum slope of 2:1) to allow trapped animals to escape uncovered holes or trenches. These ramps will be spaced every 100 feet of less.

16. All openings in pipelines lines, valves, or junctions will be sealed in such a way that animals cannot enter.

17. Visually check all sections of pipe/construction materials stored overnight for the presence of wildlife sheltering within them prior to being moved or shall have the ends capped while stored onsite to prevent wildlife from entering.

18. Project staff must read the BMPs prior to initiating work and have copies of this documents on site during all project activities.

2.2 SPECIES SPECIFIC BMPS

- **California tiger salamanders (*Ambystoma californiense*)**

1. A qualified biologist will check the project site (construction site, access paths, equipment/materials storage site, and staging areas) for all life stages, 10 days or less, prior to the start of the project.

2. Project activities shall cease and all necessary erosion control measures shall be put in place prior to the onset of a rain event.

3. Movement of vehicles, equipment, or materials will not occur on the project site during a rain event.

4. If a significant rain event occurs (storms that produce at least 0.2 inches of precipitation with a 24-hour or greater period between rain events), the project site will have to be cleared of sensitive species by a qualified biologist before project activities can resume on the project site; this includes the moving of any equipment or materials that were on site during the rain event.

5. If at any time California tiger salamanders are detected, all project activities will be suspended on the project site and the District biologist, US Fish and Wildlife Service, and California Department of Fish and Wildlife will be notified and consulted with prior to commencing work on the project site.

6. Trenches left open overnight shall have an egress ramp installed at the end of the work day, no less than one every 100 feet. The ends of the trenches shall have an earthen ramp. The slope of the ramps shall not exceed 45 degrees.

PART 3 - EXECUTION

Any standing water in a trench must be cleared of sensitive species by a qualified biologist before work can occur in the site; this includes the backfilling of trenches.

3.1 STORM WATER

- Follow all provisions in local storm water permits and/or rules during construction.

- Maintain sufficient best management practices or other controls as outlined in the storm water management plan to prevent impacts to storm water from pollution including soil, dust, stored hazardous materials, and construction activities.

3.2 WASTE MANAGEMENT & DISPOSAL

- Segregate, stage, label/mark, and properly manage waste at the jobsite in a manner that complies with applicable regulations and to facilitate proper disposal.

- Characterize all liquid wastes, solid wastes, and other wastes prior to removing from the project site. Sampling and analysis shall adhere to the Sampling and Analysis Plan.
- Non-hazardous waste shall be disposed as outlined in the approved Waste Management Plan.
- Transport materials and/or wastes in accordance with all local, state, and federal laws, rules, and regulations.
- Contractor shall be responsible for all costs of disposal of Construction and Demolition

3.3 PROTECTION OF BIOLOGICAL RESOURCES

- Protection of biological resources include:
- Jurisdictional wetlands, waters, streambeds, banks and associated riparian vegetation;
- Native and nonnative trees protected under local ordinances;
- Roosting and nesting habitat for raptors and other protected bird species; and
- Special status species, as specified herein.
- General Requirements
- Project boundaries shall be delineated and flagged prior to construction by the Contractor.
- Staging areas and construction access points shall be delineated in the field away from sensitive plant species, and all staging shall occur within these designated areas.
- All construction activities, including the movement of heavy equipment, shall be conducted within the delineated Project boundaries to minimize habitat disturbance.
- Keep construction equipment and personnel out of designated restricted areas.
- Depending on the proximity of the populations to the construction work area, populations will be monitored by the Designated Biologist to ensure inadvertent impacts are avoided.
- Clearing and grubbing of the construction site shall be confined to the minimum area necessary to facilitate construction activities.
- The District will conduct biological and tree surveys in advance of construction and will conduct biological and arboreal monitoring during construction. The results of the surveys and monitoring actions will indicate requirements to be implemented by the Contractor.
- Jurisdictional Wetlands, Waters, and Streambeds

- Minimize the impact of construction activities on identified wetland, streambed, and other aquatic areas by complying with the requirements as specified herein.

END OF SECTION

SECTION 01 35 53

SECURITY PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Requirements of this section apply to work sites located at or near critical District facilities or infrastructure.

B. Contractor shall comply with the District's protocol as described herein for personnel identification, site access control, and contractor deliveries.

C. Unless otherwise specified in the Contract Documents, Security of this (these) site(s) and the Contractor's equipment and tools shall be the Contractor's responsibility from commencement of work through contract completion.

D. The District reserves the right to deny access to the site to any person as allowed by law.

E. Related Sections:

1. Section 01 14 00 – Work Restrictions

2. Section 01 50 00 – Temporary Facilities and Controls

1.2 PERSONNEL IDENTIFICATION

A. Contractor and all other people associated with the work that enter the site are required to possess and carry a valid and current California Driver's License, California Identification Card (issued by the California Department of Motor Vehicles), or current driver's license or photo identification card from another governmental entity. This identification shall include a photograph and signature of the holder. Personnel without such identification shall be removed from the site by the Contractor.

1.3 SITE ACCESS CONTROL

A. At the end of each workday, doors, windows, manways, and exterior ladders, etc. shall be secured, closed, and locked. Any alarmed system which is activated or disabled during the workday shall be tested through to the alarm monitoring station for proper actuation.

B. At the end of each workday secure all equipment, hazardous materials, tools, materials, and flammable fluids. The Contractor shall maintain key control to assure only authorized personnel have access to equipment, hazardous materials, tools, materials, and flammable fluids.

C. At all times, security measures at the site shall, at a minimum, be equal to the security measures prior to initiation of the project as determined by the Engineer.

1.4 DAILY SITE ACCESS PATH

A. General:

1. All personnel shall take the most direct path from their point of site entry to their work area and shall not loiter in non-work areas.

1.5 PHOTO CONTROL

A. Restrict photos to work zone.

B. The District reserves the right, at any time, to disallow photography at any site, of any District facilities, equipment, or processes which are deemed to be sensitive in nature, either due to current threat-level conditions or internal assessment of the business need and benefit to the District.

1.6 CONTRACTOR DELIVERIES – SECURE SITE

A. All deliveries shall be made during normal work hours as defined in Section 01 14 00 Work Restrictions.

B. All freight and bulk deliveries made to the site may be subject to search and inspection regardless of the final delivery destination. The Contractor shall inform all delivery companies and drivers in advance that all freight entering the site is subject to search. Contractor shall submit acknowledgment from all freight and bulk delivery companies that the companies have been informed of and consent to such searches.

1.7 PRODUCTIVITY LOST AND COST INCURRED DUE TO SECURITY REQUIREMENTS

A. Time lost and/ or costs incurred due to compliance with District security measures (e.g., deliveries or personnel held at the gate without identification, refusal of package deliveries, etc.) shall be deemed an inexcusable delay.

B. Failure to comply with these security measures may lead to the termination of the Contractor’s right to proceed under the contract.

1.8 PAYMENT

A. Full compensation for doing all work and furnishing all materials required to comply with site security requirements as specified in these Specifications shall be included in the price bid for the contract.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 01 43 11

SEISMIC QUALIFICATION AND CERTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. All products to be furnished under this contract shall be designed, constructed, and installed in conformance with the seismic requirements contained in the California Building Code (CBC) as modified below and in the related sections.

B. Related Sections:

1. Section 01 33 00 – Submittal Procedures

2. Section 01 81 02 – Seismic Design Criteria

1.2 STRUCTURAL INTEGRITY AND ANCHORAGE

A. Structural integrity of the equipment shall be certified by calculations that demonstrate the adequacy of the equipment housing for seismic forces. These calculations may be based on principles of structural analysis and engineering mechanics, or based on approved shake table tests.

B. Provide electrical and mechanical equipment and other non-structural components with proper anchorage to the supporting structures designed to resist seismic forces as specified in Section 01 81 02.

C. The equipment and all components listed in the contract documents shall not undergo loss of their intended function after application of the Building Code prescribed seismic forces in Section 13.2 of ASCE 7

1.3 PROOF OF COMPLIANCE

A. For equipment installed in sites or structures designated as seismic design category C, D, E or F, prepare and submit the following:

1. Statement of seismic qualification, or special seismic certification:

a. “Statement of Seismic Qualification:” Provide manufacturer’s statement that the equipment satisfies the seismic design requirements of California Building Code 2022, including the requirements of ASCE 7, Chapter 13.

1) Supplier shall submit for review and approval test data or calculations certified by a Civil or Structural Engineer registered in the State of California to show compliance with the requirements of Article 1.2.

b. "Special Seismic Certification:" Provide manufacturer's certification of compliance when subjected to shake table testing, including both operability and containment of hazardous materials as appropriate for the unit being tested. The certification shall be prepared in accordance with:

1) IEEE Std. 693, for equipment listed in Paragraph 1.2.C above. This equipment shall meet or exceed IEEE Std 693 "High seismic level" qualification requirements.

2) ICC-ES AC 156, for equipment not covered in Paragraph 1.2.C. This equipment shall meet the "Post-Test Functional Compliance Verification" requirements for "Components with Ip=1.5."

2. Substantiating test data: With seismic qualification and special seismic certification statements, submit results of testing in accordance with applicable standards.

B. Exemptions: A "statement of seismic qualification" and a "special seismic certification" are not required for the following equipment:

1. Temporary or moveable equipment.

2. Equipment anchored to the structure and having a total weight of 20 pounds or less.

3. Distribution equipment anchored to the structure and having a total unit weight of 5 pounds per linear foot, or less.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 01 61 01

ELECTRICAL REQUIREMENTS FOR MECHANICAL PACKAGE SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included:

1. Furnish and install the electrical control panels and instrumentation devices furnished as part of a packaged mechanical system. This Section shall govern these panels when supplied skid-mounted on the mechanical unit or when furnished separately for floor or wall mounting.

2. In general package equipment interconnecting conduit and wire are not shown on the Contract Drawings. Furnish and install all conduits and wiring associated with a packaged mechanical system for a fully functioning and operational system.

3. All mounting and ancillary equipment required as part of the mechanical packaged system necessary for a fully functioning and operational system.

B. Related sections:

1. The equipment covered under this Section shall be provided as part of packaged process, HVAC, and mechanical systems furnished under the detailed technical Sections of these Specifications.

2. All electrical work performed under this Section shall conform to the electrical system requirements as specified under Division 26.

3. Section 16 80 00 – Programmable Logic Controllers and Associated Equipment.

4. Where conflicts occur between this Section and the specific product Technical Specifications as noted, the latter shall govern.

1.2 QUALITY ASSURANCE

A. All materials shall be listed by UL or other equivalent nationally recognized independent testing laboratory. All built-up control panels shall be similarly labeled and have the markings required by the National Electric Code, Article 409.110.

B. All work shall conform to the requirements of the National Electrical Code (NFPA 70).

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Submittal Procedures.

B. Submit the following for all control panels provided as part of mechanical packaged system:

1. Control panel internal and external elevations showing all components provided.

2. Complete Bill of Material.

3. Control schematic (elementary) with functional comments describing all controls, alarms, and interlocks. Provide rung and wire numbering for schematics. All relay contacts shall be cross-referenced to the associated relay coils using the rung numbers and each coil shall be tagged clearly identifying its function in the control scheme.

4. Wiring diagrams showing terminal numbers for all terminal strips and identifying all wiring points and devices located external to the control panel.

5. Scaled drawings for all skid mounted panels showing location on the skid and all interconnecting conduit and wire fill. Drawing shall show conformance with all clearance requirements required per the National Electrical Code including requirements for final installation in the field.

6. Letter of certification of testing. See Article 3.1.

C. Software programming logic for any PLCs provided in the panels. Submit hardcopies of programming logic for submittal review. Logic shall include abundant comments in sufficient detail to determine compliance with the detailed control descriptions included in the individual technical specifications of these specifications.

D. Submit O&M Manuals in accordance with Section 01 33 00. Submittal shall include copies of the final field verified shop drawings. Submit hardcopies and electronic copies on flash drive of the final as left PLC programs with the system O&M documentation.

E. Submit test data or calculations demonstrating compliance to the anchoring requirements per Section 01 43 11 Seismic Qualification and Certification, 01 81 02 and Seismic Design Criteria.

PART 2 - PRODUCTS

2.1 ELECTRICAL DEVICES FURNISHED WITH MECHANICAL EQUIPMENT

A. The Contract Drawings detail only the major components, required for the first named mechanical system. Interconnecting conduit and wire is not shown. Provide all electrical, instrumentation, and control hardware, conduit and/or wiring which is required for complete system operation.

B. The systems governed by this Section shall contain control panels which include instrumentation and control equipment furnished by the mechanical system supplier. In some instances the panels, along with instruments, motors, and connecting wiring, are completely mounted on the units furnished. In other cases, the panels are furnished

separately for floor or wall mounting. All panels and equipment requiring field interconnection wiring shall be provided with terminal connections which are clearly marked. Supplier shall furnish a complete field wiring diagram showing all required interconnections of the supplied equipment, labeled consistently with the terminal markings.

C. Provide panels rated for the NEMA environment shown on the Contract Drawings. Provide stainless steel NEMA 4X enclosures in NEMA 4X areas unless indicated otherwise. Access doors or panels shall have continuous stainless steel hinges, oil resistant gasketing, and approved latching of fastening means to allow access. Front panels or sections containing instruments shall be reinforced to prevent warping or distortion.

D. All panel equipment shall be factory mounted, on suitable racks or subpanels and wired on or within the cabinet. Any process or sensor piping shall remain outside of the panel. Wiring shall comply with latest National Electrical Code. Wiring shall be grouped in plastic wireways and wired to sequentially arranged and uniquely numbered terminal blocks. Power and low voltage dc signal wiring shall be routed in separate wireways. Wiring troughs shall not be filled to more than 60 percent visible fill. Wiring trough covers shall be match marked to identify placement. If component identification is shown on covers for visibility, the ID shall also appear on the mounting subpanel. Wiring trough for supporting internal wiring shall be plastic type with snap-on covers. The side walls shall be open top type to permit wiring changing without disconnecting. Terminal blocks shall be arranged in vertical rows and separated into groups (power, ac control, dc signal, alarm, graphic, etc.). Provide minimum 30 percent spare of each type of terminal block. Direct interlock wiring between equipment will not be allowed. Only one side of a terminal block row shall be used for internal wiring. The field wiring side of the terminal shall not be within 6-inches of the side panel or adjacent terminal.

E. A 120 VAC convenience outlet and a switched overhead internal LED light shall be provided for panel over 24" width and 36" height. Print storage pockets shall be provided on the inside of each panel. Print pockets shall be of sufficient size to hold all of the prints required to service the equipment.

F. Nameplates shall be provided for all front of panel mounted equipment. Nameplates shall be attached to panels by self-tapping screws.

G. Power wire size shall be as required but no less than 12 AWG. Wire type shall be THWN stranded, insulated and rated for 600 volts unless specified otherwise. Wire color shall be:

1. Line power – black

2. Neutral or common – white

3. AC control – red

4. DC control – blue

5. DC return – white with blue stripes

6. Equipment or chassis ground – green

7. Specified externally powered circuits – yellow

8. Each wire shall be provided with a numbered heat shrink tubing identification markers at both ends. Identification markers shall be pre-typed. Handwritten markers or paper markers will not be permitted. When externally powered circuits are present, provide 1-inch by 3-inch yellow and black laminated phenolic nameplates inscribed "CAUTION: FOREIGN VOLTAGES PRESENT". Engraved letters shall be approximately ¼-inch high, extending through the yellow face into the black layer.

H. Panels containing door mounted controls or instruments shall utilize individual covers, window kits, NEMA rated devices or other mechanism as approved by the Engineer to maintain the overall NEMA rating of the panel.

I. Each panel shall be provided with an isolated copper grounding bus for all signal and shield ground connections. Shield grounding shall be in accordance with the instrumentation manufacturer's recommendations. Each panel shall be provided with a separate copper power grounding bus (safety) in accordance with the requirements of the National Electrical Code.

J. Each panel, where applicable, shall be provided with analog signal isolation (I/I) where analog signals are sent from one panel or console to another. Each panel shall be provided with surge suppression protection (electrical transients) for connections between AC power systems and electrical and electronic equipment. Surge suppressor grounding shall be in accordance with the manufacturer's recommendations.

K. All panels shall be protected from internal corrosion by the use of corrosion inhibiting vapor capsules as manufactured by Northern Instruments Model Zerust VC; Hoffman Engineering Model AHCI; or equal as approved by the Engineer.

L. All panels housing electrical equipment shall be designed for front access only unless otherwise noted.

M. Conductors extending beyond a panel to other auxiliary equipment which is prewired on a skid type or package base shall be protected by galvanized rigid steel conduit. Where terminating at a motor or other similar device requiring frequent movement or which produces excessive vibration liquid-tight type flexible conduit shall be used. Liquid-tight flexible conduit will be limited to three feet maximum length at any termination.

N. Gasketed type conduit hubs will be used for all conduit penetrations of the panel.

O. Provide a single main power disconnect for each panel. The main panel power disconnect handle shall be externally mounted (operable with the enclosure door closed) and padlockable in the off position. Disconnect shall be interlocked with the door to ensure panel is de-energized when the door is open. Provide a disconnect

defeat mechanism to allow access to the panel interior components while energized by authorized personnel for maintenance and troubleshooting. A main panel power disconnect device shall be an integral part of the panel and shall be one of the following types:

1. A molded case thermal magnetic circuit breaker for 480 volt, 1 phase or 3 phase panels.

2. A circuit breaker or fractional horsepower manual motor starter switch without overloads for 120 volt, 1 phase panels.

P. Unless otherwise noted all panels supplied with a 480 volt power feeder shall be provided with an integrally mounted dual winding 120 volt power or control power transformers with KVA as required. Control power transformers shall have primary and secondary fusing. Power transformers shall have circuit breaker primary and secondary protection. All transformers shall have the neutral grounded.

Q. Starters incorporated into panels shall be of the combination motor circuit protector type with ambient compensated thermal type overload relays in each ungrounded conductor. Overloads shall be adjustable for either manual or automatic reset. Provide Size 1 NEMA starter size minimum.

R. All devices shall be of a heavy duty industrial type quality. Devices mounted in panel interiors shall be suitable for use in non ventilated panels subjected to a 40 degree C ambient without de-rating the system.

S. Schematic (elementary) diagrams, wiring (interconnection) diagrams, riser (interconnection with external components) diagrams, panel interior and exterior elevation drawings and equipment lists shall be furnished for all panels. For panels containing a complex control scheme, a written operational theory shall be cross referenced to the schematic diagram. The wiring diagram in its "as built" form shall be fastened to the panel door. The Bill of Materials shall identify the manufacturer, manufacturer's part or model number and a cross reference as to its location in the panel.

T. Contacts for external alarms or equipment interlocking shall be of the isolated contact type and provided as required per individual equipment specifications and drawings. Contacts shall be rated at 10 amps continuous pilot duty. Unless noted otherwise, alarm contacts shall be of the maintained contact type requiring manual reset at the control panel via a suitably labeled reset pushbutton. Configure all alarm contacts for external connection to the PLC to be fail-safe (i.e. on loss of continuity or loss of power.) Alarm contact should fail to the alarm or the inoperative condition unless otherwise indicated

U. All analog instrumentation signals shall be 4-20 ma DC and provided as required per the specifications and the Contract Drawings.

V. Auxiliary devices (solenoid valves, pressure switches, flow switches, etc.) located remotely from panels but furnished with the equipment shall have enclosures in

conformance with the area classification noted on the Contract Drawings. Provide fuse protection for all circuits to external devices.

W. Unless otherwise noted control panels furnished under this section shall contain door mounted control pushbuttons, selector switches, push-to-test red run lights, etc., as required for proper system operation, control, and monitoring. This equipment shall be mounted on the door of the control panel and comply with the panel NEMA rating.

X. The electrical short circuit interrupting rating of the starters and circuit breakers supplied shall be adequate for its location in the system and shall be rated minimum of 65,000 AIC, unless noted otherwise.

Y. Panels containing 480 V (power) and low voltage (less than 120 VAC or DC) digital or 4-20 ma DC analog control devices and circuits or PLC components shall be compartmentalized with full height plexiglass isolation barriers between the low voltage and 480 volt power devices within the panel.

PART 3 - EXECUTION

3.1 FACTORY QUALITY CONTROL

A. Control panels furnished on skids or separately mounted shall be UL 508 certified and tested at the factory with the mechanical equipment prior to being shipped. A letter of certification stating that the packaged system and controls have been satisfactorily tested shall be submitted to the Engineer prior to shipping the package.

END OF SECTION

SECTION 01 74 05

CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Section includes: Perform the work necessary for cleaning during construction and final cleaning on completion of the work.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. At all times maintain areas covered by the Contract and public properties free from accumulations of waste, debris, and rubbish caused by construction operations.

B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws. Do not burn or bury rubbish and waste materials on project site. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains. Do not dispose of wastes into streams or waterways.

C. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

D. Use cleaning materials only on surfaces recommended by cleaning material manufacturers.

3.2 CLEANING DURING CONSTRUCTION

A. During execution of work, clean site and legally dispose of waste materials, debris, and rubbish to assure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish. The Contractor shall comply with all rules and regulations as applicable for its cleaning method.

B. Dispose of all refuse off District property as often as necessary so that at no time shall there be any unsightly or unsafe accumulation of rubbish.

C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish.

D. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from exposed and semi-exposed surfaces.

E. Repair, patch, and touch up marred surfaces to specified finish to match adjacent surfaces.

F. Broom clean paved surfaces; rake clean other surfaces of grounds.

G. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

H. Generator and Fuel Systems: Ensure the generator radiator fins are free of construction debris, dust, or overspray.

1. Prior to first fire, the interior of the generator enclosure and the engine itself must be wiped down to remove any combustible oils or packing materials.

2. Ensure all fluid spill containment areas (under the engine/day tank) are wiped clean of any water, dirt, or construction debris.

3.3 FINAL CLEANING

A. At the completion of work on all portions of the contract and immediately prior to final inspection, cleaning of the entire project will be accomplished according to the following provisions:

1. Thoroughly clean, sweep, and wash all work and equipment, including finishes. The cleaning shall leave the site in a complete and finished condition to the satisfaction of the Engineer.

2. Should the Contractor not remove rubbish or debris or not clean buildings and site as specified above, the District reserves the right to have the cleaning done at the expense of the Contractor.

B. In preparation for contract completion, conduct final inspection of sight exposed interior and exterior surfaces, and of concealed spaces.

C. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight exposed surfaces.

D. Repair, patch, and touch up marred surfaces.

E. Broom clean paved surfaces; rake clean other surfaces of grounds.

F. Remove from District property all temporary structures and all material, equipment, and appurtenances not required as a part of, or appurtenant to, the completed work.

G. Leave watercourses, storm drains, inlets, and ditches open and clear.

H. Electrical System Decontamination

1. Vacuuming: Use a non-metallic vacuum attachment to clean the interior of all switchgear, breakers, and wireways. The use of compressed air for cleaning inside electrical equipment is strictly prohibited as it forces contaminants deeper into components.

2. Insulation Surfaces: Wipe down busbars, insulators, and cable terminations with a clean, lint-free cloth and, if necessary, an approved non-conductive electrical contact cleaner.

3. Infrared Window Cleaning: Ensure all IR scanning windows are free of smudges or stickers.

4. Generator Exhaust: Ensure the exhaust stack and silencer are free of any debris or birds' nests that may have accumulated during the construction period.

END OF SECTION

SECTION 01 75 17

FIELD TESTING AND STARTUP

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Commissioning and startup of installed equipment and systems, as well as other manufacturer services.

B. Contractor shall be responsible for providing services and participating in activities specified herein and coordinating with the Engineer, subcontractors, vendors, and other manufacturers working under the Contractor for the Project.

C. All Commissioning shall comply with the requirements of this Section. Additional testing requirements are specified in other sections.

D. For Factory Acceptance Testing (FAT) requirements, see paragraph 1.8 of this Specification. All equipment and systems testing and startup activities shall be allowed for and shown on the Contractor's Construction Progress Schedule, in accordance with Section 01 32 00 – Construction Progress Documentation.

E. Table 1 at the end of this section summarizes the equipment/systems that require Functional and Performance Testing.

F. Related Sections shall include but not be limited to:

1. Section 01 14 00 – Work Restrictions

2. Section 01 33 00 – Submittal Procedures

3. Section 26 08 00 – Commissioning of Electrical Systems

1.2 DEFINITIONS

A. Commissioning (Cx): The process of verifying that equipment, a system or a subsystem meets specified contract requirements prior to handover to the District at the Ready for Service (RFS) milestone. This process involves pre-commissioning activities, field functional and performance equipment testing, control system functional and systems startup testing. The Commissioning process ends following successful completion of an Operational Startup Test.

B. Commissioning Engineer: Leads the commissioning coordination among District staff and the Contractor's Commissioning Coordinator. Leads commissioning meetings, reviews and approves all testing submittals, witnesses factory, field functional and performance testing and supports control system functional and operational startup testing.

C. Contractor's Commissioning Coordinator (CCC): The CCC shall implement commissioning activities listed in this document and the contract documents. Responsibilities include scheduling, coordination, and testing activities with input/participation of vendors and manufacturer's representatives. The CCC shall also participate in commissioning meetings and provide field support to correct defective work as identified during commissioning.

D. Control Systems Functional Test (CSFT): Test to demonstrate the proper interaction of the facility control systems and related equipment. This primarily includes the electrical power control and monitoring system and DCS-, PLC- and SCADA RTU-based instrumentation and process control system, as well as all related equipment. Unlike other field tests, the District conducts this testing with the Contractor's assistance.

E. Energization: Application of primary and auxiliary power to the equipment under test.

F. Equipment: An assembly of component(s) and devices(s) that requires installation or functional testing. (Examples: MCC breaker, emergency generator, VFD, valves, etc.).

G. Factory Acceptance Testing (FAT): Quality control testing conducted at the Manufacturer's facility to demonstrate components, devices, equipment/systems, and software meets specified performance requirements prior to shipment. Also referred to as Factory Demonstration Test (FDT) or source testing.Functional Testing (FT): The field testing required to determine if installed equipment or system(s) operate in a satisfactory manner and as specified. Functional testing is not intended to measure efficiency and performance.

H. Installation Completion (IC): The stage in the commissioning process when all of the equipment and systems have been installed and are ready for testing. This includes not only the mechanical and piping systems, but also electrical, instrumentation, and control systems.

I. Manufacturer's Certificate of Proper Installation: The form is submitted to the District prior to Functional Testing to confirm that the equipment/system is installed in conformance with the Contract Documents. The form is provided in Appendix A.

J. Operational Startup Test: A test of all systems operating together to demonstrate satisfactory performance of the facility as a whole for a continuous period. Unlike other fields tests, the District Operations staff conducts this testing with the Contractor's assistance.

K. Performance Testing: The field testing required to demonstrate the individual equipment or system meets all of the specified performance requirements. This may include testing during normal operating scenarios and fault operating scenarios.

L. Pre-commissioning: Activities that focused on getting the equipment or facility ready for the Functional Testing (FT) and is performed prior to energization.

M. Startup: means first energization or first introduction of process fluids, where the systems start to function for their intended purpose for the first time.

N. System: A grouping of subsystems, equipment, components, and devices that perform a definable function. (Examples: Dual ATS and Emergency Generator, Chemical Feed system, building security system, HVAC system).

O. System Startup and Commissioning (SSC) Plans: District-provided plans to coordinate, conduct and document the commissioning of complex subsystems or systems.

P. Test Procedure: The document that defines the test(s) and methodology to complete and verify the correct operation of equipment or systems. The document will include testing methods, acceptance criteria, procedures, and test data forms for functional and performance tests.

1.3 FIELD TESTING INSTRUMENTS

A. The Contractor or its qualified subcontractors/vendors shall provide all instruments and materials necessary to complete the field tests unless otherwise specified. If required calibration instruments and materials are not provided on the day of test, the Engineer may postpone witnessing and sign off on instrument testing.

B. All instruments shall be calibrated prior to the start of testing. Certificates of calibration for all instruments used for testing shall be current, and shall be at the job site during testing. If an uncalibrated instrument was used in a test, the entire test shall be redone with calibrated instruments at the Contractor’s sole expense including labor costs and other expenses incurred by District staff to witness the retest.

1.4 SUBMITTALS

A. Submit the following within 90 calendar days of Notice to Proceed (NTP)

1. Comprehensive Test and Startup Schedule.

B. Submit the following at least 60 calendar days prior to factory and field testing:

1. Factory Acceptance Test procedures for all witnessed and unwitnessed tests as required in technical specifications.

2. Test procedures for all field tests

C. Prior to field testing, submit Calibration certificates for all instruments to be used during testing.

D. Test Reports:

1. Test Reports shall be submitted for complete systems, which is typically by specification section. Submitting partial test reports is not acceptable. Test submittals shall include the specification section number, and Equipment Name in the title. The test report cover page shall include description and asset numbers of equipment tested.

2. Upon completion of testing for each equipment item or system, the Contractor shall submit word processed test reports and forms for review and acceptance within 10 calendar days of completed testing. Submit test results with signed statement by manufacturer's representative that results meet specification requirements and manufacturer standards; when a manufacturer's representative is not required to be present during testing, this signed statement shall be provided by the Contractor. Upon acceptance, all test reports (including all factory and field testing) shall be inserted by the Contractor into their respective O&M manuals.

1.5 MANUFACTURERS' SERVICES

A. A manufacturer's authorized representative shall perform all services when manufacturer's services are specified in the technical sections. The authorized representative shall be factory trained and experienced in the technical applications, installation, operation, and maintenance of the equipment, subsystem, or system. Additional qualifications may be specified elsewhere.

B. Manufacturer's representatives shall be subject to acceptance by the Engineer. No substitute representatives will be allowed without prior written approval by the Engineer.

C. The manufacturer's on-site services as specified in the Contract Documents include the following:

1. Assistance during Inspection, Commissioning and Process Start-up. The manufacturer's representatives shall be regularly engaged and experienced in all aspects of commissioning and process start-up, equipment/systems of similar size, type, and capacity as this project.

2. Provide copies of manufacturer's representatives' field notes and data

3. Provide technical instructions for commissioning and process start-up.

4. Carefully review the additional testing requirements in the Contract Documents and coordinate with requirements specified in this Section.

1.6 TEST AND STARTUP SCHEDULE

A. Updated test schedules shall be submitted on a monthly basis after the first test schedule submittal.

B. List all equipment testing by specification section number, name, and tag number. Include the following for each equipment/system:

1. Specification section and paragraph number

2. Testing pre-requisites as specified in technical specification sections, e.g. pipe flushing, leak testing, or disinfection.

3. Test type (e.g. factory acceptance, hydrostatic, functional, or performance testing)

4. Test procedure submittal number

5. Testing and startup dates and durations

6. Test report submittal number

C. Estimate dates as necessary, include actual dates when known

D. Verify that conditions necessary to allow successful testing have been met before scheduling manufacturer's services. Testing prerequisites are specified in the technical specification sections.

E. Address all Engineer comments on the submitted schedule, make resubmittals as needed, and obtain final approval no later than 10 days prior to start of any field testing, and 20 days prior to any factory acceptance testing.

1.7 TEST PROCEDURES

A. Submit test procedures and forms for each required Factory Test, Field Functional, and Performance Test for all equipment as specified in the individual equipment specifications. Test procedures shall not be submitted as part of the technical equipment submittal.

B. Unless otherwise noted, submit individual Field Test Procedures and Field Functional Test Data forms by specification section. Grouping test procedures for multiple specification sections into a single submittal is not acceptable. If functional tests are submitted together with performance tests, then separate each procedure and clearly identify each test by name: Functional Test, or Performance Test.

C. Coordinate with the Engineer to determine the operating requirements of adjacent or related systems that may be required to complete any Functional, Performance, CSFT, or Operational Startup Test.

D. Prior to submitting for Engineer review, the Contractor shall review all test procedures to verify completeness and compliance with the specifications, addenda, requests for information, as-builts, and change orders.

E. Test procedures shall be comprehensive, neatly organized, and word-processed. Test procedures shall include the following:

1. Approach to testing, including: test objective, procedures, schedule, and details of support to be required from the District.

2. Detailed test methods including sample calculations, sketches as required.

3. Test setup procedures including details of all necessary adjustments, balancing, required equipment isolations or configurations, testing equipment, and testing instruments.

4. Step-by-step testing procedures (number each step). Specifically identify each test instrument (including tag numbers) used during testing.

5. Acceptance Criteria: For each test phase, specifically indicate what is considered an acceptable test result.

6. Test Data Forms: Include test name, equipment (with tag numbers as applicable) or system name, specification section and paragraph number, test instrument tag numbers, test date, space for testing personnel names, test data names and units, reference equations for all calculated values, and signature lines for manufacturer's representative, Contractor, and District witness.

F. Testing procedures and manufacturer representative’s resumés shall be approved by the District prior to performing any tests.

1.8 FACTORY ACCEPTANCE TESTS (FAT)

A. Prior to shipment of equipment, test components, devices, and equipment/system for proper performance at point of manufacture or assembly as required in the technical specifications.

B. FAT requirements are specified in the technical sections and include:

1. Un-witnessed: District’s representatives are not present during testing

2. Witnessed: District’s representatives are present during testing

C. If not specified otherwise in the technical specification sections, any process, control or electrical equipment FAT test procedure submittal shall include:

1. Purpose and goals of the test

2. Identification of each item of equipment/system, including system designation, location, tag number, control loop identifier, etc.

3. Description of the pass/fail criteria that will be used

4. Listing of pertinent reference documents (Contract Documents and industry standards or specifications applicable to the testing)

5. Complete description, including drawings or photographs, of test stands and/or test apparatus

6. Calibration records for the test equipment

7. Detailed, step-by-step test procedures:

   a. The level of detail shall be sufficient for any witness with a rudimentary technical aptitude to be able to follow the steps and develop confidence that the tests were being performed as planned.

8. Sample data logs and data recording forms. Sample computations or analyses with the results in the same format as the final report to demonstrate how data collected will be used to generate final results.

9. Detailed outline of the FAT report

D. Prepare and submit test reports for all witnessed and un-witnessed FATs for approval by the Engineer prior to shipment of equipment to job site. Include a written record of the punchlist items identified during witnessed FAT and sign-off that each item was addressed prior to shipment.

1.9 QUALITY ASSURANCE & QUALITY CONTROL

A. Testing Notification and Qualification:

1. All tests shall be subject to approval of the Engineer and shall be witnessed by the Commissioning Engineer. No testing shall be scheduled by the Contractor without Engineer-approved test submittals.

2. Provide a minimum of 5 work days' written notice confirming testing dates to the Engineer.

B. The Contractor or their subcontractor shall be regularly engaged in the testing of process control equipment devices, installations, and system integration for a minimum of five years.

C. Utilize only full-time technicians or engineers who are regularly employed by the firm. Where applicable to power and powered equipment, only electrically qualified employees are permitted to perform testing or assistance of any kind.

D. As part of the inspection, the Contractor shall conduct a field walk with the Engineer to verify that all materials and equipment have been installed per the Contract Documents, manufacturer's instructions and approved submittals.

E. Installation Completion Verification

1. Installation completion refers to the stage in the QA/QC process when the quality control inspections was performed, all of the equipment and (sub) systems including mechanical and piping systems, electrical, instrumentation, and control systems have been installed and are ready for testing, and the submittals required for commissioning have been submitted and approved.

2. Ensure that copies or the below listed approved documents are provided to the Engineer and are present at the job site.

a. Interconnection diagrams (when required)

b. Control and Protection Settings

c. PLC logic files

d. Approved preliminary Asset List

e. As-builts

f. Manufacturer's Certificate of Proper Installation (when required)

g. Engineer-approved equipment or system technical submittal

h. Approved draft O&M Manuals with all factory test results and certificates, excluding field functional testing and as-builts

i. FAT test reports, if required per technical specifications.

j. Calibration certificates (for all instruments used during testing)

k. Engineer-approved Field Functional Test Procedures and Test Data Forms

1.10 PRE-COMMISSIONING

A. Pre-commissioning activities are performed after Installation Completion and are focused on getting the equipment or facility ready for the Functional Testing or energization.

B. As applicable, general pre-commissioning activities may include:

1. Installation and testing of temporary equipment such as piping and instrumentation or utilities, such as water, air, and electrical power.

2. Applicable permit and regulatory requirements need to be met for functional testing to commence.

3. Permit from the California Air Resources Board (CARB) for temporary portable diesel generators.

4. Permit from the local fire department for all installed fire alarm systems, fire protection systems, and fuel storage/conveyance systems.

5. Leak testing of equipment and systems as required in the technical specifications.

6. Installation Inspection: Check for proper rotation, adjustment, alignment, mechanical and electrical connections, wire labeling, proper lubrication, and any other conditions which may damage or impair functioning.

C. Electrical pre-commissioning is required as specified in the technical specification sections and shall be conducted before equipment is energized for testing. Electrical pre-commissioning may include tasks as:

1. All site inspections, verification, point-to-point checks and pretesting per Section 26 08 00, Paragraphs 3.2.A and 3.2.B.

2. Performing initial un-witnessed loop or point-to-point test prior to requesting District staff to witness functional testing.

3. Installation witness-check of control systems wiring and devices with District staff shall not proceed until the following has been completed:

a. The Contractor has completed an initial un-witnessed loop or point-to-point test prior to requesting the Engineer to witness functional testing.

b. All field cables and wires are properly pulled, terminated, and labeled per contract requirements and match the latest drawings and interconnects.

D. All ID tags and labels on equipment, piping, valves, instruments, conduit and other devices or systems directly or indirectly related to the functional test shall be installed by the Contractor and verified by the Engineer prior to conducting the functional test.

1.11 FUNCTIONAL TESTING

A. Functional tests shall not proceed until Installation Completion is accepted by the Engineer and all pre-commissioning activities are concluded.

B. Functional tests include but are not limited to:

1. Mechanical, Electrical, Communications, and Equipment Control Tests:

a. All work required to commission the communications systems equipment as specified in Section 27 08 00 – Commissioning of Communications Systems.

b. Phase 1 electrical equipment commissioning: All Phase 1 testing required by Section 26 08 00 shall be completed before the equipment is energized. This test report shall be submitted and approved by the District prior to energizing any equipment on the project during functional testing.

c. Phase 2 electrical equipment commissioning: All Phase 2 testing required by Section 26 08 00 to be done after the equipment has been energized (with the exception of thermographic surveying) shall be completed during the Contractor's functional test program.

2. Operation Check: Check for the proper operation of all system components.

3. Controls Check: Demonstrate proper function of all local and remote controls, instrumentation, and other equipment functions.

4. Alarms Check: Simulate alarm conditions and verify the proper operation of each alarm at the specified set point. Simulations shall be by means of direct element stimulation whenever possible, or by other means when direct element stimulation is not practical as determined by the Engineer.

5. Run Check: Each system or equipment item shall be operated continuously for 1 hour, minimum, to verify satisfactory operation. Additional operating time may be required as specified in the individual technical specifications, or as recommended by the manufacturer.

6. The individual technical specifications or the manufacturer may specify additional functional test requirements for each component or system.

7. If any part of a unit shows evidence of unsatisfactory or improper operation during the one-hour test period, or the test period specified by equipment technical specifications, correction or repairs shall be made, and the full test operation, as specified herein, shall be repeated after all parts operate satisfactorily.

1.12 PERFORMANCE TESTS

A. Performance Tests shall not proceed until the Functional Test(s) have been successfully completed.

B. Copies of all prior test results (Factory and Field Functional Tests) shall be available on-site, prior to proceeding with performance tests.

C. Performance Tests shall demonstrate that the equipment or system meets all performance requirements as specified in the technical specification sections.

1.13 CONTROL SYSTEMS FUNCTIONAL TESTS

A. The CSFTs shall demonstrate the proper function each process systems' control modes (local manual/automatic, remote manual/automatic) from all interface locations (local and remote).

B. The District will not begin control systems functional testing until the Contractor has satisfied all prerequisites below:

1. All field functional and performance testing has been completed.

2. Copies of all Engineer-approved test reports (factory, field functional, and performance tests), Contractor redline drawings and preliminary O&M manuals shall be available on-site.

3. All special tools and equipment related to instruments, controllers, and control systems furnished under this contract shall be provided prior to the start of CSFT.

1.14 OPERATIONAL STARTUP TEST

A. The Operational Startup Test shall not proceed until all of the following have been completed:

1. The District has successfully completed all control systems functional testing work specified in this Section.

2. All other required tests have been completed and accepted by the Engineer. At the Engineer's discretion, selected performance tests may be conducted during the Operational Startup Test period.

3. Copies of all prior tests (factory, field functional, and performance tests) shall be available on-site.

B. Operational Startup tests shall be scheduled no sooner than 7 calendar days after the completion of Functional Testing, or can begin immediately following successful completion of CSFT, if a CSFT was performed. All equipment/systems required by these specifications shall be included in the Operational Startup Test.

C. The Operational Startup Test shall demonstrate satisfactory performance of all project system components for a period of seven (7) continuous days, (24 hours per day).

D. The Contractor shall coordinate with District staff to startup the facility equipment and systems. The District will conduct the test with support of the Contractor, Subcontractors and Vendor Representatives as required by the Engineer to demonstrate to the Engineer's satisfaction that all equipment and systems required by these specifications operate together as intended.

E. The Contractor shall provide qualified personnel to support startup and testing, and appropriate construction trade personnel to correct malfunctions and deficiencies at any time during the Operational Startup Test. Only District personnel shall operate the equipment and systems.

F. The District will provide Contractor-trained operating personnel for the duration of the Operational Startup Test. The District's operating personnel shall be assisted by the Contractor and/or the manufacturer's representatives to assure each system is being operated as intended and as specified in the contract documents.

G. All defects in operation, materials, or workmanship that appear during the Operational Startup Test shall be immediately corrected by the Contractor. In case of a system interruption, the Contractor shall repeat the Operational Startup Test of the affected systems and any other system directly related to the operation of the affected system. The Operational Startup Test shall not be accepted as complete until all systems have successfully operated together to the satisfaction of the District. All costs for corrective work and retesting shall be borne by the Contractor.

H. System interruptions include the following:

1. Malfunction or deficiency that results in a shut down or partial shutdown of any system

2. Malfunction or deficiency in any backup system that cannot be corrected by the Contractor within 4 hours after notification of the problem

3. Malfunction or deficiency that results in system or equipment performance that is less than specified

I. Maintain the qualified staff or vendor representatives (either onsite or on-call) to be able to respond immediately (24-hours per day) to system or equipment related questions and to correct deficiencies. The Contractor shall provide a list of qualified staff or vendor representatives to perform troubleshooting services during the Operational Startup period. On-call staff shall report to the site within 2 hours of being informed of a deficiency.

J. The Engineer will maintain a log of equipment or system deficiencies along with the date and time when the Contractor was notified of the deficiency and the date and time when the Contractor notifies the Engineer that the deficiency has been corrected. All corrected deficiencies shall be inspected and approved by the Engineer.

K. Maintain a log of equipment or system deficiencies along with a description of the required repairs necessary to correct the problem. Furnish up-to-date copies of this log to the Engineer upon request.

L. If the Operational Startup Test is interrupted through no fault of the Contractor, the test may resume at the earliest mutually agreeable time at no additional cost to the District.

M. Following a successful Operational Startup Test and after all Ready for Service (RFS) milestone requirements are met, the Engineer will declare RFS for the specific activity or milestone.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor or its qualified equipment manufacturer representative shall perform all functional and performance testing of installed equipment unless otherwise specified. The Contractor shall be present during all testing, even if the specific functional or performance test is performed by its equipment manufacturer representative.

B. The Contractor shall complete all testing in accordance with the Engineer-approved test procedures.

C. The Contractor, at a minimum, shall maintain and provide to the Engineer, the following records:

1. Daily logs indicating all equipment testing and startup activities and activities of all manufacturers' representatives

2. Records of all tests, calibrations, inspections, adjustments, services and corrective actions taken

3. Copies of all test data collected at the end of each day of testing

D. In addition to the tests specified in the individual technical specifications, the Contractor shall perform additional tests as required by the Engineer to demonstrate to the Engineer's satisfaction that all equipment and systems required by the specifications will operate as intended.

E. If the testing of any equipment may affect the operation of existing District facilities, the testing shall be done under direct supervision of the Engineer. The Contractor shall comply with directions given by the Engineer.

F. Table 1 is a summary of equipment/systems that require functional and performance testing. Additional testing may be required when specified elsewhere.

Table 1: Testing Requirements Summary
(Additional tests may be required in other specification sections.)

Specification Section	System / Equipment Name	*Factory Acceptance Test	Functional Test	Performance Test
16 70 00	Control Panels		Yes	Yes
16 80 00	Programmable Logic Controllers and Associated Equipment		Yes	Yes
26 22 13	Low Voltage Distribution Transformers		Yes	
26 24 13	Switchboards		Yes	Yes
26 24 16	Panelboards		Yes	
26 28 16	Circuit Breakers		Yes	
26 36 23	Automatic Transfer Switch		Yes	Yes
26 32 13.13	Diesel Engine Driven Generator Set	Yes	Yes	Yes

3.2 SCHEDULING ALLOWANCES

A. The Contractor shall make scheduling allowances for Functional Tests, Performance Tests, CSFT, and Operational Startup Tests, and incorporate this information into the construction schedule (see Section 01 32 00 – Construction Progress Documentation).

3.3 CONTROL SYSTEMS FUNCTIONAL TESTS

A. All systems designed for control through DCS, PLC, RTU, or SCADA will require testing. If the Engineer identifies deficiencies in workmanship, installation, materials, products, or anything else associated with the Contract work that delays the progress of the CSFT, then the Engineer may require additional time (beyond the number of calendar days specified in Section 01 11 00) to complete the testing to compensate for actual time lost due to troubleshooting and correcting the deficiencies as well as additional time to compensate for testing inefficiencies.

3.4 DEFICIENCY IDENTIFICATION AND COMMISSIONING PUNCHLIST TRACKING

A. Commissioning related punchlist items, deficiencies, or any non-conformances to the Contract documents will be collected throughout the commissioning process. The Engineer will convey appropriate punchlist items to the Contractor.

B. Commissioning related deficiencies will be classified as follows:

1. Type A – Shall be corrected before the next steps can proceed (i.e. before further testing can proceed, before energization can proceed, etc.). A Type A deficiency may compromise safety, performance, or functionality. A deficiency may also be classified as Type A if a significant outage or disruption to operations is required in the future in order to address the deficiency.

2. Type B – Requires corrective action but can be addressed at a later date without compromising safety, performance, or functionality, and will not require a significant outage or disruption to operations in the future. Type B deficiencies do not prevent equipment from operating but must be rectified prior to RFS milestone.

3. Type C – Requires corrective action but can be addressed at a later date, but prior to Contract completion.

3.5 FIELD TESTING COORDINATION MEETINGS

A. The Contractor shall prepare materials for and attend periodic testing coordination meetings at the project site. During periods when field testing occurs regularly, the District's Commissioning Engineer will schedule weekly or biweekly field-testing coordination meetings. The Contractor's Commissioning Coordinator (CCC) shall attend all meetings, and the Contractor shall provide suitable representation from each subcontractor having testing responsibilities so that informed decisions can be made during the meetings.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 DESCRIPTION OF PROJECT CLOSEOUT

A. Project Closeout is hereby defined to include general requirements near the end of the contract time, in preparation for final acceptance, final payment, normal completion of contract, occupancy by the District and similar actions evidencing completion of the work. Individual specification sections may contain additional requirements.

1.2 SUBMITTALS

A. Project Closeout items: Required prior to release of final payment.

1. As-Built and Record Drawings: As required in Section 01 33 00 – Submittal Procedures.

2. Equipment and Parts Close-out List: A summary list of materials and parts required by the individual specification sections.

3. Operations and Maintenance Manuals: As required in Section 01 33 00.

4. Special Bonds, Special Warranties, and Service Agreements: As required by individual specification sections. Provide written evidence that these bonds, warranties, and agreements have been satisfactorily performed.

5. Releases of Claims: As required in Section 01 29 00 – Payment Procedures.

6. Releases from Agreements: As required by individual specification sections.

7. Spare Parts, Special Tools and Extra Material: As required by individual specification sections. Include inventory.

8. Cleaning: As required in Section 01 74 05 – Cleaning.

9. Field Records: As required by individual specification sections.

10. Commissioning Report: Materials as described in Sections 26 08 00 and 27 08 00.

11. Inspections and certifications from outside agencies: As required by individual specification sections.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. Upon completion of work or a part thereof and immediately prior to Contractor's notice of completion, clean the facilities and areas of work or parts thereof, as applicable to this project.

3.2 RESTORATION OF DAMAGED WORK

A. Restore or replace damaged materials and finishes caused by movement of equipment or other operations as specified or directed by the Project Lead, at no additional cost to the District.

B. Restoration shall be equal to the original Work, and finishes shall match the appearance of existing adjacent Work.

3.3 REMEDIAL WORK

A. Replace Work due to faulty workmanship or materials at no additional cost to the District.

B. Coordinate Work with the District and perform at such time and manner to cause minimal interruption and inconvenience to the District's operations.

3.4 WARRANTIES

A. Article 10 of the General Conditions cover the Contractor's responsibility to remedy defects due to faulty workmanship and materials that appear within one year, unless noted otherwise, from the date of final acceptance.

B. Special warranties are required by various sections of the specifications. Assemble written warranties, label and submit to the Engineer.

1. Equipment warranties shall be written in the manufacturer's standard form and shall be countersigned by the subcontractor or supplier and the Contractor.

2. All other warranties shall be written on the subcontractor's or supplier's letterhead and shall be countersigned by the Contractor.

C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

D. Additional Requirements

1. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.

2. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

3. District's Recourse: Written warranties made to the District are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the District can enforce such other duties, obligations, rights, or remedies.

4. The District reserves the right to refuse to accept work for the Project where a special warranty, certification, or similar commitment is required on such work or part of the work, until evidence is presented that entities required to countersign such commitments are willing to do so.

3.5 FINAL INSPECTION

B. Prior to requesting Engineer's final inspection for certification of final acceptance and final payment, complete the following and list known exceptions (if any):

1. Submit copy of Engineer's final punch list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by Engineer.

C. Contractor shall provide a "Notice of Completion." This notice shall certify in writing that the work has been completed in accordance with the Contract Documents, and request Engineer's final inspection.

D. Within seven (7) days after receipt of the Contractor's notice that the work has been completed, including punch list items resulting from earlier inspections, and excepting incomplete items delayed because of acceptable circumstance, the Engineer will reinspect the work. Upon completion of reinspection, Engineer will either prepare a certificate of final acceptance or advise the Contractor of work not complete or obligations not fulfilled as required for final acceptance. If necessary, inspection procedure will be repeated.

3.6 RELEASES FROM AGREEMENTS

B. Furnish District written releases from property owners or public agencies where agreements or special easements have been made, or where Contractor's operations have not been kept within the District's construction right-of-way.

E. In the event Contractor is unable to secure written releases, inform the Engineer of the reasons:

1. The Engineer will examine the site, and will direct the Contractor to complete work that may be necessary to satisfy terms of the agreement.

2. Should Contractor refuse to perform this work, the Engineer reserves the right to have it done by separate contract and deduct the cost of same from the contract price, or require the Contractor to furnish a satisfactory bond in a sum to cover legal claims for damages.

3. When the Engineer is satisfied that work has been completed in agreement with the Contract Documents and terms of agreements, the right is reserved to waive the requirement for written release if: (1) Contractor's failure to obtain such statement is due to the grantor's refusal to sign, and this refusal is not based upon any legitimate claims that Contractor has failed to fulfill the terms of the agreement, or (2) Contractor is unable to contact or has had undue hardship in contacting the grantor.

END OF SECTION

SECTION 01 81 02

SEISMIC DESIGN CRITERIA

PART 1 - GENERAL

1.1 REFERENCES:

A. ASCE 7, American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures.

1.2 RELATED SECTIONS:

A. Section 01 33 00 – Submittal Procedures

B. Section 01 43 11 – Seismic Qualification and Certification

C. Section 05 05 19 – Mechanical Anchoring to Concrete and Masonry

D. Section 16 70 00 – Control Panels

E. Section 26 24 13 - Switchboards

F. Section 26 32 13.13 - Diesel Engine Driven Generator Sets

G. Section 26 36 23 – Automatic Transfer Switches

1.3 SYSTEM DESCRIPTION

A. Design Requirements:

1. Architectural elements, mechanical and electrical components, equipment housings and their attachments, supporting structures, and anchorages shall comply with the requirements of ASCE 7, using the following values:

a. Design spectral acceleration at short periods, S_{DS} =0.54

b. Design spectral acceleration at long periods, S_{D1} =0.36

c. Seismic Design Category, D

d. Component importance Factor, Ip = 1.50

e. Seismic Importance Factor for the design of tanks and the anchorage of tanks: I_e = [1.5]

f. If designated as part of an essential facility or containing highly toxic materials, in which case I_e = 1.50.

g. Component amplification factor, ap: In accordance with ASCE 7, Tables 13.5-1 and 13.6-1.

h. Component response modification factor, Rp: In accordance with ASCE 7, Tables 13.5-1 and 13.6-1.

i. Overstrength Factor, Ω: In accordance with ASCE 7, Tables 13.5-1 and 13.6-1 for anchorage in concrete.

2. Do not use friction to resist sliding due to seismic forces.

3. Do not use more than 60 percent of the weight of the mechanical and electrical equipment for designing anchors for resisting overturning due to seismic forces.

4. Do not use more than 60 percent of the weight of the tanks for resisting overturning due to seismic forces.

5. When designing anchors for uplift due to seismic forces, include the vertical seismic load effects (+/- 0.2SDSWp) and reduced dead loads as required by the Basic Load Combinations of ASCE 7-160. For example: use only 60 percent of the equipment or tank dead load for resisting overturning.

6. Resist seismic forces through direct bearing on anchors and fasteners. Do not design or provide connections that use friction to resist seismic loads.

7. Anchoring and fastening to concrete and masonry.

A. Use cast-in anchors (anchor bolts or welded studs) whenever possible for anchors at connections that resist seismic forces.

B. Do not use concrete anchors, flush shells, sleeve anchors, screw anchors, powder actuated fasteners, or other types of post-installed adhesive or mechanical anchors unless indicated on the Drawings or accepted in writing by the Engineer.

1.4 SEISMIC QUALIFICATION AND CERTIFICATION

A. The equipment and all components listed in this specification shall not undergo loss of their intended function after application of the Code prescribed seismic forces as specified in Section 01 43 11.

B. Certification that the equipment is seismically qualified for the above requirements shall be submitted as prescribed in Section 13.2 of ASCE 7.

1.5 SUBMITTALS

A. Shop drawings and calculations: Complete shop drawings and seismic calculations in accordance with Section 01 33 00 – Submittal Procedures.

B. When evaluating the strength of a structural element, indicate applied stresses compared to strength, or show Demand/Capacity ratios.

C. Evaluating the results by stating “Okay by Inspection” is not acceptable.

D. Calculations and details shall be prepared, stamped and signed by a Civil or Structural Engineer registered in the State of California with a minimum of three (3) years of experience in water or wastewater projects.

E. If the Contractor has not provided a complete and acceptable submittal by the second submission, the District, at its discretion, may provide the required seismic design services at the Contractor’s expense. The cost of providing the required seismic design services shall be deducted from the Contractor’s monthly progress payments.

F. Reference Drawings: include plans, sections, details and equipment information necessary to understand the seismic calculations. Reference plans shall show the location of all relevant equipment and related items for loading calculations.

G. Proof of Compliance for anchorage system as specified in Section 01 43 11.

H. Seismic Qualification and Certification shall be verified by an approved calculation that demonstrates the adequacy of the system for seismic forces. This calculation may be based on principles of structural analysis and engineering mechanics, or based on similarity to approved shake table tests as specified in Section 01 43 11.

I. Contractor shall submit for review and approval test data or calculations signed and sealed by a Civil or Structural Engineer registered in the State of California to show compliance with the above requirements.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 02 41 13

SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Work includes: Perform selective demolition including removal and disposal of structures, roofing, finishes, paving, landscape, electrical equipment and other work as shown on the drawings and as specified herein.

B. Related sections:

1. Section 01 32 00 – Construction Progress Documentation

2. Section 01 35 13 – Special Project Procedures

3. Section 01 35 24 – Project Safety Requirements

4. Section 01 35 44 – Environmental Requirements

1.2 JOB CONDITIONS

A. Asbestos-related work and hazardous substance removal work shall be performed by Contractor who is properly certified by the Contractors State License Board and registered with the Division of Occupational Safety and Health.

B. Promptly repair damages caused to adjacent facilities by demolition operations at no cost to the District.

C. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.

D. Provide interior and exterior shoring, bracing, and support to prevent movement, settlement or collapse of structures and adjacent facilities to remain.

E. Blasting is not permitted.

1.3 SUBMITTALS

A. Submit Construction and Demolition Waste Disposal Plan in accordance with Section 01 35 44.

B. Submit demolition plan showing schedule of phased demolition, as part of and consistent with the progress schedule specified in Section 01 32 00, hazard control methods, plans to stabilize structure while not in the active stages of demolition, and method of demolition proposed at each site.

C. Submit plan on methods and materials to be used to protect operating equipment during demolition operations for the Engineer's approval.

D. Shop drawings: Proposed shoring plans stamped by a Civil Engineer registered in the State of California.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. Demolition operations shall be conducted in accordance with Article 31 of the Construction Safety Orders, Title 8, California Code of Regulations.

B. Conduct demolition operations and removal of debris to ensure minimum interference with roads, walks, and other adjacent occupied or in-use facilities to remain as shown on the Contract Drawings.

C. Ensure safe passage of persons around area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.

D. Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt dispersion. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations.

E. Remove, handle, and dispose of off-site, in a safe, appropriate, and lawful manner, and in accordance with Site Safety and Health Plan, all materials and equipment that are required to be removed under this contract.

3.2 PREPARATION

A. Utilities:

1. Notify District or appropriate utilities to turn off affected services before starting demolition.

3.3 SALVAGEABLE ITEMS

A. Existing materials and equipment removed in the execution of the work and designated for reinstallation shall be fully protected until reinstalled.

B. All reasonable effort shall be made to remove and preserve such designated materials and equipment to be reinstalled in an undamaged condition.

C. Equipment and materials designated to be reinstalled shall be stored and protected at the work site or other location as designated by the Engineer.

3.4 EQUIPMENT PROTECTION

A. Fish Hatchery:

1. Temporary equipment enclosures shall be constructed around new and existing switchboard, instrument panels, control panels, and junction boxes to protect the equipment during equipment demolition and construction. Each enclosure shall be constructed of 3/4" (min.) thick exterior grade plywood, and shall be weather-tight, free standing, and provide physical protection from falling debris of weight no less than 100 pounds.

2. Provide switchboard, instrument panel, junction boxes, , and control panel enclosures with the following features:

   a. Double or single, full height (7'-6" min.) hinged access doors for each MCC.

   b. Double or single, full height (7'-6" min.) hinged access doors for each instrument panel.

   c. Double or single, full height (7'-6" min.) hinged access doors for each control panel.

   d. Securely anchor enclosure to floor slab and wall with threaded drop-in anchor bolts set 1/2" min. below concrete surface.

   e. Provide 6-inch minimum clearance between all enclosure panel surfaces and interior surface of enclosure.

3. Remove all temporary enclosures as required during installation of other equipment. Grout all anchor bolt voids with non-shrink grout.

3.5 DEMOLITION

A. Contract Drawings define minimum portions of structures, facilities, and equipment to be removed. Unless otherwise shown, rough cuts or breaks may be made exceeding limits of demolition shown.

B. Remove material from existing improvements as required to permit connection of new work. Avoid both damage to the portion to remain, and interference with the use and operation of existing structures and utilities.

1. Pavement to be removed shall be saw cut to a uniform line prior to removal.

2. Shut off, cap, or otherwise protect existing public utility lines in accordance with the requirements of the public agency or utility having jurisdiction.

3. Completely remove all materials designated for removal as shown on the Contract Drawings.

C. Remove all materials associated with existing equipment that is to be removed or relocated.

D. Cut off concealed or embedded piping, conduit, boxes, reinforcing steel, anchor bolts, or other materials a minimum of 3/4" below the final finished surface.

E. Patch existing surfaces to create a neat, smooth appearance. Use non-shrink grout to patch concrete or masonry surfaces. Use like materials for other surfaces.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove, handle, and dispose of off-site, in a safe, appropriate and lawful manner, and in accordance with Section 01 35 44, all materials that are required to be removed under this contract.

B. Underground conduits, pipes, and drainage facilities that are to be demolished shall be removed flush with any excavation and a 0.5 foot thick plug of concrete placed securely in the pipe end to provide closure.

C. Burning of removed materials is not permitted on the site.

END OF SECTION

SECTION 03 30 53

MISCELLANEOUS CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Cast-in-place concrete required for this work shall be as shown on the drawings and specified herein.

B. Related sections:

1. Section 01 33 00 – Submittal Procedures

2. Concrete Notes – Drawing 100-A-011.4

1.2 QUALITY ASSURANCE

A. Codes and Standards:

1. In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations of "Structural Concrete for Buildings", publication ACI 301 of the American Concrete Institute.

PART 2 - PRODUCTS

2.1 CONCRETE

A. General:

1. All concrete unless otherwise specifically permitted by the Engineer shall conform to the requirements of this section.

B. Quality:

1. Concrete shall have the following:

Min. Cement Quantity in Pounds per Cubic Yard	Max. Size Aggregate	Min. Compressive Strength at 28 days	Max. Slump in Inches
602	3/4"x No.4	4000 psi	3 ± 1/2"

C. Portland Cement:

1. Portland cement shall conform to ASTM C150, Type II.

D. Aggregate:

1. Shall conform to CSS 90-3 or ASTM C-33

E. Admixtures:

1. AEA: Air entraining admixtures shall conform to ASTM C260 Type F

F. Water:

1. Water for mixing and curing concrete, washing aggregates, and mixing mortar shall be clean and potable and conform to CSS 90 - 2.03.

2.2 CURING COMPOUND

A. Curing compound shall be resin-based, clear, conforming to ASTM C309, Type 1, Class B.

B. Acceptable products:

1. "Burke Aqua Resin Cure" (clear), Edoco by Dayton Superior, Kansas City, KS, telephone (877) 266-7732

2. "1100-Clear", W. R. Meadows, Inc., Benicia, CA, telephone (707) 745-6666

3. Or equal as approved by the Engineer

PART 3 - EXECUTION

3.1 PREPARATION OF FOUNDATION

A. Foundation surfaces where concrete is to be placed shall be free from standing water, mud or debris.

3.2 BATCHING CONCRETE

A. General:

1. Contractor shall give the Engineer 24-hours advance notice when batching is to be done.

2. At the Contractor's option, local mixing of concrete may be done.

3.3 MIXING AND DELIVERY CONCRETE

A. General:

1. Concrete shall be mixed and delivered to the site with transit mix trucks.

B. Mixing:

1. Each batch of concrete shall be mixed for not less than 70 revolutions of the drum or blades. The rate of rotation shall be the mixing speed designated by the manufacturer of the equipment.

C. Delivery:

1. The concrete shall be delivered to the site of the work and discharge shall be completed within 1-1/2 hours, or before the drum has completed 300 revolutions.

2. When truck mixer or agitator arrives at the job site, the concrete shall be evaluated for slump. If slump exceeds that permitted in the Specifications, it will be rejected. If the slump is less than specified, water may be added at this time and at this time only, to obtain the slump permitted. No additional mixing water shall be allowed later.

3.4 PLACING CONCRETE

A. General:

1. Place concrete in the presence of a District inspector.

2. Concrete in each integral part shall be placed continuously.

a. Contractor will not be permitted to commence work on any part unless his facilities and his forces on hand are sufficient to complete the placing and finishing of the concrete.

3. The methods and equipment used for conveying or transporting concrete shall maintain the concrete's required composition and consistency without segregation or loss of slump.

4. Concrete shall not be deposited over reinforcement, conduit, or piping until the Engineer has inspected the placing thereof and given permission to proceed.

5. Deposit concrete while fresh before it has taken initial set.

6. Consolidate concrete by high frequency internal vibrators.

B. Rain:

1. Do not place concrete in the rain unless the concrete is protected from the addition of extra water.

2. Equipment and materials needed for rain protection shall be immediately available during concrete placement.

C. Temperature:

1. General:

a. Fresh concrete when deposited shall have a temperature of not more than 90 degrees F and not less than 50 degrees F.

2. Cold weather concrete:

a. Protect newly placed concrete against freezing.

b. Remove ice, snow and frost from placement area, before concrete is placed. Concrete shall not be placed on a frozen subgrade.

3. Hot weather concrete:

a. An approved water reducing retarder shall be used in concrete when the temperature of the concrete, as discharged from the mixer, is 80 degrees F or higher.

D. Foundations:

1. Concrete in foundations shall not be placed on other than original and undisturbed material unless otherwise shown on the Drawings or unless required excavation prevents utilization of such foundation.

3.5 FINISHING

A. General:

1. Working of the surface shall be the minimum necessary to produce the desired finish.

2. Use of any finishing tool in areas where water has accumulated will be prohibited.

a. Delay operations on such areas until the water has been absorbed, evaporated, or removed by draining, mopping, dragging off with a loop of hose, or other means.

B. Finish U-TB (unformed, troweled, hair brush finish):

1. Use on sidewalks and other concrete surfaces subject to foot traffic.

2. After floating and troweling and before concrete has hardened, score by brooming with a hair brush to produce a fine texture.

3.6 CURING AND PROTECTING CONCRETE

A. General:

1. Cure all fresh concrete with an approved curing compound or by keeping concrete continually wet for 7 days.

B. Application of Curing Compound:

1. Apply curing compound immediately after finishing operations are completed.

2. Apply curing compound by spraying at a uniform rate of one gallon per 150 sq. ft. of surface.

END OF SECTION

SECTION 16 70 00

CONTROL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Furnish all labor, materials, tools, equipment, and services for the unloading, installation, and wiring of control panel CPNL-01, which is integrated into the switchboard lineup (delivered as a complete assembly or in shipping splits) as indicated in accordance with provisions of the Contract Documents.

2. Furnish all labor, materials, tools, equipment and services for supply, installation and wiring of control panel as indicated in accordance with provisions of the Contract Documents.

3. Completely coordinate with equipment being supplied under this RFP.

4. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation. This includes all power, control, and data connections.

5. The Control Panel Supplier(s) shall furnish all labor, materials, appurtenances, and incidentals required for fabrication and integration of control panel into the compete overall switchboard lineup.

6. Refer to the Contract Drawings for additional control panel requirements and devices to be installed within the control panel. Furnish and install all devices shown on the Contract Drawings whether or not specifically listed herein.

7. The control panel identification to be provided is as follows:

   a. CPNL-01

8. PLC Programming Requirements

   a. The Contractor shall hire the services of an Instrumentation System Supplier (ISS) to perform on-site field testing and commissioning of the PLC program. The ISS shall be present on site for field testing and commissioning of PLC programming. The Contractor shall notify the ISS and the District a minimum of four weeks in advance of the anticipated on-site testing and commissioning window. PLC programming shall be fully function tested with any necessary adjustments made during testing and commissioning.

b. The Contractor shall provide a qualified electrician to remain on-site during the ISS's testing window to perform circuit verification, point-to-point wiring checks, and localized troubleshooting as required to facilitate field testing and commissioning.

c. On site field testing and commissioning shall be completed no later than August 14, 2027.

B. Related sections:

1. Section 00 72 00 – General Conditions

2. Section 01 43 11 – Seismic Qualification and Certification

3. Section 01 81 02 – Seismic Design Criteria

4. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables

5. Section 26 05 53 – Identification for Electrical Systems

6. Section 26 24 13 - Switchboards

7. Section 26 27 26 - Wiring Devices

1.2 CODES AND STANDARDS

A. All equipment shall be designed, manufactured and supplied in accordance with the latest editions and revisions of the following:

1. American National Standard Institute, Inc. (ANSI).

2. California Administrative Code, Title 24, Part 3, Basic Electrical Regulations (BER).

3. Institute Of Electrical And Electronics Engineers, Inc. (IEEE).

4. Insulated Cable Engineers' Association (ICEA).

5. National Electrical Code (NEC).

6. National Electrical Manufacturer's Association (NEMA).

7. Underwriters' Laboratories (UL).

B. The following individual standards are specifically listed for their applicability to the particular type of equipment to be supplied, but are not intended as a complete or exclusive list of applicable standards or standards organizations:

National Electrical Manufacturers Association (NEMA):

ICS-1 *General Standards for Industrial Control and Systems*

ICS-2 *Industrial Control Devices, Controllers and Assemblies*

ICS-6 *Enclosures for Industrial Controls and Systems*

C. All equipment furnished shall be designed and constructed to comply with all applicable laws and regulations of the state of California, and the requirements of any local codes effective at the site.

1.3 QUALITY ASSURANCE

A. Seismic design requirements:

1. The switchboard shall be designed to withstand seismic forces as required in Sections 01 43 11 and 01 81 02.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall be present at the time of delivery to perform a joint inspection with the Control Panel Supplier and the District. Contractor shall sign a 'Delivery Acceptance Form' noting any visible damage, missing components, or shipping discrepancies. Upon signature and off-loading, the Contractor assumes full custody and liability for the equipment until Final Acceptance.

B. Contractor shall provide temporary environmental protection (dust covers, space heaters to prevent condensation) for CPNL-01 from the time of delivery until the equipment is energized.

1.5 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 01 33 00 – Submittal Procedures.

B. Provide submittals for approval as outlined below

1. Front and side elevations, top and floor plans, structural details, weights, and conduit entry/exit locations

2. Equipment anchorage provisions

3. Nameplate schedules

4. Major components technical bulletins, instruction and maintenance manuals and bill of materials

5. Complete AC, DC, and instrumentation loop control schematics

6. Complete panel wiring diagrams

7. Equipment seismic qualifications, seismic calculations, and anchorage details as specified in Sections 01 43 11, 01 81 02, and this section

8. Spare parts list

9. Factory acceptance testing reports

PART 2 - PRODUCTS

2.1 MATERIAL - GENERAL

Where manufacturers are named for a particular item of equipment, it is intended as a guide to acceptable quality and performance and does not except such equipment from the requirements of these specifications or plans.

All material of a given type shall be of a single manufacturer for all equipment. All material shall bear a UL label where such is available for the class of equipment involved.

2.2 ELECTRICAL CONTROL PANELS (ECPS)

Electrical Control Panels (ECPS) shall be utilized as a central control station for the site.

A. Construction

1. Structure:

a. Electrical control panel enclosure shall consist of single or multiple-compartment, freestanding, NEMA 3r, code gauge steel enclosure designed for bottom conduit entry, deadfront non-walk-in enclosures for outdoor locations. The panel enclosure shall have minimum dimensions of 36”w x 24”d x 90”h. A full-length key lockable door with three-point latching mechanism shall be provided over the compartment. A common key shall open all doors. Panel doors shall open to at least 90° and shall be supplied with door latching rod with rollers. A backpan shall be provided in the compartment with barriers partitioning off differing purpose equipment (ie. Power/control).

1) The ECP enclosure shall be given a rust preventative treatment, primed, and painted.

2) Enclosure exterior finish shall be manufacturer's standard medium gray for standalone ECPS, matching the switchboard’s exterior finish.

3) Panel interior (and backpan) finish shall be white enamel. The enclosure finish shall be uniform and completely free of pits and blemishes.

b. The arrangement of components in the ECP shall be as shown on the Contract Drawings and described in these specifications. All internal components shall be mounted on mounting pans. Door-mounted components shall be flush or semi-flush-mounted and arranged as shown. Door sheet steel gauge shall be selected to provide proper rigidity with doors open or closed, after all door-mounted components have been installed. Door stiffeners or ribs are not permitted.

c. ECP shall be supplied with interior data pocket for storage of sheets, and laptop computer shelf. Install of data pocket and laptop computer shelf shall not pierce finished control panel door with mounting hardware.

d. The electrical control panel shall be installed flush against the new switchboard lineup, with the front of the enclosure aligned with the switchboard front to form a continuous equipment lineup. Provide mounting provisions and anchorage as required for proper alignment and secure installation.

2. Wiring methods:

Wiring shall be routed in plastic ductwork with removable covers. Wiring not routed in ductwork shall be neatly bundled, treed, and laced with plastic ties. Wiring across door hinges shall be carefully made up and supported to avoid straining and chafing of the conductors or from putting any strain on their terminations.

120VAC and 24VDC control wiring shall be with SIS type wire #16 AWG minimum. Annunciator wiring shall be with #18 AWG SIS. 4-20mADC instrument loop wiring shall be shielded twisted pair, 600V, 16-gauge BELDEN #8719 or approved equal.

4-20mADC and 24VDC wiring shall not be run together with 120VAC wiring. Separate ductwork, wire bundles, and terminal blocks shall be used. 24VDC and 420mADC wiring shall cross 120VAC wiring at right angles where crossing is required.

4-20mADC wiring shall have shields grounded at one end only (panel terminal block) as shown on the Contract Drawings. Insulate shield at opposite end with heat shrink tube. At signal wire terminations strip back shield approximately 1.5 inches maximum to minimize RFI, EMI interference. Apply wire labels to signal cable, not signal conductors. Connect black wire electrically closest to 24V positive source, white wire closest to negative. Show cable number and wire color on submittal wiring schematics.

ECPs shall be completely factory-wired, and function tested prior to shipment.

3. Terminal blocks:

Terminal blocks shall be of ample size to accept two no. 12 AWG field conductors per point and shall have compression type clamps capable of accepting ring and spade lug terminations. Terminal blocks shall be buchanan #b112 or equal. Terminal blocks shall be provided for all panel remote-wiring connections with 10% spare points.

4-20mADC signal wiring and other instrumentation circuits indicated shall be with din rail mount terminals as shown on the Contract Drawings. Din rail terminals shall be installed with proper accessories for a complete termination system including end plates, separator plates, rail clamps, terminal labels, etc. Din rail terminals shall be phoenix contact #UK3-TW1N, #UK4-T-P-P, #UK3-TW1N-PE, #UK6.3-HESILED or approved equal.

4. Wire marking:

Wire marking shall be as follows: all conductors lighting circuits and electronic-printed circuit boards and other similar devices shall be marked at each end with wire marker letters and numbers in accordance with the approved submittal drawings. Markers shall consist of plastic sleeves, heat shrunk or otherwise firmly anchored, with indelible ink machine printed characters.

The wire numbering system shall be by circuit branch and shall be submitted for review and approval.

5. Nameplates:

Each device shall be identified with a laminated phenolic nameplate fastened with corrosion resistant screws. Internal relays and other control devices shall be identified by equipment number and device designation in letters 3/16-inches high. Nameplates shall be black and white phenolic adjacent to the device. Nameplates shall be fastened to panels with stainless steel drive screws. Nameplates schedule shall be submitted to the construction manager for approval.

B. Panel and door-mounted components

Various special items shall be as shown; other components shall be as follows:

1. Ordinary relays (R):

Ordinary relays for 120VAC and 24VDC application shall be transparent dust cover 11-blade type square base plug-in, with top wired, din rail capable, industrial type sockets with screw terminals and mounted with spring retaining clips. Relays shall have mechanical on/off indicator or pilot lamp, with contacts rated 10A at 120VAC. Relays shall be Allen Bradley #700-HB Square D #KUP, Potter Brumfield #KUP, or approved equal. Latching relays shall be of a mechanical latching type. When an ordinary relay is not adequate for the

application, a control relay or special relay shall be installed.

2. Control relays (CR):

   Relays shall be heavy-duty switchboard type or industrial machine tool type, rated 600VAC, with a minimum of four contacts rated at 10 Amps continuous duty. Contacts shall be field interchangeable from normally open to normally closed.

3. Special relays:

   Special relays shall be as listed below. Additional special relays shall be as shown on the plans:

   a. AC undervoltage relay (27/AC): AC undervoltage relay shall be 120 Volt AC (nominal), single-phase with adjustable setpoint of 75% to 100% of nominal voltage, and adjustable operating time of 0.4 to 10 seconds. Relay contacts shall be DPDT rated at 240 Volts AC, 5 Amps. AC undervoltage relay shall be Basler BE4-27T, style #IA1N2 or approved equal.

   b. DC undervoltage relay (27/DC): DC undervoltage relay shall be 24 Volt DC (nominal) with adjustable dropout voltage setpoint of 19 to 27 Volts DC. Relay shall be 8-pin type, octal base, plug-in with DPDT contacts rated 240 Volts AC, 5 Amps. DC undervoltage relay shall be Diversified model #UOA-24-DLA or approved equal.

4. General purpose time delay relays (TD):

   Time delay relay applications shall be limited to intervals of less than 180 seconds, relay contacts shall be rated for more than one million operations at 120VAC, 10 Amps and shall be of the sealed timing head type, having a linear variable.

5. Solid state control relays:

   Solid state control relays shall accept a 120VAC input and shall have a 120VAC triac output. The relay output shall be rated to switch a 10 Amp load and the relay shall be designed for zero voltage turn on with a 4,000V rms optical isolation of inputs and outputs. Solid state control relays shall be Potter and Brumfield #SSRT-120A10 or approved equal.

6. Control circuit protection (FU):

   Control circuits shall be protected with fuses as shown. Fuse rating shall be as shown on as recommended by protected equipment manufacturer.

   Fuses below 10A shall be ¼-inch x 1¼-inch, 250V. Buss #AGC, ABC, MDL, or equal.

Fuse holders shall be draw-out, type with led blown fuse indicators properly rated for voltage. Fuse holders shall be integrated with din rail mount terminals and accessories and shall be Phoenix Contact #UK6.3-HESILED or approved equal.

Spare fuses shall be furnished in quantities of 10% but not less than 10 units of each type and current rating used.

7. Selector switches (SS):

Selector switches and control switches (CS) used on control panels, switchgear or as otherwise called out shall be of the 'transfer switch' type commonly used in switchgear applications. Handles shall be of the pistol grip type or as shown. Contacts shall be rated 10 Amps continuous current and shall have noninductive interrupting rating of 40 Amps at 115VAC and 0.5 Amps at 125VDC for each contact. Two contacts of the same stage may be connected in series for application requirements within the increased rating of the unit.

Switches shall be provided complete with cover, front escutcheon, handle and with the legend plate engraved by the switch manufacturer in accordance with the plans.

The manufacturer's standard contact development diagram shall be submitted for each different switch arrangement required. The development diagram shall identify each switch it describes and shall call out all special operating features in addition to providing the standard contact status for each switch position.

Unless otherwise indicated, selector switches shall be of the heavy-duty, full-size NEMA 13 oiltight, NEMA 4/13 watertight, or NEMA 4x type as required by panel location.

Where no callout is given, the Control Panel Supplier shall use the diagrammatic presentation to determine the type of selector switch to apply in conformance with the electrical symbol drawing.

Selector switches shall be Square D or Allen Bradley.

8. Pushbuttons (PB):

Pushbuttons shall be heavy-duty, full-size, NEMA 13 oiltight, NEMA 4/13 watertight, or NEMA 4x type as required by panel location. Lockout-stop buttons shall be equipped with an integral locking device and shall additionally be capable of receiving a 3/8-inch shackle padlock. Contacts shall be rated as required for selector switches.

Pushbuttons shall be Square D or Allen Bradley.

9. Panel indicating lamps (IL):

Panel indicating lamps shall be of the full-size, heavy-duty NEMA 13 oiltight, NEMA 4.13 watertight, or NEMA 4x type as required by panel location. Red, green and amber ILs shall have led cluster lamps, with matching lamp and lens color as shown. Unless specifically indicated, ILs shall be push-to-test type.

Panel indicating lamps shall be Square D or Allen Bradley.

Four (4) spare LED lamps of each color shall be provided.

10. Surge arrester:

    The 120VAC input circuit to electrical control panels shall be protected by a MOV type surge arrester as shown. Surge arrester shall be for 120VAC, provide L-N, L-G, and N-G protection, rated 25kA for 8x20 surge, and shall be Joslyn #1260-11 or approved equal.

11. Metal oxide varistors (electronic equipment protection):

    a. Metal oxide varistors (MOVs) shall be provided throughout to protect electronic and other sensitive equipment from power transients and lightning surges.

    b. MOVs shall have the proper voltage rating for the application and shall be rated at least 30 joules, unless otherwise specified. MOVs shall start to conduct at approximately 10% above the working or normal voltage.

12. DC power supply:

    Direct current power supply shall operate from 120 AC unregulated power and, unless otherwise indicated, shall not exceed 30 Volt DC output. DC output voltage shall be regulated to ± 1.0% for 10% AC line voltage change and ± 0.1% over the rated output range. Output ripple shall be less than 15mV. Power supply shall be protected against output short-circuit. All power supply equipment shall be octal base plug-in modules and shall be manufacturer's catalogued items approved by the construction manager as suitable for application. Power supply shall be Allen Bradley 1606-Xl120D Phoenix 2938604, Action Pak 9046, Wilkerson MM9046 or approved equal.

13. Uninterruptible power supply:

    A UPS system shall be installed on a slide tray within the enclosure for user servicing. UPS system shall be APC SMT 1500 with AP9613 or approved equal.

14. UPS bypass

    A UPS bypass system shall be installed on a slide tray within the enclosure for user servicing. UPS bypassing system shall be Liebert 2U POD or approved equal.

15. I to I Isolator:

    a. Isolators shall be of the electronic, solid state type for inside the enclosure mounting and shall complete input/output isolation. It shall accept a 4-20mADC signal and shall output a similar 420mADC signal. The output shall have a suitable resistor which can be removed in the future. It shall be provided with a NEMA 1 cover, flexible cord plug-in connector, and gold flash jack.

    b. Isolator shall have an accuracy of 0.1% and a temperature variation of 0.0025% / °f. The input impedance shall be 50 Ohms and the output impedance shall be 1,500 Ohms. The input power shall be 115VAC, 60 Hz. Fuse protection shall be provided.

    c. Isolators shall be AGM or approved equal.

16. Signal transmission and signal conditioners:

    Unless otherwise indicated, electric or electronic signal shall be 4-20 milliamps DC. Signal conditioners shall be provided as required and shall be by AGM, 4000 series in type PTA module or approved equal.

17. Precision resistors:

    Precision resistors shall be wire-wound, one watt (minimum - larger when shown), 0.1% accuracy rating, with ohmic value as noted on the plans.

18. Programmable logic controller (PLC):

    Refer to Section 16 80 00 – Programmable Logic Controllers and Associated Equipment, for PLC requirements.

19. Strip heaters:

    Strip heaters shall be installed in all electrical control panels which are not installed in climate controlled areas. Strip heaters shall be 240 Volt, single-phase, AC, 500 Watt units connected for 120 Volt AC, 125 Watt service. Strip heaters shall be controlled by individual line voltage thermostats.

20. Axial fans:

    Axial fans shall be installed in all electrical control panels for air circulation. Fans shall be 4-11/16-inch square, axial fans, of the ball-bearing type. Fans shall be 120 Volts, single-phase, 60 Hertz, 3100 rpm rated at 115 cubic feet per minute (cfm) airflow. Fans shall be supplied complete with wire guards. Fans shall be Comair Rotrom #028422, model #MX2B3 or approved equal.

21. Thermostats:

Thermostats shall be heavy-duty for line voltage operation with a three-position selector switch for Auto-Off-On control. Full load rating of the switch shall be not less than 16 Amps at 120V. The thermal switch shall be set to close on rising or decreasing temperature, as required. Thermostats shall be as manufactured by Honeywell, Johnson Service, or equal.

22. Panel Air Conditioners:

    A side-mounted panel air conditioner shall be provided for control panel temperature control. Control Panel Supplier shall submit for approval calculations of heat loading within the control panel and select an appropriated sized air conditioner after District approval. Air conditioner shall be as manufactured by nVent Hoffman or equal.

23. Corrosion-inhibitors:

    a. Corrosion-inhibitors shall produce corrosion-inhibiting vapors that provide a molecular film on metal surfaces. The film shall not affect electrical or mechanical operations of contacts, relays, or other devices.

    b. The corrosion-inhibitors shall provide protection from humidity, salt and other corrosive gents for up to 24 months.

    c. The corrosion-inhibitors shall be as manufactured by Cortec Corporation, Hoffman Engineering Company, or equal.

PART 3 - EXECUTION

3.1 GENERAL

A. Perform the work in a workmanlike manner with craftsmen skilled in the particular trade. Provide equipment and work presenting a neat and finished appearance.

B. Install equipment in strict accordance with "no exceptions noted" shop drawings and manufacturer's recommendations. Secure equipment in strict accordance with approved means that meet the seismic requirements of Article 1.2.A.

C. After the equipment is installed, touch up any scratches, burrs, etc., incurred during shipment or installation of the equipment. If required by the Engineer because of an undue amount of scratches, repaint the entire assembly at the Contractor's own expense.

3.2 INSTALLATION

A. Install control panel in switchboard lineup on foundation at location as shown on the Contract Drawings and anchor in compliance with manufacturer's recommendations.

B. The Contractor is responsible for providing all anchoring systems, seismic restraints (if required), and internal wiring jumpers/connectors necessary to connect CPNL-01 to the adjacent switchboard sections, regardless of whether these items were shipped with the control panel.

C. Contractor shall verify the physical dimensions and mounting requirements of the delivered CPNL-01 against the switchboard lineup and foundation prior to final positioning.

D. Install grounding system per Section 26 05 26.

3.3 CLEANING

A. Remove all rubbish and debris from inside and around the control panel. Remove dirt, dust, or concrete spatter from the interior and exterior of the equipment using brushes, vacuum cleaner, or clean, lint free rags. Do not use compressed air.

3.4 FIELD QUALITY CONTROL

A. Acceptance testing of the panelboard shall be per the requirements of Section 26 08 00.

END OF SECTION

SECTION 16 80 00

PROGRAMMABLE LOGIC CONTROLLERS AND ASSOCIATED EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes

1. The supplier of the control panel (identified in this specification section as the instrumentation system supplier (ISS)), shall furnish all labor, materials, equipment, software, appurtenances, and incidentals required to install, program, function test, and operate the programmable logic controller (PLC) and auxiliaries as specified herein, and as shown on the Contract Drawings.

2. The ISS shall furnish engineering and technical expertise as required for complete integration of a PLC system for proper control, data storage, and communications. Control logic shall be generally as described herein and as shown on the Contract Drawings but shall be adjusted by the ISS as required for safe and satisfactory automatic operation, including controlled process start-up and shutdown sequences.

3. The complete proven and documented system shall meet the highest standards for this type of service.

4. New PLC systems completely furnished and factory-installed within control panel CPNL-01 by the ISS.

5. The PLC system is an integral component of the switchboard lineup provided by the ISS. The physical installation of the housing assembly is by the Contractor per Section 16 70 00.

B. Related sections:

1. Section 00 72 00 – General Conditions

2. Section 01 43 11 – Seismic Qualification and Certification

3. Section 01 81 02 – Seismic Design Criteria

4. Section 16 70 00 – Control Panels

5. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables

6. Section 26 05 53 – Identification for Electrical Systems

7. Section 26 27 26 - Wiring Devices

C. Description of System

1. PLC systems shall be furnished, factory-mounted, and programmed by the ISS.

2. PLC systems as shown on the Contract Drawings shall be furnished and installed under this contract. PLC shall monitor local functions, as shown on the Contract Drawings and described in these specifications. PLC programming and communications configuration shall be By Others.

3. Field Wiring: The ISS's installation is limited to factory-mounting and internal panel wiring. The Contractor shall be responsible for all field-run power, control, and communication cabling (including Cat 6A/Fiber) and final terminations to the PLC I/O modules as indicated on the Contract Drawings.

4. Point-to-Point Testing: Contractor shall complete all field wiring and continuity testing prior to the ISS's arrival for field commissioning.

5. No erratic operation of any PLC device shall be allowed during operation, start-up, shutdown, loss of power, or restoration of power.

6. The ISS shall be responsible for PLC physical network integration as shown on the Contract Drawings and shall provide:

a. Termination, labeling, and testing of all Ethernet CAT 6A cables.

b. Termination, labeling, and testing of all PLC, I/O and TB interconnect cables,

c. Configuration of all Ethernet device settings for optimal communication speed and integrity of data.

d. Test, debug, and optimization of in-service Ethernet network.

1.2 QUALITY ASSURANCE

A. PLC shall be designed, built, tested, and installed in accordance with the latest editions and revisions of the following:

NEMA ICS 1	*General Standards for Industrial Control and Systems*
NEMA ICS 1.1	*Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control*
NEMA ICS 3	*Industrial Systems*

NEMA/EIA 232-D	*Interface Between Data Terminal Equipment and Data Communications Equipment Employing Serial Binary Data Interchange*
ANSI/TIA/EIA-568-A	*Commercial Building Telecommunications Cabling Standard*
ANSI/TIA/EIA-568-B.1	*Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements*
ANSI/TIA/EIA-568-B.2	*Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components, 2001*

1.3 QUALIFICATIONS

1. The PLC components shall be supplied and integrated by the ISS. The ISS shall perform all work necessary to select, furnish, supervise installation, connect, function test, and place into operation a complete PLC system as specified herein.

2. The ISS's technicians performing the installation and function testing of the PLC System shall have at least three years experience on similar projects. The technicians' full resumes shall be available upon request.

3. The ISS's technician performing configuration and testing of the Ethernet networks shall be a network specialist with current certification by Microsoft (MCSE) or Cisco with a minimum of three years relevant experience. Cat 6A Ethernet cable termination and cable testing shall be performed by technicians under the supervision of the network specialist.

1.4 CONTRACT DRAWINGS AND SPECIFICATIONS

1. The PLC System Drawings and Specifications include:

   a. PLC Layout Diagram

   b. PLC Typical I/O Connection Diagrams

   c. PLC I/O Point Lists

   d. PLC Comm Diagram

   e. PLC Loop Diagrams

2. The PLC layout typical I/O connection diagrams are intended to show the basic interconnections required for the communications bus and the various I/O modules.

3. The PLC logic diagrams are intended to show the basic control logic rather than a complete PLC program description. All programming required for a complete and operating system including controlled start-up and shutdown sequences shall be performed By Others.

4. The PLC I/O points lists are intended to indicate the minimum number of points required to be installed.

1.5 SUBMITTALS

1. Submit shop drawings and product data in accordance with Section 01 33 00 – Submittal Procedures.

2. Shop drawings, schematics, and wiring diagrams, submitted shall include:

   a. Product or item names as used herein and on the drawings.

   b. The manufacturer's model or other designation for each item.

   c. Bill of materials listing all items included in the system.

   d. System block diagram showing all major hardware components with locations and code designations indicated.

   e. Connection diagrams showing all wiring between PLC modules, auxiliary devices and interfacing items. All items shall be identified as named herein or in the drawings. All termination points shall be shown and labeled. DC polarities shall be shown.

   f. Pin-out diagrams for all RS-232, RS-485, and similar comm cables shall be shown. Typical Ethernet Cat 6A cable pinout diagram for straight-through or crossed connection shall be shown, and the type (straight-through or crossed) shall be noted for each cable in the ISS's network diagram.

   g. All cables shall be identified by the wire labeling code shown on the drawings and to be installed at each end of each wire. All device and equipment labeling codes shall be shown. All wire sizes, color codes, and special cable types shall be shown.

   h. Index with proper identification and cross-referencing.

   i. Exceptions to the specifications or drawings shall be clearly indicated. The shop drawing submittal shall contain sufficient details so that the District may make a proper evaluation.

   j. Proposed factory testing forms.

   k. Spare parts list.

3. Equipment test forms for factory testing.

1.6 OPERATION AND MAINTENANCE (O&M) MANUALS

1. Operation and Maintenance Manuals shall include:

a. A comprehensive index.

b. A complete "As Constructed" set of favorably reviewed shop drawings.

c. System schematic drawings "As Constructed", illustrating all components and electrical connections of the system supplied under this Section.

d. A complete list of equipment supplied, including serial numbers, ranges, and pertinent data.

e. Full specifications on each item.

f. Detailed operation, maintenance, and service instructions including a step-by-step trouble-shooting guide for each item supplied.

g. Special maintenance requirements particular to this system.

h. The operating instructions shall also incorporate a functional description of the entire system, with references to the system's schematic drawings and instructions applicable to this project.

i. Complete parts list with stock numbers.

j. Recommended spare parts list.

k. Factory testing data in approved forms.

l. A draft O&M manual shall be submitted for review three weeks prior to equipment scheduled factory testing. Four (4) copies of the approved O&M manual including factory test result on the approved test forms shall be supplied in indexed, subdivided, Levelox three-post notebook binders at the time of shipment of the equipment. O&M manuals and documents shall be provided to the District electronically in unlocked and editable form (Microsoft Word and AutoCAD).

1.7 AS-BUILT DRAWINGS

A. All drawings and software submittals described above shall be corrected to the final as-built state of the equipment and delivered to the District prior to final acceptance of the equipment. Copies for inclusion in all equipment manuals shall be provided. All drawings shall be provided to the District electronically in an unlockable and editable format (AutoCAD).

B. Contractor shall maintain "As-Built" redline drawings showing final field-wiring terminations to the PLC I/O modules.

1.8 SITE CONDITIONS

A. General Environment

The PLC shall withstand anticipated environmental conditions of 5 to 50ºC temperature and 10 to 95% humidity. Electro-magnetic interference (EMI) and radio frequency interference (RFI) as may be anticipated in a typical industrial environment shall not impede proper functioning of the PLC systems. EMI and RFI are expected from two-way radios, lightning strikes, motors, transformers, contactors, relays, etc.

B. Power Source

Normal fluctuations of the 120VAC 60 Hz power supply shall not cause improper operation of the PLC system. Normal fluctuations are voltage excursions between 100 and 130V, or surges caused by switching of electrical loads. Battery power shall be supplied at 24VDC.

On loss of station AC power the PLC shall initiate an orderly shutdown of its control functions. On restoration of power the PLC shall restart the system in an orderly and controlled sequence.

No erratic operation of any PLC output device is allowed during start-up, shutdown, operation, or on loss or restoration of power.

C. Surge Protection

PLC power supply, CPU and all I/O devices shall have built-in surge withstand capacity to prevent damage from electrical surges on any connected line.

Additional surge protection shall be provided on any 4-20mA DC signal loops which extend beyond the perimeter of the building housing the PLC Control Panel. Surge protection shall be properly applied devices, Bournes/Joslyn #1820-28-A3 or equal by Alan Scientific.

PART 2 - PRODUCTS

2.1 GENERAL

A. The ISS shall furnish equipment which is of one manufacturer to the maximum possible extent. Where this is not practical, all equipment of a given type shall be the product of one manufacturer.

B. Contractor shall receive, store, and turn over to the District all spare parts, specialized cables, and software licensing media provided by the ISS.

2.2 PLC COMPONENTS

A. The PLCs shall be Allen Bradley CompactLogix series 5069 hardware as shown.

B. Components shall be as specified below.

2.3 PLC CPU AND COMMUNICATIONS MODULES

For CompactLogix, the PLC CPU shall be a 5069-L3100ERM.

2.4 RACK AND POWER SUPPLY

A. CompactLogix PLC Assembly

CompactLogix PLC shall be assembled on DIN-rail appropriately sized for the power supply, CPU, and IO modules as shown on the Contract Drawings.

B. Power supply shall be installed on the DIN-rail to provide uninterruptible power for CPU, Communication Module, and I/O Modules. Power supplies to be Allen Bradley 1606-XL120D.

2.5 PLC INPUT OR OUTPUT (I/O) MODULES

A. General

1. All CompactLogix I/O shall be DIN-rail mounted modules of a universal type.

2. All I/O internal circuits shall be electrically isolated from external circuits.

3. Each discrete input or output point shall have a visual indicator to display on/off status, and write-on labels for point identification adjacent to each indicator.

B. Module Types

1. Discrete Input (DI) Modules:

Discrete input (DI) modules-24 VDC
- Allen Bradley 5069-IB16
- 16 points per module
- 10 VDC to 32 VDC input voltage
- Sink type connection

2. Discrete Output (DO) Modules:

Discrete Output (DO) Modules-24 VDC
- Allen Bradley 5069-OB16
- 16 points per module

- 12/24 VDC source logic
- Provide auxiliary relays (DOX) for all DO points. Auxiliary relays (DOXs) shall be DPDT, 10A rated, standard square base plug-in relays with indicating light to facilitate troubleshooting. Relays shall be Allen Bradley Model 700 HB 32Z24-1 or equal.

3. Analog Input Modules:

Analog Input (AI) Modules Voltage/Current
- Allen Bradley 5069-IF8
- 4-20 mADC input
- Differential inputs
- 18-bit resolution
- ± 0.05% full scale recovery
- 8 points per module

4. Analog Output Modules:

- Allen Bradley 5069-OF8
- 4-20 mADC output
- 16-bit resolution
- 8 points per module
- Configure for 4-20 mADC output

2.6 PLC COMMUNICATION AND CABLES

A. All PLC power supply, communication, and interconnect cables shall be the PLC manufacturer's standard cables and shall be furnished by the ISS.

B. RS-232/485 serial cables shall be configured and provided as required. Serial cable pinouts shall be documented in the plans.

C. Ethernet cables for inside-panel interconnection shall be Belden factory assembled shielded cables. Category 6A Ethernet cables shall be Belden OSP6AF of required length or equal.

2.7 ETHERNET SWITCH

A. (8) Fast Ethernet Coper Ports shall be provided for use as shown on the plans. Ethernet switch shall be N-Tron 108TX or approved equal.

2.8 SERIAL INTERFACE MODULE

A. Serial interface module shall be Allen Bradley Model 5069-SERIAL as manufactured by Allen Bradley. Module shall provide serial communication interface capability for RS-232 and RS-485 devices and shall be compatible with the CompactLogix 5069 I/O platform.

B. Module shall support configurable serial communication parameters including baud rate, parity, stop bits, and data bits. Module shall be configured for the communication protocol required by connected field devices as indicated on the Contract Drawings.

2.9 SERIAL TO FIBER CONVERTER

A. Serial-to-fiber media converter shall be provided for use as shown on the plans. Converter shall be Moxa TCF-90 series or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

A. Testing Support: Contractor shall provide a qualified electrician to assist the ISS during PLC field-testing and commissioning for circuit verification.

B. Signal Verification: Contractor is responsible for correcting any field-wiring errors (mis-landed wires, loose terminations) identified during functional testing at no additional cost to the District.

3.2 PLC PROGRAMMING

A. A tag listing of all Logix tags used by the vendor's local HMI will be provided showing a minimum of the following tag parameters.

1. PLC tag name (this is the same as the tag address for Logix tags unless aliases are used)

2. Description

3. Data type

4. Range of possible values

5. Engineering units

6. State descriptions (true and false states for discrete tags, all value states for analog tags)

7. Alarm status (for discrete alarm tags what state indicates the alarm state)

8. Read and/or write accessibility

9. If separate read and write tags are used for set points and commands indicate the relationship between the write tag and the read tag.

10. All text must be in American English

B. PLC tags addressed by the SCADA should be located in contiguous registers (e.g., read array and write array) when possible.

C. Prior to Factory Demonstration Testing, a minimum of two programming workshops are required to resolve design and code issues between the vendor and the District programming staff.

D. An Ethernet IP addressing scheme is in place by the District for all equipment installed on the plant's Ethernet networks. Vendor equipment connecting to the plant's Ethernet network must be assigned an IP address by the District and must implement the assigned IP address in the hardware prior to connecting any equipment to the network.

E. PLC programming shall be developed using Ladder Logic (LD) to the greatest extent possible. All code shall adhere to industry best practices for structured programming and comply with all established District PLC programming standards.

3.3 CONSTRUCTION

A. Components shall be installed in accordance with the manufacturer's instructions and located as shown on the Contract Drawings or as approved by the submittal process.

B. The ISS shall be responsible for coordinating the equipment and assuring a fully operable and factory tested system.

C. All analog and digital I/O points shall be wired out to panel terminal strips.

D. PLC DI and DO modules shall be connected with #18 AWG type SIS or MTW (fine strand) wire. PLC AI and AO modules shall be connected with #18 shielded twisted pair, Belden #8760 or approved equal.

E. 24VDC control, analog signal, and communication wiring shall be carefully segregated from 120VAC power wiring. Cross low voltage and AC power wiring at right angles only as necessary.

F. Terminate 100BaseTX Cat 6A Ethernet shielded cable with shielded RJ45 connectors properly matched to the Cat 6A cable, and including protective boot with cable strain relief. Termination shall be performed with appropriate crimping tools.

G. Terminations shall be carefully coordinated per the ISS ’s Network diagram and shall be “straight-through” or “crossed” as required. Termination shall be supervised by the ISS’s certified network specialist. All Ethernet cables shall be labeled at both ends according to the ISS’s Network Diagram.

H. Testing of Ethernet Cat 6A cabling shall be performed by the ISS’s network specialist. Testing shall follow termination and shall include:

1. Testing for proper termination including proper coordination of RX and TX pairs for “straight-through” or “crossed” connection as required.

2. Testing for opens, shorts, polarity reversals, and presence of AC and DC voltage.

3. Testing with calibrated Fluke “DSP” or Agilent “WireScope” according to the latest revision of the TIA/EIA-568-B.

4. Certification that cables are acceptable for intended 100BaseTX service and submittal of test data, properly labeled and organized.

3.4 FACTORY TESTING

A. General

This specification subsection shall define factory testing requirements for the equipment supplied under Section 16 70 00. See Section 16 70 00 for additional control panel details.

B. Test Forms

Equipment shall be tested as described herein. Test forms for the factory testing shall be submitted for review and approval per Part 1.05 - Submittals.

C. Witness Testing

The District shall send a representative to witness factory testing. The ISS shall make all reasonable efforts to accommodate scheduling for the factory test. Completed test forms shall be supplied to the District at completion of the factory testing.

D. Retest

Any equipment, material, or workmanship found defective during testing shall be immediately replaced/corrected and all necessary retesting shall be satisfactorily completed and documented in the testing forms.

E. Test Equipment

All necessary test equipment to perform the testing described herein shall be supplied by the ISS. All test forms shall include a listing of the test equipment used in obtaining the test results contained on that form. Test instrument information shall include manufacturer, model number, and serial number.

F. Factory Tests

1. The following factory tests as a minimum shall be performed:

    a. Point-to-point testing for all PLC I/O.

b. Continuity testing of all wiring.

c. Yellow line all schematics and wiring drawings against wiring checks.

d. Provide testing of discrete and analog PLC inputs and outputs from the field terminal connections by simulated contact closure and analog signal injection to verify proper PLC I/O addressing.

Successful completion and documentation of the above factory tests are required for equipment release for shipment. Acceptance of factory test results does not relieve the ISS for the requirement of conforming to the contract documents.

3.5 START-UP TESTING

A. The ISS shall perform thorough start-up testing in close co-ordination with the District and Construction Manager. The designated ISS Commissioning Engineer shall be responsible for submittal of test procedures, test scheduling and coordination, and documentation and submittal of test results. Start-up tests shall include:

1. Point-to-point wire checking of all PLC I/O circuits. All schematic and wiring drawings shall be yellow lined against these physical checks.

2. Verification of proper functioning of all analog I/O loops. Verify proper scaling in PLC registers. Verify “signal out of range” and all “high” and/or “low” alarms. All test forms shall include a listing of the test equipment used, including manufacturer, model number, and serial number.

3. With all outputs disabled, manually activate each input device and check for status change at the appropriate input point.

4. Without causing any undesirable actions to occur, use “forcing” to verify that each discrete and analog output is properly addressed. and wired.

5. Schedule and perform demonstration testing of all I/O to be witnessed by designated District or Construction Manager inspector.

6. Check program for proper logic, I/O and internal register address assignments, and timer, counter, and setpoint values.

7. Provide test procedures, scheduling, and coordination of operational tests to demonstrate for each subsystem complete operability to be witnessed by designated District or Construction Manager inspector for certification of system “substantially complete” and initiation of in-service commissioning period.

8. Provide close monitoring of systems and coordination with Facility staff, during the commissioning (acceptance test) period. Provide as necessary any modification to programming to establish stable operation.

9. Provide training for the Facility Operations staff for each subsystem during its commissioning period. Training shall include review of the PLC programming and monitoring via District SCADA.

10. Any equipment, material, or workmanship found defective during testing shall be immediately replaced or corrected, and all necessary retesting shall be satisfactorily completed and documented on the test forms.

11. All PLC programs shall be documented thoroughly. Back-up copies on disc shall be made promptly. Printout of final PLC ladder logic shall be included in O&M manual submittal.

END OF SECTION

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Section includes:

1. Division 26, Electrical covers the work necessary for the complete electrical system. Furnish materials, labor, and equipment in accordance with these Specifications and the accompanying Drawings.

2. The requirements of Division 26, Electrical in their entirety apply to all electrical work and equipment furnished on this project whether furnished or specified under this or other divisions of these Specifications.

3. See Division 01, General Requirements, which contain information and requirements that apply to the work specified herein and are mandatory for this project.

4. Like items of materials provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, maintenance, and replacement.

1.2 QUALITY ASSURANCE

A. Codes and Standards: The components covered by these Specifications shall be designed, tested, assembled, and installed in accordance with the minimum requirements of the latest published standards of the California Electric Code (CEC), National Electrical Safety Code (NESC), Underwriters Laboratory (UL), American National Standard Institute (ANSI), Institute of Electrical and Electronic Engineers, Inc. (IEEE), and the National Electrical Manufacturers Association (NEMA).

1.3 SUBMITTALS

A. General:

1. Provide manufacturers' descriptive information and shop drawings for all equipment, material, and devices furnished under Division 26, Electrical including certified outline and arrangement drawings, schematic (elementary) diagrams, interconnection and connection diagrams, in accordance with Section 01 33 00, Submittals and this section. Device designations and symbols for schematic (elementary) connection or interconnection diagrams shall conform to the latest edition of NEMA ICS l.

2. Submit complete interface schematic drawings for all equipment furnished in accordance with other Divisions (27, 33, etc.) that interface with electrical equipment. These drawings shall contain diagrams, terminal numbers, device names, tag numbers, control cable conductor colors and numbers, etc., to provide complete identification of the circuits and provide coordination between the equipment.

3. Manufacturer's standardized elementary diagrams will not be acceptable unless applicable portions of the diagram have been clearly identified and non-applicable portions deleted or crossed out.

B. Submit certified shop drawings and diagrams as follows:

1. Layouts indicating conformity with space requirements

2. Assembly drawings in sufficient detail to identify every part of the specified equipment including bills of material

3. General dimension, outline, and panel, cubicle, and structure layout drawings showing the principal dimensions of the equipment, the location of all devices therein, and the size of electrical conduits and connections

4. One-line, three-line, schematic (elementary), connections detailing all internal wiring, and interconnection diagrams detailing all field wiring

5. Control schematics shall use the ladder diagram type format incorporating line number, operation function statement, contact location line number with an underline for a normally closed contact, a description of operation of each device and complete step-by-step written sequence of operation. Wire and terminal numbers shall be clearly shown. Actual device symbols shall be used to represent equipment such as limit switches, level switches, pressure switches, time delay relays, etc. Control schematics shall be shown with the electrical system in a de-energized state. Complete interconnection diagram for each system showing every wire by number, every junction terminal box or device to which it connects from origination to final destination, and boxes, manholes, pull boxes, and cabinets through which it passes. These diagrams shall show wiring installed by Contractor between items of manufactured, prewired or non-prewired equipment.

6. Furnish schematic (elementary) diagrams, including Contractor modifications, of all factory wired equipment and Contractor assembled or supplied equipment for Engineer's approval and record purposes. These wiring diagrams shall indicate point-to-point wire terminations, and wire color identifications with tags per Section 26 05 19.

7. Characteristic curves for all protective devices.

8. Installation drawings for all electrical work showing conduit layout, conduit sizes and locations of equipment foundations, and details accurately dimensioned. Conduits located in foundation slabs or routed through concrete structures shall be indicated on the installation drawings and submitted for review prior to foundation concrete pour.

C. Seismic requirements:

1. Submit anchorage calculations for equipment that weighs 400 pounds or greater. Calculations shall be based on:

a. Determination of operating weight and centroid of equipment

b. Operating weight is to be weight of unit plus weight of fluids or solids normally contained in unit during operation

c. Determination of seismic forces and overturning moments

d. Determination of shear and tension forces in connections

e. Design of connection details based on calculated shear and tension forces

2. The following electrical equipment shall be designed and seismically anchored to resist Code prescribed seismic forces and shall not undergo loss of their intended function after application of these forces in in accordance with Sections 01 43 11 and 01 81 02:

a. Diesel Engine Driven Generator Sets (Section 26 32 13.13)

b. Switchboards (Section 26 24 13)

c. Automatic Transfer Switches (Section 26 36 23)

d. Low Voltage Distribution Transformers (Section 26 22 13)

e. Control Panels (Section 16 70 00)

f. Panelboards (Section 26 24 16)

1.4 RESPONSIBILITY

A. The Contractor shall be responsible for:

1. Complete systems functionally in accordance with the intent of these Contract Documents.

2. Coordinating the details of equipment layouts and construction for all Specification Divisions which affect the work covered under Division 26, ELECTRICAL.

3. Furnishing and installing all incidental items not actually shown or specified, but which are required by good practice to provide complete functional systems.

4. Coordination with Division 27 – Communications; for installation and wiring requirements

5. Coordination with Division 33 – Utilities including but not limited to: mechanical systems packaged with electrical equipment, substations, transmission equipment, motor operated valves with integral controls, pump motors with motor protection controls, radio path survey and field instrumentation.

1.5 INTENT OF DRAWINGS

A. The Contract drawings indicate the extent, general location, and arrangement of equipment. Duct bank and conduit runs are diagrammatic and may not show the exact locations for installation. The Contractor shall verify the locations of conduit stub-ups based upon conduit entry space of equipment furnished from the manufacturer's certified shop drawings and by inspection of the actual equipment to be installed.

B. In general, where the background on Drawings has been screened, the area screened is work other than electrical, unless otherwise noted. Work under Division 26 is shown heavier for contrast.

C. Standard details are typical for all locations which apply regardless of whether a callout is shown on the plan or not.

D. Electrical design is based on minimum horsepower and current ratings. If the manufacturer or Contractor provides equipment with a larger horsepower or current rating, the Contractor shall be responsible for making all necessary changes to accommodate the larger unit, with the approval of the Engineer. Contractor shall pay for all such changes including engineering design by a Professional Electrical Engineer currently registered in the State of California.

E. Number and size of wires which shall be installed in runs of conduit where not shown on the Drawings shall be determined from the one line, schematics, connection, interconnection, and control diagrams of actual equipment furnished.

1.6 DEFINITIONS (APPLICABLE TO ELECTRICAL SPECIFICATIONS AND DRAWINGS)

A. Certified: Confirmed to be accurate, or as represented, or as meeting standards.

B. Concealed: Inside building above grade and located within walls, furred spaces, crawl spaces, attics, above suspended ceiling, etc. In general, any item not visible or directly accessible.

C. Connect: Complete hookup of item with required services, including conduits, wires, and other accessories.

D. Exposed: Either visible or subject to mechanical or weather damage, indoor or outdoor, include areas such as mechanical and storage rooms. In general any item that is directly accessible without removing walls, panels, ceilings or other parts of structure.

E. Furnish: Supply and deliver complete.

F. Install: Place, secure and connect as required to make fully operational.

G. Provide: Furnish and install as defined above: perform work.

H. Use (verb): Furnish and install as defined above.

I. Wiring: Electrical conduit, raceway, conductors and connections.

1.7 UTILITY SERVICE AND METERING

A. PG&E will provide the service and metering. The engineering contact person is as follows:

1. Brandon Wright
brandon.wright@pge.com
(510) 333-5389

B. The District will be responsible for paying for utility service revisions. New communications service shall be as shown on the Drawings and as specified under Division 27.

PART 2 - PRODUCTS

2.1 GENERAL

A. Unless otherwise indicated, provide all first quality, new materials and equipment, free from any defects, in first class condition, and suitable for the space provided. Provide UL listed materials and equipment wherever standards have been established by that agency.

B. Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer.

2.2 MATERIALS AND EQUIPMENT

A. Unless otherwise indicated, provide materials and equipment which are the standard products of manufacturers regularly engaged in the production of such materials and equipment. Provide the manufacturers' latest standard design that conforms to these Specifications.

2.3 EQUIPMENT FINISH

A. Provide materials and equipment with manufacturers' standard finish system. Provide ANSI 61, light grey color for all equipment unless otherwise specified in the individual equipment sections. Provide two quarts of touchup paint.

2.4 ENVIRONMENTAL

A. Provide materials and equipment suitable for installation and operation under rated conditions at 200 feet above sea level and with maximum ambient temperature of 104ºF (40ºC).

B. Refer to Section 01 35 44 for additional information regarding environmental conditions and requirements.

2.5 OUTDOOR EQUIPMENT

A. Provide equipment and devices to be installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of 32ºF to 104ºF. Equipment must be capable of proper operation at rated output continuously in this ambient temperature range in direct sun. Provide any additional equipment such as enclosures, sunshades, and cooling equipment so that this performance requirement can be met.

2.6 FASTENERS

A. Fasteners for securing equipment to walls and floors shall be either hot-dip galvanized after fabrication or stainless steel.

2.7 ENCLOSURES

A. General

1. Equipment enclosures shall have NEMA ratings suitable for the location in which they are installed, as specified in this Section or as shown on the Drawings.

B. Electrical enclosures shall have the following ratings:

1. NEMA 1 for dry, non-process indoor locations shown on the Drawings.

2. NEMA 12 for locations shown on the Drawings.

3. NEMA 4 for outdoor locations, rooms below grade (including basements and buried vaults) and locations shown on the Drawings.

PART 3 - EXECUTION

3.1 GENERAL

A. Unless specified otherwise, electrical equipment and anchoring systems shall be designed to withstand seismic forces as specified in Section 01 43 11and Section 01 81 02.

B. Install materials and equipment in a workmanlike manner utilizing craftsmen skilled in the particular trade. Provide work which has a neat and finished appearance. Carry out work in accordance with NECA Standard of Installation unless otherwise specified.

C. Coordinate electrical work with the Engineer and work of other trades to avoid conflicts, errors, delays, and unnecessary interference with operation of the plant during construction.

D. Check the approximate locations of light fixtures, electrical outlets, equipment, and other electrical system components shown on Drawings for conflicts with openings, structural members, and components of other systems and equipment having fixed locations. In the event of conflicts, notify the Engineer in writing. The Engineer's decision shall govern. Make modifications and changes required to correct conflicts.

3.2 PROTECTION DURING CONSTRUCTION

A. Throughout this Contract, provide protection for materials and equipment against loss or damage in accordance with provisions elsewhere in these Contract Documents. Throughout this Contract, follow manufacturers' recommendations for storage. Protect everything from the effects of weather. Prior to installation, store items in clean, dry, indoor locations to prevent condensation. Energize all space heaters furnished with equipment or provide temporary heating, sufficient to prevent condensation, in transformers, switchboard, switchgear, generator, and control panel which do not have space heaters.

B. Following installation, protect materials and equipment from corrosion, physical damage, and the effects of moisture on insulation. When equipment intended for indoor installation is installed at the Contractor's convenience in areas where it is subject to dampness, moisture, dirt, or other adverse atmosphere until completion of construction, ensure that adequate protection from these atmospheres is provided that is acceptable to the Engineer. Cap conduit runs during construction with manufactured seals. Keep openings in boxes or equipment closed during

construction. Energize all space heaters furnished with equipment. Cap all spare conduits.

3.3 MATERIAL AND EQUIPMENT INSTALLATION

A. Follow manufacturers' installation instructions explicitly, unless otherwise indicated. Wherever any conflict arises between the manufacturers' instructions, codes and regulations, and these Contract Documents, follow Engineer's decision. Keep copy of manufacturers' installation instructions on the jobsite available for review at all times.

B. Use appropriate conduit and conductor entry fittings with enclosures which maintain the specified enclosure environmental capability after proper installation.

3.4 EQUIPMENT SUPPORTS

A. Provide equipment supports for all equipment in accordance with manufacturer’s requirements. Free standing panels and enclosures shall be mounted on concrete pads that are of the same plan dimensions as the equipment furnished unless otherwise shown on the drawings. Provide leveling channels under all equipment with roll out or drawout circuit breakers or contactors, located as recommended by the equipment manufacturer.

3.5 CUTTING AND PATCHING

A. Lay out work carefully in advance. Do not cut, drill, or notch any structural member or building surface without specific approval of Engineer. Carefully carry out any cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical materials and equipment. Following such work, restore surfaces neatly to original condition. Use only skilled craftsmen of the trades.

3.6 CLEANING AND TOUCHUP PAINTING

A. Keep the premises free from accumulation of waste material or rubbish. Upon completion of work, remove all materials, scraps, and debris from premises and from interior and exterior of all devices and equipment. Touch up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original finish. If extensive damage is done to equipment paint surfaces, refinish the entire equipment in a manner that provides a finish equal to or better than the factory finish, that meets the requirements of the Specifications, and that is acceptable to the Engineer.

B. The interior of all electrical equipment, including windings of dry type transformers, shall be vacuumed and wiped free of dust just before final acceptance. De-energization of equipment shall be at times approved in writing by the Engineer.

3.7 INSPECTION

A. Allow materials, equipment, and workmanship to be inspected at any time by the Engineer and District or their representatives. Correct work, materials, or equipment not in accordance with these Contract Documents or found to be deficient or defective in a manner satisfactory to the Engineer.

3.8 STANDARDS, CODES, PERMITS, AND REGULATIONS

A. Perform work; furnish, install, and test materials and equipment in full accordance with the latest applicable rules, regulations, requirements, and specifications of the following:

1. Local Laws and Ordinances
2. State and Federal Laws
3. State Fire Marshal
4. Underwriters Laboratories (UL)
5. National Electrical Safety Code (NESC)
6. American National Standards Institute (ANSI)
7. National Electrical Manufacturers Association (NEMA)
8. National Electrical Contractors Association (NECA) Standard of Installation
9. Institute of Electrical and Electronics Engineers (IEEE)
10. Insulated Cable Engineers Association (ICEA)
11. Occupational Safety and Health Administration (OSHA)
12. National Electrical Testing Association (NETA)
13. ASTM International (ASTM)
14. California Electrical Code (CEC)

B. Conflicts, if any, that may exist between the above items, will be resolved at the discretion of the Engineer.

C. Wherever the requirements of the Specifications or Drawings exceed those of the above items, the requirements of the Specifications or Drawings govern. Code compliance is mandatory. Construe nothing in the Contract Documents as permitting work not in compliance with these codes.

D. Obtain all permits and pay all fees required by any governmental agency or utility having jurisdiction over the work. Arrange all inspections required by these agencies. On completion of the work, furnish satisfactory evidence to the Engineer that the work is acceptable to the regulatory authorities having jurisdiction.

3.9 SERVICE CONTINUITY

A. Maintain continuity of electric service to all functioning portions of the plant. Make no outages without prior written authorization of the Engineer. District shall be notified in writing ten (10) business days before service cutover. Include all costs for temporary wiring and overtime work required in the Contract price. Remove all temporary wiring at the completion of the work. Refer to Section 01 35 13 additional requirements.

3.10 TEMPORARY ELECTRIC POWER

A. Refer to Section 01 50 00 for necessary provisions for electric power used during construction.

B. The Contractor shall provide temporary lighting for all trades within the buildings. The average lighting level (footcandle) shall meet OSHA and CAL-OSHA requirements.

3.11 TESTS

A. Perform testing as specified in Sections 01 75 17 and 26 08 00.

END OF SECTION

SECTION 26 05 19

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Work necessary to provide a complete and operable low voltage cable system as specified herein.

2. Contractor shall be responsible for the procurement, delivery, and storage of all conductors and cables. All materials shall be new, unused, and provided in original factory packaging.

B. Related sections: Refer to other divisions and sections of the contract documents to determine the extent and character of related electrical work specified elsewhere, but which shall be done under this section.

1. Section 00 72 00 – General Conditions

2. Section 01 33 00 – Submittal Procedures

3. Section 26 05 26 – Grounding and Bonding for Electrical Systems

4. Section 26 05 53 – Identification of Electrical Systems

1.2 REFERENCES

A. Low-Voltage cables shall be installed in accordance with the latest editions and revisions of the following:

1. ASTM International (ASTM)

a. B3 – Standard Specification for Soft or Annealed Copper Wire

b. B8 – Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

c. B33 – Standard Specification for Tinned-Coated Soft or Annealed Copper Wire for Electrical Purposes

2. Insulated Cable Engineers Association (ICEA), American National Standards Institute (ANSI), and National Electrical Manufacturers Association (NEMA)

a. ANSI/NEMA WC 57, ICEA S-73-532 – Standard for Control, Thermocouple Extension and Instrumentation Cables

b. ANSI/NEMA WC 70, ICEA S-95-658 – Standard for Power Cables rated 2000 Volts or less for the Distribution of Electrical Energy

3. National Fire Protection Association (NFPA)

a. NFPA 70 – National Electrical Code

4. Underwriters Laboratory (UL)

a. Standard 44 – Thermoset Insulated Wires and Cables

b. Standard 83 – Thermoplastic Insulated Wires and Cables

c. Standard 1063 – Machine Tool Wires and Cables

d. Standard 1277 – Standard for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members

e. Standard 1581 – Reference Standard for Electrical Wires, Cables and Flexible Cords

1.3 SUBMITTALS

1. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures, and Section 26 05 00 – Common Work Results for Electrical.

1.4 QUALITY ASSURANCE

A. Electrical Safety

1. On-site personnel shall meet all project safety requirements specified in the Contract Documents.

2. Contractor personnel energizing equipment shall have documented and current training for the specific type of equipment that will be energized as required by the latest edition of NFPA 70E, Article 110.46. Reference also the general electrical safety-related work practice requirements in Section 01 35 24 – Project Safety Requirements.

1.5 DELIVERY, STORAGE AND HANDLING

A. Storage of cable after pulling or splicing shall include purging of entire cable with nitrogen or otherwise seal with tape at both ends.

B. The Contractor shall inspect the reels as they are unloaded from the delivery truck. If the reel arrives on its side (one flange on the truck; the other in the air), notify the Engineer and the cable manufacturer before accepting shipment.

C. Provide a crane, special lift truck or forklift to unload the cable reels.

D. Cables shall be packaged on spools or reels. Each package shall contain only one continuous length of cable. Construct the packaging so as to prevent damage to the cable during shipping and handling.

E. All conductor ends shall be sealed at the factory, and these seals shall be intact when the conductors are delivered.

1.6 COMMISSIONING

A. Commission low voltage cables as specified in Section 26 08 00 – Commissioning of Electrical Systems.

B. Scheduling

1. Schedule commissioning work around the work restrictions specified in Section 01 14 00.

C. The District's Commissioning Services Group (CSG) shall witness all commissioning testing.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Provide cables as specified under the type number in this Section (Type 1, Type 2, etc.). Conduits shown on the Contract Drawings have been sized to accommodate the outside diameter for each type.

B. Type 11 (Power and control cables 600 Volts and less)

1. Unless otherwise indicated, provide stranded copper conductors with size as indicated on the Contract Drawings.

2. Provide the following types of insulation:

a. Type XHHW-2 insulation for conductors No.14 and larger having cross linked polyethylene insulation rated at 90 degrees C in continuous wet and dry locations. All conductors installed in underground conduits shall be UL listed for such use.

b. Insulation shall be self-lubricating for sizes #8 AWG and larger.

3. Single conductor control wiring shall be No.14 AWG and shall have insulation type XHHW-2.

4. Acceptable products:

a. Okonite, X-Olene Type XHHW-2

b. Southwire, SIMpull Type XHHW-2

c. Cerrowire, SLiPWire XHHW-2

d. Or equal as approved by the Engineer

C. Multi-conductor Power, Control, and Instrumentation Cable 600 Volts and Less:

1. Provide cable that is UL listed and conforms to the requirements of UL 1277 and CEC Article 340, or UL listed Power Limited Circuit Cable that conforms to the requirements of Article 725 of the National Electrical Code. Provide cables permanently and legibly marked with the manufacturer's name, the nominal voltage, the type of cable, and the UL label (or submit evidence of UL listing).

2. Type 10 (600 Volt, Twisted, Shielded Pair or Triad Instrumentation Cable):

a. General: Type TC, single pair or triad instrumentation cable designed for noise rejection for process control, computer, or data log applications. Suitable for installation in conduit, cable tray, or other approved raceways. Minimum cable temperature rating shall be 90 degrees C dry locations, 75 degrees C wet locations.

b. Individual Conductors: No.18 AWG stranded bare soft annealed copper, Class B, 7strand concentric per ASTM B8, size as indicated on the Contract Drawings; 7 strand tinned copper drain wire.

c. Insulation and Jacket: Each conductor 15mil nominal PVC/nylon insulation. Conductors color scheme shall follow current ICEA standard, See section 3.4C. Jacket flame retardant and sunlight and oil-resistant PVC with 45 mil nominal thickness. Aluminum/polyester shield overlapped to provide 100 percent coverage.

1) Acceptable products:

a) Belden

i) 3088A (pairs)

ii)3089A (triads)

b) Okonite Okoseal-N Type P-OS

i) 264-60-3301 (pairs)

ii)264-65-3301 (triads)

c) Or equal as approved by the Engineer

3. Type 14 (600 Volt Individually Shielded Pairs with a Common Overall Shield Instrumentation Cable):

    a. General: Type TC, twisted, shielded pairs of instrument cables, grouped in a single cable, designed for use for instrumentation, process control, and computer applications. Suitable for installation in conduit, wireway, or other approved raceways. Minimum cable temperature rating shall be 90 degrees C dry locations and 75 degrees C wet locations.

    b. Conductors: No. 18 stranded bare annealed copper, Class B, 7strand, concentric per ASTM B8. Tinned copper drain wires sized as shown on the Contract Drawings, one for each pair and one for the overall group.

    c. Insulation and Jacket: Each conductor 15mil PVC and 4mil nylon insulation. Conductors color scheme shall follow current ICEA standard, See section 3.4C.. Outer jacket flame retardant and sunlight and oil resistant PVC with 45 mil minimum thickness. Individual pair shield aluminum/polyester. Group shield aluminum/polyester, overlapped for 100 percent coverage.

    d. Acceptable Manufacturers:

        1) Belden No. 1048A (2 pairs), 1049A (4 pairs), 1050A (8 pairs)

        2) Okonite Okoseal-N Type SP-OS 261-60-3304 (4 pairs), 261-60-3308 (8 pairs)

        3) Or equal as approved by the Engineer

4. Type 19 (600 Volt Unshielded Multi-Conductor Control and Power Cable):

    a. #14 AWG and larger

        1) General: UL listed, Type TC-ER, 600V multi-conductor copper control cable with Class B stranding per ASTM B8, #10 AWG unless noted otherwise on the drawings. Suitable for installation in conduit, cable tray, or other approved raceways. Minimum cable temperature rating of 90 degrees C for dry and wet locations.

        2) Insulation and jacket: Provide conductors having 30-mil ethylene-propylene rubber (EPR) insulation and chlorinated polyethylene (CPE) jacket of minimum thickness as required by UL 1277. Color-code the conductor group in accordance with ICEA S-73-532, See section 3.4C.

        3) Acceptable Manufacturers:

            a) The Okonite Company, Okonite-FMR Okolon TS-CPE Type TC-ER Cable

b) General Cable FREP, Spec 4300, FR-EPR/CPE, Control, Unshielded.

c) Or equal as approved by the Engineer.

b. #16 AWG and smaller

1) General: UL Listed, Type TC-ER, multi-conductor copper control cables. Suitable for installation in conduit, cable tray, or other approved raceways. Minimum cable temperature rating shall be 90 degrees C dry locations, 75 degrees C wet locations.

2) Individual Conductors: Stranded bare soft annealed copper, Class B, 7strand concentric per ASTM B8, size and number of conductors as indicated on the Contract Drawings.

3) Insulation and Jacket: Each conductor nominal 15-mil PVC/nylon insulation. Color-code the conductor group in accordance with ICEA S-73-532, See section 3.4C., Jacket flame retardant and sunlight and oilresistant PVC with 45 mil nominal thickness, adjusted as necessary to meet the jacket thickness requirements of UL 1277.

4) Acceptable products:

a) Belden UL Control Cable, 600V Type TC Cable

i) Examples:

(1) 27325A (2-conductor)

(2) 28326A (4-conductor)

(3) 28327A (7-conductor)

b) Southwire, Unshielded Multiconductor Type TC-ER 600Volt

i) Examples:

(1) 677071 (2-conductor)

(2) 582642 (4-conductor)

(3) 581513 (7-conductor)

c) Or equal as approved by the Engineer.

5. Type 31 (600 Volt Multi-Conductor Control Cable with a Common Overall Shield):

a. General: UL Listed, Type TC-ER, multi-conductor copper control cable for cables. Suitable for installation in conduit, cable tray, or other approved raceways. Minimum cable temperature rating shall be 90 degrees C dry locations, 75 degrees C wet locations. Overall aluminum/poly foil shield in contact with a stranded tinned copper drain wire.

b. Individual Conductors: No.18 AWG stranded bare soft annealed copper, Class B, 7strand concentric per ASTM B8, size and number of conductors as indicated on the Contract Drawings.

c. Insulation and Jacket: Each conductor nominal 15-mil PVC/nylon insulation. Color-code the conductor group in accordance with ICEA S-73-532, See section 3.4C. Jacket flame retardant and sunlight and oil-resistant PVC with minimum thickness per UL 1277.

d. Acceptable products:

1) Belden UL Control Cable, 600V Type TC Cable

a) Examples:

i) 27325AS (2-conductor)

ii) 28326AS (4-conductor)

iii) 28327AS (7-conductor)

2) Southwire, Shielded Multiconductor Type TC-ER 600Volt

a) Examples:

i) 677081 (2-conductor)

ii) 588461 (4-conductor)

iii) 588463 (7-conductor)

3) Or equal as approved by the Engineer.

6. Type 27 (600 Volt, Individually Shielded Triads with a Common Overall Shield Instrumentation Cable):

a. General: Twisted, shielded triads of instrument cables, Type TC, grouped in a single cable, designed for use for instrumentation, process control, and computer applications. Suitable for installation in conduit, wireway, or other approved raceways. Minimum cable temperature rating shall be 90 degrees C dry locations and 75 degrees C wet locations.

b. Conductors: No. 18 AWG stranded bare annealed copper, Class B, 7-strand, concentric per ASTM B8, size as indicated on the Contract Drawings. Tinned copper drain wires, one for each triad and one for the overall group.

c. Insulation and Jacket: Each conductor 15-mil PVC and 4-mil nylon insulation. Triad conductors pigmented black, red, and blue, or black, white, and red, with red or white conductor numerically printed for group identification. Outer jacket flame-retardant and sunlight- and oil-resistant PVC with 45 mil minimum thickness, adjusted as necessary to meet the jacket thickness requirements of UL 1277. Individual triad shield 1.35-mil aluminum/polyester. Group shield 2.35-mil aluminum/polyester, overlapped for 100 percent coverage.

d. Conductors shall be numerically printed for group identification.

e. Acceptable products:

1) Belden No. 1093A (4 triads); 1094A (8 triads)

2) Okonite Okoseal-N Type SP-OS 261-65-3304 (4 triads); 261-65-3308 (8 triads)

3) Or equal as approved by the Engineer

D. Type 15 (RS-485):

1. General: industrial low-capacitance shielded cables for EIA RS-485 applications, including security access card readers, suitable for outdoor use and installation in conduit and other approved raceways.

2. Conductors:

a. One (1) Pair of 22 AWG, 7x30 strand tinned copper

b. One (1) Conductor of 22 AWG, 7x30 strand tinned copper

3. Conductor insulation:

a. Pair(s) shall be insulated with foam high density polyethylene and color coded in White w/ Orange Stripe & Orange w/White Stripe.

b. Conductor(s) shall be insulated with Polyvinyl Chloride and color coded in Blue w/ White Stripe.

4. Shield:

a. Pair(s) shall be individually shielded via aluminum foil polyester tape providing 100% coverage.

b. Overall shield shall be aluminum foil polyester tape providing 100% coverage and a tinned copper braid providing 65% percent coverage and, 7x30 strand tinned copper 22 AWG drain wire.

5. Jacket: UV and oil resistant PVC, 300 volt, -20 degrees C to +60 degrees C operating temperature.

6. Characteristic Impedance: 120 Ohms per pair

7. Applicable Standards: CEC/UL CM and PLTC OIL RES II, UL 1685 Flame Test, UL 1581 Sunlight Resistance Test.

8. Acceptable products:

a. Belden No. 3106A (for one pair RS-485 applications)

b. Belden No. 3107A (for two pair RS-485 applications)

c. Or equal as approved by the Engineer

E. Flexible Cord and Cable Sealing Fittings:

1. Provide liquid-tight strain relief connectors for exposed flexible cord and power cable where cables enter electrical panels and enclosures.

2. Acceptable manufacturers:

a. OZ Gedney

b. Hubbell

c. Appleton

d. Or equal as approved by the Engineer

F. Electrical Tape for Color Coding:

1. Electrical tape shall be premium grade, not less than 7 mils thick, rated for 90 degree C minimum, flame-retardant, weather resistant, and available in suitable colors for color coding. The tape shall be resistant to abrasion, ultraviolet rays, moisture, alkalis, solvents, acids, and suitable for indoor and weather-protected outdoor use. The tape shall be suitable for use with PVC and polyethylene jacketed cables, and meet or exceed the requirements of UL 510.

2. Acceptable manufacturers:

a. 3M 35 Scotch Vinyl Electrical Tape for Color Coding

b. Plymouth Rubber Company Premium 37 Color Coding Tape

c. Or equal as approved by the Engineer

G. Low Voltage Splices, 600 volts and below:

1. General: when approved by Engineer, or shown on the Contract Drawings, provide low voltage splices consisting of 600 volt compression type connectors and connector insulators, suitable for indoor and outdoor field installations.

2. Long Barrel compression connectors

a. Acceptable products:

1) Burndy

2) ABB Installation Products

3) Panduit

4) Or equal as approved by the Engineer

b. Provide two way, un-insulated, compression connectors, long barrel type, suitable for use with stranded copper conductors. Provide UL listed connectors rated 600 volts minimum.

3. Connector Insulation

a. Connector insulators shall be cold shrink type factory expanded and assembled tubular EPDM rubber sleeves, suitable for field installation. Insulators shall shrink over in-line connections, forming a water-proof seal. Provide insulators rated for 1000 volts, minimum.

b. Acceptable products:

1) 3M

2) Or equal as approved by the Engineer

PART 3 - EXECUTION

3.1 GENERAL

A. Do not exceed cable manufacturer's recommendations for maximum pulling tensions and minimum bending radius. Where pulling compound is used, use only UL listed compound compatible with the cable outer jacket, voltage rating, and with the raceway involved.

B. Submit a schedule of cable pulls 2 weeks prior to installation.

C. Monitor pulling tensions while pulling on runs between manholes and handholes and record the maximum tensions used. Advise the Engineer of cases exceeding the

manufacturer's recommendations and remove and replace cables subjected to tensions in excess of those recommended.

D. Pulling Log: For all feeder pulls (#1/0 and larger), Contractor shall submit a log indicating the pulling lubricant used, the calculated max tension, and the actual measured tension recorded by a calibrated dynamometer.

E. Perform pulling of cable in such a manner that the cable outer jacket does not scrape against the edge of the conduit, at both the inlet and outlet ends of the conduit. Cable shall be free of sandy or gritty material during pulling. If cable is laid on ground during pulling, cable shall be wiped free of sandy or gritty material prior to entry of cable into conduit and prior to application of any pulling compound.

F. Tighten all screws and terminal bolts using torque type wrenches and/or drivers to tighten to the inch pound requirements of the CEC and UL.

G. Where single conductors and cables in manholes, handholes, vaults, and other indicated locations are not wrapped together by some other means such as arc and fireproofing tapes, bundle throughout their exposed length all conductors entering from each conduit with nylon, self-locking, releasable, cable ties placed at intervals not exceeding 18 inches on centers.

H. Terminate no more than two control conductors per terminal point. Terminate all spare conductors on terminal blocks.

I. Low voltage power and control conductors shall be in separate conduits.

J. Only combine conductors with no more than two wire sizes difference to prevent possible installation damage to the smaller conductors; otherwise use separate conduits.

3.2 CONDUCTOR 600 VOLTS AND BELOW

A. Provide conductor sizes indicated on Contract Drawings with no splices except as accepted in writing by the Engineer.

B. Wire nuts may be used on 120 Volt lighting and 120 Volt receptacle circuits only. Place no more than one conductor in any single-barrel pressure connection. Use crimp connectors with tools by same manufacturer and/or UL listed for connectors of all stranded conductors.

C. Soldered mechanical joints insulated with tape will not be acceptable.

D. Color coding on wire sizes larger than No. 6 AWG shall be by taping the individual conductors with the appropriate colored self-adhesive vinyl electrical tape. Vinyl plastic insulating tape for wire and cable splices and terminations shall be flame retardant, 7-mil thick minimum, rated for 90 degrees C minimum meeting the requirements of UL 510.

E. Provide terminals and connectors acceptable for the type of material used.

F. Arrange wiring inside control panels, motor starters, switchboards, etc., neatly cut to proper length, remove surplus wire, and bridle and secure in an acceptable manner. Identify all circuits entering switchboards, motor starters, control panels, etc. Terminate cable conductors on the same side of the terminal blocks as shown on the Contract Drawings.

G. Terminate control and instrumentation wiring with methods consistent with terminals provided, and in accordance with terminal manufacturer's instructions. Where terminals provided will accept such lugs, terminate all control and instrumentation wiring with insulated, ring terminal compression lugs. Control panel incoming field wireway sizes indicated on the Contract Drawings are considered minimum. Contractor shall adjust wireway sizes to meet CEC percentage fill requirements in coordination with the manufacturer.

H. For control and instrumentation wire terminals designed to accept only bare wire compression terminations, use insulated wire ferrules on ends of wire. Tighten all terminal screws with torque screwdriver to recommended torque values.

I. Attach compression lugs with a tool specifically designed for that purpose which provides a complete, controlled crimp where the tool will not release until the crimp is complete. Use of plier type crimpers is not acceptable.

J. Cap spare conductors and conductors not terminated with UL listed end caps.

K. Where conductors pass through holes or over edges in sheet metal, remove all burrs, chamfer all edges, and install bushings and protective strips of insulating material to protect the conductors.

L. For conductors that will be connected by others, provide at least 6 feet spare conductor in freestanding panels and at least 2 feet spare in other assemblies. Provide additional spare conductor length in any particular assembly where it is obvious that more conductor length will be needed to reach the termination point.

M. Do not strip cables more than eight inches from the nearest termination point of that cable.

N. Bundle and label all spare pairs with the cable designation. Tag all individual pairs to enable identification of spare pairs when making future terminations.

O. Splices will not be permitted except as accepted in writing by the Engineer.

P. Ends of cable shall not be exposed to environment more than 24 hours after pulling or splicing. After 24 hours, purge the cable with nitrogen and seal with tape.

3.3 MULTI-CONDUCTOR POWER, CONTROL, AND INSTRUMENTATION CABLES 600 VOLTS AND LESS

A. Splices will not be permitted except as accepted in writing by the Engineer.

B. Maintaining the integrity of shielding of instrumentation cables is essential to the operation of the control systems. Take special care in cable installation to ensure that grounds do not occur because of damage to the jacket over the shield. Shields shall be grounded at one location only as shown on the Contract Drawings.

3.4 CONDUCTOR COLOR CODING

A. Color coding of multiconductor control and instrumentation cable is specified in the individual cable type specification.

B. For power conductors, provide all single conductors and individual conductors of multiconductor power cables with integral insulation pigmentation of the designated colors, except conductors larger than No. 6 AWG may be provided with color coding by wrapping the conductor at each end and at all accessible locations with vinyl tape. Where this method of color coding is used, wrap at least six full overlapping turns of tape around the conductor covering an area 1-1/2 to 2 inches wide at a visible location at all conductor termination and pulling points.

C. Phase A, B, C implies a positive sequence connection (i.e., counterclockwise electrical phasor rotation and clockwise motor rotation).

D. Use the following colors:

System	Conductor	Color
All Systems	Equipment Grounding	Green
240/120 Volts, 1-Phase, 3-Wire	Grounded Neutral	White
	Phase A	Black
	Phase B	Red
208Y/120 Volts, 1-Phase, 3-Wire	Grounded Neutral	White
	Phase A	Black
	Phase B	Red
208Y/120 Volts, 3-Phase, 4-Wire	Grounded Neutral	White
	Phase A	Black
	Phase B	Red
	Phase C	Blue
480Y/277 Volts,	Grounded Neutral (if used)	White, Black Tracer

3-Phase, 4-Wire		
	Phase A	Brown
	Phase B	Orange
	Phase C	Yellow
48V DC Positive	Red	
48V DC Negative	Black	
Single Conductor, AC		Red
Multiple Conductor Control Cables		ICEA Method 1, Table E-2
Multiple Conductor Power Cables (Sizes #10 AWG and smaller)	ICEA Method 1, Table E-2	
Multiple Conductor Power Cables (Sizes #8 AWG and larger)	ICEA Method 4	
Multiple Conductor DC Power Cables		ICEA Method 1, Option C
Twisted shield pair	Positive	White
	Return	Black
Twisted shield triad (for RTDs)	Positive	Red
	Compensation	White
	Return	Black
24V DC Positive	Blue	
24V DC Negative	Gray	
Single Conductor-, DC Alarm, Annunciator, Instrumentation, and Telemetering (if not shielded)		Purple

E. All conductors carrying AC foreign voltage over 100 VAC into control panels, switchboards, and other enclosures shall be yellow. Multi-conductor cables carrying such foreign voltage shall be marked with yellow tape at each termination point.

3.5 LACING OF WIRES AND CABLES

A. Lace all wires and cables in pull or junction boxes, manholes, handholes, wireways, and at each termination. Lace wires and cables so that the wires of the individual circuits are laced together by circuit and the laced together circuit or cable shall be tagged with the cable number. Bundle all wiring entering and exiting the control panels into groups. Bundle and lace power, lighting, control, alarm, annunciator, and instrumentation wiring as specified herein.

3.6 PRE-ENERGIZATION CHECKOUT

A. Conduct a complete inspection of the cable installation, including checking that all installation all accessible connections for tightness and correct torque, visually checking insulators for cracks and supports for damages, verifying that all shipping and packing material has been removed, and that all relay, meter, instrumentation, and other accessory wiring is correct.

B. Check that all raceways and conductors are identified and tagged in accordance with the Contract Drawings and the Contractor's approved interconnection diagrams. Do this before replacing all covers.

C. Verify that all cable shields are bonded at the equipment endpoints.

3.7 ENERGIZATION

A. Energizing of low-voltage cables shall comply with the requirements specified in Article 1.4 - Quality Assurance.

B. There shall be no load on the Type 11 power cables while they are being energized. Turn off all downstream loads.

C. Prior to energizing any circuit that supplies rotating machinery, measure the phase sequence and verify that it is correct.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Furnish all labor, materials, equipment, and incidentals required and install a complete grounding system in strict accordance with Article 250 of the California Electrical Code (CEC), as shown on the Contract Drawings and as specified herein.

2. All raceways, conduits and ducts shall contain equipment grounding conductors. If a size is not shown on the Contract Drawings, size in accordance with the CEC. Minimum sizes shall be No. 12 AWG.

3. Contractor shall perform a complete continuity check of the ground grid and all bond points to ensure a low-impedance path to earth. Any high-resistance connections shall be remediated at the Contractor's expense.

B. Related Sections

1. Section 00 72 00 – General Conditions

2. Section 01 33 00 – Submittal Procedures

3. Section 01 75 17 – Field Testing and Startup

4. Section 26 05 00 – Common Work Results for Electrical

5. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables

6. Section 26 05 33 – Raceways and Boxes for Electrical Systems

7. Section 26 05 53 – Identification of Electrical Systems

8. Section 26 08 00 – Commissioning of Electrical Systems

9. Section 33 71 19 – Electrical Underground Ducts and Manholes

1.2 REFERENCES

A. Grounding systems shall be designed, built, tested, and installed in accordance with the latest editions and revisions of the following:

1. ASTM International (ASTM)

a. B2 – Standard Specification for Medium-Hard Copper Wire

b. B187 – Standard Specification for Copper Bar, Bus Bar, Rod, and Shapes

c. B8 – Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

d. B418-95a Type II – Standard Specification for Cast and Wrought Galvanic Zinc Anodes

2. California Code of Regulations (CCR)

a. Title 24, Part 3 – California Electrical Code (CEC), Article 250 (Grounding)

3. Institute of Electrical and Electronics Engineers (IEEE)

a. IEEE Std 80 – IEEE Guide for Safety in AC Substation Grounding

b. IEEE Std 837 – IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding

c. IEEE Std 142 – IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems

4. Underwriters Laboratories (UL)

a. 467 – UL Standard for Grounding and Bonding Equipment

b. 224 – UL Standard for Extruded Insulating Tubing

5. Canadian Standards Association (CSA)

a. CAN/CSA-C22.3 No. 6-M91 – Principles and Practices of Electrical Coordination Between Pipelines and Electric Supply Lines

6. InterNational Electrical Testing Association (NETA)

a. ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems

7. National Association of Corrosion Engineers (NACE)

a. RP0177 – Mitigation of Alternating Current & Lightning Effects on Metallic Structures and Corrosion Control Systems

8. National Electrical Contractors Association (NECA)

a. NECA 331, Standard for Building and Service Entrance Grounding and Bonding

1.3 SYSTEM DESCRIPTION

A. Design requirements

1. Equipment grounding conductor sizing

a. Include a Type 11 insulated copper ground wire as specified in Section 26 05 19 in every power conduit or multi-conductor cable that supplies power to motors. If a size is not shown on the Contract Drawings, the ground wire shall be the same size as the power cable up to size 2 AWG. For cables larger than 2 AWG, the ground wire may be reduced to half the size of the power cable as long as 2 AWG is the smallest size selected when the ground cable is smaller than the power cable.

b. Include a Type 11 insulated copper ground wire as specified in Section 26 05 19 in every power conduit or multi-conductor cable that supplies power to motors. If a size is not shown on the Contract Drawings, the ground wire shall be the same size as the power cable up to size 2 AWG. For cables larger than 2 AWG, the ground wire may be reduced to half the size of the power cable as long as 2 AWG is the smallest size selected when the ground cable is smaller than the power cable.

1.4 SUBMITTALS

A. Submittals shall be made in accordance with Section 01 33 00 – Submittal Procedures, and Section 26 05 00 – Common Work Results for Electrical. In addition to these requirements, provide the following:

1. Shop drawings

a. As-built drawings of the grounding system installation.

b. As-built drawings shall be dimensioned and include GPS reference points for each buried ground rod using California grid NAD83 northing/easting coordinates. Include all information necessary to locate buried and/or concealed grounding system infrastructure in the future.

1.5 QUALITY ASSURANCE

A. All grounding and bonding products shall be UL listed.

B. All exothermically welded or compression-type terminal lugs for buried or embedded connections shall use materials qualified in accordance with IEEE 837.

1.6 COMMISSIONING

A. Commission the grounding system and equipment as specified in Section 01 75 17 – Field Testing and Startup and Section 26 08 00 - Commissioning of Electrical Systems.

B. Scheduling:

1. See Section 26 08 00 – Commissioning of Electrical Systems for additional requirements.

PART 2 - PRODUCTS

2.1 GENERAL

A. Direct-buried, concrete encased, and exposed grounding conductors

1. Bare copper stranded conductors conforming to ASTM B2 (medium hard drawn) with Class B stranding, size as indicated on the drawings.

2. Acceptable manufacturers:

a. Southwire

b. General Cable

c. Or equal as approved by the Engineer

B. Ground rods

1. 3/4in by 12ft copper clad steel constructed in accordance with UL 467. The copper thickness shall be 10 mil minimum. Provide UL mark on ground rod.

2. Acceptable manufacturers:

a. Eritech (Erico), part number 613412

b. Harger, part number 3412

c. Or equal as approved by the Engineer

C. Conduit grounding bushings

1. Insulated, 150 degree Celsius, malleable iron type with a solderless set-screw lug.

2. Acceptable manufacturers:

a. Appleton, GIB-L-BC Series with bronze lay-in-lug for copper conductors

b. Hubbell Electrical Products (Raco)

c. Or equal as approved by the Engineer

D. Waterpipe ground clamps

1. Electroplated tinned bronze U-bolt style pipe clamp, sized as required for the pipe diameter and ground wire size specified.

2. Acceptable manufacturers:

    a. Harger

    b. Blackburn (Thomas & Betts)

    c. Or equal as approved by the Engineer

E. Fence grounding:

1. Provide fence post and fabric grounding clamps, jumpers, and assemblies as shown on the Contract Drawings.

2. Acceptable manufacturers:

    a. Harger

    b. Erico

    c. Or equal as approved by the Engineer

F. Grounding system connections:

1. Buried or inaccessible connections

    a. Make buried or inaccessible grounding connections with exothermic welds. Molds, cartridge materials, and accessories shall be as recommended by the manufacturer of the molds for the items to be welded. Molds and powder shall be furnished by the same manufacturer. An acceptable alternative to exothermically welded connections is a compression radial swage connection.

    b. Acceptable manufacturers:

        1) Exothermic welded connections

            a) Erico (Cadweld)

            b) Harger (Ultraweld)

            c) Or equal as approved by the Engineer

        2) Compression radial swage connections

            a) DMC Power

            b) No substitutions

2. Accessible connections to equipment or connections to structural steel

    a. Make connections to equipment, structural steel, and other accessible connections using one- or two-hole welded copper lugs as required for the cable size specified. An acceptable alternative to exothermically welded connections is a compression radial swage connection.

    b. Acceptable manufacturers:

        1) Exothermic welded connections

            a) Erico (Cadweld)

            b) Harger (Ultraweld)

            c) Or equal as approved by the Engineer

        2) Compression radial swage connections

            a) DMC Power

            b) No substitutions

3. Connections to reinforcing steel

    a. Make mechanical connections to reinforcing steel using UL 467 listed irreversible crimp compression copper connectors with the “run” and “tap” sizes as required for the reinforcing steel and cable size, respectively, specified. Connectors shall be factory prefilled with moisture inhibiting compound.

    b. Acceptable manufacturers:

        1) Burndy HYTAP, Type YGHP

        2) Thomas & Betts (Blackburn), Figure 6 Compression Ground Tap Connector

        3) Or equal as approved by the Engineer

G. Pre-cast concrete boxes for ground-rod installation

1. Provide where shown on the Contract Drawings. Provide H-20 traffic rated lids inscribed “Ground Rod” on the top.

2. Acceptable manufacturers:

    a. Christy

    b. Jensen Concrete Products

c. Or equal as approved by the Engineer

H. Fasteners

1. Use silicon bronze alloy hardware for all grounding connections to structures or equipment.

2. Acceptable manufacturers:

a. Burndy, “Durium” hardware

b. AFL Global, “Everdur” hardware

c. Or equal as approved by the Engineer

I. Electrical joint inhibitor compound

1. Used for all bolted grounding connections as a moisture and oxidizing seal.

2. Acceptable manufacturers:

a. Sanchem Inc., NO-OX-ID (A-Special Electrical Grade)

b. Or equal as approved by the Engineer

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare and clean piping, rods, and conductors prior to exothermic welding in conformance with the specific requirements of the welding system.

3.2 INSTALLATION

A. General

1. Metal conduits stubbed into power distribution equipment, control panels, or other enclosure shall be terminated with insulated grounding bushings and bonded to the enclosure’s ground bus. Size the bonding wire in accordance with the CEC, except that a minimum No. 12 AWG shall be used.

2. All equipment enclosures, motor and transformer frames, conduits systems, cable armor, exposed structural steel and all other equipment and materials required by the CEC to be grounded, shall be grounded and bonded in accordance with the CEC.

3. Care shall be taken to ensure good ground continuity, in particular between the conduit system and equipment frames and enclosures. Where necessary, jumper wires shall be installed.

4. Liquid tight flexible metal conduit shall have bonding jumpers. Bonding jumpers shall be external, run parallel (not spiraled) and fastened with Type 316 stainless steel tie wraps spaced at intervals not exceeding 12 inches.

5. Run grounding electrode conductors in the building concrete slab/wall or in slab/wall-embedded PVC Schedule 40 conduits unless otherwise shown on the Contract Drawings. Stub-ups at ground test stations and conduit runs underneath structures out to the perimeter ground ring shall be in PVC Schedule 80 conduit.

6. Ground cable penetrations through building exterior walls shall enter within 3 feet below finish grade and shall be prepared with a water stop. Unless otherwise indicated, the water stop shall include filling the space between stands with solder and soldering a 12-inch copper disc over the cable.

7. Install equipment grounding conductors with all feeders and branch circuits. Each circuit shall have a dedicated equipment grounding conductor from source to load without splicing or "tee tapping" (e.g., three different receptacle circuits in a common home-run conduit back to a lighting panelboard shall have three separate equipment grounding conductors back to the lighting panelboard).

B. Ground connections

1. Ground all grounding type receptacles to the outlet boxes with a No. 12 THWN/THHN/MTW green conductor connected to the ground terminal of the receptacle and fastened to the outlet box by means of a grounding screw.

2. Single-point ground instrumentation cable shields at the signal ground bus at the control panel end of the circuit.

3. Seal exposed connections between different metals with electrical joint inhibitor compound. Clean and coat all buried connections with electrical joint inhibitor compound before backfilling.

4. Do not bury or embed bolted connections. For compression-type connectors, the tool for crimping shall emboss the die index number into the connector as the crimp is completed. Each compression-type connector shall have an inspection port for use in checking proper conductor insertion.

5. Molds used for exothermic welding shall be new. The number of welds made per mold shall not exceed the manufacturer's recommendations.

C. Ground rods

1. Drive grounding electrodes at locations shown on the Contract Drawings.

2. Bury ground rods to the depth shown on the Contract Drawings. Interconnect ground rods with the wire size shown on the Contract Drawings.

D. Grounding wires

1. Unless otherwise specified, provide continuous, unspliced equipment grounding conductors.

2. Lay all underground grounding conductors slack and, where exposed to mechanical injury, protect by pipes or other substantial guards. If guards are steel pipe, or other magnetic material, electrically connect conductors to both ends of the guard. Make connections as specified in this Section.

E. Fasteners

1. Clean the connector and conductor surfaces with a wire brush or emery cloth to a shiny, bright surface. For plated surfaces, use compatible solvent cleaning in order not to remove any portion of the plating.

2. Apply electrical joint inhibitor compound immediately after cleaning.

3. All fasteners shall engage a minimum of four full threads for electrical connections and equipment mounting.

4. Coat all bolts with electrical joint inhibitor compound.

5. Torque fasteners to equipment manufacturer's specifications. If not specified by the manufacturer, torque fasteners to NETA specifications.

3.2 PRE-ENERGIZATION CHECKLIST

A. All pre-energization commissioning specified in Section 26 08 00 shall be complete and the testing submittal approved by the Engineer prior to energization.

B. Inspect the grounding and bonding system conductors and connections for tightness, proper installation, and proper application of electrical joint inhibitor compound.

END OF SECTION

SECTION 26 05 33

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. The work necessary to furnish and install complete raceways and boxes for electrical systems

B. Related sections:

1. Section 01 33 00 – Submittal Procedures

2. Section 01 43 11 – Seismic Qualification and Certification

3. Section 01 81 02 – Seismic Design Criteria

4. Section 26 05 00 – Common Work Results for Electrical

5. Section 26 05 43 – Underground Ducts and Raceways for Electrical Systems

6. Section 26 05 53 – Identification for Electrical Systems

7. Section 26 08 00 – Commissioning of Electrical Systems

1.2 REFERENCES

A. Raceway and boxes for electrical systems shall be designed, built, tested, and installed in accordance with the latest edition and revisions of the following:

1. California Code of Regulations (CCR)

a. Title 24, Part 3 – California Electrical Code (CEC)

2. National Electrical Contractors Association (NECA)

a. ANSI/NECA 1, Standard Practices for Good Workmanship in Electrical Construction

b. ANSI/NECA 101, Standard for installing Steel Conduits (Rigid,IMC, EMT)

c. ANSI/NECA 102, Standard for installing Aluminum Rigid Metal Conduit

3. National Electrical Manufacturers Association (NEMA)

a. ANSI/NEMA C80.1 American National Standard for Electrical Rigid Steel Conduit (ERSC)

b. ANSI/NEMA FB-1, Fittings, Cast Metal Boxes and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cables

c. RN 1, Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit

d. TC 2, Polyvinyl-Chloride (PVC) Conduit

e. TC 3, Polyvinyl-Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing

4. Underwriters Laboratories (UL)

a. UL 6 Electrical Rigid Metal Conduit

b. UL 360, Standard for Liquid –Tight Flexible Metal Conduit

c. UL 651, Standard for Schedule 40, 80, Type EB, and a Rigid PVC Conduit and Fittings

1.3 QUALITY ASSURANCE

A. Seismic design requirements for conduit hangers and supports:

1. All raceway systems to be furnished under this Section shall be designed and constructed to meet the seismic requirements of Sections 01 43 11 – Seismic Qualification and Certification and 01 81 02 – Seismic Design Criteria.

B. The Contractor shall demonstrate to the Engineer that the approved manufacturer's recommended installation tools and methods are being utilized on the job site by all persons engaged in the installation of PVC coated rigid steel conduit, elbows, nipples, and fittings. These tools and methods shall include, but not be limited to, clamp inserts for use on power driven units of chain vises, new die heads and enlarged pipe guides in conduit threading machines, and strap wrenches and extra wide wrench jaws for use in conduit assembly.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 01 33 00 – Submittal Procedures, and Section 26 05 00 – Common Work Results for Electrical.

PART 2 - PRODUCTS

2.1 GENERAL

A. Rigid Steel Conduit

1. Hot-dipped galvanized rigid steel conduit, including threaded type couplings, elbows, nipples, and other fittings, shall meet the requirements of ANSI C80.1, UL-6 and the CEC. Do not use setscrew or threadless type couplings, bushings, elbows, nipples, and other fittings, except when approved in writing by the Engineer.

2. Acceptable manufacturers:

    a. Allied Tube and Conduit

    b. Western Tube and Conduit

    c. Or equal as approved by the Engineer

B. PVC Schedule 40 and Schedule 80 Conduits

1. PVC conduit shall be Schedule 40 or Schedule 80 as designated on the drawings, UL listed for concrete encased, underground direct burial, concealed and direct-sunlight-exposed use, and UL listed and marked for use with conductors having 90 degree C insulation. Conduits, couplings, elbows, nipples, and other fittings shall meet the requirements of NEMA TC 2 AND TC 3, Federal Specification W-C-1094, UL, CEC, and ASTM specified tests for the intended use. Use only conduit with a factory formed bell on one end. Conduit that requires the use of couplings for straight runs will not be acceptable.

2. Acceptable manufacturers:

    a. Carlon Plus 40 or Plus 80 Rigid PVC Nonmetallic Conduit

    b. JM Eagle

    c. Or equal as approved by the Engineer

C. PVC-coated rigid steel conduit

1. PVC-coated rigid steel conduit shall be hot-dipped galvanized rigid steel conduit meeting the requirements of NEMA RN 1, ETL PVC-001, UL and the CEC. Conduit shall have a factory installed PVC coating 40 mils nominal thickness, and applied over and permanently bonded to the galvanized surface, with an interior 2 mil urethane coating. All male threads on conduit, elbows, and nipples shall be protected by an application of a urethane coating. Couplings, elbows, nipples and other fittings shall be threaded and galvanized and shall have integral plastic sleeves which overlap the plastic-coated conduit with pressure sealing sleeves. Use PVC coated conduit suitable for conductors with 75 degrees C insulation.

2. Acceptable manufacturers:

a. Robroy Plasti-Bond Red

b. Perma-Cote Industries Supreme Conduit System

c. Or equal as approved by the Engineer

D. Flexible Metal Conduit, Liquid-Tight

1. Flexible metal conduit shall be UL listed, liquid-tight, consisting of galvanized steel flexible conduit covered with an extruded gray PVC jacket and terminated with nylon bushings or bushings with steel or malleable iron body and insulated throat and sealing O-ring.

2. Acceptable manufacturers:

a. Anaconda Sealtite Type UA

b. Electri-Flex Liquatite Type LA

c. Or equal as approved by the Engineer

E. Pulling Tape – pulling conductors into conduits

1. Flat, woven, polyester tape used for installing fiber optic, copper, and coaxial cables in underground conduit. Tape shall have the following characteristics:

a. Lubricated for easy installation and reduced friction

b. Printed with sequential footage markings

c. 2,500 pound tensile strength

2. Acceptable manufacturers:

a. NEPTCO, Polyester MULETAPE, WP Series

b. Or equal as approved by the Engineer

F. Pulling Tape – empty spare conduits

1. Flat, woven, polyester tape with insulated 22 gauge conductor metallic conductor to enable detection of empty, spare conduits. Tape shall have the following characteristics:

a. Lubricated for easy installation and reduced friction.

b. Printed with sequential footage markings.

c. 2,500 pound tensile strengths.

2. Acceptable manufacturers:

    a. NEPTCO, Detectable MULETAPE, DT Series

    b. Or equal as approved by the Engineer

G. Raceway Fittings

1. Fittings for Rigid Steel:

    a. Watertight hubs for rigid steel conduit shall be male thread type zinc-plated malleable iron with recessed "O" ring seal, insulated throat, and locking screw.

        1) Acceptable manufacturers:

            a) OZ Gedney, Type CHM-T

            b) Cooper Crouse-Hinds, Raintight Malleable Iron “MHUB”

            c) Or equal as approved by the Engineer

    b. Provide all malleable iron conduit bodies and covers with captive stainless steel screws and neoprene gaskets.

        1) Acceptable manufacturers:

            a) Appleton, Form 35 Threaded Unilets

            b) Killark, Duraloy 5 Series Malleable Iron

            c) Or equal as approved by the Engineer

    c. Provide EYS and EZS conduit sealing fittings for use in Class I, Division I and Division 2 locations shown on the Drawings. Provide with Chico sealing compound.

        1) Acceptable manufacturers:

            a) Emerson/Appleton

            b) Cooper Crouse-Hinds

            c) Or equal as approved by the Engineer

2. Fittings for Liquid-Tight Flexible Metal Conduit:

    a. Straight, 45 degree angle, or 90 degree angle connectors with malleable iron gland nut, polyethylene compression ring, steel ferrule, malleable

iron conduit assembly with insulated throat, steel lock nut, and copper grounding lug.

1) Acceptable manufacturers:

a) Cooper Crouse-Hinds, Liquidator Series

b) Steel Electric Products

c) Or equal as approved by the Engineer

3. Fittings for PVC-Coated Rigid Steel Conduit:

a. Watertight and corrosion resistant hubs for PVC Coated Rigid Steel conduit shall have a minimum 40 mil PVC exterior coating, a urethane interior coating, and pressure sealing sleeves.

1) Acceptable Manufacturers:

a) Robroy Plasti-Bond Red Type ST Hub

b) Perma-Cote Industries Supreme Type ST Hub

c) Or equal as approved by the Engineer

b. For corrosion resistant conduit bodies for use with PVC Coated Rigid Steel conduit sized as required by the CEC, use cast iron conduit bodies and covers with captive stainless steel screws, a 40 mil minimum PVC exterior coating and nominal 2 mil internal urethane coating, and pressure sealing sleeves on all conduit openings.

1) Acceptable manufacturers:

a) Robroy Plasti-Bond Red Conduit Bodies

b) Perma-Cote Industries Supreme Conduit Bodies

c) Or equal as approved by the Engineer

c. In NEMA 4X areas, provide zinc-plated malleable iron or galvanized steel insulated throat connectors for liquid-tight flexible metal conduit, suitable for use in wet locations, with a minimum 40 mil PVC exterior coating and pressure sealing sleeves.

1) Acceptable manufacturers:

a) Robroy Plasti-Bond Red Liquid Tight Connectors

b) Perma-Cote Industries Supreme Liquidtight Connectors

c) Or equal as approved by the Engineer

H. Expansion/Deflection Couplings

1. Provide expansion/deflection couplings for use where shown on the Drawings and wherever conduit crosses an expansion joint. The couplings shall alleviate longitudinal, angular, and shear conduit stress caused by differential settlement.

2. Acceptable manufacturers:

a. Appleton/O-Z Gedney Type DX

b. Cooper/Crouse-Hinds Type XD

c. Or equal as approved by the Engineer

I. Expansion Couplings

1. Provide expansion couplings for use where shown on the Drawings. The couplings shall allow for expansion and contraction up to a maximum of 8" (4" in either direction) in a run of rigid metal conduit.

2. Acceptable Manufacturers:

a. Appleton/O-Z Gedney Type AX-8

b. Cooper/Crouse-Hinds Type XJG

c. Or equal as approved by the Engineer

J. Supports and Fittings

1. For areas not designated as NEMA 4X on the drawings, supports and fittings for support systems for electrical equipment and raceways shall be channel supports sized to meet seismic requirements. Finish shall be hot-dipped galvanized steel for strut, pipe straps, clamp back spacers, hanger rod, strut nuts, U-bolts, beam clamps, and other supports and fittings.

a. Acceptable manufacturers:

1) Unistrut, B-Line

2) Power Strut

3) Or equal as approved by the Engineer

2. For areas designated as NEMA 4X on the drawings; supports and fittings for support systems for electrical equipment and raceways shall be channel supports sized to meet seismic requirements. Materials of construction shall be

40 mil PVC coated hot-dipped stainless steel, or self-extinguishing fiberglass which meets UL-94V-0 flammability tests, for strut, pipe straps, clamp back spacers, hanger rod, strut nuts, U-bolts, beam clamps, and other supports and fittings.

a. Acceptable Manufacturers:

1) Robroy Plastibond-Red PVC Coated Steel Strut and accessories

2) Fiberglass Strut and accessories

3) Perma-Cote Supreme PVC Coated Steel Channel and accessories

4) Or equal as approved by the Engineer

K. Boxes and Fittings

1. Pressed steel switch and outlet boxes shall be hot-dipped galvanized.

a. Acceptable Manufacturers:

1) Raco Manufacturing Co.

2) OZ Gedney

3) Or equal as approved by the Engineer

2. NEMA 12 terminal boxes, junction boxes, pull boxes, etc., shall be sheet steel unless otherwise shown on the drawings. Boxes shall have continuous welded seams and mounting feet. Welds shall be ground smooth. Boxes shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 14 gauge metal. Covers shall be gasketed with rolled lip and fastened with stainless steel clamps. Condulets shall be Form 7 wedge nut condulets with integral gaskets. Condulet covers that attach to the condulet body via threaded holes in the condulet body are not acceptable. Furnish boxes with continuous hinged doors, terminal mounting straps, and brackets. Terminal blocks shall be NEMA type, not less than 20A, 600V.

a. Acceptable Manufacturers:

1) Hoffman Engineering Co.

2) Lee Products Co.

3) Keystone/Rees, Inc.

4) Or equal as approved by the Engineer

3. For NEMA 4 and NEMA 4X locations, terminal boxes, junction boxes, pull boxes etc., shall be Type 304 stainless steel (NEMA 4 locations) or Type 316L stainless steel (NEMA 4X locations) unless otherwise shown on the drawings. Boxes shall have continuous welded seams and mounting feet. Welds shall be ground smooth. Boxes shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 12 gauge metal. Covers shall be gasketed and fastened with stainless steel clamps. Condulets shall be Form 7 wedge nut condulets with integral gaskets. Condulet covers that attach to the condulet body via threaded holes in the condulet body are not acceptable. Furnish terminal boxes with hinged doors, terminal mounting straps and brackets. Terminal blocks shall be NEMA type, not less than 20A, 600V.

    a. Acceptable Manufacturers:

        1) Hoffman Engineering Co.

        2) Lee Products Co.

        3) Keystone/Rees, Inc.

        4) Or equal as approved by the Engineer

4. All boxes and fittings used with PVC coated conduit shall be furnished with a PVC coating bonded to the metal, the same thickness as used on the coated steel conduit. The ends of couplings and fittings shall have a minimum of one pipe diameter PVC overlap to cover threads and provide a seal.

5. Device boxes shall be malleable iron with zinc electroplate and epoxy powder coat finish, malleable iron covers, and stainless steel screws. Provide the “deep” configuration for all devices boxes.

    a. Acceptable Manufacturers:

        1) Appleton, UNILETS Malleable Iron, Type FD

        2) Steel Electric Products, Type FD

        3) Or equal as approved by the Engineer

6. All terminal boxes, junction boxes, and metallic pull boxes shall have two conduit drain fittings installed in the bottom of the box to permit water to drain from the box continuously. Drain fittings shall be stainless steel, designed for use with 1/2" hubs or 1/2" drilled and tapped conduit openings.

    a. Acceptable manufacturers:

        1) Killark, KDB-1

2) OZ Gedney, DB-50

3) Or equal as approved by the Engineer

L. Conduit Penetration Seals and Sleeves

1. Conduit penetration seals shall be modular, mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the conduit and the opening. The elastomeric element shall be sized and selected per the manufacturer's recommendations and shall be suitable for use in standard service applications (-40 degree F to 250 degrees F).

2. Sleeves shall be the thermoplastic type with water stops, suitable for poured wall construction.

3. Conduit penetration seals and sleeves shall be complete assemblies supplied by a single manufacturer.

4. Acceptable manufacturers:

1) GPT Link-Seal and Plastic Sleeves

2) Calpico Inc. Pipe Linx and Plastic Sleeves

3) Or equal as approved by the Engineer

M. Duct Seal

1. Duct seal shall be a non-hardening compound designed as a waterstop and moisture barrier for sealing the annular space between conduit and electrical conductors and cables.

2. Acceptable manufacturers:

a. O-Z Gedney DUX

b. Thomas & Betts, Type DX

c. Or equal as approved by the Engineer

N. Firestopping

1. Sealant

a. UL certified, one-part, two stage intumescent latex compound that, when exposed to high heat or flame, expands to close off voids left by the burning or melting of combustible materials. The sealant shall be capable of caulking or troweling onto vertical surfaces or overhead.

b. Acceptable Manufacturers

1) Specified Technologies, Inc. SSS Intumescent Firestop Sealant

2) Or equal as approved by the Engineer

2. Mortar

a. UL classified, lightweight, fast drying, Portland cement-based firestop mortar

b. Acceptable Manufacturers

1) Specified Technologies, Inc. SSM Firestop Mortar

2) Or equal as approved by the Engineer

PART 3 - EXECUTION

3.1 GENERAL

A. Check the approximate locations of raceway system components shown on drawings for conflicts with openings, structural members, and components of other systems and equipment having fixed locations. In the event of conflicts, consult the Engineer. Make modifications and changes required.

B. Protection during construction:

1. In addition to the requirements of Division 01, and Section 26 05 00, prior to installation, store all products in a dry location. Following installation, protect products from the effects of moisture, corrosion, and physical damage during construction. Keep openings in conduit and tubing capped with manufactured seals during construction. Cover PVC conduit, elbows, and PVC coated rigid steel conduit, nipples, elbows, and fittings from exposure to sunlight.

C. Material and equipment installation:

1. Follow manufacturer's installation instructions explicitly, unless otherwise indicated. Wherever any conflict arises between manufacturer's installation instructions, codes and regulations, and these contract documents, follow Engineer's decision. Keep copy of manufacturer's installation instructions on the jobsite available for review at all times.

3.2 INSTALLATION

A. Install raceways and boxes in a neat and workmanlike manner as described by ANSI/NECA 1 – Standard Practices for Good Workmanship in Electrical Construction and ANSI/NECA 101 – Installing Steel Conduits (Rigid, IMC, EMT).

B. Use no circular raceway less than 3/4-inch unless otherwise approved by the Engineer.

C. Raceway type for location and installation method unless noted otherwise on the drawings.

1. Exterior, Exposed (higher than 6-inches above grade), all locations except those designated as NEMA 4X or NEMA 6P:

a. Rigid steel conduit

2. Interior, Exposed or Concealed (Not Embedded in Concrete), all locations except those designated as NEMA 4X or NEMA 6P:

a. Rigid steel conduit

3. Embedded within Concrete Walls, Slabs, Ductbank or Floors:

a. PVC Schedule 40

4. Risers from concealed nonmetallic conduit, floor stub-ups, wall, or ceiling penetrations; also, all locations designated NEMA 4X or NEMA 6P:

a. PVC Coated rigid steel conduit

5. Direct buried

a. PVC Schedule 40

D. Location, Routing, and Grouping:

1. Conceal or expose raceways as indicated on the drawings. Group raceways in same area together. Locate raceways at least 12 inches away from parallel runs of heated piping for other utility systems.

2. Run exposed raceways parallel or perpendicular to walls, structural members, or intersections of vertical planes to provide a neat appearance. Follow surface contours as much as possible.

3. Avoid obstruction of passageways. Run concealed raceways with the minimum of bends in the shortest practical distance considering the building construction and other systems.

4. In block walls, do not run raceways in the same horizontal course with reinforcing steel.

5. In outdoor, underground, or wet locations, use watertight couplings and connections in raceways. Install and equip boxes and fittings so as to prevent water from entering the raceway.

6. Paint all threads of galvanized conduits with zinc-rich paint or liquid galvanizing compound before assembling. Touch up after assembly to cover nicks or scars.

7. Do not notch or penetrate structural members for passage of raceways except with prior approval of the Engineer.

8. Do not run raceways horizontally in equipment foundation pads.

9. Separate raceway in slabs not less than three times the largest raceway outside diameter minimum, except at raceway crossings, and then only with the approval of the Engineer.

10. Do not run raceways across walkways.

11. Embed conduits in walls, floors, slabs, or overhead in the middle one-third of the concrete and at least 3-inches from the concrete surface; thicken slabs where necessary to accommodate conduits in a manner as approved by the Engineer.

12. Pull boxes, junction boxes, and/or handholes shall be used in any conduit run where a splice is required. Pull boxes shall be provided every 200 feet of straight run, every 150 feet with 90 degrees of bends, every 100 feet with 180 degrees of bends, and every 50 feet with 270 degrees of bends.

13. Conduits must be kept within the furring lines of building walls and ceilings unless specifically noted to be exposed.

14. Provide all necessary sleeves and chases required where conduits pass through floors or walls; seal all openings and finish to match adjacent surfaces.

15. Where conduit runs change from concrete embedded within floors, slabs, or equipment pads to exposed, maintain a minimum separation of 6-inches between the closest wall, pad, or structure face and the outer edge of the exposed conduit.

E. Special Locations:

1. In exterior light pole foundations; extend PVC schedule 40 conduit 6 inches above the top of the foundation.

2. Where conduit changes from underground direct burial to exposed, extend PVC coated rigid steel conduit minimum 6-inches above finished grade.

3. Where conduit changes from concrete embedded within walls, slabs, and floors to exposed, embed PVC coated rigid steel conduit and factory manufactured elbows from the concrete to exposed, and extend PVC coated rigid steel conduit a minimum of 6-inches beyond the concrete walls, slabs, or floors.

4. Under equipment mounting pads (direct burial), use PVC coated rigid steel conduit.

5. Final Connection to Equipment:

   a. Make final connection to motors, wall or ceiling mounted fans and unit heaters, dry type transformers, valves, local instrumentation, and other equipment where flexible connection is required to facilitate removal or adjustment of equipment with 18-inch minimum, 60-inch maximum lengths unless otherwise approved by the Engineer, of liquid-tight, PVC-jacketed flexible conduit where the required conduit size is 4 inches or less. For larger sizes, use rigid steel conduit as specified.

   b. The flexible conduit shall be long enough to allow the item to which is connected to be withdrawn or moved off its base. Use liquid-tight flexible metal conduit in outside areas, process areas exposed to moisture, and areas required to be oil-tight and dust-tight.

F. Support:

1. Support raceways at intervals not exceeding CEC requirements unless otherwise indicated. Support multiple raceways adjacent to each other by ceiling trapeze. Support individual raceways by wall brackets, strap hangers, or ceiling trapeze, fastened by toggle bolts on hollow masonry units, expansion shields on concrete or brick, and machine screws or welded thread studs on steelwork.

2. Threaded studs driven in by a powder charge and provided with lock washers and nuts may be used in lieu of expansion shields.

3. Support all raceways from structural members only. Do not support from pipe hangers or rods, cable tray, or other conduit.

4. Do not use nails anywhere or wooden plugs inserted in concrete or masonry as a base for raceway or box fastenings. Do not weld raceways or pipe straps to steel structures. Do not use wire in lieu of straps or hangers.

5. Support flexible metal conduit with conduit clamps, except where the flexible metal conduit is fished and where sections less than 4 feet in length are used in concealed areas to supply lighting fixtures in accordance with the CEC.

G. Bends:

1. Make changes in direction of runs with symmetrical bends or cast metal fittings. Make bends and offsets of the longest practical radius. Avoid field made bends and offsets where possible, but where necessary, make with an acceptable hickey or conduit bending machine. Do not heat metal raceways to facilitate bending.

2. Make bends in parallel or banked runs of raceways from the same center or centerline so that bends are parallel and of neat appearance. Factory elbows may be used in parallel or banked raceways if there is a change in the plane of the run and the raceways are of the same size. Otherwise, make field bends in parallel runs.

3. For PVC Schedule 40 conduits, use factory made elbows for all bends 30 degrees or larger. Use acceptable heating methods for forming smaller bends.

4. Make no bends in flexible conduit that exceed allowable bending radius of the cable to be installed or that significantly restricts the conduits flexibility.

H. Threaded Joints:

1. Paint all field cut threads with zinc rich paint or liquid galvanizing compound for rigid steel conduit and for PVC coated rigid steel conduit after removal of chips and cleaning with solvent. Use approved, highly conductive jointing compound on all joints

a. Acceptable Manufacturers:

1) Appleton Type TLC

2) Or equal as approved by the Engineer

I. Bushing and Insulating Sleeves:

1. Where rigid steel conduit, PVC coated rigid steel conduit, or liquid-tight flexible metal conduit enters metal enclosures, install an insulated throat grounding bushing on the end of each conduit. Install a bonding jumper from the bushing to any equipment ground bus or ground pad. Interconnection of bonding jumpers from each conduit grounding bushing to the equipment ground bus or ground pad is acceptable.

2. If neither a ground bus or ground pad exists, connect the bonding jumper to the metallic enclosure with a bolted-lug connection.

3. Make conduit connections to NEMA 3R, NEMA 4, or NEMA 4X enclosures, junction boxes, terminal junction boxes, or device outlet boxes with watertight, corrosion resistant hubs. The conduit connections shall maintain the integrity of the enclosure NEMA rating.

J. Expansion Joints:

1. Provide expansion/deflection fittings for raceways crossing expansion joints in structures, between structures and walkways or concrete slabs to compensate for expansion, contraction, and deflection. Provide expansion only fittings in every 200 feet of exposed, straight, rigid steel conduit runs.

K. PVC Coated Rigid Steel Conduit:

1. Install in strict accordance with the manufacturer's instructions. Touch up any damage to the coating with conduit manufacturer acceptable patching compound. PVC boot shall cover all threads. Where belled conduits are used, bevel the unbelled end of the joint before joining. Leave no metallic threads uncovered. Clean field threads with solvent and coat with urethane touch-up. Keep two cans of urethane touch-up at each threading station.

L. Penetrations:

1. Seal the interior of all raceways entering structures or buildings at the first box or outlet with duct seal to prevent the entrance into or exit from the structure of gases, liquids, or rodents.

2. Where conduit enters a new structure above ground or below grade through a concrete roof or wall, install a watertight conduit penetration seal and sleeve. Install the sealing assembly such that it may be tightened at any time from the interior side. For wall and roof penetrations, dry pack with non-shrink grout around the conduit and the sealing assembly on the exterior side. Where conduit enters a new structure below grade through a concrete floor, cast the conduit directly into the concrete floor slab.

3. Where conduit enters an existing structure above ground or below grade through a concrete roof or wall, core drill through the existing roof or wall and install a watertight conduit penetration seal. Install the sealing assembly such that it may be tightened at any time from the interior side. Dry pack with non-shrink grout around the conduit and the sealing assembly on the exterior side.

4. Where raceways penetrate fire-rated walls, floors, or ceilings, provide firestop material specified herein in openings around electrical penetrations to maintain the fire-resistance rating.

5. All connections between conduits and NEMA 1, 1A, and 12 enclosures shall be made with hubs outside and bushings on the inside. All NEMA 3R, 4, and 4X enclosures without integral watertight hubs shall have watertight, threaded, rigid, conduit hubs.

M. Wireways

1. Mount wireways securely in accordance with the CEC and manufacturer's instructions. Locate removable cover on accessible vertical face of wireway unless otherwise indicated.

N. Preparation for Pulling in Conductors

1. Do not install crushed or deformed raceways. Avoid traps in raceways. Take care to prevent the lodging of plaster, concrete, dirt, or trash in raceways, boxes, fittings, and equipment during the course of construction. Make

raceways entirely free of obstructions or replace them. Ream all raceways, remove burrs, and clean raceway interior before introducing conductors or pull tape.

2. For underground concrete-encased and direct-buried raceways, prove the integrity of the raceway system as specified in Section 26 05 43 before pulling in conductors.

3. Immediately after installation, plug or cap all raceway ends with watertight and dust-tight seals until the time for pulling in conductors.

O. Empty Raceways

1. Certain raceways will have no conductors pulled in as part of this Contract. Identify with conduit tags at each end and at any intermediate pull point of each such empty raceway. Provide a removable cap over each end of empty raceways. Provide a detectable pull tape with a minimum of 3-feet of slack at each end in each empty raceway. Provide cap with eyelet for attaching the pull tape.

2. Strip insulation from the jacket of the detectable pull tape wire and attach to the ground rod in each manhole or pullbox, to the frame of metallic pullboxes, to switchgear ground busses, to switchboard ground busses, and to control panel ground busses.

END OF SECTION

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. All electrical equipment and systems shall include identification tags or nameplates as shown on the Contract Drawings and as specified herein.

2. The Supplier shall develop a tagging system in accordance with the information shown on the Contract Drawings and the procedure specified in this Section.

B. Related Sections:

1. Section 01 33 00 – Submittal Procedures

1.2 SUBMITTALS

A. Submittals shall be made in accordance with Section 01 33 00 – Submittal Procedures.

A. In addition to the requirements of Section 01 33 00:

1. A tagging system scheme or schedule shall be submitted to the Engineer for review and approval prior to tagging of equipment.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Wire labels for #1 AWG and smaller

1. Wire labels relying on adhesives or taped-on markers are not acceptable.

2. Individual wires #1 AWG and smaller in each cable or wire bundle shall be identified with legible permanent sleeve of white heat-shrink polyolefin with machine printed weatherproof black marking.

3. Meet UL Standard 224 for flammability

4. Provide necessary tools and accessories to print labels and shrink labels.

5. Acceptable Manufacturers:

   a. Brady Model B-342 Brady PermaSleeve 1.5” width one-sided thermal transfer labels

   b. Panduit

   c. Or equal as approved by the Engineer

B. Wire labels for #1/0 and larger sizes and cable identification tags

1. Cable tags shall be of the reusable labeling type so that changing of the labels can occur without removing the tag from the conduit. Construct the label holder so that the labels can slide on and off when they need to be changed or replaced. The tags shall be suitable for industrial use.

2. Tag holders shall be PVC for horizontal orientation sized to hold the alphanumeric conduit tag designations specified in the cable schedule on the drawings.

3. Tags shall be black letters on yellow background.

4. Attach the cable tag holder to the cable or wire bundle using UV protected, self-locking black nylon cable ties.

5. Acceptable Manufacturers:

   a. Almetek ID Marking Systems, Mini Tags

   b. Tyco Electronics, K-Type cable Markers

   c. Or equal as approved by the Engineer

C. Equipment Nameplates

1. Reference Contract Drawings for nameplate letter and background color requirements.

PART 3 -

3.1 GENERAL EXECUTION

A. Conductor Identification:

1. Identify conductors at each termination and in all accessible locations such as control panels, panelboards, wireways, junction terminal boxes, switchboards,

etc. A typical circuit will have the following identification: conduit tag, overall cable tag, and individual wire labels.

B. Legend Plates and Nameplates

1. Install nameplates on devices or equipment as specified in Contract Drawings.

2. Provide legend plate engraving for pilot devices as shown on the Contract Drawings; if not shown, Supplier shall submit a schedule showing proposed legend plate text for the Engineer's approval.

3.2 TAGGING OF WIRES AND CABLES

A. All wires and cables shall be tagged and laced in wireways, and at each termination. Each wire and cable shall be tagged at least once as it passes through each junction box, and at each termination. Each wire and cable shall be tagged at least once as it passes through wireways. Wires and cables shall be laced so that the wires of the individual circuits are laced together by circuit and the laced together circuit or cable shall be tagged with the cable number. Power, lighting, control, alarm, annunciator, and instrumentation wiring shall be bundled, laced, and tagged, as specified herein.

B. All wires and cables within control panels, switchboards mechanical mounting panels, terminal junction boxes, etc., shall be tagged at each termination with conductor tags as specified. All circuit identification tags shall be readily accessible for inspection at the locations cited above.

C. Label wires with cable numbers as shown on the Contract Drawings. Cable labels shall be placed within one inch of the ends of the cable jacket.

B. All spare pairs shall be bundled and labeled with the cable designation. All individual pairs shall be tagged to enable identification of spare pairs when making future terminations.

D. Identify multi-circuit control cables and individual instrumentation and control circuits as indicated on the Contract Drawings. Multi-circuit cable shall be tagged with the cable name around the entire cable assembly and shall have the individual circuits tagged as well. Tag twisted, shielded pairs and where exposed, multipair cable twisted pairs around each pair separately.

A. Identify each individual conductor at each termination. This includes such locations as switchboards, control panels, junction/terminal boxes, and junction boxes, and all other locations where conductors are terminated. Identify the termination of these conductors in accordance with the accepted shop drawings. Tag conductors with sleeve type labels.

B. Where more than 1 nominal voltage system exists, identify each ungrounded system conductor by phase and system. Permanently post means of identification at each

branch-circuit panelboard, switchboard, or other type of power distribution equipment.

C. Include the following minimum information for wire and cable identification:

1. Circuit number or load identification tag number

2. Origin (from source)

3. Destination (to load)

D. Wire Numbers:

1. The Supplier shall coordinate the wire numbering system with all vendors of equipment so that each and every field wire has a unique wire number associated with it for the entire system.

END OF SECTION

SECTION 26 08 00

COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Section includes:

1. Perform field tests as herein specified by a certified, independent Testing Firm as specified herein.

2. The Testing Firm shall provide all material, equipment, labor and technical supervision to perform such tests.

3. It is the intent of these tests to assure that all district-furnished and Contractor supplied electrical equipment are operational and within industry and manufactures tolerances and is installed in accordance with manufacturer's design and specifications.

4. The Testing Firm shall maintain a written record of the tests and upon completion of project, assemble and certify a final test report for review by the Engineer.

5. All testing specified in this Section with the exception of the thermographic survey shall be completed during the period defined as "functional testing" in Section 01 75 17. See Section 01 75 17 for additional details regarding the sequencing testing.

6. Refer to Section 16 70 00 for PLC programming requirements by control panel CPNL-01 and PLC Equipment Supplier.

7. Refer to Contract Drawing 100-Z-011.3 for additional generator testing requirements for operation of the new emergency generator EGEN-01 and ATS-01 in conjunction with EGEN-02 and ATS-02.

8. The Testing Firm shall perform a Functional Matrix Test to verify the integrated operation of the Switchboard (SWBD-01), the Automatic Transfer Switch (ATS-01), and the Generator (EGEN-01), ensuring the system responds correctly to a simulated utility power failure.

B. Related sections

1. Section 01 11 00 – Summary of Work

2. Section 01 14 00 – Work Restrictions

3. Section 01 31 19 – Project Meetings

4. Section 01 75 17 – Field Testing and Startup

5. Section 16 70 00 - Control Panels

6. Section 16 80 00 - Programmable Logic Controllers and Associated Equipment

7. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables

8. Section 26 05 26 – Grounding and Bonding for Electrical Systems

9. Section 26 22 13 – Low Voltage Distribution Transformers

10. Section 26 24 13 – Switchboards

11. Section 26 24 16 – Panelboards

12. Section 26 28 16 – Circuit Breakers

13. Section 26 32 13.13 – Diesel Engine Drien Generator Sets

14. Section 26 36 23 – Automatic Transfer Switches

1.2 QUALITY ASSURANCE

A. Electrical Safety

1. On-Site personnel shall meet all project safety requirements specified in Section 01 35 24 – Project Safety Requirements.

2. All personnel working on the installation, commissioning, and operation of the equipment specified in this Section shall have documented and current training for all work tasks specified in this Section as required by the latest edition of NFPA 70E, Article 110.2.

B. Experience:

1. The Testing Firm shall be a corporately independent testing organization which can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment or systems evaluated by the Testing Firm.

2. The Testing Firm shall be regularly engaged in the testing of electrical equipment devices, installations, and systems.

3. The Testing Firm shall have been engaged in such practices for a minimum of five years.

4. The Testing Firm shall meet federal OSHA criteria for accreditation of testing laboratories, Title 29, Parts 1907, 1910, and 1936. Full membership in the International Electrical Testing Association constitutes proof of such criteria.

5. The lead, on-site technical person shall be currently certified by the International Electrical Testing Association (NETA) in Electrical Power Distribution System Testing. Submit copy of qualifications and certifications for review by the Engineer.

6. Testing firm shall utilize only full-time technicians who are regularly employed by the firm for testing services. Electrically unskilled employees are not permitted to perform testing or assistance of any kind. Electricians or linemen may assist, but may not perform testing or inspection services.

7. The Testing Firm shall submit proof of the above qualifications with bid documents when requested.

8. The Testing Firm shall be an independent organization as defined by OSHA Title 29, Part 1936, and the International Electrical Testing Association.

9. All instruments used by the Testing Firm to evaluate electrical performance shall meet NETA's Specifications for Calibration of Test Instruments.

10. The Testing Firm shall be

    a. Associated Power Solutions (APS)

    b. Pacific Power Testing, Inc.

    c. Apparatus Testing and Engineering, Inc.

    d. Or equal as approved by the Engineer.

1.3 SUBMITTALS

A. The Contractor shall furnish submittals for approval as outlined below:

1. Provide electrical safety submittals that are specific to the work in this Section in accordance with Section 01 35 24, including:

    a. Task-specific job briefing and planning checklist for the specific work to be performed

    b. Hazardous energy control plan, including task-specific procedural steps for the specific work to be performed, in accordance with the Contractor’s and Testing Firm’s lockout/tagout (LOTO) program

2. Submit prior to field testing:

    a. Comprehensive equipment list of equipment to be tested. The equipment list shall be provided as a Microsoft Excel spreadsheet as follows:

1) Provide a spreadsheet row for each individual piece of equipment requiring testing

2) Provide spreadsheet columns for the following:

a) Equipment number

b) Equipment description

c) Testing Firm's test form designation and numbering

d) Test instrument used and date instrument was last calibrated

e) Paragraph number of the NETA test procedure used, referencing the latest version of the standard

f) Optional, modified or additional tests specified in this Section (e.g., inspect bolted connections by calibrated torque-wrench, primary injection current testing, etc.)

g) Any additional notes

b. Field acceptance test forms, customized as required for the specific testing to be performed on this project for all Phases.

3. Submit upon completion of field testing:

a. Phase 1 testing submittal with the results of all pre-energization acceptance testing

b. Phase 2 testing submittal with the results of all post-energization acceptance testing

c. Phase 3 testing submittal with the results of the thermographic survey to be completed during the Startup Test, or when otherwise specified in the technical specifications

1.4 REFERENCES

A. National Fire Protection Association (NFPA)

1. Latest edition of NFPA 70E, Standard for Electrical Safety in the Workplace

B. International Electrical Testing Association (NETA)

1. Latest edition of ANSI/NETA ATS – ANSI/NETA Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems.

1.5 SCHEDULING

A. The Contractor shall notify the Testing Firm when equipment becomes available for field functional testing. Coordinate Work with other systems. All electrical testing work specified in this Section shall be listed on the three-week look-ahead schedule as described in Section 01 31 19 – Project Meetings.

B. The District will inform the Contractor when facility operation is sufficient to permit thermographic testing at the equipment.

C. The District's Commissioning Services Group (CSG) will witness all commissioning testing. The CSG requires a minimum of one-week advance notice via the three-week look-ahead schedule specified in Section 01 31 19. The contractor and equipment manufacturers shall schedule their work accordingly.

1.6 SYSTEM DESCRIPTION

A. Performance requirements.

1. Testing and calculations required under this Section shall be per the guidelines specified in the most recent International Electrical Testing Association (NETA) publication "Acceptance Testing Specification (ATS) for Electric Power Distribution Equipment and Systems."

2. In general, the standard test procedure referenced in ANSI/NETA ATS for each individual item of equipment shall be followed for all testing specified in this Section with the following modifications:

a. If the NETA ATS procedure provides several methods to perform a test (e.g., inspecting bolted connections for high resistance), then the individual Article in this Section clarifies which method shall be used.

b. In the NETA ATS acceptance testing specifications, some test procedures are marked as "Optional" (marked with an asterisk *). If an "Optional" test procedure is required for the equipment on the project, then the individual Article in this Section will specify this. Otherwise, the "Optional" test procedure is not required.

c. If the project work requires modifications to the standard NETA ATS test procedures or if additional testing not specified in NETA ATS is required, then the individual Article in this Section will specify this.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall fully complete the equipment installation, including cable pulling before the Testing Firm begins work. It is not acceptable to commence testing on partially completed equipment systems. After cable testing, the Contractor should promptly terminate cables per interconnect drawings so that Testing Firm can complete circuit related tests.

B. Perform general equipment inspection and checking procedures recommended by the manufacturer and as specified in other Sections of these specifications prior to and in addition to tests performed by the Testing Firm specified herein.

1. Once field installation for an item requiring testing per this Section is complete, and prior to commencement of Phase 1 Testing, the Contractor shall provide the District a written Notice of Readiness for Phase I Testing and request a pre-testing inspection by the District. Testing shall not proceed until the District has completed the pre-testing inspection and any items identified during the inspection as requiring correction have been addressed.

C. Supply a suitable and stable source of electrical power to each test site. The Testing Firm shall specify the specific power requirements.

D. Any system, material, or workmanship which is found defective on the basis of acceptance tests shall be reported, corrected and retested all at no additional cost to the District.

E. The District will provide protective device settings once testing has been scheduled on the three-week look-ahead schedule as described in Section 01 31 19 – Project Meetings.

F. The District will provide arc flash labels to the Contractor one week prior to “Ready for Integration Programming” and Contractor shall install labels as directed by the Engineer prior to the “Ready for Integration Programming” date as described under Section 01 11 00.

3.2 FIELD QUALITY CONTROL

A. Site Testing

1. Testing and commissioning shall be performed in accordance with the latest revision of NETA Standard ATS “Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

2. Perform testing in three separate phases. Submit a typed report after each testing phase is completed. Submit the report to the Engineer for review,

comment and record purposes. All reports submitted by the Testing Firm shall meet NETA's Specifications for Test Reports.

3. The report shall include a data sheet for each component (i.e. cable, circuit breaker, transformer, relay, etc.) tested. Include in each data sheet the weather conditions at the time of the test (i.e. temperature, humidity, sunny, rain, etc.) the tester's observation and findings, discrepancies, any remedial work performed or act to resolve problems, technical parameters obtained during the tests, as left settings of all devices, and a statement indicating the equipment is ready to be energized. The report shall contain a statement indicating the equipment was tested in accordance with the procedures outlines in the latest editions of The International Testing Association Acceptance Testing Specifications. For microprocessor-based protective relays, provide a Flash Drive which includes the event file for each functional test where an element operation resulted in a "trip" output.

B. Phase 1 – Testing requirements to be performed before the equipment is energized and after successful completion of the Pre-Testing Inspection as set forth in Paragraph 3.1.B.1.

1. Inspect and mechanically operate all circuit breakers, power disconnect switches, transfer switches, and circuit breakers/disconnect switches supplied within district-furnished equipment under other divisions of these specifications.

2. Verify that ground sensing devices, fuses, interrupter switches, transfer switches, and transformers are in accordance with the approved shop drawings and the District-provided protective device settings.

3. Test all low voltage (less than 600V) power system cables as specified under Section 26 05 19 Low Voltage Electrical Power Conductors and Cables.

4. Verify that all power and control power fuses installed are in accordance with the manufacturer's approved shop drawings, the District-provided protective device settings, and the CEC. Replace fuses found to be of the incorrect rating.

5. Check all instrument wiring and verify grounding is in accordance with the manufacturer's recommendations.

6. Verify all lightning and surge arrestors, service entrance equipment, power distribution equipment, motors, control centers, utilization equipment, etc., are properly grounded.

7. Verify the resistance to ground of all power distribution equipment is 5 ohms or less.

8. Verify all terminations at the transformers, service entrance and distribution switchboards, and panelboards are correctly made and properly torqued.

9. Perform point-to-point tests to determine the resistance between the main grounding system and all major electrical equipment frames, system neutral, and/or derived neutral points. Verify the resistance is 0.5 ohms or less.

10. Refer to the individual equipment and material specification sections for additional testing requirements.

11. Verify all circuit breaker ratings and settings are as required by the Contract Documents or as amended during shop drawing review. Advise the Engineer of discrepancies and make changes as directed by the Engineer.

12. Verify proper operation of automatic transfer switches (ATS-01 and ATS-02), and accessories devices.

13. Testing of the new standby engine generator EGEN-01 and existing standby engine generator EGEN-02. Refer to Contract Drawing 100-Z-011.3 for additional generator testing requirements.

14. Verify grounding of instrumentation equipment and line surge protection equipment.

15. Provide test report as specified above. Report shall be reviewed and approved by the Engineer prior to approval for utility service per Section 01 14 00 – Work Restrictions.

C. Phase 2 – After the electrical distribution equipment has been energized perform the following tests:

1. Verify phase rotation at the service entrance and distribution switchboard, and panelboards.

2. Adjust the taps on the transformers to produce a nominal voltage at the secondary terminals of the transformers.

3. Verify control circuits and functionality of the controls for all motors, automatic transfer systems, remote protective device (i.e. wiring for differential protection relays, remote breaker open/close operator; remote breaker racking operator; alarms systems; safety interlocks; emergency stop controls; and transformer and generator protective devices). The functionality shall be in accordance with the approved control schematics, wiring diagrams or functional descriptions.

4. Submit a typed report as specified above.

D. Phase 3 – Thermographic Survey

1. A thermographic survey shall be performed on all current-carrying devices specified this section.

2. Perform all standard visual and mechanical inspections listed in NETA ATS, paragraph 9 for Thermographic Surveys.

    a. Perform thermographic survey when at least 25 percent load is applied to the system.

    b. Use equipment IR ports to perform the inspection where installed.

3. Perform the thermographic survey as directed by the Engineer prior to or during the Operational Startup Testing period referenced in Section 01 75 17.

3.3 INSTRUMENT TRANSFORMERS

A. Instrument Transformers specified in Section 26 24 13 – Low Voltage Switchboards shall be field inspected and tested as follows:

1. Perform all standard visual and mechanical inspections listed in NETA ATS, paragraph 7.10 for Instrument Transformers.

    a. Inspect bolted electrical connections for high resistance by verifying the tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.

2. Perform all standard electrical tests listed in NETA ATS, Paragraph 7.10.2.1 for Current Transformers.

3. Perform the following optional electrical tests listed in NETA ATS, Paragraph 7.10.2.1 for Current Transformers:

    a. Measure current circuit burdens at transformer terminals.

4. Perform all standard electrical tests listed in NETA ATS, Paragraph 7.10.2.2 for Voltage Transformers.

5. Perform the following optional electrical tests listed in NETA ATS, Paragraph 7.10.2.2 for Voltage Transformers:

    a. Measure voltage circuit burdens at transformer terminals.

    b. Perform a dielectric withstand test on the primary windings with the secondary windings connected to ground. The dielectric voltage shall be in accordance with NETA ATS table 100.9. The test voltage shall be applied for one minute.

6. Perform all standard electrical tests listed in NETA ATS, Paragraph 7.10.2.3 for Coupling-Capacitor Voltage Transformers.

3.4 SWITCHBOARD ASSEMBLIES

A. Switchgear and Switchboard Assemblies specified in Section 26 24 13 – Low Voltage Switchboards shall be field inspected and tested as follows:

1. Perform all standard visual and mechanical inspections listed in NETA ATS, Paragraph 7.1 for Switchgear and Switchboard Assemblies.

    a. Inspect bolted electrical connections for high resistance by verifying the tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.

2. Perform all standard electrical tests listed in NETA ATS, Paragraph 7.1 for Switchgear and Switchboard Assemblies.

    a. An overpotential test on each bus section is not required.

3. Perform the following optional electrical tests listed in NETA ATS, Paragraph 7.1 for Switchgear and Switchboard Assemblies:

    a. Perform current injection test on the entire current circuit in each section of the switchgear.

        1) Perform current tests by primary injection with magnitudes such that a minimum of 1.0 ampere flows in the secondary circuit. Verify correct magnitude of the current at each device in the circuit.

        2) Perform current tests on each phase by primary injection on all bus differential circuits to ensure no trip operation during through fault conditions. Verify current transformer wiring and polarity.

B. Instrument Transformers specified in Sections 26 24 13 shall be field inspected and tested as follows:

1. Perform all standard visual and mechanical inspections listed in NETA ATS, Paragraph 7.10 for Instrument Transformers.

    a. Inspect bolted electrical connections for high resistance by verifying the tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.

2. Perform all standard electrical tests listed in NETA ATS, Paragraph 7.10.2.1 for Current Transformers.

3. Perform the following optional electrical tests listed in NETA ATS, Paragraph 7.10.2.1 for Current Transformers:

    a. Measure current circuit burdens at transformer terminals.

4. Perform all standard electrical tests listed in NETA ATS, Paragraph 7.10.2.2 for Voltage Transformers.

5. Perform the following optional electrical tests listed in NETA ATS, Paragraph 7.10.2.2 for Voltage Transformers:

    a. Measure voltage circuit burdens at transformer terminals.

3.5 GROUNDING SYSTEMS

A. Grounding Systems specified in Section 26 05 26 – Grounding and Bonding for Electrical System shall be field inspected and tested as follows:

1. Perform all standard visual and mechanical inspections and electrical tests listed in NETA ATS, paragraph 7.13 for Grounding Systems:

    a. For the fall of potential test, the outer current probe spacing shall be the maximum length obtainable within the property line boundaries of the site. Take measurements at 5% intervals.

    b. For the point-to-point test at the facility, determine the resistance between the main grounding system and all equipment connected to ground test station. The reference point for all measurements shall be the ground test station, with the other measurement end at the equipment.

3.6 LOW VOLTAGE CABLE

A. Low Voltage Cable specified in Sections 26 05 19 – Low Voltage Electrical Power Conductors shall be field inspected and tested as follows:

1. Perform all standard visual and mechanical inspections and electrical tests listed in NETA ATS, paragraph 7.3.2 for Low Voltage Cables:

    a. Inspect bolted electrical connections for high resistance by verifying the tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.

    b. Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for $\geq$600 volt rated cable. Test duration shall be one minute.

2. Perform the following additional electrical tests on shielded control cable:

    a. Inspect shield grounding, cable support, and termination.

    b. Perform a shield-continuity test on each cable by ohmmeter method.

3.7 AUTOMATIC TRANSFER SWITCHES

A. Automatic Transfer Switches specified in Section 26 36 23 shall be field inspected and tested as follows:

1. Perform all standard visual and mechanical inspections and electrical tests listed in NETA ATS, Paragraph 7.22.3 for Automatic Transfer Switches.

a. Inspect bolted electrical connections for high resistance by verifying the tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.

3.8 CIRCUIT BREAKERS

A. Circuit Breakers specified in Sections 26 28 16 – Circuit Breakers shall be field inspected and tested as follows:

1. Perform all standard visual and mechanical inspections and electrical tests in accordance with NETA ATS, Section 7.6 for low voltage circuit breakers.

a. Inspect bolted electrical connections for high resistance by verifying the tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.

3.9 LOW VOLTAGE DRY TYPE TRANSFORMERS

A. Low Voltage Dry Type Transformers specified in Section 26 22 13 shall be field inspected and tested as follows:

1. Perform all standard visual and mechanical inspections and electrical tests listed in NETA ATS, Paragraph 7.2.1.1 for Low-Voltage Dry-Type Small Transformers.

a. Inspect bolted electrical connections for high resistance by verifying the tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.

2. Perform the following optional electrical test listed in NETA ATS, Paragraph 7.2.1.1 for Low-Voltage Dry-Type Transformers:

a. Perform turns ratio test at the nominal tap.

3.10 LOW VOLTAGE CIRCUIT BREAKERS, AIR, INSULATED-CASE/MOLDED-CASE

A. All Low Voltage Circuit Breakers equal to or greater than 100 amperes shall be field inspected and tested as follows:

1. Perform all standard visual and mechanical inspections and electrical tests listed in NETA ATS, paragraph 7.6.1.1 for Low-Voltage Air, Insulated/Molded Case Circuit Breakers.

    a. Inspect bolted electrical connections for high resistance by verifying the tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.

2. Perform the following optional electrical test listed in NETA ATS, paragraph 7.6.1.1 for Low-Voltage Air, Insulated/Molded Case Circuit Breakers:

    a. Perform insulation-resistance test all control wiring with respect to ground. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute. Perform surge comparison tests. For units with solid-state components, follow manufacturer's recommendations.

    b. For high instantaneous settings, an acceptable alternative to testing the District-provided instantaneous setting via primary current injection is to test via secondary current injection in addition to primary current injection at District-approved reduced setting.

3.11 ELECTRICAL POWER MONITORING AND CONTROL

A. Electrical power monitoring and control equipment specified in Sections 26 24 13 – Switchboards shall be field inspected and tested as follows:

1. Perform all standard visual and mechanical inspections listed in NETA ATS, Paragraph 7.11 for Metering Devices.

    a. Tighten case connections. Inspect cover for correct gasket seal. Clean cover glass. Inspect shorting hardware, connection paddles, and/or knife switches. Remove any foreign material from the case.

2. Provide the following electrical tests:

    a. Calibrate meters in accordance with manufacturer's published data.

    b. Verify the accuracy of meters at 0 percent, 50 percent, and 100 percent of scale values.

    c. Verify all instrument multipliers.

    d. Verify all inputs, outputs, internal logic, and timing elements used in protection, metering, and control functions.

    e. Verify the operation of the communications interface locally by direct connection to the meter and remotely by modem or computer network.

f. After the equipment is initially energized, measure magnitude and phase angle of all inputs and compare to expected values.

3.12 DIESEL ENGINE DRIVEN GENERATOR SETS

A. Diesel engine driven generator sets specified in Section 26 32 13.13 shall be field inspected and tested as follows:

1. Perform all standard visual and mechanical inspections listed in NETA ATS, Paragraph 7.15.1 for AC Generators.

2. Perform all standard electrical tests listed in NETA ATS, Paragraph 7.15.1.2.2 for AC Synchronous Generators.

3. Perform the following optional electrical tests listed in NETA ATS, Paragraph 7.15.1.2.2 for AC Synchronous Generators:

a. Perform surge comparison tests.

4. Provide the following additional field tests:

a. Verify operation of the generator jacket water heaters.

b. Functionally test engine shutdown for low oil pressure, overtemperature, overspeed, and other protection features as applicable.

c. Verify correct functioning of governors and regulators.

d. Each protective device, control circuit and monitoring device shall be operated to demonstrate its proper operation.

e. Functionally test the operation on the radiator mounted load banks and controls.

f. For each generator, perform a load test:

1) A load shall be applied for a 2-hour, full-load test. The load shall be supplied by a load bank of sufficient size to provide a load equal to 100 percent of the nameplate kW rating of the generator.

2) Voltage dips shall be measured and recorded to demonstrate conformity to the specifications.

3) A unity power factor shall be permitted for on-site testing, provided that rated load tests at the rated power factor have been performed by the manufacturer of the generator prior to shipment.

4) The voltage, frequency, load current, kilowatts, power factor, and speed shall be recorded at 15 minute intervals.

5) The prime mover oil pressure and water temperature shall be recorded at 15 minute intervals.

6) Verify that the generator status contact output signals (generator in auto, generator running) are functional by measuring electrical continuity across each dry contact or at the receiving end of the signal control wiring if installed at the time of testing.

g. For each diesel engine driven generator set, conduct performance tests in accordance with NFPA 110, Paragraph 7.13 – Installation Acceptance.

h. Vibration Performance Test:

1) Perform vibration baseline tests at no load. Measure filtered vibration spectra for peak velocity and peak to peak displacement versus frequency in three perpendicular planes at each bearing housing; one plane of measurement to be parallel to the axis of rotation of the component. Record actual rotational speeds for each vibration spectra measured. Vibration levels shall not exceed those values listed in NEMA MG1, part 7, as follows: peak-to-peak displacement: 0.0025"; peak velocity: 0.15 in/sec; peak acceleration: 1.0g.

i. Noise Performance Test:

1) Measure filtered A-weighted overall sound pressure level in dBA for each of 8 octave band mid-points beginning at 63 hertz. Measure in each direction (N, S, E, and W) measured at 1 meter and 7 meters (23 feet) horizontally from the surface of the equipment at 5-feet above finished grade.

B. Distribution circuit breakers specified in Section 26 32 13.13 shall be field inspected and tested as follows:

1. Perform all standard visual and mechanical inspections and electrical tests listed in NETA ATS, Paragraph 7.6.1.1 for molded case circuit breakers.

a. Inspect bolted electrical connections for high resistance by verifying the tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.

3.13 CONTROL PANEL

A. Construction Contractor shall provide support for District Equipment Supplier during all field testing and commissioning efforts. See Section 16 70 00 – Control Panels and Section 16 80 00 – Programmable Logic Controllers for additional requirements related to Control Panel testing and commissioning.

3.14 AREA LIGHTING

A. Area and roadway lighting fixtures, lamps, and ballasts as shown in the Contract Drawings shall be field tested as follows:

1. Field Functional Tests:

a. Test all area and roadway lighting fixtures, lamps, and ballasts for proper operation and conformity to these specifications and as shown on the Contract Drawings.

b. Take illuminance field measurements of all area and roadway light fixture installations in accordance with the Illuminating Engineering Society of North America Lighting Handbook. Measure light output in footcandles using a color and cosine corrected digital light meter with calibration certificate traceable to the National Institute of Standards and Technology. Document all field measurements and submit to the Engineer for review and approval.

3.15 PG&E PRE-ENERGIZATION PROCEDURES

A. Contractor shall coordinate with the PG&E Project Manager regarding all pre-energization testing requirements. Testing shall be performed in accordance with PG&E's documented procedures and instructions and as discussed in the pre-construction meeting.

END OF SECTION

SECTION 26 22 13

LOW-VOLTAGE DISTRIBUTION TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Equipment Supplier shall furnish low-voltage transformer as an integrated component of the switchboard SWBD-01 lineup as specified herein and in other Sections as noted.

2. The low-voltage transformer identification to be provided is as follows:

a. XFMR-01

B. Related sections

1. Section 00 72 00 – General Conditions

2. Section 01 14 00 – Work Restrictions

3. Section 01 43 11 – Seismic Qualification and Certification

4. Section 01 75 17 – Field Testing and Startup

5. Section 01 81 02 – Seismic Design Criteria

6. Section 26 05 00 – Common Work Results for Electrical

7. Section 26 05 53 – Identification for Electrical Systems

8. Section 26 24 13 - Switchboards

9. Section 26 08 00 – Commissioning of Electrical Systems

1.2 REFERENCES

A. Low-voltage distribution transformers shall be designed, built, tested, and installed in accordance with the latest editions and revisions of the following:

1. California Code of Regulations (CCR)

a. Title 24, Part 3 – California Electrical Code (CEC)

2. Code of Federal Regulations (CFR)

a. Title 10, Chapter II, Subchapter D, Part 431, Subpart K – Distribution Transformers

3. Institute of Electrical and Electronics Engineers (IEEE)

a. ANSI/IEEE Std 693, IEEE Recommended Practice for Seismic Design of Substations

b. IEEE C57.12.01, General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid Cast and/or Resin-Encapsulated Windings

c. IEEE C57.12.91, Test Code for Dry-Type Distribution and Power Transformers

d. ANSI/IEEE C57.96, Distribution and Power Transformers, Guide for Loading Dry-Type appendix to ANSI C57.12 standards

4. National Electrical Contractors Association (NECA)

a. ANSI/NECA 409 – Standard for Installing and Maintaining Dry-Type Transformers

5. National Electrical Manufacturers Association (NEMA)

a. ST-20 – Dry Type Transformers for General Applications

b. TP-1 – Guide for Determining Energy Efficiency for Distribution Transformers

c. TP-2 – Standard Test Methods for Measuring the Energy Consumption of Distribution Transformers

6. National Fire Protection Association (NFPA)

a. ANSI/NFPA 70 – National Electrical Code (NEC)

b. NFPA 70E – Standard for Electrical Safety in the Workplace

7. Underwriters Laboratories (UL)

a. UL 506 – Specialty Transformers

1.3 QUALITY ASSURANCE

A. Electrical safety

1. On-site personnel shall meet all project safety requirements specified in Document Section 01 35 24 – Project Safety Requirements

2. All personnel working on the installation and operation of the equipment specified in this Section shall have documented and current training for all work tasks specified in this Section as required by NFPA 70E, Article 110.4 (latest edition)

PART 2 - PRODUCTS

2.1 FURNISHED EQUIPMENT

1. Refer to Section 26 50 00 for district-furnished equipment.

PART 3 - EXECUTION

3.1 PRE-ENERGIZATION CHECKOUT

A. All Phase 1 pre-energization commissioning specified in Section 26 08 00 – Commissioning of Electrical Systems shall be complete and the testing submittal approved by the District prior to energization.

B. Conduct a complete inspection of the transformer, including checking all accessible connections for tightness and correct torque, checking supports for damage, verifying that all shipping and packing material has been removed, and that all wiring is correct.

C. Check that all raceways and conductors are identified and tagged in accordance with the Contract Drawings and the Contractor's approved interconnection diagrams. Do this before replacing all covers.

D. Verify that the transformer bonding and grounding is correct.

E. Verify that all raceway grounding bushings are bonded to the equipment grounding conductor.

F. Perform an insulation resistance (megger) test on the transformer using 1,000 VDC, phase-to-phase, phase-to-ground, and phase-to-neutral. Prior to this test, remove any other equipment that should not be subjected to DC high potential voltage. Reconnect all equipment after this test has been completed.

3.2 CLEANING

A. After the pre-energization checkout has been completed, remove all rubbish and debris from inside and around the transformers. Remove dirt, dust, or concrete spatter from the interior and exterior of the equipment using brushes, vacuum cleaner, or clean, lint free rags. Do not use compressed air.

B. Replace all covers. Check for pinched wires and securely fasten all covers.

3.3 ENERGIZATION

A. Only qualified persons shall energize the equipment for the first time, as specified in Article 1.3 – QUALITY ASSURANCE

B. There shall be no load on the transformer while it is being energized. Turn off all downstream loads.

C. Complete all Phase 2 post-energization commissioning specified in Section 26 08 00

3.4 ADJUSTING

A. Measure the primary and secondary phase-to-phase and phase-to-neutral voltages, along with the secondary phase-to-ground and neutral-to-ground voltages, after energizing the transformer and prior to loading.

B. Adjust primary taps so that secondary voltage is within 2 percent of rated voltage.

C. Check the phase rotation of the transformer secondary.

END OF SECTION

SECTION 26 24 13

SWITCHBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Furnish, install and test the switchboard as shown on the Contract Drawings in accordance with these specifications.

2. The switchboard assembly shall include a control panel, 480V 3Ø 1000A automatic transfer switch (ATS), 120/208V-3Ø 225A panelboard, 45kVA 480V:120/208V 3Ø transformer, and transition sections as required. All components shall be provided in NEMA 3R rated enclosures and mounted within the same switchboard lineup. Transition sections shall be provided and sized as required for proper equipment alignment, cable routing, and a complete installation.

3. The Contractor shall coordinate the size of the switchboard footprint with the size of the equipment pad.

4. Switchboards shall be sized to include all equipment, spares, and spaces as shown on the Contract Drawings.

5. Provide with an electrical power monitoring unit, surge protective devices, and power fail relays.

6. Switchboard main disconnect shall be 100% rated and shall be equipped with an arc flash reduction maintenance system (ARMS), ground fault protection relay, and auxiliary breaker status contacts.

7. Completely coordinate with work of all other trades.

8. The switchboard identification to be provided is as follows:

a. SWBD-01

B. Related sections:

1. Section 00 72 00 – General Conditions

2. Section 01 33 00 – Submittal Procedures

3. Section 01 43 11 – Seismic Qualification and Certification

4. Section 01 81 02 – Seismic Design Criteria

5. Section 16 70 00 – Control Panels

6. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables

7. Section 26 22 13 – Low Voltage Distribution Transformers

8. Section 26 24 16 – Panelboards

9. Section 26 28 16 – Circuit Breakers

1.2 QUALITY ASSURANCE

A. Seismic design requirements:

1. The switchboard shall be designed to withstand seismic forces as required in Sections 01 43 11 and 01 81 02.

B. The switchboard shall be the product of a manufacturer who shall also be the manufacturer of all the circuit breakers and fused switches included in the switchboard.

C. All units and sections shall be UL labeled. Switchboard containing service entrance equipment shall be UL labeled "Suitable for Use as Service Equipment."

1.3 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 01 33 00 – Submittal Procedures.

B. Furnish submittals for approval as outlined below:

1. Shop drawings of the equipment proposed to meet both this specification and PG&E's (Pacific Gas and Electric) Service Requirements ("Green Book") for Electric Switchboards: 0 Through 600 Volts. The Engineer will submit the shop drawings to PG&E for approval. Drawings shall include the District's name and job location. Under no circumstances shall manufacturing proceed without PG&E and the Engineer approval of this submittal.

2. Equipment shop drawings showing elevation and plan views, compartment arrangement, dimensions, weight, shipping splits, and metering layouts

3. Single line diagrams, point-to-point compartment wiring diagrams for metering, and relay and control circuits. Show wire and terminal numbers.

4. Bus material, ratings, and insulation details

5. Product data sheets and catalog numbers for circuit breakers and fused switches. List all options, trip adjustments, and accessories furnished

specifically for this project. Submit time current characteristic curves for each protective device provided.

6. Itemized bill of material for metering, protective relays, accessories, and control equipment.

7. Nameplate schedule.

8. Conduit entry/exit locations.

9. Major component ratings including:

   a. Voltage

   b. Continuous current

   c. Interrupting ratings

C. Where applicable, the following additional information shall be submitted to the Engineer:

1. Busway connection

2. Connection details between close-coupled assemblies

3. Composite floor plan of close-coupled assemblies

D. Composite floor plan of close-coupled assemblies

E. Prior to delivery, submit the following to the Engineer:

1. Submit anchoring calculations per the requirements of Sections 01 43 11 and 01 81 02.

2. Submit certification that the switchboards have been designed and constructed to withstand the seismic forces as described in the above mentioned sections.

3. Spare parts list

1.4 DELIVERY, STORAGE AND HANDLING

A. Refer to Common Work Results for Electrical – Section 26 05 00.

B. Follow the manufacturer's handling instructions.

C. Ship equipment, material, and spare parts complete except where partial disassembly is required by transportation regulations or for protection of components.

D. All mechanical and electrical equipment shall be coated, wrapped, and otherwise protected from snow, rain, drippings of any sort, dust, dirt, mud, flood and condensed water vapor during shipment and while stored or installed in place during construction. The protective coverings shall remain in place until the work areas are substantially free of all construction dust, dirt, mud, accumulated water, moisture, and debris. Space heaters shall be energized at all times during storage.

1.5 REFERENCE STANDARDS

A. The switchboards shall be designed, built, and tested in accordance with the latest editions and revisions NEMA Standard PB-2, and Underwriters' Laboratories (UL) Standard No. UL-891. Switchboards shall also comply with any applicable ANSI and IEEE Standards and the requirements of the California Electric Code (CEC).

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

C. Utility service equipment and installation shall comply with the requirements of the serving utility, Pacific Gas and Electric Company (PG&E), including the PG&E Electric and Gas Service Requirements (Greenbook), latest edition, and applicable PG&E service planning and installation standards.

1.6 MANUFACTURER'S FIELD SERVICES

A. Installation

1. Manufacturer's representative shall be present at the site for a minimum of 4 person days for assistance, startup, testing, and certification. Travel time not included.

2. Submit a manufacturer's certificate of proper installation upon successful completion of the field testing and startup effort per the requirements listed in Part 3.

B. Testing

1. The manufacturer's service technician shall provide calibration, inspection, and adjustments per the requirements in Part 3.

1.7 JOB CONDITIONS

A. Refer to Common Work Results for Electrical, Section 26 05 00.

1.8 WARRANTY

A. Manufacturer's standard warranty

PART 2 - PRODUCTS

2.1 GENERAL

A. The switchboard shall have an individually mounted main breaker with group mounted feeders (Class 2). The switchboard shall be a fully integrated system that provides distributed power as shown on the Contract Drawing single line diagram.

B. The switchboard and components shall be from the same manufacturer.

2.2 UTILITY METERING

A. Provide a utility metering compartment integral to the switchboard assembly for a 1000A, 480V, 3 phase, 4 wire service. Metering compartment shall comply with current PG&E utility metering requirements.

B. Provide a barrier separating the utility metering compartment from all customer sections and provide a hinged sealable door for utility access. Bus work shall include provisions for mounting utility company current transformers and potential taps as required by the utility company.

1. The surge protective device and all other customer owned hardware shall be isolated by a physical barrier from energized utility lines to permit safe maintenance.

C. Provide service entrance labeling and all applicable service entrance features in accordance with NEC, local code, and PG&E requirements.

D. Metering section shall include provisions for PG&E furnished revenue meter, current transformers, and associated metering wiring. Provide meter mounting provisions, current transformer mounting provisions, test blocks, terminal blocks, conduits, and wiring required for utility revenue metering in accordance with PG&E standards.

E. Switchboard manufacturer shall coordinate metering compartment construction, dimensions, and equipment requirements with PG&E prior to issuing shop drawings to ensure compliance with current PG&E service and metering requirements.

2.3 SWITCHBOARD

A. Ratings

1. Service: As shown on the Contract Drawings.

2. The switchboard and protective devices shall be fully rated for a short circuit current of 65,000 rms symmetrical amperes or as shown on the Contract Drawings, whichever is greater. Systems employing series connected ratings shall not be used. Main and feeder devices shall be coordinated for selective tripping.

3. The manufacturer shall design the switchboard, including devices, for continuous operation at its rated current in a 25 degree C ambient temperature.

4. Switchboards shall be UL listed.

B. Construction

1. Switchboards shall be NEMA 3R outdoor type, free-standing, front accessible, and front and rear aligned with depth as shown on the Contract Drawings. Side access shall not be required. All connections, load terminations, and bus maintenance shall be accessible from the front or the top. All protective devices shall be group-mounted, front removable, and arranged to permit against-the-wall mounting.

2. Isolated compartments shall be provided for main circuit device and metering equipment.

3. Feeder devices shall be arranged in group mounted construction. Feeder section(s) shall be isolated from main section, and from adjacent feeder sections.

4. Side, top, and rear covers shall be code gauge steel, bolted to 12 gauge frame structure members. Front doors shall be flush, hinged, with screw fasteners.

5. A cable pull section shall be furnished where shown on the Contract Drawings, which shall be per PG&E requirements.

6. IR Window

   a. Switchboard rear sections shall be provided with infrared viewing windows to allow infrared thermographic inspection of bus connections and cable terminations without opening energized equipment. Provide sight glass window in enclosure for use with an infrared camera. IR sight glass shall include a 3 inch IR crystal insert that provides direct line of sight for infrared inspections, is transparent to visible light, and serves as a physical barrier between the camera and the target.

   b. Sight glass shall have an anodized aluminum housing with aluminum security cover, stainless steel tamperproof screws, low smoke and fume gasket, and overall IP65 ingress protection. Cover shall swivel open to provide access to the IR window. Windows shall be permanently installed, impact resistant, and certified for use on energized electrical equipment.

   c. See Contract Drawings for switchboard sections requiring infrared viewing windows.

7. All metal surfaces shall be chemically cleaned and primed. The finishing coat of paint shall be ANSI Z55.1 No. 61, light gray enamel.

C. Buses

1. All buses shall be silver plated copper.

2. Buses shall be braced for the specified equipment short circuit current rating.

3. All joint connections shall be welded or shall be joined with bolts and Belleville washers.

4. Provide a copper ground bus extending throughout the entire length of the switchboard, equipped with lugs for external ground connections, sized for cables shown on the Contract Drawings.

5. Unused spaces, or spaces indicated for future devices shall include doors, bus, device supports or mounting plates and connections.

D. Manufacturers:

1. Eaton Type Pow-R-Line C

2. General Electric Spectra Series

3. Square D Type QED

4. Or equal as approved by the Engineer

2.4 COMPONENTS

A. Main Circuit Protective Device

1. Main circuit breaker shall be insulated case, 3 Pole, 600 Volt, 100 percent rated, bolt-on type, manually operated with stored energy closing mechanism. Trip device shall be solid state with the following:

a. Long time pickup and delay

b. Short time pickup and delay with short time i^2t switch

c. Adjustable and high instantaneous pickup

d. Ground fault pickup and delay with i^2t switch

e. Overload

f. Short circuit and ground fault indicator lights

g. Ground fault delay and pickup trips for selective tripping

h. Arc Flash Reduction Maintenance System

i. 100 percent equipment rated

2. Equip main device with auxiliary contacts for remote status and trip indication. Device trip setting and frame rating shall be as shown on the Contract Drawings.

3. Acceptable Manufacture:

a. General Electric, Power Break I with MicroVersa Trip

b. Cutler Hammer, Magnum SB with Seltronic Trip

c. Or equal as approved by the Engineer.

B. Power Monitor

1. Provide shorting blocks for incoming current transformer (CT) circuits and fuse blocks for incoming voltage circuits to provide an intermediate termination point between the power meter and the associated circuits.

C. Surge Protective Device

1. Provide two integral surge protective devices within the switchboard assembly. Each device shall be suitable for application on a 480V 3-phase system and shall be UL 1449 listed. One surge protective device shall be installed on the load side of the main breaker and one surge protective device shall be installed on the load side of the automatic transfer switch, as indicated on the Contract Drawings. Each surge protective device shall have a minimum surge current capacity of 200 kA per phase and shall include replaceable surge modules, internal overcurrent protection, and visual status indication.

D. Power Failure Relay

1. Provide power failure relay for monitoring loss of normal power. Relay shall be suitable for monitoring a 480V, 3-phase system and shall provide dry contacts for indication of loss of power and restoration of power. Relay shall be mounted within the switchboard control section and wired to terminal blocks for connection to external monitoring or control systems as indicated on the Contract Drawings.

E. GFCI

1. Provide ground fault circuit interrupter (GFCI) receptacle on the front face of the switchboard as indicated on the Contract Drawings. Receptacle shall be factory wired and powered from panelboard PNL-01 within the switchboard.

F. Feeder Protective Devices

1. Feeder circuit breakers with a rating greater than 150A shall be molded case, 3 Pole, 600 Volt, 80 percent equipment rated, bolt-on type equipped with an adjustable, temperature insensitive, solid state, trip device similar by the General Electric Company's "MicroVersa Trip"; Cutler Hammer "Seltronic", or equal as approved by the Engineer with adjustable and high instantaneous, short time, long time and ground fault delay pickup trips for selective tripping.

2. Feeder protective devices less than or equal to 150A rating shall be molded case circuit breakers bolt-on type with fixed thermal-magnetic trips.

3. Supply five (5) 50A-3P spare thermal-magnetic circuit breakers.

G. Wiring

1. Low voltage instrument and control wiring shall be copper, Type SIS, flameproof switchboard wire identified with shrink on marker sleeves at each end. Low voltage wiring terminal blocks shall have marking strips and shall be mounted vertically in an accessible location. All terminal lugs shall be of the full loop type.

H. Marking and Identification

1. Provide nameplates on all hinged doors for unit load description and for each control or indicating device. Engrave nameplates as shown on the Contract Drawing or as directed, using lettering approximately 3/8in high for unit identification nameplates and 1/4in high elsewhere. The nameplates shall be black and white laminated phenolic material. The engraving shall extend through the white exterior lamination to the black core. Nameplates shall be screw fastened.

2. A manufacturer's plaque shall be fastened to the front of the switchboard. The plaque shall indicate model number, serial number, amperes, volts, short circuit rating, etc.

3. Furnish each switchboard with a sign marked "DANGER – 480 VOLTS KEEP OUT". Letters shall be not less than 1-in high, 1/4-in stroke. Signs shall be adhesive backed mylar, OSHA approved.

I. Spare Parts

1. Provide the following spare parts in the quantities specified for the switchboards:

a. One dozen each size of cover bolts, cage nuts and door fasteners

b. Six cans of aerosol touch-up paint

c. 50 percent replacement fuses, all types and sizes

d. Two of each color replacement lens caps for pilot lights

2. Spare parts shall be boxed or packaged for long term storage. Identify each item with manufacturers name, description, and part number on the exterior of the package.

PART 3 - EXECUTION

3.1 GENERAL

A. Factory quality control

1. Perform manufacturers standard production testing and inspection in accordance with NEMA and ANSI standards.

2. Provide a Factory Acceptance Test (FAT) for the switchboard assembly.

3. Notify the Engineer and the District a minimum of fourteen (14) days prior to the scheduled FAT to allow for witness testing.

4. The FAT shall include verification of the following:

a. Equipment operation.

b. Control functions.

c. Protective relay settings and operation.

d. Metering operation.

e. Communications functionality.

f. Inspection of wiring, labeling, and workmanship.

5. The Engineer and District shall be permitted to witness the FAT.

6. Provide documented test results and inspection reports for review.

7. Correct all deficiencies identified during testing prior to shipment.

8. Do not ship the switchboard until FAT documentation has been submitted and accepted by the Engineer and District.

3.2 INSTALLATION

A. Switchboard floor sills shall be bolted directly to the equipment pad. Structure shall be leveled and plumb. Anchor bolts shall be as sized per Section 01 43 11. Provide hardware and shims for installation.

B. Field installed interior wiring shall be neatly grouped by circuit and bound by plastic tie wraps. Circuit groups shall be supported so that circuit terminations are not stressed.

C. In general, all conduit entering or leaving a switchboard shall be stubbed into the bottom or top horizontal wireway directly below or above the vertical section in which the conductors are to be terminated.

D. Install the equipment in accordance with the manufacturer's instructions.

E. Remove temporary lifting angles, lugs, and shipping braces. Touchup damaged paint finished.

F. Make wiring interconnections between shipping splits.

G. Install bus splice plates and torque connections.

H. Seal all seams, cracks, or openings in outdoor enclosures.

3.3 FIELD QUALITY CONTROL

A. The Contractor shall make the following minimum tests and checks before the testing agency's representative is called in for testing and adjustment per the requirements of Section 26 08 00.

1. Megger incoming line terminals and buses, phase-to-phase and phase-to-ground after disconnecting devices sensitive to megger voltage.

2. Remove current transformer shunts after completing secondary circuit. Check polarity and continuity of metering and relaying circuits.

3. Check mechanical interlocks for proper operation.

4. Test ground connections for continuity and resistance.

5. Adjust unit compartment doors.

6. Check control circuit interlocking and continuity with starters in the TEST position. Provide external source of control power for this test.

7. Adjust voltage trip devices to their correct settings.

B. In the event of an equipment fault, notify the Engineer immediately. After the cause of the fault has been identified and corrected, a joint inspection of the equipment shall be conducted by the Contractor, the Engineer and the equipment manufacturer's factory service technician. Repair or replace the equipment as directed by the Engineer prior to placing the equipment back into service.

C. All as-built drawings shall be corrected and verified for correctness of in-field changes by the Contractor prior to submittal to the Engineer for final review.

3.4 ADJUSTMENT

A. The switchboards manufacturer shall provide the services of a factory trained service technician for startup and training of the District's personnel. The first trip shall be coordinated with the equipment startup. The second trip shall include any necessary follow up or punch list work and shall also include instructions to the District. The manufacturer's service technician shall demonstrate and test all operational features of the installed equipment to the satisfaction of the Engineer. Submit a certified copy of the field inspection to the Engineer. No equipment shall be energized without the approval of the Engineer.

B. The switchboard manufacturer's factory service technician shall make the following inspection, tests and adjustments:

1. Calibrate and test main and feeder circuit breaker trip devices per the Coordination Study specified in 26 08 00.

2. Inspect the installation for compliance with the manufacturers recommended installation practices and report all deviations to the Engineer.

3.5 CLEANING

A. Remove all rubbish and debris from inside and around the switchboard. Remove dirt, dust, or concrete spatter from the interior and exterior of the equipment using brushes, vacuum cleaner, or clean, lint free rags. Do not use compressed air.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Equipment Supplier shall furnish panelboard as an integrated component of the switchboard SWBD-01 lineup as specified herein and in other Sections as noted.

2. The panelboard identification to be provided is as follows:

a. PNL-01

B. Related sections

1. Section 00 72 00 – General Conditions Section 01 14 00 – Work Restrictions

2. Section 01 43 11 – Seismic Qualification and Certification

3. Section 01 75 17 – Field Testing and Startup

4. Section 01 81 02 – Seismic Design Criteria

5. Section 26 05 00 – Common Work Results for Electrical

6. Section 26 05 53 – Identification for Electrical Systems

7. Section 26 24 13 - Switchboards

8. Section 26 28 16 – Circuit Breakers

9. Section 26 08 00 – Commissioning of Electrical Systems

1.2 REFERENCES

A. Panelboards shall be designed, built, tested, and installed in accordance with the latest editions and revisions of the following:

1. Institute of Electrical and Electronics Engineers (IEEE)

a. ANSI/IEEE C62.41.1-2002, Guide on the Surge Environment in Low-Voltage AC Power Circuits

b. ANSI/IEEE Std 693, IEEE Recommended Practice for Seismic Design of Substations

2. National Electrical Contractors Association (NECA)

    a. ANSI/NECA 407, Standard for Installing and Maintaining Panelboards

3. National Electrical Manufacturers Association (NEMA)

    a. NEMA PB 1.1 – General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less

4. National Fire Protection Association (NFPA)

    a. NFPA 70E, Standard for Electrical Safety in the Workplace

5. Underwriters Laboratories (UL)

    a. UL 508A, Industrial Control Panels

    b. UL 1449, Standard for Surge Protective Devices

1.3 COMMISSIONING

A. Commission the equipment as specified in Section 01 75 17 – Field Testing and Startup and Section 26 08 00 – Commissioning of Electrical Systems.

B. Scheduling

1. Schedule commissioning work:

    a. Around the work restrictions specified in Section 01 14 00 – Work Restrictions.

2. Include all commissioning work specified in this Section on the three-week look-ahead schedule specified in Section 01 31 19 – Project Meetings.

3. The Engineer will inform the Contractor when facility operation is sufficient to permit thermographic testing at the panelboards. This will occur during the period defined as the Startup Test in Section 01 75 17 – Field Testing and Startup.

4. The District's Commissioning Services Group (CSG) shall witness all commissioning testing. The CSG requires minimum one-week advance notice via the three-week look-ahead schedule specified in Section 01 31 19 – Project Meetings. The Contractor and equipment manufacturer shall schedule their work accordingly.

1.4 REFERENCE STANDARDS

A. Panelboards shall be in accordance with the Underwriter Laboratories, Inc. "Standard for Panelboards" and "Standard for Cabinets and Boxes" and shall be so

labeled where procedures exist. Panelboards shall also comply with NEMA Standard for Panelboards and the National Electrical Code.

PART 2 - PRODUCTS

2.1 FURNISHED EQUIPMENT

A. Refer to Section 26 50 00 for district-furnished equipment.

PART 3 - EXECUTION

3.1 PRE-ENERGIZATION CHECKOUT

A. All Phase 1 pre-energization commissioning specified in Section 26 08 00 – Commissioning of Electrical Systems shall be complete and the testing submittal approved by the Engineer prior to energization.

B. Conduct a complete inspection of the panelboard, including checking all accessible connections for tightness and correct torque and verifying that all shipping and packing material has been removed.

C. Check that all raceways and conductors are identified and tagged in accordance with the contract drawings and the Contractor's approved interconnection diagrams. Do this before replacing all covers.

D. Verify that neutral connections and bus bars are insulated and isolated from the equipment grounding conductor, the panelboard, the cabinet, and any isolated grounding conductors in other than service equipment applications.

E. Verify that all raceway grounding bushings are bonded to the equipment grounding conductor.

F. Perform an insulation resistance (megger) test on the panelboard using 1,000 VDC, phase-to-phase and phase-to-ground, with the circuit breakers in both the open and closed positions. Prior to this test, disconnect any equipment that should not be subjected to DC high potential voltage (TVSS, for example). Reconnect all equipment after this test has been completed.

G. Manually operate protective devices to ensure proper operation. Leave in the off position.

3.2 CLEANING

A. After the pre-energization checkout has been completed, remove all rubbish and debris from inside and around the panelboard. Remove dirt, dust, or concrete spatter from the interior and exterior of the equipment using brushes, vacuum cleaner, or clean, lint free rags. Do not use compressed air.

B. Replace all covers. Check for pinched wires and close all doors. Make sure that the enclosure parts are properly aligned and fastened securely.

3.3 ENERGIZATION

A. Only qualified persons shall energize the equipment for the first time.

B. There shall be no load on the panelboard when it is energized. Turn off all downstream loads.

C. Prior to energizing any circuit that supplies rotating machinery, measure the phase sequence and verify that it is correct.

D. Energize the panelboard in sequence by starting at the source end and working towards the load.

E. Complete all Phase 2 post-energization commissioning specified in Section 26 08 00 – Commissioning of Electrical Systems.

3.4 FIELD QUALITY CONTROL

A. Acceptance testing of the panelboard shall be per the requirements of Section 26 08 00.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Furnish all labor, materials, equipment, and install wiring devices as shown on the Contract Drawings and as specified herein.

2. Provide all interconnecting conduit and branch circuit wiring for receptacle circuits in accordance with the CEC.

B. Related sections

1. Section 00 72 00 – General Conditions

2. Section 01 33 00 – Submittal Procedures

3. Section 26 05 53 – Identification for Electrical Systems

4. Section 26 28 16 – Circuit Breakers

1.2 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 00 – Submittal Procedures..

1.3 REFERENCE STANDARDS

A. Wiring devices shall be designed, built, tested, and installed in accordance with the latest editions and revisions of the following:

1. California Code of Regulations (CCR)

a. Title 24, Part 3 – California Electrical Code (CEC)

2. National Electrical Contractors Association (NECA)

a. ANSI/NECA 130 – Standard for Installing and Maintaining Wiring Devices

3. Underwriters Laboratories

a. UL 498 – Standard for Attachment Plugs and Receptacles

b. UL 943 – Standard for Safety for Ground Fault Circuit Interrupters

B. U.S. General Services Administration's Federal Specification's (GSA)

1. Specification WS 896 Switches, Toggle (Toggle and Lock), Flush Mounted (General Specification)

2. Specification WC 596-F Connectors, Plug, Electrical, General Purpose, General Grade, Groudning, 2 Pole, 3 Wire, 20 Amperes, 250 Volts, 50/60 Hertz

C. Underwriters Laboratories

D. ANSI/NECA 130 – Standard for Installing and Maintaining Wiring Devices

1. UL 498

PART 2 - PRODUCTS

2.1 MATERIALS

A. Wall Switches

1. Switches shall be extra heavy duty, industrial specification grade, toggle action, and flush mounting quiet type with ground screw terminal.

2. Number of poles as shown on the Contract Drawings.

3. Toggle switch shall be white color.

4. Rating shall be 20A, 120/277 Volt.

5. Acceptable manufacturers:

a. Hubbell HBL Extra Heavy-Duty Specification Grade Catalog Number HBL1221W (single-pole), HBL1223W (three-way), and HBL1224W (four-way)

b. Eaton Wiring Devices

c. Legrand/Pass & Seymour, Inc.

d. Or equal as approved by the Engineer

B. Single Receptacles – Special Use

1. Provide the following industrial specification grade receptacle types where shown on the Contract Drawings:

a. 20 Amp, 125 Volt, 2 Pole, 3 Wire, power lock type

b. 20 Amp, 250 Volt, 2 Pole, 3 Wire, NEMA 6-20R

c. 30 Amp, 125 Volt, 2 Pole, 3 Wire, twist-lock type, NEMA L5-30R

d. 20 Amp, 250 Volt, 2 Pole, 3 Wire, twist-lock type, NEMA L6-20R

e. 30 Amp, 250 Volt, 2 Pole, 3 Wire, twist-lock type, NEMA L6-30R

f. Receptacles called out on Contract Drawings but not listed above shall still be industrial grade.

2. Acceptable Manufacturers:

a. Eaton Wiring Devices

b. Hubbell, Inc.

c. Pass & Seymour, Inc.

d. Or equal as approved by the Engineer.

C. Single or Duplex Receptacles – general purpose type

1. Receptacles shall be extra heavy duty, industrial specification grade, straight blade, 2 pole, 3 wire grounding recessed receptacle.

2. Rating shall be 20A, 125Volt with NEMA 5-20R configuration.

3. High impact and chemical resistant nylon face and color white

4. Single or duplex as shown on the Contract Drawings.

5. Acceptable Manufacturers:

a. Cooper Wiring Devices

b. Hubbell, Inc.

c. Legrand/Pass & Seymour, Inc.

d. Or equal as approved by the Engineer

D. Single or Duplex Receptacles – corrosion resistant

1. Industrial grade corrosion resistant type receptacles shall have a high impact and chemical resistant nylon face with color gray.

2. Line contacts shall be made of solid brass that is resistant to corrosion.

3. Single or Duplex as shown on the Contract Drawings

4. 20A, 125V with NEMA 5-20R configuration

5. Acceptable Manufacturers:

    a. Cooper Wiring Devices, M-1

    b. Crouse-Hinds, Co.

    c. Appleton Electric

    d. Or equal as approved by the Engineer.

E. Duplex Receptacles - Ground fault interrupter type

1. Industrial grade, 20 Amp, 125 Volt, 2 Pole, 3 Wire, GFCI feed thru type with "test" and "reset" buttons.

2. NEMA 5-20R configuration.

3. Acceptable Manufacturers:

    a. Eaton Wiring Devices

    b. Hubbell, Inc.Or equal as approved by the Engineer.

F. Device plates

1. Plates for indoor flush mounted devices shall be of the required number of gangs for the application involved and shall be as follows:

    a. NEMA 1 (Finished) Areas: Smooth, high impact nylon of the same manufacturer and color (white) as the device. Color selection shall be submitted and approved by the Engineer.

    b. NEMA 4X, 4 and 12 (Indoor Process) Areas: Stainless steel, brushed with stainless steel mounting screws.

2. Plates for indoor surface mounted device boxes shall be cast metal of the same material as the box.

3. Install oversized plates where standard plates do not fully cover the wall opening.

4. Device plates for toggle-switches style disconnect switches specified in Section 26 28 16, switches mounted outdoors, or indicated as weatherproof shall be gasketed, with provisions for padlocking switches "On" and "Off".

5. Multiple surface mounted devices shall be ganged in a single, common box and provided with an adapter, if necessary, to allow mounting of single gang device plates on multigang cast boxes.

6. Engraved device plates shall be provided where required.

7. Device plates for UPS power receptacles shall be labeled “UPS POWERED, CIRCUIT NO. LP-XXXX”. The UPS circuit number is as shown on the Contract Drawings.

8. Identify receptacle and light switch device plates as required in Section 26 05 53.

G. Weatherproof Switch Cover with Device (Outdoor)

1. Single pole toggle switch with metal switch cover

2. 10A, 125V

3. Acceptable Manufacturers:

a. Emerson

b. Crouse-Hinds

c. Or equal as approved by the Engineer.

H. Weatherproof Receptacle Cover

1. Industrial specification grade UL listed for wet locations with self-closing spring door and gasketing

2. Suitable for single and duplex receptacles

3. Cover manufactured by same manufacturer of receptacle Acceptable manufacturers

a. Eaton Wiring Devices

b. Hubbell/Bell

c. Or equal as approved by the Engineer

I. Weatherproof while in use cover

1. UL listed single or two gang box cover made of die cast aluminum vertical arrangement

2. Acceptable Manufacturers:

a. Emerson

b. Crouse-Hinds

c. Or equal as approved by the Engineer.

J. Multi Outlet Assemblies

1. Assembly enclosures shall consist of two-piece, all steel or anodized aluminum raceways which shall allow for field installation of wiring and standard receptacles as shown on the Contract Drawings.

2. Multi outlet assemblies shall be UL Listed as a multi-outlet assembly.

3. The multi outlet assembly shall include surge suppression modules that can be easily removed and replaced without removing the metal cover. The surge protective devices shall be tested per UL 1449.

4. Raceway bases and removable covers shall be .040-inch steel, minimum of 2-1/8-inch high by 1-5/8-inch deep. Entrance fittings shall be sized for 3/4-inch conduit.

5. Raceways shall include all fittings, couplings, etc. for the complete installation of a finished system.

6. Provide outlets, jacks, and terminators of the type and location shown on the Contract Drawings.

7. Acceptable Manufacturers:

a. Legrand Wiremold, Plugmold

b. Or equal as approved by the Engineer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install switch and receptacles outlets flush with the finished wall surfaces in NEMA 1 areas on the Contract Drawings or when raceways are shown as concealed on the Contract Drawings.

B. Do not install flush mounted devices in areas designated NEMA 3R, 12, 4, or 4X on the Contract Drawings. Provide surface mounted devices in these areas.

C. Provide weatherproof covers and device covers in areas designated NEMA 3R, 4 or 4X on the Contract Drawings.

D. Provide While-in-Use covers in outdoor areas.

E. Light pole GFCI installation

1. Provide and install a 125V, 20A tamper resistant, weather resistant GFCI receptacle within the light pole base. The GFCI shall be installed in a weather suitable enclosure with an in use cover rated for wet locations.

2. Provide grounding and bonding of the receptacle, enclosure, and light pole in accordance with applicable codes.

3. Install the receptacle in an accessible location within the pole base and label as required.

4. Test the GFCI after installation to verify proper operation, including trip and reset functionality.

F. Provide “Constant Use” covers for receptacles used for sump pumps in vaults and other mechanical equipment that is connected by means of a plug into a receptacle outlet.

G. Indoor dry areas: provide convenience outlets mounted 18” above the floor unless noted otherwise.

H. For any below grade vaults, structures, or pump rooms, mount receptacles 48” above the finished floor.

I. The location of all devices is shown, in general, on the Contract Drawings and may be varied within reasonable limits so as to avoid any piping or other obstruction without extra cost, subject to the approval of the Engineer. Coordinate the installation of the devices for piping and equipment clearance. Install receptacles with the ground pin “up”.

J. Indicate circuit number for receptacle and light switches per Section 26 05 53.

3.2 ENERGIZATION

A. After energizing, test wiring devices for proper voltage, polarity, and ground continuity. Correct faulty circuit conditions, remove malfunctioning wiring devices, replace with new devices, and retest.

B. Test GFCI devices for proper operation.

END OF SECTION

SECTION 26 28 16

CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes

1. Equipment Supplier shall furnish circuit breakers in switchboard SWBD-01 and panelboard PNL-01 as specified herein and in other Sections as noted.

B. Related sections

1. Section 00 72 00 – General Conditions

2. Section 01 43 11 – Seismic Qualification and Certification

3. Section 01 81 02 – Seismic Design Criteria

4. Section 26 05 33 – Identification for Electrical Systems

5. Section 26 24 13 – Switchboards

6. Section 26 24 16 - Panelboards

1.2 REFERENCES

A. Circuit Breakers shall be designed, built, tested, and installed in accordance with the latest editions and revisions of the following:

1. National Electrical Manufacturers Association (NEMA):

a. NEMA AB 1 – Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures

b. NEMA KS 1 – Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)

c. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum)

2. Underwriters Laboratories (UL)

a. 98 – UL Standard for Safety Enclosed and Dead-Front Switches

b. 489 – Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures

PART 2 - PRODUCTS

2.1 FURNISHED EQUIPMENT

A. Refer to Section 26 50 00 for district-furnished equipment.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Testing: As specified in Section 26 08 00.

END OF SECTION

SECTION 26 32 13.13

DIESEL ENGINE DRIVEN GENERATOR SET

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. District shall furnish integrated engine-generator package system. The system shall include a skid mounted diesel engine-generator unit, control panel, 100% rated 800A frame LSIG main breaker with 400A trip plug, low voltage distribution circuit breakers, panelboard, generator starting battery and battery charger, 50% rated radiator mounted load bank, sound attenuation weatherproof enclosure, wiring and conduit, piping, cooling and ventilation equipment, exhaust components, and appurtenances. Contractor shall install, field-test, and commission diesel engine-generator unit and associated equipment according to manufacturer's instructions and per these specifications.

2. The integrated engine-generator package system shall meet or exceed NFPA 110 requirements for providing Level 1, Class 96, Type 10 life safety emergency power.

3. The integrated engine-generator package system shall meet or exceed EPA Tier 4 Final emissions requirements for non-road compression ignition engines.

4. Generator is supplied with a 660 gallon belly tank sized for a minimum 24 hours continuous run time at 50% load based on the generator full rated capacity.

5. Contractor shall provide the initial fill of all required fluids, including ASTM D975 No. 2 diesel fuel (full 660-gallon tank capacity), engine oil, and extended-life coolant, prior to field testing and commissioning.

6. The diesel engine driven generator set and load bank identification to be provided is as follows:

a. EGEN-01

b. LB-01

B. Related sections:

1. Section 00 72 00 – General Conditions

2. Section 01 43 11 – Seismic Qualification and Certification

3. Section 01 61 01 – Electrical Requirements for Mechanical Package Systems

4. Section 01 75 17 – Field Testing and Startup

5. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables

6. Section 26 05 53 – Identification for Electrical Systems

7. Section 26 24 16 – Panelboards

8. Section 26 27 26 – Wiring Devices

9. Section 26 28 16 – Circuit Breakers

10. Section 26 36 23 – Automatic Transfer Switches

1.2 QUALITY ASSURANCE

A. Seismic design requirements:

1. See Section 01 43 11, 01 81 02 for seismic requirements.

The system shall have affixed a permanent engraved nameplate in a readily visible location, stating that the equipment is suitable for use as Level 1, Class 96, Type 10 life safety emergency power in accordance with NFPA 110 requirements. The Equipment Supplier shall obtain all required permits and approvals from the local air quality authority for installation of the generator at the project site. The Contractor shall obtain final approval for operation from the local air quality authority having jurisdiction during commissioning and start-up of the generator and associated power system equipment.

B. Contractor shall coordinate final air quality authority approval for generator operation during commissioning and start up, to be obtained prior to August 14, 2027. Contractor shall notify the District of the selected date upon confirmation from the air board.

1.3 REFERENCES

A. Diesel Engine Driven Generator shall be installed and tested in accordance with the latest editions and revisions of the following:

1. UL 2200 – Stationary Engine Generator Assemblies

2. California Code of Regulations:

a. Title 24, Part 3 – California Electrical Code (CEC)

1.4 JOB CONDITIONS

A. The operating environment of the diesel engine driven generator set shall be:

1. Altitude: Approximately 100 feet above Mean Sea Level for Mokelumne River Fish Hatchery

2. Outside temperature, maximum: 120 degrees F

3. Outside temperature, minimum: 25 degrees F

4. Fuel type: Diesel No .2

PART 2 - PRODUCTS

2.1 FURNISHED EQUIPMENT

A. Refer to Section 26 05 00 for district-furnished equipment.

PART 3 - EXECUTION

3.1 GENERAL

A. Perform the work in a workmanlike manner with craftsmen skilled in the particular trade. Provide equipment and work presenting a neat and finished appearance.

B. Install equipment in strict accordance with "no exceptions noted" shop drawings and manufacturer's recommendations. Secure equipment in strict accordance with approved means that meet the seismic requirements of Article 1.2.A.

C. Installation, final adjustments, and initial startup of the diesel engine driven generator set equipment shall be supervised by qualified factory-trained manufacturer's employees.

D. After the equipment is installed, touch up any scratches, burrs, etc., incurred during shipment or installation of the equipment. If required by the Engineer because of an undue amount of scratches, repaint the entire assembly at the Contractor's own expense.

E. Final Assembly: Contractor shall be responsible for the complete assembly of all diesel engine driven generator set package system components.

3.2 INSTALLATION

A. Diesel Engine Driven Generator Ses:

1. Mounting: The engine-generator set shall be leveled and placed on vibration isolators in strict accordance with the approved seismic anchorage calculations. Contractor shall provide all 304 stainless steel shims required to achieve a level installation. Contractor shall provide all rigging and crane services

required for off-loading and setting the integrated package. Lifting shall only be performed using the manufacturer-designated lifting points. Contractor is responsible for protecting the enclosure and belly tank from damage during installation.

B. All engine connections shall be sealed and shall remain sealed until just prior to making field connections. Contractor shall take all necessary precautions to prevent the entry of dirt or any other foreign matter into all engine and related system openings.

C. Make all electrical connections in accordance with Division 26, ELECTRICAL, and NFPA 110, Paragraph 7.12 – Distribution.

D. Check out and inspection:

1. All diesel engine driven generator system components shall be installed complete, inspected, and individually tested for cleanliness, proper installation and function prior to startup and field testing.

2. Contractor shall provide temporary spill containment and a specialized fuel spill kit on-site during all fueling and testing operations.

E. Batteries:

1. The starting batteries shall be disconnected until the engine generator sets are ready for field testing.

F. Anchor System: Shall meet requirements of Section 01 43 11. Anchor plan must be approved by the Engineer. Anchors shall be stainless steel type 304.

3.3 FIELD QUALITY CONTROL

A. General:

1. Fully field test the diesel engine driven generator system to demonstrate that the components are in compliance with the specifications and are ready for service.

2. Installation of the engine-generator assembly shall be complete and the engine-generator package system shall be serviced, adjusted, and ready for use before the field tests are scheduled.

3. Repairs and adjustments shall be made by the Contractor as required to achieve satisfactory performance of the diesel engine driven generator set system. If repairs or adjustments are made during the tests, additional testing shall be performed at no additional cost to the District.

4. Records of the tests shall be made by the Contractor, and copies of the test records shall be submitted to the Engineer.

5. The Contractor shall provide load banks, fuel, test equipment, cables, labor, materials, and all other equipment and services required for all tests. The Contractor shall provide supplemental portable load banks (to achieve 100% rated nameplate capacity), temporary cables, test equipment, materials, all other labor, and labor required for the 4-hour NFPA 110 factory-witness/field-acceptance test. The 50% radiator-mounted load bank (LB-01) shall be tested for functionality but shall not be the sole means of load for the 100% performance certification.

6. The Contractor shall submit detailed field test procedures to the Engineer for review. Tests shall not begin until the Engineer has approved the test procedures.

7. The Contractor shall provide certified manufacturer's employees for the diesel engine driven generator set to be present at the jobsite for the full duration of the field tests.

8. Submit test results to the Engineer for review, demonstrating proper performance of all systems during the tests. Field testing shall not be considered complete until acceptable results have been approved by the Engineer. Upon satisfactory completion of the field tests, final adjustments shall be made to all equipment, fuel and oil filters shall be replaced, belt drive tensions shall be checked, etc., to insure that the system is ready for operation.

9. Contractor shall perform a 'Full System Cold Start' test. This test shall demonstrate that upon loss of utility power at the Switchboard (SWBD-01), the generator (EGEN-01) starts, reaches required voltage and frequency, and the ATS (ATS-01) transfers load within the NFPA 110 'Type 10' (10-second) requirement.

10. See Section 26 08 00 for additional electrical testing requirements. See Section 01 75 17 for additional field-testing requirements and procedures.

3.4 CLEANING / FINAL

A. Final acceptance

1. Following the successful completion of all field tests, Contractor shall:

   a. Top off the fuel belly tank to 100% capacity at the Contractor’s expense following the successful completion of all testing.

   b. Replace all fuel and oil filters.

2.

END OF SECTION

SECTION 26 36 23

AUTOMATIC TRANSFER SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes

1. Furnish all labor, materials, tools, equipment, and services for supply, installation, and wiring of Automatic Transfer Switch (ATS) equipment as indicated in accordance with all provisions of the Contract Documents.

2. ATS shall be furnished as an integrated component of the switchboard lineup. Refer to Switchboards – Section 26 24 13.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a sound, secure, and complete installation.

4. Provide all special accommodations shown on the Contract Drawings and described in these specifications to ensure complete integration with the new emergency generator system.

5. Completely coordinate with work of all other trades.

6. Automatic transfer switch (ATS) installed on emergency power system. The transfer switch and identification to be provided is as follows:

B. ATS-01Related Sections:

1. Section 00 72 00 – General Conditions

2. Section 01 33 00 – Submittal Requirements

3. Section 01 43 11 – Seismic Qualification and Certification

4. Section 01 81 02 – Seismic Design Criteria

5. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables

6. Section 26 05 33 – Identification for Electrical Systems

7. Section 26 27 26 – Wiring Devices

8. Section 26 32 13.13 – Diesel Engine Driven Generator Set

1.2 QUALITY ASSURANCE

A. The equipment furnished under this section shall be the product of a manufacturer who has produced this same type of equipment for a period of at least 5 consecutive years.

B. The transfer switch shall be manufactured in a certified ISO Standard 9001 facility.

1.3 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 01 33 00 – Submittal Procedures.

B. Furnish submittals for approval as outlined below:

1. Product data
2. Warranty
3. Bill of materials
4. Manufacturer's nameplate data
5. Plan, front, and side view drawing including overall dimensions, weights, and mounting details
6. Internal schematics (elementary diagrams), wiring diagrams, and point-to-point interconnection diagrams for all connections
7. Physical drawings showing equipment arrangement and terminal block locations
8. Equipment seismic qualifications, seismic calculations, and anchorage details as specified in Sections 01 43 11, 01 81 02, and this section
9. Training schedule
10. Complete installation and instruction manuals
11. As-built documents and Operation and Maintenance (O&M) manuals
12. Spare parts list
13. Factory acceptance testing reports

1.4 REFERENCES

A. Automatic Transfer Switch shall be designed, built, tested, and installed in accordance with the latest editions and revisions of the following:

1. Underwriters Laboratories (UL):

    a. UL 1008 – Automatic Transfer Switches

2. National Fire Protection Association (NFPA):

    a. NFPA 110 – Standard for Emergency and Standby Power Systems

    b. NFPA 70 – National Electrical Code

3. Institute of Electronic and Electrical Engineers

    a. IEEE 446 – Recommended Practice for Emergency and Standby Power Systems.

4. National Electrical Manufacturers Association

    a. NEMA – AC Automatic Transfer Switch Equipment

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with these specifications, the typical equipment, systems and accessories installed shall be manufactured by:

1. ASCO, 300 Series

2. Or equal as approved by the Engineer

2.2 AUTOMATIC TRANSFER SWITCH

A. The switch shall be rated and UL listed for emergency use and be open transition type, 3-pole suitable for 480 VAC, 3-phase, 60 Hz operation with ampere rating as indicated on the Contract Drawings.

1. Separately mounted in NEMA 3R switchboard enclosure within the switchboard lineup, as shown in the Contract Drawings.

2. Capable of switching all classes of load, and rated for continuous duty when installed in a non-ventilated enclosure

3. 6 cycle or less closing and withstand current rating: 65,000 amperes RMS minimum

4. Complete with all accessories; Nameplate with Standard UL-1008 listing acceptable for use on emergency systems or life safety systems

5. Double throw, actuated by 2 electrical operators, momentarily energized and connected to a simple over-center linkage

    a. Minimum transfer time of 400 milliseconds. Provide adjustable transfer time delay, 1-300 seconds factory set at 3 seconds.

    b. Switches shall be capable of transferring successfully in either direction with 70 percent of rated voltage applied to the terminals.

6. The time delay between the opening of the closed contacts and the closing of the open contacts shall allow for voltage decay before transfer, allowing the motor and transformer loads to be re-energized after transfer with normal in-rush current.

7. Normal and Emergency Contacts: Positively interlocked mechanically and electrically to prevent simultaneous closing.

    a. Main contacts shall be of silver-tungsten alloy, mechanically locked in position in both the normal and standby positions without the use of hooks, latches, or magnets.

    b. Provide separate arcing contacts with magnetic blowouts on each pole.

    c. Interlocked molded case circuit breakers, switches or contactors are not acceptable.

8. Equip transfer switch with a permanently attached, safe, manual operator designed to prevent injury to personnel in the event the electrical operator should become energized during manual transfer.

9. Switches: Capable of normal operation during and after seismic loading. Seismic loading shall not cause false operation.

B. Include a test switch to simulate normal power failure and mount pilot lights on the switchboard cabinet door housing the ATS to indicate switch position.

C. Relays, timers, control wiring, and accessories shall be front accessible.

D. Identify control wire terminations by tubular sleeve-type markers at both ends in accordance with the approved shop drawings.

E. Provide control relays, timers, terminal blocks, wiring, and similar equipment in accordance with the relevant individual specification sections of this contract.

2.3 MICROPROCESSOR CONTROLLER

A. The transfer switch shall be equipped with a microprocessor based control system, to provide all the operational functions of the automatic transfer switch. The controller shall have a real-time clock with battery backup.

B. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance. Controller components and wiring shall be front accessible.

C. The controller shall include a 20 character, 4-line LCD display, with a keypad, which allows access to the system.

D. The controller shall have password protection available to limit access to qualified and authorized personnel.

E. A single controller should be able to be programmed for single phase/three phase and for any voltage between 120 and 600V. The controller shall include three phase over/under voltage, over/under frequency, phase sequence detection, and phase differential monitoring on both source 1 and source 2.

F. Multipurpose display for continuous monitoring and control of the ATS functions and settings include following parameters. All field changeable functions shall be passcode protected and accessible through the keypad.

1. Nominal line voltage and frequency
2. Single or three phase sensing
3. Operating parameters
4. Transfer operating mode configuration (Open, Closed or Delay Transition)

G. Built-in diagnostic display that includes the capturing of historical data, such as number of transfers and time on source 2 power source, for ease of troubleshooting.

H. The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:

1. EN 5011:2009+A1:2010 -Industrial, scientific and medical (ISM) radio-frequency equipment
2. IEC 61000-4-2: 2008 - Electrostatic discharge immunity test
3. IEC 61000-4-3:2006+A1:2007+A2:2010 - Radiated, radio-frequency, electromagnetic field immunity test
4. IEC 61000-4-4:2012 - Electrical fast transient/burst immunity test.
5. IEC 61000-4-5:2005 - Surge immunity test
6. IEC 61000-4-6:2008 - Immunity to conducted disturbances, induced by radio-frequency fields
7. IEC 61000-4-12:2006 - Ring wave immunity test

I. Capability for external communication and network interface through an optional Modbus RS485 serial communication module.

J. Touch pad test switch with Fast Test / Test with Load and No-Load positions to simulate a source 1 failure.

K. The controls shall have isolated relay module logic inputs, high isolation transformers for AC inputs, and relay module on all outputs, to provide optimum protection from line voltage surges, RFI ,and EMI.

2.4 ENCLOSURE

A. All enclosures shall be third-party certified for compliance to NEMA ICS 6 and UL 508, unless otherwise indicated:

1. The enclosure shall provide wire bending space in compliance to the latest version of UL 1008, regardless of the direction from which the conduit enters the enclosure.

2. Exterior cabinet door shall provide complete protection for the system's internal components. Doors must have permanently mounted key-type latches. Bolted covers or front doors are not acceptable.

3. Transfer switches shall be provided in enclosures that are third party certified for their intended environment per NEMA requirements, Type 1, 3R, 12, 4, and 4X.

B. Enclosure color

1. Enclosure color shall match switchboard color. Refer to Switchboards – Section 26 24 13.

C. Drawings

1. Installation drawings must clearly state mounting provisions and requirements for installation.

2.5 PERFORMANCE

A. Should the voltage of the normal source drop below 80 percent on any phase after an adjustable time delay of 0.5-3 seconds to allow for momentary dips, transfer to the emergency source shall occur.

B. Transfer to the emergency power source shall occur when 90 percent of rated voltage and frequency has been obtained by the emergency generator.

C. After restoration of normal power on all phases to 90 percent of rated voltage, an adjustable time delay period of zero to 60 minutes shall delay retransfer to the normal source to allow for stabilization of normal power.

D. After retransfer to the normal source, the emergency generator shall operate unloaded for a nominal 5 minute adjustable cool down period before shutdown.

2.6 ACCESSORIES

A. Provide automatic transfer switch with the following features:

1. Time delay relays to control contact transition time on transfer to either source, pneumatic type, adjustable 1-300 seconds

2. Test switch to simulate normal power failure

3. Relay contacts which close when normal source fails

4. Relay contacts which open when normal source fails

5. 2 auxiliary contacts rated 15 amperes at 120 VAC on main shaft, closed on normal

6. 2 auxiliary contacts rated 15 amperes at 120 VAC on main contacts, closed on standby

7. Pilot lights to indicate transfer switch position

2.7 OPERATIONAL TESTING FEATURES

A. Provide a means to automatically start and run the emergency generator for a set period of time for the purpose of testing or exercising the complete engine, generator, and load transfer control.

B. After completion of the set period of time for testing and exercising, the emergency source shall automatically shut down.

C. Such periods for testing or exercising to be adjustable in multiples of 15 minutes per period with the period repeated on any combination of days over a cycle of 7 days before recycling.

D. During the period of testing or exercising, emergency power shall not automatically assume its load.

PART 3 - EXECUTION

3.1 FACTORY QUALITY CONTROL

A. Factory qualification tests shall be performed on transfer switch samples of identical design and rating as the specified equipment. These tests shall be conducted without the use of current limiting fuses unless such fuses are specifically part of the tested transfer switch assembly.

B. Oscillograph recordings across the main contacts shall demonstrate that no contact separation occurs and that electrical continuity is maintained across all phases during the short circuit withstand and closing tests.

C. Temperature rise testing shall be conducted in accordance with UL 1008. A post endurance temperature rise test shall also be performed after completion of the overload and endurance tests to verify the transfer switch can continue to carry full rated current.

D. Verify the ability of the transfer switch to carry full rated current after completing the overload and endurance tests.

E. The complete ATS shall be factory tested to ensure proper operation and ensure that the operating transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements. Copy of test documents shall be made available upon request.

F. The manufacturer shall provide a line-by-line compliance review document showing the compliance of the proposed equipment to this specification. All exceptions and deviations to the specifications shall not be permitted without approval by the engineer.

G. The ATS manufacturer shall be certified to ISO 9001 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, installation and servicing in accordance with ISO 9001.

H. The ATS manufacturer shall provide Certification to IBC-2024 for seismic compliance.

3.2 INSTALLATION

A. The automatic transfer switch shall be integrated as part of the complete switchboard lineup, as shown on the Contract Drawings.

B. The automatic transfer switch shall be bonded to the switchboard to create a single grounded system.

C. Correct damage to factory paint finish with factory-approved touch-up paint.

3.3 TESTING

A. Test automatic transfer switch in compliance with Section 26 08 00.

END OF SECTION

SECTION 27 05 00

COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Furnish all materials, equipment, labor and services required to achieve a fully integrated and operational communications system which shall be as indicated on the Contract Drawings and as specified.

2. Supervise and coordinate the installation of the communications system with other related equipment and materials furnished by other suppliers under other sections of this specification.

3. Ensure that all equipment of the system is furnished, installed, and connected in accordance with the manufacturer's instructions.

4. The requirements of Division 27 in their entirety apply to all communications work and equipment furnished on this project whether furnished or specified under this or other divisions of these specifications.

5. Provide grounding and bonding for communications systems as specified in individual equipment specifications and Section 26 05 26 – Grounding and Bonding for Electrical Systems.

6. The District shall be responsible for direct coordination with the communications services providers. The Contractor shall coordinate with the Engineer in order to meet all minimum point of entry (MPOE) installation requirements of the providers.

B. Under this contract, the terms "communications" and "telecommunications" shall be interchangeable.

C. Related sections:

1. Section 01 33 00 – Submittal Procedures

2. Section 01 35 13 – Special Project Procedures

3. Section 01 43 11 – Seismic Qualification and Certification

4. Section 01 75 17 – Field Testing and Startup

6. Section 01 81 02 – Seismic Design Criteria

7. Section 26 05 00 – Common Work Results for Electrical

8. Section 26 05 26 – Grounding and Bonding for Electrical Systems

9. Section 27 08 00 – Commissioning of Communications Systems

1.2 QUALITY ASSURANCE

A. The Contractor and each subcontractor performing communications work under this Contract shall possess a current State of California C-7 Low Voltage Systems Contractor License, and shall be certified by at least one major telecommunications equipment manufacturer such as Ortronics, Lucent Technologies, or Avaya for the installation, splicing, termination, and testing of copper cables, fiber optic cables, and telecommunications equipment for outside and inside plant wiring.

B. The Contractor and each subcontractor shall have a minimum of 5 years recent experience in satisfactory completion of jobs of similar size and scope.

C. The Contractor shall compile and submit detailed information relating to licensing, certification, experience, and similar work completed by all telecommunications system subcontractors, including references sufficient to enable the Engineer to evaluate and approve of the Contractor and subcontractors responsibility, experience, and capacity to perform the work.

D. The Contractor shall provide complete day-to-day supervision of the construction and testing of the communications system and coordination with other related construction and testing efforts. The Contractor shall be available in person, telephone, or pager at all times throughout the duration of this Contract.

1.3 SUBMITTALS

A. Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. Furnish submittals for approval as outlined below:

1. Detailed information relating to licensing, certification, experience, and similar work completed by the Contractor and all telecommunications system subcontractors, including references.

PART 2 - PRODUCTS

2.1 GENERAL

A. Unless otherwise indicated, provide all first quality, new materials and equipment, free from any defects, in first class condition, and suitable for the space provided.

Provide materials and equipment listed by UL wherever standards have been established by that agency.

B. Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer.

2.2 STANDARD PRODUCTS

A. Unless otherwise indicated, provide materials and equipment which are the standard products of manufacturers regularly engaged in the production of such materials and equipment. Provide the manufacturers' latest standard design that conforms to these specifications.

2.3 SEISMIC REQUIREMENTS

A. General: Install all products to be furnished under this contract in conformance with the seismic requirements of Section 01 43 11 – Seismic Qualification and Certification, and 01 81 02 – Seismic Design Criteria.

B. Refer to the detailed technical specifications within Division 27 for specific equipment seismic requirements.

2.4 EQUIPMENT FINISH

A. Provide materials and equipment with manufacturers' standard finish system. Provide ANSI 61, light grey color for all equipment. Provide two quarts of touchup paint.

2.5 ENVIRONMENTAL

A. Provide materials and equipment suitable for installation and operation under rated conditions at 400 feet above sea level and with maximum ambient temperature of 50 degrees Centigrade.

2.6 OUTDOOR EQUIPMENT

A. Provide equipment and devices to be installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of 20 degrees F to 120 degrees F. Equipment must be capable of proper operation at rated output continuously in this ambient temperature range in direct sun. Provide any additional equipment such as enclosures, sunshades, and cooling equipment so that this performance requirement can be met.

2.7 FASTENERS

A. Fasteners for securing equipment to walls and floors shall be either hot dip galvanized after fabrication or stainless steel.

2.8 EQUIPMENT ENCLOSURES

A. General:

1. Equipment enclosures shall have NEMA ratings suitable for the location in which they are installed, as specified in the individual technical sections or as shown on the Contract Drawings.

PART 3 - EXECUTION

3.1 GENERAL

A. Unless specified otherwise, equipment anchoring systems shall be designed to withstand seismic forces as specified in Section 01 81 02 – Seismic Design Criteria.

B. Install materials and equipment in a workmanlike manner utilizing craftsmen skilled in the particular trade. Provide work which has a neat and finished appearance.

C. Coordinate work with the Engineer and work of other trades to avoid conflicts, errors, delays, and unnecessary interference with operation of the new facilities during construction.

D. Check the approximate locations of equipment and other system components shown on Contract Drawings for conflicts with openings, structural members, and components of other systems and equipment having fixed locations. In the event of conflicts, notify the Engineer in writing. The Engineer's decision shall govern. Make modifications and changes required to correct conflicts.

3.2 PROTECTION DURING CONSTRUCTION

A. Throughout the Work, provide protection for materials and equipment against loss or damage in accordance with provisions elsewhere in these Contract Documents. Throughout the Work, follow manufacturers' recommendations for storage. Protect everything from the effects of weather.

B. Following installation, protect materials and equipment from corrosion, physical damage, and the effects of moisture. When equipment intended for indoor installation is installed at the Contractor's convenience in areas where it is subject to dampness, moisture, dirt, or other adverse atmosphere until completion of construction, ensure that adequate protection from these atmospheres is provided that is acceptable to the Engineer. Keep openings in boxes or equipment closed during construction.

3.3 MATERIAL AND EQUIPMENT INSTALLATION

A. Follow manufacturers' installation instructions explicitly, unless otherwise indicated. Wherever any conflict arises between the manufacturers' instructions, codes and regulations, and these Contract Documents, follow Engineer's decision.

Keep copy of manufacturers' installation instructions on the jobsite available for review at all times.

B. Use appropriate conduit and conductor entry fittings with enclosures which maintain the specified enclosure environmental capability after proper installation.

3.4 EQUIPMENT SUPPORTS

A. Provide equipment supports for all equipment in accordance with Division 01 – General Requirements.

3.5 CUTTING AND PATCHING

A. Lay out work carefully in advance. Do not cut, drill, or notch any structural member or building surface without specific approval of Engineer. Carefully carry out any cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of materials and equipment. Following such work, restore surfaces neatly to original condition. Use skilled craftsmen of the trades involved.

3.6 CLEANING AND TOUCHUP PAINTING

A. Keep the premises free from accumulation of waste material or rubbish. Upon completion of work, remove all materials, scraps, and debris from premises and from interior and exterior of all devices and equipment. Touch up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original finish. If extensive damage is done to equipment paint surfaces, refinish the entire equipment in a manner that provides a finish equal to or better than the factory finish, that meets the requirements of the specifications, and that is acceptable to the Engineer.

B. The interior of all equipment shall be vacuumed and wiped free of dust just before final acceptance. De-energization of equipment shall be at times approved in writing by the Engineer.

3.7 INSPECTION

A. Allow materials, equipment, and workmanship to be inspected at any time by the Engineer or their representatives. Correct work, materials, or equipment not in accordance with these Contract Documents or found to be deficient or defective in a manner satisfactory to the Engineer.

3.8 STANDARDS, CODES, PERMITS, AND REGULATIONS

A. Perform work; furnish, install, and test materials and equipment in full accordance with the latest applicable rules, regulations, requirements, and specifications of the following:

1. Local Laws and Ordinances

2. State and Federal Laws

3. California Code of Regulations:

   a. Title 24, Part 3 – California Electrical Code (CEC)

4. Telecommunications Industry Association/Electronic Industries Alliance (TIA/EIA)

5. State Fire Marshal

6. Underwriters Laboratories (UL)

7. National Electrical Safety Code (NESC)

8. American National Standards Institute (ANSI)

9. National Electrical Manufacturers Association (NEMA)

10. National Electrical Contractors Association (NECA) Standard of Installation

11. Institute of Electrical and Electronics Engineers (IEEE)

12. Insulated Cable Engineers Association (ICEA)

13. Occupational Safety and Health Administration (OSHA)

14. ASTM International (ASTM)

B. Conflicts, if any, which may exist between the above items will be resolved at the discretion of the Engineer.

C. Wherever the requirements of the specifications or Contract Drawings exceed those of the above items, the requirements of the specifications or Contract Drawings govern. Code compliance is mandatory. Construe nothing in the Contract Documents as permitting work not in compliance with these codes.

3.9 TEMPORARY ELECTRIC POWER

A. Refer to Section 01 50 00 - Temporary Facilities and Controls for necessary provisions for electric power used during construction.

3.10 TESTS

A. Perform testing as specified in Sections 01 75 17 – Field Testing and Startup and 27 08 00 – Commissioning of Communications Systems.

END OF SECTION

SECTION 27 08 00

COMMISSIONING OF COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Work included in this section shall consist of furnishing labor, equipment supplies, materials, and testing equipment, and performing commissioning of communications systems as shown on the drawings and required by these specifications.

2. The fiber optic cable networks, and interior and exterior horizontal copper cabling shall be fully tested per the requirements of this Specification.

B. Related sections:

1. Section 01 33 00 – Submittal Procedures

2. Section 01 75 17 – Field Testing and Startup

1.2 REFERENCES

A. Electronics Industry Association/Telecommunications Industry Association (EIA/TIA)

1. EIA/TIA 568B – Commercial Building Telecommunications Cabling Standard

2. EIA/TIA 526-14 – Optical Power Loss Measurements of Installed Multimode and Singlemode Fiber Cable Plant

3. EIA/TIA 758 – Customer-Owned Outside Plant Telecommunications Infrastructure Standard

4. TIA/EIA Technical Systems Bulletin 67 (TSB-67), Link Performance Specifications for Field Testing of Unshielded Twisted-Pair Cabling Systems

B. National Electrical Contractors Association (NECA)

1. NECA 301 – Standard for Installing and Testing Fiber Optic Cables

C. California Code of Regulations

1. Title 24, Part 3 – California Electrical Code (CEC)

D. Underwriters Laboratory

1.3 SUBMITTALS

A. Provide submittals in accordance with Section 01 33 00.

B. Submit detailed information relating to certification, experience, and similar work completed by technicians performing testing work, including references.

C. Submit proposed test procedures for all installed copper communications systems for review and approval. The procedures shall show, at a minimum, test configurations, calibration procedures, impedances, and measurement equipment. The scope of this work includes, but is not limited to, the following:

1. All system(s) shall be checked for compliance with manufacturer's requirements, the specifications, and the drawings.

2. Maintain a check-off list for reference by the Engineer during tests.

3. The result of the measurements outlined shall be recorded and submitted to the Engineer as final proof of system performance.

D. Submit the following proposed test procedures for the fiber optic cable system as required in this section for each fiber cable type. Obtain the approval of the Engineer of the proposed test procedure prior to onset of test.

1. Pre-Installation Test

2. Installation Test

3. Final Acceptance Test

E. Submit literature or data sheets on proposed testing equipment, including certification of calibration.

F. Submit proposed PC software package to be used for OTDR analysis and method of storing test data.

G. Submit letter of Certification of Compliance upon successful testing of the fiber optic system. Letter shall state that the installed system meets the criteria based on the link loss budget.

1.4 QUALITY ASSURANCE

A. The Contractor shall have fully qualified technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof shall conduct the tests. Appropriate training programs include but are not limited to installation certification programs provided by the Building Industry Consulting Service International (BiCSi).

B. Each technician that will perform testing shall have a minimum of 5 years recent experience in satisfactory completion of jobs of similar size and scope.

C. Compile and submit detailed information relating to certification, experience, and similar work completed by all technicians performing testing work, including references sufficient to enable the Engineer to evaluate and approve of the technicians' responsibility, experience, and capacity to perform the work.

D. Test Equipment:

1. Test equipment used under this contract shall be from manufacturers that have a minimum of 5 years' experience in producing field test equipment. Manufacturers shall be ISO 9001 certified.

2. All test tools of a given type shall be from the same manufacturer, and have compatible electronic results output.

3. All test adapter cables shall be approved by the manufacturer of the test equipment. Adapters from other sources are not acceptable.

4. Baseline accuracy of the test equipment shall exceed ANSI/EIA/TIA TSB67 Level III specified instrument accuracy, as indicated by independent laboratory testing.

5. Test equipment shall have a dynamic range of at least 100 dB to minimize measurement uncertainty.

6. Test equipment shall be capable of storing full frequency sweep data for all tests and printing color graphical reports for all swept measurements.

7. Test equipment shall include S-Band time domain diagnostics for NEXT and return loss (TDNXT and TDRL) for accurate and efficient troubleshooting.

8. Test equipment shall be capable of running individual NEXT and return loss measurements in addition to auto-tests.

9. Test equipment shall include a library of cable types, sorted by major manufacturer.

10. Test equipment shall store auto-tests in internal memory.

11. Test equipment shall be able to internally group auto-tests and cables in project folders.

12. Test equipment shall include digital signal processing (DSP) technology for support of advanced measurements.

13. The measurement reference plane of the test equipment shall start immediately at the output of the test equipment interface connector. There shall not be a

time domain dead zone of any distance that excludes any part of the link from the measurement.

E. Fiber Optic Cable Systems:

1. OTDR (Optical Time Domain Reflectometer) and the use of visual fiber tracers, visual fault locators or OLTS (Optical Loss Test Set) shall be performed by trained testing personnel, using certified equipment designed for the purpose. The technicians performing the tests shall be trained in operation of the OTDR equipment and also in the interpretation of OTDR traces. Provide documentation that certifies technicians have been trained in the use of OTDR equipment.

PART 2 - PRODUCTS

2.1 GENERAL

A. Fiber Equipment including OTDR, OLTS, jumper cables, etc., required to test fiber optic cables and system shall be provided by the Contractor or testing agency providing the testing services.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor and each Subcontractor shall be knowledgeable of work to be performed by other trades and take necessary steps to integrate and coordinate their work with other trades.

B. All work performed in occupied spaces shall be in a manner that allows the District to operate the existing facilities on a continuous basis.

3.2 FIELD QUALITY CONTROL

A. Copper Cable System Field Tests:

1. Conduct witnessed field testing on all horizontal copper cable systems located within buildings as defined below:

a. Each cable pair shall be tested for crosses, opens, grounds, reversed and/or transposed pairs, shorts, foreign battery, continuity, and resistance (in ohms).

b. All riser cable pairs shall be tested for loss in dB.

c. All cable pairs that fail initial tests shall be repaired or replaced and the cable re-tested to ensure compliance.

d. Using a Category 6 rated pair scanner or similar device, all copper cables shall be tested to verify the installation meets or exceeds the EIA/TIA Category 6 performance specifications as defined in TSB-40A and TSB 67.

e. All test results, including jack locations, shall be printed on a hardcopy report. The test results shall also be provided in .PDF electronic format on CD-ROM.

f. All cable pair scanners used on the project shall be calibrated to a single common test cable at the start of each shift and after changing batteries. The hardcopy of the calibration results shall be included as a reference with each group of test results submitted.

2. Conduct witnessed field testing on all outdoor (between buildings and from buildings to exterior equipment) horizontal copper cable systems as defined below:

a. The correct and continuous bonding of cable shields shall be verified. This test shall be conducted from the buildings' telecommunications main distribution frames and intermediate distribution frames prior to strapping shield grounds at termination points.

b. Each cable pair shall be tested for crosses, opens, grounds, reversed and/or transposed pairs, shorts, foreign battery, continuity, and resistance (in ohms).

c. All riser cable pairs shall be tested for loss in dB.

d. All cable pairs that fail initial tests shall be repaired or replaced and the cable re-tested to ensure compliance.

e. All test results shall be printed on a hardcopy report. The test results shall also be provided in PDF electronic format on a USB flash drive.

B. Fiber Optic Cable System Field Tests

1. General

a. Field tests will be performed on each fiber. All fibers will be tested for breaks, abnormalities, and overall attenuation characteristics to ensure that the db loss at each splice point and test location is in conformance with the requirements specified herein. Cables shall be tested per Standard NECA 301 where applicable and per the requirements of this Section.

b. Test jumpers (end-to-end attenuation) or test fiber box (OTDR) are of the same fiber core size and connector type as the cable system.

c. Optical sources shall be stabilized and have center wavelengths within ± 20nm of the 850/1300nm multimode and 1310nm/1550nm single mode nominal wavelengths. In accordance with TIA/EIA-526-14-A, multimode LED sources should have spectral widths from 30-60nm at 850nm and 100-140nm at 1300nm.

d. The power meter shall be calibrated at each of the nominal test wavelengths and traceable to the National Institute of Standards and Technology (NIST) calibration standard.

e. The power meter and light source shall be set to the same wavelength.

f. All system connectors, jumpers, and adapters used during the test procedures shall be properly cleaned prior to and during test measurements.

g. Test technicians shall use the same brand and model of test equipment using the same testing profile. Use of different test equipment and profiles may result in test reports being rejected by the Engineer.

h. Test the fiber optic cables in the following wavelengths:

1) Multimode fiber: 850nm and 1300nm

2) Single-mode fiber: 1310nm and 1550nm

i. Use LED sources to test multimode fiber and laser sources to test single-mode fiber.

2. Pre-Installation Test

a. After delivery to the site, and before the cable is installed, an end-to-end OTDR bi-directional signature trace for each fiber using proper index of refraction shall be performed. These traces shall identify the total optical length and any point faults or discontinuities caused by shipping or handling. An average optical attenuation measurement (db/km) shall be made for each fiber at an OTDR. Each measurement shall be captured on a trace and compared to the factory test reports that were attached to the reels. If pre-installation test results differ from factory test report or if the fiber cable shows macro or micro bend damage the fiber cable will be rejected by the Engineer.

b. Pre-installation test results shall include the signature trace analysis over the length of the fiber optic cable in graphical display indicating attenuation in dB/km. Each test result shall be labeled indicating the cable type and length. The test report shall be submitted to the Engineer for review and approval prior to installation of the fiber optic cable.

3. Installation Test

   a. Cable shall be tested after the cable is pulled through conduits or on poles prior to splicing to verify that there has been no damage to cable after installation. The cable shall be tested with an OTDR and signature traces documented indicating the cable type, length and cable number per the Cable Schedule provided in the drawings.

   b. An OTDR measurement shall be completed on each splice and field installed connector. The measurement test shall be done after each splice and field connection to ensure that a clean, low-loss connection was made. Measurement shall be done in both directions.

   c. Acceptable losses are as follows:

      1) Splices: ≤0.3 dB (single-mode and multimode)

      2) Field installed connectors: ≤ .75 dB

   d. If the measured splice or connector loss is unacceptable, the splice or connector shall be reworked and retested until the measured loss values are below the acceptable limits as specified.

   e. Provide a Certificate of Compliance for Connector and Splice Loss. Document each splice and field connector measurement. Indicate cable number and location of splice and field connection. Submit documentation to Engineer for review and approval.

4. Final Acceptance Test

   a. After installation of fiber cables are complete, perform an end-to-end attenuation test from both directions for each fiber cable link or from patch panel to patch panel as shown on the drawings. Test using the wavelengths as specified herein.

   b. Use an OLTS power meter and source to test for attenuation losses.

   c. Measured attenuation losses (dB) shall be documented for each fiber cable and compared to the link-loss budget.

   d. If measured attenuation losses are greater than the maximum link-loss budget values, the fiber cable links in question shall be required to have troubleshooting using an OTDR. The OTDR shall be utilized to locate fault points in the cable system. Once the fault points are located and repaired the link shall be tested again with an OLTS to verify attenuation losses. This process shall be repeated until the attenuation losses are below the maximum link-loss budget for that particular fiber link.

e. Once the end-to-end attenuation test is completed the results shall be provided in a test report for review and approval by the Engineer. In the report include the budget link-loss for each link and indicate criteria used for dB loss values. Label each link using the cable number as provided in the Cable Schedules as shown on the drawings. Measured test values shall be provided in one section with the budgeted link-loss values provided in another section. Provide a brief explanation at the beginning of the report indicating testing methods used.

C. Certificate of Compliance for Fiber Cable System Network

1. After the Engineer has approved the Final Acceptance Test Report, the Contractor shall provide a letter stating that the fiber cable system network has been fully tested and is ready for operation.

END OF SECTION

EXHIBIT I
PROJECT DRAWINGS

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN PROJECT

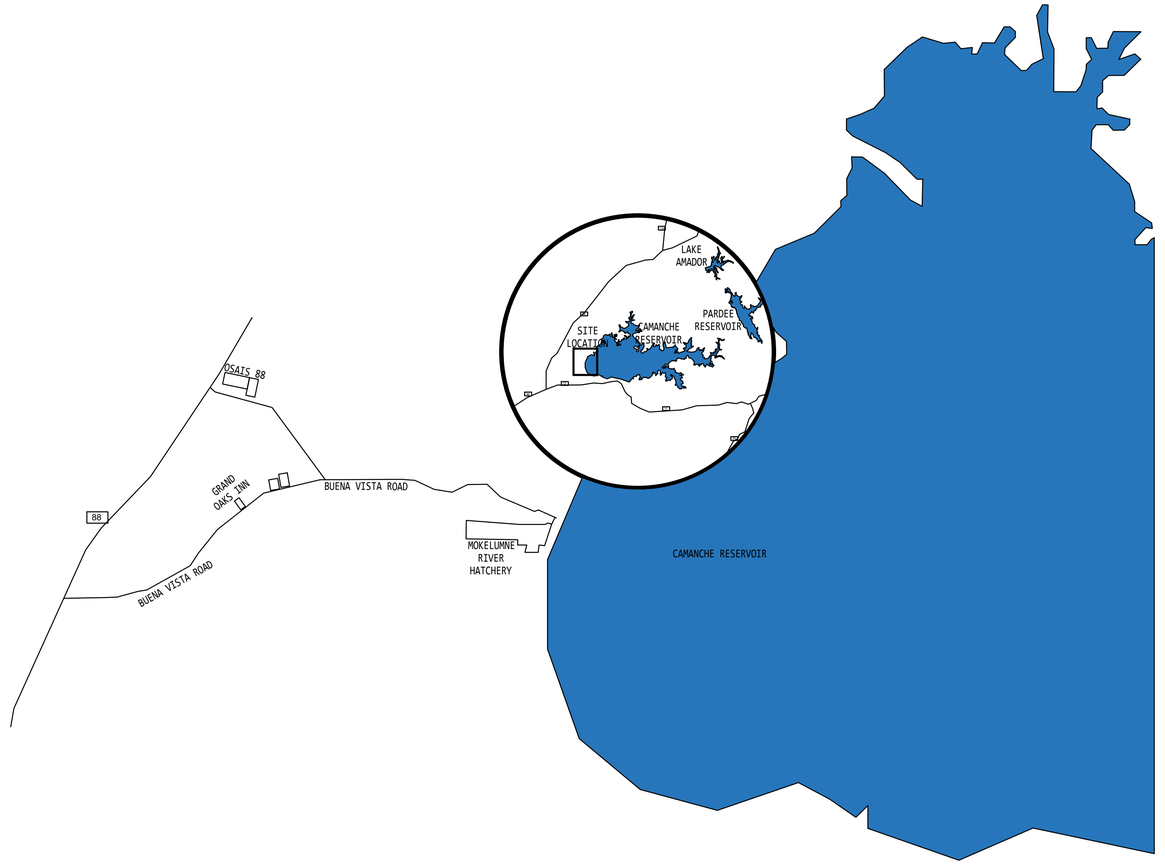
CONTRACT DRAWINGS AND SPECIFICATIONS

EAST BAY MUNICIPAL UTILITY DISTRICT

SPEC NO. 2197

LIST OF PROJECT DRAWINGS
MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN PROJECT

GENERAL		
SHEET NO.	DRAWING NO.	DRAWING NAME
1	100-Z-011.1	LIST OF DRAWINGS AND PROJECT MAP
2	100-Z-011.2	GENERAL PROJECT NOTES
3	100-Z-011.3	ELECTRICAL PROJECT NOTES
4	100-Z-011.4	ELECTRICAL & STRUCTURAL PROJECT NOTES
5	100-Z-011.5	ELECTRICAL SYMBOLS & ABBREVIATIONS
-	-	-
ELECTRICAL DEMOLITION		
SHEET NO.	DRAWING NO.	DRAWING NAME
6	100-E-017	ELECTRICAL SITE PLAN DEMO - 1
7	100-E-018	ELECTRICAL SITE PLAN DEMO - 2
-	-	-
ELECTRICAL		
SHEET NO.	DRAWING NO.	DRAWING NAME
8	100-E-019	ELECTRICAL OVERALL SITE PLAN
9	100-E-020	NEW SWITCHBOARD & EMERGENCY GENERATOR PLAN
10	100-E-021	MODIFIED HATCHERY SUPPORTING EQUIPMENT PLANS
11	100-E-022	MODIFIED VALVE HOUSE PLAN
12	100-E-110	ONE-LINE DIAGRAM
13	100-E-111	EQUIPMENT ELEVATION & PLAN VIEWS
14	100-E-300	CONDUIT SCHEDULE
15	100-E-301	CABLE SCHEDULE
16	100-E-302	PANEL, LIGHTING, & PULL BOX SCHEDULES
17	100-E-303	MISCELLANEOUS SCHEMATICS
18	100-E-205	CONTROL PANEL ELEVATION & BILL OF MATERIALS
19	100-E-206	COMMUNICATION DIAGRAMS & INPUT/OUTPUT SCHEDULE
20	100-E-207	CONTROL PANEL POWER DIAGRAM
21	100-E-500	EQUIPMENT & DEVICE ASSET TAG LIST
22	100-E-900	ELECTRICAL DETAILS - 1
23	100-E-901	ELECTRICAL DETAILS - 2
24	100-E-902	GROUNDING DETAILS
-	-	-
-	-	-
STRUCTURAL		
SHEET NO.	DRAWING NO.	DRAWING NAME
25	100-S-040	GENERATOR & SWITCHBOARD PAD PLAN & SECTIONS
-	-	-
-	-	-



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5 WORKING DAYS UTILITY NOTIFICATION
PRIOR TO CONSTRUCTION

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

LIST OF DRAWINGS AND PROJECT MAP

PROJ NO.	100-Z-011.1	0
SCALE: AS SHOWN	STRUCT. DISC. NUMBER	REV.
DATE: 02OCT2025		

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REGISTERED PROFESSIONAL ENGINEER
KOOSHA TOOFAN
20418
Exp. SEPT. 30/2027
Electrical Engineer
STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN	
DESIGN CHECKED BY: JOHN GUILLORY	
DRAWN BY: KOOSHA TOOFAN	
SR. PROJ ENGR. R.P.E. NO.: 20418	
APPROVED: KOOSHA TOOFAN	
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418	

EBMUD

USER:KOOSHA TOOFAN
DATE:9/4/2025 1:22 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN SERVICES\DRAFTING\1-WORKING\100-Z-011.1 - LIST OF DRAWINGS AND PROJECT MAP.DWG

SPEC NO.2197

CODES & REGULATIONS

1. ALL ELECTRICAL INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND SHALL COMPLY WITH ALL NATIONAL AND LOCAL AUTHORITIES, ORDINANCES, AND CODES AT TIME OF INSTALLATION. THIS INCLUDES THE CALIFORNIA BUILDING CODE (IBC), NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA), AND AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).

2. ALL CONSTRUCTION AND OPERATIONS BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS. PRIOR TO BEGINNING WORK, CONTACT OSHA FOR PERMIT REQUIREMENTS.

3. ALL WORK PERFORMED SHALL BE IN ACCORDANCE WITH CURRENT CONSTRUCTION INDUSTRY STANDARDS AND WORKMANSHIP.

4. IN THE EVENT OF CODE CONFLICT, THE MOST RESTRICTIVE CODE SHALL PREVAIL.

GENERAL NOTES

1. ALL EQUIPMENT SHALL BE NEW, UNUSED, AND U.L. LISTED (WHERE A U.L. LISTING IS AVAILABLE FOR THAT CLASS OF EQUIPMENT).

2. ALL EQUIPMENT FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE, UNLESS A LONGER PERIOD IS SPECIFIED BY THE MANUFACTURER.

3. DESIGN DETAILS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR SITUATIONS OCCURRING THROUGH THE PROJECT, WHETHER OR NOT THEY ARE INDIVIDUALLY CALLED OUT.

4. VERIFY FINAL OPENING DIMENSIONS IN WALLS, SLABS, AND DECKS WITH OTHER DISCIPLINE DRAWINGS PRIOR TO CONSTRUCTION OF THESE ELEMENTS.

5. VISITS TO THE JOB SITE BY THE ENGINEER TO OBSERVE THE CONSTRUCTION DO NOT IN ANY WAY MEAN THAT ENGINEER IS GUARANTOR OF CONSTRUCTOR'S WORK, NOR RESPONSIBLE FOR THE COMPREHENSIVE OR SPECIAL INSPECTIONS, COORDINATION, SUPERVISION, OR SAFETY AT THE JOB SITE.

6. PRIOR TO COMMENCING WORK, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FIELD LOCATE ALL AFFECTED UNDERGROUND UTILITIES MAIN AND SERVICE LINES AND POTHOLE ALL CONFLICTING UTILITIES PRIOR TO EXCAVATION. THE CONTRACTOR SHALL NOTIFY THE MEMBERS OF THE UNDERGROUND SERVICE ALERT (U.S.A.) 48 HOURS IN ADVANCE OF PERFORMING EXCAVATION WORK, BY CALLING THE TOLL-FREE NUMBER 811 FROM DIGALERT.ORG/CONTACT. THE KNOWN EXISTING BURIED UTILITIES AND PIPELINES ARE SHOWN ON THE DRAWINGS IN THEIR APPROXIMATE LOCATIONS. THERE IS NO GUARANTEE THAT ALL EXISTING PIPELINES AND OBSTRUCTIONS ARE SHOWN OR THAT LOCATIONS INDICATED ARE ACCURATE.

7. CONSTRUCTION MATERIALS TESTING, AND INSPECTION SHALL COMPLY WITH THESE CONSTRUCTION DOCUMENTS. FAILURE TO MEET ANY OF THE LISTED REQUIREMENTS SHALL BE CAUSE FOR REJECTION.

8. CONTRACTOR SHALL KEEP ONE ACCURATE, LEGIBLE SET OF AS-BUILT DRAWINGS AT THE SITE AND AVAILABLE FOR REVIEW BY THE ENGINEER IN CONTRACTOR'S FIELD OFFICE THROUGHOUT THE PROJECT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED TO THE DISTRICT FOR APPROVAL PRIOR TO FINAL ACCEPTANCE OF THE WORK.

9. ALL MANUFACTURED EQUIPMENT, ACCESSORIES, AND MATERIALS SHALL BE USED AS INTENDED BY THE CONTRACTOR, IN STRICT ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS.

10. COORDINATE ELECTRICAL WORK WITH THAT OF OTHER TRADES. REFER TO STRUCTURAL DRAWINGS. COORDINATION SHALL OCCUR PRIOR TO FABRICATION, PURCHASE, AND INSTALLATION OF WORK.

11. THOROUGHLY TEST ALL LINES, FEEDERS, EQUIPMENT, AND DEVICES WITH MAXIMUM LOADS TO ASSURE PROPER OPERATION.

12. COMPLETION OF WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE PROJECT SCHEDULE. SCHEDULE INSTALLATION WITH OTHER TRADES TO ENSURE PROJECT MILESTONES ARE MET.

13. DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL COMPONENTS REQUIRED FOR A COMPLETE INSTALLATION. PROVIDE COMPONENTS REQUIRED FOR COMPLETE AND OPERATIONAL SYSTEMS INCLUDING RACEWAYS, CONDUCTORS, BOXES, SUPPORTS, AND SIMILAR ITEMS.

14. DEVICE LOCATIONS ARE APPROXIMATE. COORDINATE DEVICE LOCATIONS AND ELEVATIONS WITH APPROPRIATE DOCUMENTS INCLUDING CASEWORK SHOP DRAWINGS AND INTERIOR ELEVATIONS PRIOR TO ROUGH-IN.

15. DRAWINGS ARE NOT INTENDED TO SHOW THE EXACT LOCATION OF CONDUIT RUNS AND STUB-UPS. THESE ARE TO BE COORDINATED WITH OTHER TRADES TO AVOID CONFLICTS AND MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR SHALL COORDINATE CONDUIT STUB-UP LOCATIONS BASED UPON APPROVED EQUIPMENT SHOP DRAWINGS.

16. THE CONTRACTOR SHALL NOTIFY THE DISTRICT REGARDING ANY DISCREPANCIES OR AMBIGUITIES, WHICH MAY EXIST IN THE DRAWINGS PRIOR TO ROUGH IN.

17. WHERE THE DRAWINGS DESCRIBE PORTIONS OF THE WORK IN GENERAL TERMS BUT NOT IN COMPLETE DETAIL, IT IS UNDERSTOOD THAT ONLY THE BEST GENERAL PRACTICE IS TO PREVAIL AND THAT ONLY MATERIALS AND WORKMANSHIP OF THE FIRST QUALITY ARE TO BE USED.

18. THE PROJECT CONTRACTOR SHALL EXERCISE DUE CAUTION AND SHALL CAREFULLY PRESERVE BENCHMARKS AND SURVEY REFERENCE POINTS, AND SHALL BEAR ALL EXPENSES FOR REPLACEMENT BY A CALIFORNIA REGISTERED PROFESSIONAL LAND SURVEYOR.

19. THE CONTRACTOR SHALL PROVIDE ALL LIGHTS, BARRICADES, SIGNS, FLAGMEN, OR OTHER DEVICES NECESSARY FOR PUBLIC SAFETY.

GENERAL NOTES (CONTINUED)

20. THE CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANIES AND VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES. IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO PROTECT ALL EXISTING UTILITIES SO THAT NO DAMAGE RESULTS DURING THE PERFORMANCE OF THIS CONTRACT WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION AND PRESERVATION OF ALL SUCH FACILITIES IN THE AREA OF CONSTRUCTION AND SHALL NOTIFY UTILITY COMPANIES A MINIMUM OF FORTY-EIGHT HOURS IN ADVANCE OF ANY CONSTRUCTION.

21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING EXISTING IMPROVEMENTS FROM DAMAGE. THE COST OF REPLACING EXISTING IMPROVEMENTS WITH SAME LEVEL OF QUALITY SHALL BE INCLUDED IN THE CONTRACT BID PROCESS.

22. CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS WITHIN THE PROJECT SITE, STAGING AREAS, AND ACCESS ROAD TO THE SITE, DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT. THIS INCLUDES THE SAFETY OF ALL PERSONS AND PROPERTY; THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

23. REQUIRE ALL NECESSARY PERMITS AND COMPLY WITH ALL LOCAL CODES AND ORDINANCES FOR EXCAVATIONS OR TRENCHES FIVE (5) FEET OR MORE IN DEPTH.

24. WHENEVER PAVEMENT IS BROKEN OR CUT IN THE INSTALLATION OF THE WORK COVERED BY THESE SPECIFICATIONS, THE CONTRACTOR SHALL REPLACE THE PAVEMENT, AFTER PROPER BACKFILLING, WITH PAVEMENT MATERIALS EQUAL TO OR BETTER THAN THE MATERIALS USED IN THE ORIGINAL PAVING. THE FINISHED PAVEMENT SHALL BE SUBJECT TO THE APPROVAL OF THE DISTRICT.

25. EXACT LIMITS OF PAVEMENT REMOVAL AND RECONSTRUCTION SHALL BE DETERMINED IN COORDINATION WITH THE DISTRICT.

26. DUST SHALL BE CONTROLLED IN COMPLIANCE WITH LOCAL AUTHORITY.

27. ALL DRAINAGE PATTERNS SHALL BE MAINTAINED AT ALL TIMES DURING AND AFTER CONSTRUCTION.

28. PERFORM ALL VERIFICATION, OBSERVATIONS, TESTING, AND EXAMINATION OF WORK PRIOR TO THE ORDERING OF ELECTRICAL EQUIPMENT AND THE ACTUAL CONSTRUCTION. ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE DISTRICT LISTING ALL MALFUNCTIONS, FAULTY EQUIPMENT, AND DISCREPANCIES.

29. UNAUTHORIZED CHANGES & USES: THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

30. ALL OPEN TRENCHES SHALL BE APPROPRIATELY PLATED OVER, WHEN THE CONTRACTOR IS NOT ACTIVELY WORKING IN SAID TRENCH.

31. PRIOR TO OPENING AN EXCAVATION, THE CONTRACTOR SHALL DETERMINE WHETHER UNDERGROUND INSTALLATIONS; I.E., SEWER, WATER, FUEL, ELECTRIC LINES, ETC., WILL BE ENCOUNTERED AND IF SO, WHERE SUCH UNDERGROUND INSTALLATION ARE LOCATED, WHEN THE EXCAVATION APPROACHES THE LOCATION OF SUCH UNDERGROUND INSTALLATION, THE EXACT LOCATION SHALL BE DETERMINED BY CAREFUL PROBING OR HAND DIGGING; AND, WHEN IT IS UNCOVERED, ADEQUATE PROTECTION SHALL BE PROVIDED FOR THE EXISTING INSTALLATION BY THE CONTRACTOR.

32. THE DISTRICT SHALL BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF ANY WORK TO BE PERFORMED.

33. A TEN (10) DAY NOTICE SHALL BE GIVEN FOR ANY PLANNED DISRUPTION, AND THE DISTRICT OR ASSOCIATED UTILITY COMPANY TO BE AFFECTED SHALL BE NOTIFIED IMMEDIATELY UPON ANY UTILITY SERVICE DISRUPTION OTHER THAN SPECIFIED PREVIOUSLY.

34. EXISTING OVERHEAD ELECTRIC AND TELEPHONE TRANSMISSION LINES MAY BE LOCATED AT OR NEAR THE SITE. THESE OVERHEAD UTILITIES ARE NOT SHOWN ON THE DRAWINGS. EXTREME CAUTION SHALL BE USED WHEN WORKING IN THE VICINITY OF OVERHEAD UTILITIES SO AS TO PREVENT INJURY TO WORKMEN OR DAMAGE TO THE UTILITIES.

35. ALL EXISTING WATER, SEWER, AND DRAINAGE STRUCTURES AND PIPING SHALL BE PROTECTED DURING CONTRACTOR'S OPERATION. IF DAMAGED AS PART OF WORK, ALL DAMAGED UTILITIES AND STRUCTURES SHALL BE REPLACED AS GOOD OR BETTER THAN EXISTING CONDITIONS.

36. THE CONTRACTOR SHALL BE COMPLETELY RESPONSIBLE FOR PROTECTING EXISTING TREES NOT IDENTIFIED FOR REMOVAL. ANY TREE DAMAGED SHALL BE REPLACED BY THE CONTRACTOR AS DIRECTED BY THE DISTRICT.

37. CONTRACTOR SHALL COORDINATE AND NOTIFY THE DISTRICT 5 BUSINESS DAYS PRIOR TO WHEN WORK IS READY FOR INSPECTIONS. NO UNDERGROUND WORK SHALL BE BURIED PRIOR TO INSPECTION BY THE DISTRICT. THE PRESENCE OR ABSENCE OF THE DISTRICT WILL NOT RELIEVE THE CONTRACTOR OF FULL RESPONSIBILITY FOR THE PROPER PERFORMANCE OF WORK.

38. CONTRACTOR SHALL REMOVE AND LEGALLY DISPOSE OF ALL MATERIALS THAT ARE TO BE REMOVED FROM THE SITE, INCLUDING SURPLUS EXCAVATION MATERIALS AND DEBRIS. THE CONTRACTOR SHALL MAINTAIN THE SITE IN A SAFE, NEAT, AND ORDERLY CONDITION. THE CONTRACTOR SHALL DELIVER MATERIALS OR EQUIPMENT TO BE SALVAGED AND RETURNED TO THE DISTRICT AT THE LOCATION TO BE DETERMINED BY THE DISTRICT. MATERIALS MAY INCLUDE MECHANICAL/ELECTRICAL SYSTEMS THAT MAY BE DEMOLISHED AS PART OF THE WORK. REMOVED MATERIALS SHALL BE DISPOSED OF USING A LICENSED CARTING SERVICE.

39. ALL TRAFFIC CONTROL SHALL BE PERFORMED IN ACCORDANCE WITH LOCAL AND DISTRICT STANDARDS.

GENERAL NOTES (CONTINUED)

40. CONTRACTOR SHALL COMPLY WITH ALL STATE AND COUNTY LAWS AND ORDINANCES RELATING TO SAFETY AND CHARACTER OF WORK, EQUIPMENT, AND LABOR PERSONNEL. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO CONFORMANCE TO TRAFFIC CONTROL REQUIREMENTS, INCLUDING PROVISIONS AND MAINTENANCE OF BARRICADES, TRENCH COVERS, AND PREPARATION AND IMPLEMENTATION OF TRAFFIC CONTROL PLANS AS REQUIRED.

41. MANHOLE ENTRY AND/OR ENTRY TO ANY EXCAVATION OR STRUCTURE GREATER THAN FOUR (4) FEET DEEP SHALL BE IN FULL COMPLIANCE WITH THE CONFINED SPACE ENTRY REQUIREMENTS OF CALIFORNIA AND FEDERAL OSHA.

42. CONTRACTOR SHALL PREPARE A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) FOR THE PROJECT. CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING, ADHERING TO, AND MAINTAINING THE SWPPP FOR THE DURATION OF THE PROJECT. THE SWPPP SHALL BE SUBMITTED TO THE DISTRICT FOR APPROVAL PRIOR TO THE START OF ANY WORK. THE DISTRICT MAY AT ANY TIME INSPECT AND OBSERVE COMPLIANCE WITH THE SWPPP.

43. CONTRACTOR SHALL PROVIDE TEMPORARY SECURITY FENCING FOR THE STAGING AREA. STAGING AREA LOCATION SHALL BE COORDINATED AND APPROVED BY THE DISTRICT. THE DISTRICT SHALL NOT BE RESPONSIBLE FOR SITE SECURITY.

44. CONTRACTOR SHALL POTHOLE TO EXPOSE ALL EXISTING PIPING AT UTILITY CROSSINGS AND PROPOSED CONNECTIONS TO DEVELOP INFORMATION TO FACILITATE PIPE FABRICATIONS AND CONNECTIONS. EXPOSURE AND MEASUREMENT SHALL OCCUR PRIOR TO PIPING SHOP DRAWING SUBMITTALS.

45. IN THE CASE OF AN INCONSISTENCY BETWEEN PLANS AND DOCUMENTS NOT CLARIFIED BY ADDENDUM, THE BETTER QUALITY OR GREATER QUANTITY OF WORK SHALL CONTROL.

46. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.

47. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE CONTRACT DRAWINGS.

48. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS, AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.

49. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING, AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE DISTRICT.

50. THE CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.

51. THE CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.

52. THE AREAS OF THE DISTRICT'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.

53. EQUIPMENT AND DEVICES SPECIFIED IN THESE CONTRACT DRAWINGS SHALL BE PROVIDED BY THE CONTRACTOR OR AN APPROVED EQUIVALENT APPROVED BY THE DISTRICT.

GRADING

1. ALL SURFACE DRAINAGE SHALL BE DIRECTED BY GRADING AT A POSITIVE GRADIENT AWAY FROM ANY PROPOSED SLABS OR FOUNDATIONS AND SHALL NOT BE REDIRECTED TOWARD ANY EXISTING STRUCTURES.

EQUIPMENT SHIPMENT & STORAGE

1. ALL EQUIPMENT SHALL BE CAREFULLY PROTECTED FOR SHIPPING. ALL OPENINGS SHALL BE PROTECTED BY PLYWOOD SECURELY FASTENED TO THE FRAMEWORK OF THE EQUIPMENT. EQUIPMENT SHALL BE ADEQUATELY COVERED DURING LOCAL DELIVERY.

2. FROM THE TIME OF RECEIPT UNTIL THE EQUIPMENT IS ENERGIZED FOR CONSTRUCTIVE PLANT OPERATIONS UNLESS SUCH EQUIPMENT IS BEING WORKED ON, EQUIPMENT SHALL BE CONSIDERED IN STORAGE. WHILE IN STORAGE, A 120V SINGLE-PHASE POWER SOURCE SHALL BE AVAILABLE AND CONNECTED TO THE SPACE HEATERS IN ALL EQUIPMENT ITEMS SO EQUIPPED.

3. UNLESS STORED INDOORS, EQUIPMENT SHALL BE AT LEAST 1 FOOT ABOVE GRADE COVERED WITH AT LEAST TWO LAYERS OF HEAVY POLYETHYLENE PLASTIC SHEETS AND ANCHORED TO PREVENT DAMAGE BY HIGH WINDS. ALL EQUIPMENT SHALL BE PROTECTED FROM DUST AND MOISTURE PRIOR TO AND DURING CONSTRUCTION. THE CONTRACTOR IS CAUTIONED THAT CONCRETE FINISHING AND PAINTING, ETC., IN THE VICINITY OF THE EQUIPMENT SHALL NOT PROCEED IF UNPROTECTED EQUIPMENT IS INSTALLED

4. THE CONTRACTOR SHALL BEAR COMPLETE RESPONSIBILITY FOR THE PROTECTION OF DISTRICT-SUPPLIED AND CONTRACTOR-SUPPLIED EQUIPMENT PRIOR TO FINAL ACCEPTANCE BY THE DISTRICT OF THE WORK. WHEN ALL THE OTHER WORK IN THE AREA IS COMPLETE, AND AFTER ELECTRICAL EQUIPMENT TESTING IS COMPLETE, THE CONTRACTOR SHALL REPAIR BY SPRAY PAINTING, AFTER PROPERLY PREPARING THE SURFACE, ALL SCRATCHES OR DEFECTS IN THE FINISH OF THE EQUIPMENT. ONLY IDENTICAL PAINT FURNISHED BY THE EQUIPMENT MANUFACTURER SHALL BE USED FOR SUCH PURPOSES.

ALL GENERAL NOTES APPLY TO ALL SHEETS OF THESE CONTRACT DOCUMENTS, AS IF THEY WERE WRITTEN IN THE ENTIRETY ON EACH SHEET.

USER:KOOSHA TOOFAN
DATE:9/4/2025 12:31 PM
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REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — 20418 — Exp. SEPT. 30, 2027 — Electrical Engineer — STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN
DESIGN CHECKED BY: JOHN GUILLORY
DRAWN BY: KOOSHA TOOFAN
SR. PROJ ENGR. R.P.E. NO.: 20418
APPROVED: KOOSHA TOOFAN
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

GENERAL PROJECT NOTES

PROJ NO.		
SCALE: AS SHOWN	100-Z-011.2	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

SPEC NO.2197

ELECTRICAL GENERAL NOTES

1. PROVIDE FIRE STOPPING SYSTEMS FOR CONDUIT AND RACEWAY SYSTEMS AT PENETRATIONS, SLEEVES, AND SLOTS OF FIRE RATED CONSTRUCTION FOR HORIZONTAL AND INTRABUILDING PATHWAYS AND SPACES.
2. ALL HOLES THROUGH MASONRY SHALL BE MADE WITH CORE DRILLS IF NOT SLEEVED THROUGH THE WALLS. IF CONDUITS REQUIRE CORE DRILLING, OTHER METHODS SUCH AS CHISELING OR HAMMERED OUT OPENINGS ARE NOT ACCEPTABLE. THE HOLES SHALL BE MADE NO LARGER THAN ¼ LARGER DIAMETER THAN THE CONDUIT. ALL OPENINGS SHALL BE GROUTED USING CONSTRUCTION-GRADE NON-SHRINK GROUT WHERE INSTALLED THROUGH CONCRETE AND CAULKED USING CONSTRUCTION-GRADE NATURAL CURE SILICONE CAULK WHERE INSTALLED THROUGH SIDING MATERIALS IF SHOWN, DRYWALL OR OTHER FINISHES ABOVE FINISH GRADE.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ROUTING ALL CONDUITS NOT SHOWN ON THE PLANS. THIS SHALL INCLUDE ALL CONDUITS SHOWN ON THE ONE-LINES AND HOME-RUNS SHOWN ON THE PLAN DRAWINGS.
4. ALL CONDUITS LEAVING OR ENTERING PANELS, ENCLOSURES, AND SWITCHBOARDS FROM EXTERIOR OR COLD AREAS SHALL BE DUCT SEALED AT BOTH ENDS.
5. ALL INDOOR BUILDING CONDUIT PENETRATIONS INTO TOP, SIDE, OR BOTTOM OF ELECTRICAL ENCLOSURES ARE REQUIRED TO BE MADE USING MYERS HUBS FOR TERMINATION OF ELECTRICAL CIRCUITS.
6. ALL OUTDOOR BUILDING CONDUIT PENETRATIONS INTO SIDE OR BOTTOM OF ELECTRICAL ENCLOSURES ARE REQUIRED TO BE MADE USING WATERTIGHT MYERS HUBS FOR TERMINATION OF ELECTRICAL CIRCUITS. TOP CONDUIT PENETRATIONS INTO OUTDOOR INSTALLED ENCLOSURES IS PROHIBITED.
7. WHEN CONNECTIONS ARE COMPLETE IN THE CONNECTION BOX, COAT THE TERMINAL BLOCKS AND WIRE ENDS WITH PROTECTIVE COMPOUND, NO-OXIDE OR EQUAL, TO PREVENT CORROSION.
8. ALL PULL BOXES SHALL BE SIZED AS REQUIRED, WITH A MINIMUM SIZE OF 12” x 10” x 8”, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH NEC SECTION 314.28.
9. USE STAINLESS STEEL FASTENERS FOR MOUNTING OF JUNCTION BOXES OR OTHER DEVICES.
10. PROVIDE EQUIPMENT SUPPORTS, PIPE, AND DUCT HANGERS, AS REQUIRED TO SAFELY AND PERMANENTLY CARRY THE WEIGHT OF EQUIPMENT.
11. FACTORY SWEEPS SHALL BE USED AT ALL CONDUIT BENDS. FIELD BENDS ARE NOT ACCEPTABLE. WHEN FACTORY SWEEPS ARE UNAVAILABLE, SWEEPS SHALL BE SIZED TO MEET MINIMUM CABLE BENDING RADIUS OF 12 TIMES CABLE OUTER DIAMETER AND MAXIMUM SIDEWALL PRESSURE REQUIREMENTS.
12. PULL CABLES USING SUFFICIENT LUBRICATION PER CABLE MANUFACTURER’S RECOMMENDATIONS.
13. ALL BREAKERS SHALL HAVE TERMINALS RATED A MINIMUM OF 75°C.
14. ALL POWER CONDUCTORS FOR 480V AND BELOW SYSTEMS SHALL BE 600 VOLT RATED, STRANDED COPPER WITH TYPE THHN/THWN-2 INSULATION.
15. UNLESS SHOWN OTHERWISE, ALL LIGHTING & RECEPTACLE HOMERUNS SHALL BE 3/4" CONDUIT CONTAINING (AS A MINIMUM) (2) #12 AND (1) #12 GROUND.
16. SPARE WIRES SHALL BE TAPED AND COILED.
17. ALL WIRING (INTERNAL AND EXTERNAL) SHALL BE TAGGED AT BOTH ENDS WITH PREPRINTED WIRE MARKERS. THE CONTRACTOR SHALL SUBMIT THE WIRE MARKING CODE TO THE DISTRICT FOR ACCEPTANCE PRIOR TO THE MANUFACTURE OF THE EQUIPMENT.
18. LOCKOUT AND TAGOUT PROCEDURE SHALL BE COORDINATED WITH THE DISTRICT. LIVE/ENERGIZED WORK IS NOT ALLOWED WITHOUT PRIOR APPROVAL OF THE DISTRICT.
19. CONNECTORS FOR 480V AND BELOW RATED POWER CONDUCTORS: CONTRACTOR SHALL USE PRESSURE TYPE INSULATED TWIST-ON CONNECTORS FOR NO. 10 AWG AND SMALLER. USE SOLDERLESS MECHANICAL TERMINAL LUGS FOR NO. 8 AWG AND LARGER.
20. ALL WIRING INSTALLATIONS TO FOLLOW MANUFACTURER’S INSTRUCTIONS AND RECOMMENDATIONS.
21. THE CORRECTION OF ANY DEFECTS SHALL BE COMPLETED WITHOUT ANY ADDITIONAL CHARGE AND SHALL INCLUDE THE REPLACEMENT OR THE REPAIR OF ANY OTHER PHASE OF THE INSTALLATION, WHICH MAY HAVE BEEN DAMAGED THEREIN.
22. ALL ABOVE-GROUND RACEWAYS SHALL BE GALVANIZED RIGID STEEL (GRS) CONDUIT. ALL UNDERGROUND CONDUITS SHALL BE SCHEDULE 40 RIGID PVC. CONDUITS TRANSITIONING FROM BELOW GRADE TO ABOVE GRADE SHALL BE PVC-COATED RIGID STEEL CONDUIT, EXTENDING A MINIMUM OF 18 INCHES ABOVE FINISHED GRADE BEFORE CONTINUING AS GALVANIZED RIGID STEEL (GRS) CONDUIT.

MODULAR PLC PROGRAMMING & TESTING

1. CONTRACTOR SHALL PROVIDE NECESSARY PROGRAMMING OF MODULAR PLC SYSTEM TO FACILITATE INCORPORATION OF ANY DISCRETE AND ANALOG I/O INSTALLED IN THIS PROJECT ALONG WITH DEVICE CONNECTED VIA COMMUNICATING CABLING (ETHERNET).
2. COORDINATE WITH DISTRICT FOR THE INCORPORATION OF MODULAR PLC I/O AND DATA INTO DISTRICT OWNED AND PROGRAMMED SCADA SYSTEM.
3. CONTRACTOR SHALL FULLY FUNCTION TEST ALL I/O AND COMMUNICATION CABLE CONNECTED DEVICES FOR PROPER OPERATION. COORDINATE WITH DISTRICT FORCES FOR ANY ADDITIONAL FUNCTION TESTING AND COMMISSIONING SUPPORT FOR INCORPORATION OF MODULAR PLC SYSTEM INTO THE OVERALL SCADA NETWORK.

GROUNDING NOTES

1. GROUND RODS FOR THIS PROJECT SHALL BE ¾” X 10’ COPPER CLAD STEEL, UNLESS NOTED OTHERWISE.
2. MULTIPLE ROD GROUNDING SYSTEMS SHALL BE CONNECTED TOGETHER WITH 4/0 BARE STRANDED COPPER CABLE. ALL BELOW GROUND CONNECTIONS SHALL BE EXOTHERMIC WELDED (CADWELD).
3. PROVIDE 1” PVC CONDUIT SLEEVES FOR GROUNDING CABLE PENETRATIONS THROUGH CONCRETE FLOORS AND/OR WALLS.
4. CONNECTING SURFACES OF STEEL AND CABLES SHALL BE THOROUGHLY CLEANED TO BRIGHTNESS AND PREPARED PRIOR TO COMPLETING THE CONNECTION.
5. LOCATION OF GROUND RODS AND GROUNDING CABLE SHOWN ON GROUNDING PLAN DRAWING IS APPROXIMATE, UNLESS LOCATED BY DIMENSIONS. FIELD DETERMINE EXACT LOCATIONS TO SUIT JOB SITE CONDITIONS AND TO AVOID OBSTRUCTIONS. BRANCH GROUNDING CABLE CONNECTION TO MAIN GROUNDING CABLE SHALL BE TEE TAP AS SHOWN IN THE CONSTRUCTION DRAWINGS. INSTALL UNDERGROUND GROUNDING CABLE, IN GENERAL, A MINIMUM TWENTY-FOUR (24) INCHES BELOW FINISHED GRADE.
6. COMPLETELY AND EFFECTIVELY GROUND ELECTRICAL EQUIPMENT AS REQUIRED BY THE NEC AND EQUIPMENT MANUFACTURER.
7. TOP OF GROUND RODS SHALL BE EMBEDDED 12” MINIMUM BELOW GRADE.
8. A GROUND CONDUCTOR SIZED PER NEC ARTICLE 250 IS REQUIRED IN ALL CONDUITS.
9. ALL CONDUITS SHALL INCLUDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR.
10. LABEL ALL CONNECTIONS AT GROUND BUSBARS, EQUIPMENT, AND TEST WELLS. APPLY METAL TAGS TO CABLES; LABELS SHALL INDICATE CABLE PURPOSE AND POINT OF TERMINATION FOR THE OPPOSITE END OF CABLE.
11. ALL REQUIRED BONDS MAY NOT BE SHOWN; PROVIDE ADDITIONAL BONDS TO ALL DEVICES, INSTRUMENTS, CABINETS, CONTROL VALVES, ETC. AS REQUIRED TO COMPLY WITH UL AND NEC.
8. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS, AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
9. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATH POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
10. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTION TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
11. ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS, AND EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION, BEFORE BEING PERMANENTLY CONCEALED.
12. ALL EXISTING GROUND BARS, WIRES, AND CONNECTIONS SHALL BE FIELD VERIFIED. ANY DEFICIENT ITEMS SHALL BE REPLACED AS REQUIRED TO ACHIEVE ADEQUATE GROUNDING REQUIRED
13. CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTOR'S EXPENSE.
14. ALL STEEL STRUCTURES AND ALL MISCELLANEOUS STEEL, INCLUDING LIGHT FRAMEWORK, STEEL SUPPORT STRUCTURES, AND METAL BUILDINGS, SHALL BE SOLIDLY CONNECTED TO THE EXISTING GROUNDING ELECTRODE SYSTEM WITH 4/0 BARE COPPER GROUND CABLE.

FIELD SERVICES & TRAINING

1. UPON REQUEST AND CONFIRMATION OF DISTRICT, CONTRACTOR SHALL COORDINATE WITH VENDORS TO PROVIDE MANUFACTURER’S FIELD SERVICES AND OPERATOR TRAINING FOR UP TO ONE (1) 2-HOUR SESSION UPON COMPLETION OF START-UP AND COMMISSIONING.
2. THE TRAINING DATE SHALL BE SELECTED BY THE DISTRICT. THE CONTRACTOR SHALL PROVIDE WRITTEN CONFIRMATION TO THE DISTRICT AT LEAST TWO (2) WEEKS BEFORE THE TRAINING IS HELD. AT THE SAME TIME, THE CONTRACTOR SHALL SUBMIT A TRAINING AGENDA, SPECIFIC TO THE PROJECT AND THE APPLICABLE SECTION. THE AGENDA SHALL INCLUDE A DETAILED COURSE OVERVIEW, COURSE OBJECTIVES, A COURSE OUTLINE, AND THE ESTIMATED DURATION OF EACH TOPIC.
3. CONTRACTOR SHALL ARRANGE FOR AND SECURE A VIDEOGRAPHER TO DIGITALLY RECORD AND PROFESSIONALLY EDIT THE TRAINING SESSION FOR EACH INSTALLED EQUIPMENT, SYSTEM, AND FACILITY. FINALIZED VIDEOS SHALL BE PROVIDED IN MP4 FORMAT BY ELECTRONIC TRANSFER.
4. THE TRAINING SHALL INCLUDE, BUT IS NOT LIMITED TO, THE GENERATOR, SWITCHBOARD, ATS, CONTROL PANEL, AND ASSOCIATED EQUIPMENT. IT SHALL ALSO PROVIDE A THOROUGH REVIEW OF THE FINAL APPROVED O&M MANUAL, DRAWINGS, AND DIAGRAMS (E.G., CONTROL WIRING), WITH TOPICS SPECIFICALLY ADDRESSING THE MAINTENANCE AND OPERATION OF ALL APPLICABLE EQUIPMENT, SYSTEMS, AND FACILITIES.

ELECTRICAL TESTING REQUIREMENTS

GENERAL FIELD TESTING

1. INSTALLATION OF THE ELECTRICAL EQUIPMENT SHALL BE COMPLETE AND THE ENGINE-GENERATOR PACKAGE SYSTEM SHALL BE SERVICED, ADJUSTED, AND READY FOR USE BEFORE THE FIELD TESTS ARE SCHEDULED.
2. REPAIRS AND ADJUSTMENTS SHALL BE MADE BY THE CONTRACTOR AS REQUIRED TO ACHIEVE SATISFACTORY PERFORMANCE OF THE ELECTRICAL EQUIPMENT. IF REPAIRS OR ADJUSTMENTS ARE MADE DURING THE TESTS, ADDITIONAL TESTING SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE DISTRICT.
3. RECORDS OF THE TESTS SHALL BE MADE BY THE CONTRACTOR, AND COPIES OF THE TEST RECORDS SHALL BE SUBMITTED TO THE ENGINEER.
4. THE CONTRACTOR SHALL SUBMIT DETAILED FIELD TEST PROCEDURES TO THE ENGINEER FOR REVIEW. TESTS SHALL NOT BEGIN UNTIL THE ENGINEER HAS APPROVED THE TEST PROCEDURES.
5. THE SUPPLIER SHALL PROVIDE ALL LABOR, TOOLS, TEST EQUIPMENT, SOFTWARE, FUEL, LABOR, MATERIAL AND TECHNICAL SUPERVISION TO PERFORM THE FIELD TESTING UNDER THIS TESTING REQUIREMENT SECTION, UNLESS SPECIFICALLY NOTED OTHERWISE.
6. THE ONSITE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING AND TERMINATING FIELD WIRING AND COMMUNICATION CABLE(S) TO THE EQUIPMENT SUPPLIED UNDER THIS CONTRACT FROM FIELD DEVICES AND OTHER EQUIPMENT. THE SUPPLIER FIELD TECHNICIANS SHALL COORDINATE WITH THE ELECTRICAL CONTRACTOR AND HIS ONSITE TESTING AGENCY IN VERIFYING PROPER INPUT, REGISTRATION, AND SCALING OF ALL HARDWIRED I/O TO THE CONTROL PANEL.
7. THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A RECOGNIZED TESTING SERVICE AGENCY FOR THE PURPOSE OF PERFORMING INSPECTIONS AND TESTS FOR EQUIPMENT SAFETY AND OPERABILITY, AND FUNCTIONALLY VERIFY THE CONTROL SYSTEM OPERATES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
8. THE INTENT OF THESE TESTS IS TO ASSURE THAT ALL ELECTRICAL EQUIPMENT INSTALLED BY THE CONTRACTOR UNDER THIS CONTRACT IS OPERATIONAL WITHIN INDUSTRY AND MANUFACTURER'S TOLERANCES AND TO FUNCTIONALLY TEST ALL NEW SYSTEMS AND THEIR INTEGRATION WITH EXISTING SYSTEMS, WHICH INCLUDES ALL NEW EQUIPMENT INTERFACING WITH THE EXISTING AUTOMATIC TRANSFER SWITCH AND EXISTING SCADA SYSTEM. NEW EQUIPMENT TO BE TESTED INCLUDE THE NEW SWITCHBOARD (SWBD-01), NEW AUTOMATIC TRANSFER SWITCH (ATS-01) AND EMERGENCY GENERATOR (EGEN-01), AND NEW CONTROL PANEL (CPNL-01) WITH PLC (PLC-01).
9. CONTRACTOR SHALL SUBMIT PROOF OF TESTING SERVICE AGENCY'S QUALIFICATIONS TO DISTRICT FOR APPROVAL.
10. THE CONTRACTOR AND THE ELECTRICAL TESTING SERVICE AGENCY SHALL RESOLVE ANY DEFICIENCIES AND RETEST IN A TIMELY MANNER TO FACILITATE THE PROJECT START-UP AND OPERATION.
11. THE CONTRACTOR SHALL PERFORM ROUTINE INSULATION RESISTANCE, CONTINUITY, AND ROTATION TESTS FOR ALL DISTRIBUTION AND UTILIZATION EQUIPMENT.
12. ANY SYSTEM MATERIAL OR WORKMANSHIP WHICH IS FOUND DEFECTIVE ON THE BASIS OF ELECTRICAL TESTS SHALL BE REPLACED AND RETESTED AT NO ADDITIONAL COST TO THE DISTRICT.
13. THE TESTING SERVICE SHALL MAINTAIN A WRITTEN RECORD OF ALL TESTS AND UPON COMPLETION OF THE PROJECT, AND ASSEMBLE AND CERTIFY A FINAL TEST REPORT.
14. THE INSPECTIONS AND TESTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE FOLLOWING APPLICABLE CODES AND STANDARDS FOR THE GENERATOR, SWITCHBOARD AND COMPONENTS WITHIN, ATS, LOW-VOLTAGE CABLING, AND COMMUNICATION CABLING. INCLUDE ALL REQUIRED AND OPTIONAL TESTS AS THEY APPLY TO THE STANDARDS. THE TESTING STANDARDS ARE AS FOLLOWS:
    - 14.1. INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA), ATS-2003 ACCEPTANCE TESTING SPECIFICATIONS FOR ELECTRICAL POWER DISTRIBUTION EQUIPMENT AND SYSTEMS.
    - 14.2. NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION - NEMA
    - 14.3. AMERICAN SOCIETY FOR TESTING AND MATERIALS - ASTM
    - 14.4. INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS - IEEE
    - 14.5. AMERICAN NATIONAL STANDARDS INSTITUTE - ANSI
    - 14.6. STATE AND LOCAL CODES AND ORDINANCES
    - 14.7. INSULATED CABLE ENGINEERS ASSOCIATION - ICEA
    - 14.8. OSHA PART 1910; SUBPART S, 1910.308
    - 14.9. NATIONAL FIRE PROTECTION ASSOCIATION - NFPA

ELECTRICAL TESTING REQUIREMENTS (CONTINUED)

ON-SITE GENERATOR / ATS / LOAD BANK TESTING REQUIREMENTS

- ELECTRICAL TESTING CANNOT BEGIN UNTIL DISTRICT COMPLETES ALL WIRING AND PROGRAMMING FOR INTEGRATION OF NEW EQUIPMENT AND DEVICES INTO SCADA. CONTRACTOR SHALL COORDINATE WITH THE DISTRICT OVER THE TESTING SCHEDULING.
- ON UTILITY POWER, BRING ALL LOADS TO MAX SPEEDS/FLOWS.
- SIMULATE LOSS OF UTILITY BY TRIPPING SWITCHBOARD (SWBD-01) 1000A-3P MAIN BREAKER.
- OBSERVE ATS-01 SWITCH TO EMERGENCY AND EGEN-01 STARTUP.
- OBSERVE EGEN-01 CAPABLE OF STARTING ALL LOADS AT MAX SPEEDS/FLOWS.
- WAIT 2-HOURS WITH EMERGENCY POWER RUNNING.
- SIMULATE RETURN OF UTILITY POWER BY CLOSING SWITCHBOARD (SWBD-01) 1000A-3P MAIN BREAKER.
- OBSERVE ATS-01 TRANSFER BACK TO NORMAL AFTER SOME TIME DELAY.
- OBSERVE ATS-01 RUNNING EGEN-01 FOR X MINUTES OF "COOL DOWN".
- DURING THE TEST, OBSERVE EGEN-01 POWER OUTPUT ON EGEN-01 CONTROLLER DISPLAY AND VERIFY COMMUNICATION SIGNALS PRESENT AT SCADA. ALSO, VERIFY EXISTING SCADA DFS RECEIVES STATUS OF ATS-01 IN EMERGENCY. VERIFY ALL HARDWIRE AND COMMUNICATION CABLE I/O ADDED PER THIS CONTRACT IS AVAILABLE IN EXISTING SCADA SYSTEM. THIS INCLUDES YORK CHILLER, UV PANEL, FILTRATION PANEL, ATS-02, EGEN-02, ATS-01, EGEN-01, AND LB-01 I/O. PROGRAMMING OF EXISTING SCADA SYSTEM FOR INTEGRATION OF THESE I/O TO BE BY OTHERS IN COORDINATION WITH THE CONTRACTOR.
- SIMULATE NEW ATS-01/EGEN-01 FAILED/UNAVAILABLE BY OPENING NEW EGEN-01 BREAKER. SIMULATE LOSS OF PRIMARY EMERGENCY POWER BY OPENING EGEN-01 800A-3P MAIN BREAKER. OBSERVE AFTER GENERATOR SUPPLIER COORDINATED TIME DELAY THE TRANSITION TO EMERGENCY AND STARTING OF EXISTING ATS-02/EGEN-02 FOR YORK CHILLER. AFTER VERIFICATION OF ATS-02/EGEN-02 OPERATION, SIMULATE RETURN OF ATS-01/EGEN-01 BY CLOSING EGEN-01 800A-3P BREAKER. OBSERVE ATS-01 TRANSFER TO EGEN-01, OBSERVE ATS-02 TRANSFER TO 'NORMAL'. RETURN TO UTILITY BY CLOSING SWITCHBOARD (SWBD-01) 1000A-3P MAIN BREAKER.
- TEST THE LOAD BANK FOR EGEN-01 AT BELOW 30% OF THE GENERATOR'S FULL LOAD AND ABOVE 30% TO VERIFY ITS OPERATION. WHEN THE GENERATOR OPERATES BELOW 30% OF ITS FULL LOAD, THE LOAD BANK SHALL MAINTAIN A MINIMUM OF 30% LOAD ON THE GENERATOR. WHEN THE GENERATOR OPERATES ABOVE 30% LOAD, THE LOAD BANK SHALL NOT OPERATE. ALL LOAD BANK STEPS SHALL BE TESTED.
- TEST ALL EXISTING EQUIPMENT CONNECTED TO THE NEW SWITCHBOARD (SWBD-01) FOR FULL OPERATION.

START-UP TESTING

THE SUPPLIER SHALL PERFORM THOROUGH START-UP TESTING IN COORDINATION WITH THE DISTRICT. THE DESIGNATED SUPPLIER COMMISSIONING ENGINEER SHALL BE RESPONSIBLE FOR SUBMITTAL OF TEST PROCEDURES, TEST SCHEDULING AND COORDINATION, AND DOCUMENTATION AND SUBMITTAL OF TEST RESULTS. START-UP TESTS SHALL INCLUDE:

A. POINT-TO-POINT WIRE CHECKING OF ALL PLC INPUT/OUTPUT CIRCUITS.

B. VERIFICATION OF PROPER FUNCTIONING OF ALL ANALOG I/O LOOPS.

C. VERIFY PROPER REGISTRATION, FUNCTIONING, AND DISPLAY/LOGGING OF ALL ALARMS.

D. WITH ALL OUTPUTS DISABLED, MANUALLY ACTIVATE EACH INPUT DEVICE AND CHECK FOR STATUS CHANGE AT THE APPROPRIATE INPUT POINT.

E. WITHOUT CAUSING ANY UNDESIRABLE ACTIONS TO OCCUR, USE “FORCING” TO VERIFY THAT EACH DISCRETE AND ANALOG OUTPUT IS PROPERLY ADDRESSED AND WIRED.

F. VERIFY PROPER COMMUNICATION, DATA EXCHANGE, AND CONTROL FUNCTIONALITY WITH OTHER ONSITE PLCS AND SCADA SYSTEMS. PROGRAMMING OF THESE OTHER SYSTEMS FOR TRANSMISSION/RECEPTION OF DATA, SET-POINTS AND CONTROL FUNCTIONALITY WILL BE BY OTHERS. SUPPLIER SHALL COOPERATE IN THE VERIFICATION OF END-TO-END FUNCTIONALITY AND INTEGRATION OF THESE SYSTEMS.

G. VERIFY PROPER OPERATION OF CONTROL SYSTEM TO LOSS OF COMMUNICATION AND DETECTION, ALARMING, AND RECOVERY FROM COMMUNICATION FAILURE.

H. SCHEDULE AND PERFORM DEMONSTRATION TESTING OF ALL I/O TO BE WITNESSED BY DESIGNATED DISTRICT’S REPRESENTATIVE.

USERKOOSHA TOOFAN
DATE:9/2/2025 1:50 PM
FILE: Z:\OBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN SERVICES\01-DRAFTING\1-WORKING\100-Z-011.3 - ELECTRICAL PROJECT NOTES - 1.DWG

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REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — No. 20418 — Exp. 06/30/2027 — Electrical Engineer — STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN	
DESIGN CHECKED BY: JOHN GUILLORY	
DRAWN BY: KOOSHA TOOFAN	
SR. PROJ ENGR. R.P.E. NO.: 20418	
APPROVED: KOOSHA TOOFAN	
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418	

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

ELECTRICAL PROJECT NOTES

PROJ NO.	100-Z-011.3	0
SCALE: AS SHOWN		
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

SPEC NO.2197

FIELD QUALITY CONTROL FOR WIRE/CABLE INSTALL

AFTER INSTALLING CONDUCTORS AND CABLES AND BEFORE ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, PERFORM THE FOLLOWING VISUAL AND MECHANICAL INSPECTIONS:

- VERIFY CABLES AND CONDUCTORS COMPLY WITH THE CONTRACT DOCUMENTS.
- VERIFY CABLES AND CONDUCTORS ARE BRACED FOR SHORT CIRCUIT STRESSES WHERE SPECIFIED.
- VERIFY CABLES AND CONDUCTORS ARE CORRECTLY IDENTIFIED AT EACH TERMINATION, SPLICE, AND TAP WHERE APPLICABLE.
- VERIFY CORRECT PHASE ROTATION IS MAINTAINED THROUGHOUT PROJECT.
- INSPECT ALL EXPOSED SECTIONS OF CABLES AND CONDUCTORS FOR PHYSICAL DAMAGE AND CORRECT CONNECTION.
- INSPECT ALL BOLTED AND COMPRESSION CONNECTIONS.
- VERIFY PHASE IDENTIFICATION IS A, B, C, LEFT TO RIGHT, FRONT TO BACK AND TOP TO BOTTOM. IF CORRECTIONS ARE REQUIRED CHANGE FEEDER AND BRANCH CIRCUIT IDENTIFICATION AT EACH END OF CIRCUIT SO THAT CORRECT PHASE IDENTIFICATION IS MAINTAINED THROUGHOUT THE PROJECT. IF INCORRECT IDENTIFICATION IS NOTED ON EXISTING SYSTEMS NOTIFY THE ENGINEER AND DISTRICT FOR ACTION TO BE TAKEN.

DATA & COMMUNICATION CABLE

1. DATA AND COMMUNICATION CABLES SHALL BE USED FOR DATA EXCHANGE THROUGHOUT THE WORK. MAJOR CATEGORIES AND TYPES OF DATA AND COMMUNICATION CABLES ARE LISTED BELOW IN NOTE #2. ADDITIONAL SPECIAL CABLES IN COMPLIANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS AND THE REQUIREMENTS OF THE WORK SHALL BE PROVIDED AS NECESSARY.
2. CATEGORY 6E ETHERNET CABLE: CATEGORY 6E ETHERNET CABLE SHALL CONSIST OF FOUR (4) CATEGORY 6E BONDED, TWISTED PAIRS, #23 AWG SOLID COPPER WITH POLYOLEFIN INSULATION AND OVERALL PVC JACKET. CABLE SHALL HAVE OVERALL FOIL SHIELD. CABLE SHALL BE BELDEN #2413 OR APPROVED EQUAL.

FIBER OPTIC CABLE

1. FIBER OPTIC CABLE IN DUCT: FIBER CABLE SHALL BE OF THE HEAVY-DUTY, LOOSE-TUBE TYPE, INTENDED FOR OUTDOOR USE IN DIRECT BURIAL, DUCT, CABLE TRAY, OR AERIAL APPLICATIONS. CABLE SHALL BE DOUBLE-JACKETED WITH AN OUTER AND INNER MDPE JACKET SEPARATED BY A FIBERGLASS STRENGTH MEMBER. FIBER COUNT SHALL BE SIX (6) MULTIMODE, 62.5MM OPTICAL FIBERS PER CABLE. FIBER SHALL BE INSTALLED IN 2.5M DIAMETER, GEL-FILLED BUFFER TUBES. BUFFER TUBES SHALL BE GROUPED SYMMETRICALLY AROUND A DIELECTRIC CENTRAL STRENGTH MEMBER AND SURROUNDED BY A WATER BLOCKING AGENT. CABLE SHALL BE SUITABLE FOR A MAXIMUM 600LB INSTALLATION TENSION. FIBER OPTIC CABLE OPERATING TEMPERATURE RANGE SHALL BE -40°C TO +80°C.
2. THE FIBER OPTIC CABLE SHALL MEET THE FOLLOWING SPECIFICATIONS AT 850NM AND 1300NM WAVELENGTHS. AT 850NM, THE MAXIMUM ATTENUATION SHALL NOT EXCEED 3.5DB/KM, WITH A MINIMUM BANDWIDTH OF 220MHZ-KM AND A MAXIMUM GIGABIT TRANSMISSION DISTANCE OF 300 METERS. AT 1300NM, THE MAXIMUM ATTENUATION SHALL NOT EXCEED 1.0DB/KM, WITH A MINIMUM BANDWIDTH OF 600MHZ-KM AND A MAXIMUM GIGABIT TRANSMISSION DISTANCE OF 550 METERS.

SWITCHBOARD (SWBD-01) NOTES

1. IFS POW-R-LINE XPERT SWITCHBOARD, FRONT ACCESS/ FRONT AND REAR ALIGN, TYPE 3R (NONWALK-IN) FLAT ROOF, 480Y/277V 3-PHASE 4-WIRE, 1200 SILVER PLATED COPPER, MINIMUM INTERRUPTING RATING: 65KA, BUS BRACING RATING: 65KA.
2. 1000A UTILITY METERING - PACIFIC GAS & ELECTRIC (PG&E).
3. SWITCHBOARDS SHALL BE NEMA 3R OUTDOOR TYPE, FREE-STANDING, FRONT ACCESSIBLE, AND FRONT AND REAR ALIGNED WITH DEPTH AS SHOWN ON THE DRAWINGS. SIDE ACCESS SHALL NOT BE REQUIRED. ALL CONNECTIONS, LOAD TERMINATIONS, AND BUS MAINTENANCE SHALL BE ACCESSIBLE FROM THE FRONT OR THE TOP. ALL PROTECTIVE DEVICES SHALL BE GROUP-MOUNTED, FRONT REMOVABLE, AND ARRANGED TO PERMIT AGAINST-THE-WALL MOUNTING.
4. CIRCUIT BREAKER SHALL BE CAPABLE OF BEING RACKED IN OR OUT WITH THE COMPARTMENT DOOR CLOSED. A MECHANICAL INDICATOR SHALL BE PROVIDED ON THE DRAWOUT CASSETTE TO SHOW BREAKER POSITION STATUS AS EITHER "CONNECTED," "TEST," OR "DISCONNECTED."
5. CIRCUIT BREAKER SHALL BE ELECTRICALLY OPERATED AT 120VAC FROM THE CONTROL POWER TRANSFORMER INTERNAL TO THE SWITCHGEAR ASSEMBLY. BREAKER OPERATING MECHANISM SHALL BE ELECTRICALLY CHARGED, STORED ENERGY TYPE. CHARGING MOTOR SHALL INCLUDE A LIMIT SWITCH FEATURE AND AN ANTI-PUMP RELAY. MAKE PROVISIONS FOR MANUAL CHARGING OF THE MECHANISM AND FOR SLOW CLOSING OF THE CONTACTS FOR INSPECTION AND ADJUSTMENT.
6. A MANUFACTURER'S PLAQUE SHALL BE FASTENED TO THE FRONT OF THE SWITCHGEAR. THE PLAQUE SHALL INDICATE MODEL NUMBER, SERIAL NUMBER, AMPERES, VOLTS, SHORT CIRCUIT RATING, ETC.
7. PROVIDE INTERIOR LED LIGHTS AND LIGHT SWITCH. POWER FOR THE SPACE HEATERS AND LIGHTS SHALL BE OBTAINED FROM THE CONTROL POWER TRANSFORMER WITHIN THE SWITCHGEAR.
8. PRIOR TO FABRICATION, SUBMIT THE FOLLOWING TO THE ENGINEER FOR APPROVAL: SHOP DRAWINGS OF THE PROPOSED EQUIPMENT DEMONSTRATING COMPLIANCE WITH THIS SPECIFICATION AND PG&E'S SERVICE REQUIREMENTS ("GREEN BOOK") FOR ELECTRIC SWITCHBOARDS: 0 THROUGH 600 VOLTS. THE ENGINEER WILL SUBMIT THESE SHOP DRAWINGS TO PG&E FOR APPROVAL. DRAWINGS SHALL INCLUDE THE DISTRICT'S NAME AND JOB LOCATION. UNDER NO CIRCUMSTANCES SHALL MANUFACTURING PROCEED WITHOUT BOTH PG&E AND ENGINEER APPROVAL OF THIS SUBMITTAL.

   EQUIPMENT SUBMITTALS SHALL ALSO INCLUDE ELEVATION AND PLAN VIEWS, COMPARTMENT ARRANGEMENTS, DIMENSIONS, WEIGHTS, SHIPPING SPLITS, AND METERING LAYOUTS. PROVIDE SINGLE-LINE DIAGRAMS AND POINT-TO-POINT COMPARTMENT WIRING DIAGRAMS FOR METERING, RELAY, AND CONTROL CIRCUITS, WITH WIRE AND TERMINAL NUMBERS CLEARLY INDICATED. INCLUDE DETAILS OF BUS MATERIALS, RATINGS, AND INSULATION. PRODUCT DATA SHEETS AND CATALOG NUMBERS SHALL BE SUBMITTED FOR CIRCUIT BREAKERS AND FINGER-SAFE FUSE SWITCHES USED IN CONTROL CIRCUITS, LISTING ALL OPTIONS, TRIP ADJUSTMENTS, AND ACCESSORIES FURNISHED SPECIFICALLY FOR THIS PROJECT. TIME-CURRENT CHARACTERISTIC CURVES FOR EACH PROTECTIVE DEVICE PROVIDED SHALL ALSO BE SUBMITTED. AN ITEMIZED BILL OF MATERIALS SHALL BE INCLUDED FOR ALL METERING, ACCESSORIES, AND CONTROL EQUIPMENT. SUBMITTAL TO INCLUDE WARRANTY AND MAINTENANCE INFORMATION.

   PRIOR TO DELIVERY, SUBMIT ANCHORING CALCULATIONS AND CERTIFICATION THAT THE SWITCHGEAR HAS BEEN DESIGNED AND CONSTRUCTED TO WITHSTAND SEISMIC FORCES, IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROJECT SPECIFICATIONS.

EMERGENCY GENERATOR (EGEN-01) NOTES

1. THE ENGINE GENERATOR UNIT SHALL BE DELIVERED INCLUDING UNLOADING AS APPLICABLE TO THE SITE.
2. GENERATOR ACCESSORIES INCLUDE BATTERIES, BATTERY CHARGER, BLOCK HEATER, THERMOSTATICALLY CONTROLLED STRIP HEATER, OUTPUT TERMINAL BOX, 100% RATED 480V 3-POLE 65KAIC SOLID STATE LSIG CIRCUIT BREAKER, CRITICAL SILENCER, FAILURE AND RUN RELAY, AIR CLEANER INDICATOR, AND GOVERNOR ELECTRONIC-SPEED CONTROL.
3. THE UL 2200 STATIONARY ENGINE GENERATOR SET SHALL BE SUPPLIED WITH ROOF MOUNTED LOAD BANK AND AUTOMATIC CONTROLLER. THE LOAD BANK SHALL BE RATED FOR 50% GENERATOR OUTPUT CAPACITY AND SHALL BE CAPABLE OF SWITCHING RESISTIVE ELEMENTS ACCORDING TO THE GENERATOR OUTPUT, IN A MINIMUM OF FOUR (4) STEPS. THE LOAD BANK SHALL BE COMPRISED OF RESISTIVE ELEMENTS AND CONTACTORS TO ACHIEVE ITS SWITCHING STAGES.
4. THE LOAD BANK SHALL BE SUPPLIED AND INSTALLED BY THE FACTORY OR DEALER, REMOVED FOR SHIPPING, AND REINSTALLED AT JOB SITE BY CONTRACTOR. THE GENERATOR SET SHALL BE SUPPLIED WITH A SOUND ATTENUATED ENCLOSURE, PROVIDING A SOUND LEVEL OF 75 DB(A) WHILE THE GENERATOR IS OPERATING AT 100% LOAD AT 7 METERS (23 FEET).
5. LOAD BANK SHALL BE CONFIGURED TO MAINTAIN MINIMUM 30% LOAD ON GENERATOR IN ALL OPERATION SCENARIOS.
6. LOAD BANKS SHALL BE CONSTRUCTED FROM GALVANIZED STEEL, FORMED INTO A RIGID ENCLOSURE MATCHING THE HEIGHT AND WIDTH OF THE ENGINE RADIATOR OR DUCT, AND DESIGNED FOR NEMA 3R OUTDOOR CONSTRUCTION, WITH LIFTING EYES AND RADIATOR DUCT FLANGES PROVIDED FOR COMPLETE INSTALLATION. RESISTIVE LOAD ELEMENTS SHALL BE FABRICATED FROM CORROSION-RESISTANT MATERIALS SUCH AS CHROMIUM ALLOY WIRE AND SHALL BE SUITABLE FOR OPERATION ACROSS THE FULL RANGE OF OUTPUT TEMPERATURES FROM THE DIESEL ENGINE DRIVEN GENERATOR SYSTEM, WITH LOAD STEPS PROVIDED AT 25 KW INTERVALS FROM NO LOAD TO FULL LOAD. LOAD BANKS SHALL BE FULLY COOLED BY THE DIESEL ENGINE RADIATOR FAN COOLING AIR, WITH NO ADDITIONAL COOLING SYSTEMS REQUIRED FOR PROPER OPERATION.
7. CONTRACTOR SHALL SUBMIT ALL REQUIRED APPLICATIONS AND PAY ALL ASSOCIATED FEES FOR THE GENERATOR ENGINE PERMITS, TO THE GOVERNING AIR QUALITY BOARD AFTER APPROVAL OF THE GENERATOR SUBMITTAL(S). PERMIT APPROVAL ALLOWS FOR GENERATOR PROCUREMENT AND CONSTRUCTION.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION OF THE ENGINE GENERATOR, RELATED FUEL STORAGE SYSTEMS, LOAD BANK, AND SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAYING ALL FEES ASSOCIATED WITH THE INSTALLATION, INCLUDING THE AIR QUALITY PERMIT. UPON PERMIT APPROVAL, THE CONTRACTOR SHALL INSTALL THE ENGINE-GENERATOR SET IN COMPLIANCE WITH CONDITIONS IN THE PERMITS, AND THEREAFTER, OBTAIN FIELD APPROVAL FROM THE LOCAL AIR QUALITY MANAGEMENT DISTRICT INSPECTOR.
9. SUPPLY GENERATOR WITH OPTIONAL INPUT EXPANSION MODULE, OUTPUT EXPANSION MODULE, AND REMOTE ANNUNCIATOR MODULE.
10. GENERATOR SHALL BE TIER 4 FINAL RATED.
11. GENERATOR SHALL BE 480V 500kW/625kVA CATERPILLAR D350DC OR APPROVED EQUAL.
12. THE DIESEL ENGINE DRIVEN GENERATOR SET MANUFACTURER'S AND DEALER'S STANDARD WARRANTY SHALL IN NO EVENT BE FOR A PERIOD OF LESS THAN TWO (2) YEARS FROM DATE OF INITIAL START-UP OF THE SYSTEM OR 2500 OPERATING HOURS, WHICHEVER COMES FIRST. IT SHALL INCLUDE REPAIR LABOR, REASONABLE TRAVEL EXPENSE NECESSARY FOR REPAIRS AT THE JOBSITE, AND EXPENDABLES (LUBRICATING OIL, FILTERS, ANTIFREEZE, AND OTHER SERVICE ITEMS MADE UNUSABLE BY THE DEFECT) USED DURING THE COURSE OF REPAIR. SUBMITTALS RECEIVED WITHOUT WRITTEN WARRANTIES AS SPECIFIED WILL BE REJECTED IN THEIR ENTIRETY.
13. EXHAUST SILENCERS AND EXHAUST PIPING SHALL BE INSULATED WITH HIGH TEMPERATURE INSULATION BLANKETS CONSISTING OF A WOVEN 300 SERIES STAINLESS STEEL WIRE MESH LINER, TYPE E FIBERGLASS INSULATION (MIL SPEC MIL-I-16411-E), AND A COLD FACE OF FLEXIBLE SILICONE-IMPREGNATED FIBERGLASS CLOTH. BLANKETS SHALL BE 1 INCH THICK WITH A MINIMUM DENSITY OF 11.3 LBS/CU. FT., AND SHALL BE CUSTOM FITTED TO TIGHTLY COVER PIPE, FLANGES, FLEXIBLE CONNECTORS, AND EXHAUST SILENCERS. ALL EDGES OF THE COLD FACE CLOTH SHALL BE MACHINE STITCHED WITH PERMANENTLY MOUNTED STAINLESS STEEL HOOKS, AND BLANKETS SHALL BE LACED IN PLACE WITH STAINLESS STEEL TIE WIRE, DESIGNED TO BE READILY REMOVABLE FOR EQUIPMENT MAINTENANCE. ACCEPTABLE MANUFACTURERS INCLUDE ADVANCED THERMAL PRODUCTS, INC. (TYPE D FILOMAT) AND PLANT INSULATION CO., EMERYVILLE, CA (HARMAT 11.3#/1200F), OR EQUAL AS APPROVED BY THE ENGINEER.
14. PROVIDE SENSORS AND ANNUNCIATOR PANEL TO INDICATE AND ALARM THE FOLLOWING ENGINE MALFUNCTIONS, AND SHUT DOWN THE ENGINE ON FAILURE OF FUNCTIONS NOTED:
    - HIGH WATER TEMPERATURE
    - LOW WATER TEMPERATURE
    - LOW FUEL
    - LOW OIL PRESSURE
    - OVERSPEED
    - RUNNING
    - FAIL TO START
    - EMERGENCY SHUTDOWN
    - BATTERY CHARGER

EMERGENCY GENERATOR (EGEN-01) NOTES (CONTINUED)

15. THE SUBMITTAL SHALL SHOW ALL WIRING, INCLUDING BOTH SCHEMATIC AND TERMINAL DIAGRAMS, AS WELL AS INTERCONNECTION WIRING OF THE ENGINE AND GENERATOR. A SCALED DRAWING SHALL BE SUBMITTED FOR APPROVAL SHOWING ALL DETAILS OF THE ENGINE GENERATOR, SUPPORT BASE AND MOUNTING, FUEL TANK, SILENCER, CIRCUIT BREAKER, LOAD BANK, CONTROLLER, BATTERY, CHARGER, AND CONTROL PANEL.

    THE SUBMITTAL SHALL ALSO INCLUDE PRODUCT DATA SUCH AS PROTOTYPE TEST CERTIFICATION AND A SPECIFICATION SHEET IDENTIFYING ALL STANDARD AND OPTIONAL ACCESSORIES TO BE SUPPLIED. PROVIDE A SCHEMATIC WIRING DIAGRAM, DIMENSIONAL PLAN AND ELEVATION DRAWING, AND AN INTERCONNECTION DIAGRAM THAT CLEARLY IDENTIFIES BY TERMINAL NUMBER EACH REQUIRED INTERCONNECTION BETWEEN THE GENERATOR SET AND THE TRANSFER SWITCH.

    IN ADDITION, THE SUBMITTAL SHALL INCLUDE A CERTIFICATE VERIFYING THAT THE GENERATOR SET IS LISTED TO UL 2200 OR HAS BEEN SUBMITTED TO AN INDEPENDENT THIRD-PARTY CERTIFICATION PROCESS FOR COMPLIANCE AS INSTALLED, INCLUDING VERIFICATION OF AIR BOARD EMISSIONS WITHIN THE APPLICABLE JURISDICTION. A FACTORY TEST AND EVALUATION REPORT, MANUFACTURER'S INSTALLATION AND OPERATING INSTRUCTIONS, SOURCE QUALITY CONTROL DOCUMENTATION, AND ANY REQUIRED FIELD OR SITE QUALITY CONTROL REPORT SHALL ALSO BE SUBMITTED. A MANUFACTURER'S REPORT, SPECIAL PROCEDURE SUBMITTAL, AND QUALIFICATION STATEMENT SHALL BE PROVIDED FOR REVIEW AS APPLICABLE.

PG&E COORDINATION NOTES

1. PRIOR TO THE START OF ANY WORK, THE CONTRACTOR SHALL ATTEND THE PRE-CONSTRUCTION MEETING WITH PG&E AND THE DISTRICT TO REVIEW AND CONFIRM THE DELINEATION OF WORK SCOPE BETWEEN THE CONTRACTOR AND PG&E, PG&E REQUIREMENTS, AS WELL AS TO DISCUSS THE REQUIRED DOWNTIMES FOR PG&E TO COMPLETE THEIR DEMOLITION AND INSTALLATION WORK.
2. THE CONTRACTOR SHALL EXTEND THE THREE (3) 5" PG&E T-13680 TRANSFORMER SECONDARY CONDUITS FROM THEIR EXISTING STUB-OUT LOCATION IN THE EXISTING SWITCHBOARD INCOMING SECTION TO THE NEW SWITCHBOARD LOCATION, IN ACCORDANCE WITH PG&E ENGINEERING DRAWINGS.
3. THE CONTRACTOR SHALL PROVIDE A SOIL COMPACTION REPORT AT THE NEW SWITCHBOARD (SWBD-01) LOCATION. THE CONTRACTOR SHALL COORDINATE WITH PG&E PRIOR TO POURING THE NEW EQUIPMENT PAD AND CONFIRM ALL SOIL REPORT REQUIREMENTS ARE ACCEPTABLE AND APPROVED BY PG&E.
4. THE NEW FOUNDATION PAD SHALL EXTEND A MINIMUM OF 48" IN FRONT OF THE ELECTRIC METER SECTION, AS SHOWN ON STRUCTURAL SHEET 100-S-040.
5. THE CONTRACTOR SHALL COORDINATE WITH PG&E TO INSPECT AND APPROVE THE NEW SERVICE CONDUIT INSTALLATION PRIOR TO BACKFILLING THE TRENCH.
6. PG&E WILL PERFORM THE FOLLOWING IN TWO PHASES:

   PHASE 1: DISCONNECT AND REMOVE EXISTING SERVICE CONDUCTORS AND REMOVE THE CT AND ELECTRIC METER.

   PHASE 2: PULL AND TERMINATE NEW CONDUCTORS FROM TRANSFORMER T-13680 TO THE NEW SWITCHBOARD (SWBD-01), AFTER THE CONTRACTOR HAS COMPLETED THE NEW CONDUIT INSTALLATION.

EMERGENCY GENERATOR (EGEN-01) STRUCTURAL NOTES

1. GENERATOR
   - 1.1. GENERATOR DRY WEIGHT: 16,343 LBS (INCLUDES GENSET, SOUND ENCLOSURE, SUB-BASE FUEL TANK, FUEL AND MISCELLANEOUS PARTS, e.g., CIRCUIT BREAKER).
   - 1.2. FUEL TANK TOTAL CAPACITY 700 GALLONS x 7.2 LBS/GALLON = 5040 LBS.
   - 1.3. LOAD BANK: 250 LBS
   - 1.4. TOTALW WEIGHT: 21,650 LBS.
2. DESIGN CODES:
   - 2.1. CALIFORNIA BUILDING CODE 2022
   - 2.2. ACI 318-19
3. EARTHQUAKE DESIGN DATA:
   - 3.1. RISK CATEGORY: II.
   - 3.2. SEISMIC IMPORTANCE FACTOR I/e: 1.0.
   - 3.3. MAPPED SPECTRAL RESPONSE ACCELERATION PARAMETERS, SS= 0.51 AND S1 =0.2.
   - 3.4. SITE SOIL CLASS: D.
   - 3.5. DESIGN SPECTRAL RESPONSE ACCELERATION PARAMETERS, SDS= 0.54 AND SD1= 0.37.

GEOTECHNICAL DESIGN DATA & RECOMMENDATIONS

1. MAXIMUM NET ALLOWABLE BEARING PRESSURE FOR SHALLOW SPREAD FOOTING: 3000 PSF.
2. NEW SLAB-ON-GRADE SHALL BE SUPPORTED ON COMPACTED SELECT FILL. THE COMPACTED FILL SHALL BE AT LEAST ONE FOOT THICK BENEATH CONCRETE SLABS.
3. MATERIAL FOR SELECT FILL SHALL BE INORGANIC, WELL GRADED, FREE OF ROCKS OR CLODS GREATER THAN 4 INCHES IN GREATEST DIMENSION, AND HAVE LOW POTENTIAL FOR EXPANSION.
4. THE MATERIAL SHALL HAVE A LIQUID LIMIT LESS THAN 35, A PLASTICITY INDEX LESS THAN 15 AND A MAXIMUM OF 25 PERCENT PASSING THE No. 200 SIEVE.
5. AS PER GEOTECHNICAL REPORT RECOMMENDATIONS, THE AVAILABLE ON-SITE FILL AND NATIVE MATERIAL ARE ANTICIPATED TO BE SUITABLE FOR USE AS SELECT FILL.
6. ALL LOOSE SOIL SHALL BE REMOVED TO PLACING ANY CONCRETE UNLESS NOTED OTHERWISE.
7. ALL SOFT OR ORGANIC TOPSOIL SHALL BE REMOVED PRIOR TO SLAB PLACEMENT.

GENERAL STRUCTURAL NOTES

1. THIS PLAN HAS BEEN DESIGNED BASED ON DRAWINGS AND INFORMATION SUPPLIED BY OTHERS. ADKO ENGINEERING IS NOT RESPONSIBLE FOR DESIGN REVISIONS NECESSARY DUE TO INCORRECT INFORMATION THAT IT RELIED ON FOR THE DESIGN.
2. 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 FURNISHING OR PERFORMANCE OF WORK.
3. ALL WORKERS SHALL BE PROPERLY TRAINED FOR SAFETY AND USE OF ALL EQUIPMENT.
4. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE OSHA STANDARDS INCLUDING FALL PROTECTION.
5. ADKO ENGINEERING ASSUMES NO RESPONSIBILITY FOR WORK SITE SAFETY PRACTICES. PERSONAL WORKER PROTECTION, OR ANY JOB SITE CONDITIONS. ADKO ENGINEERING WARRANTS THE STRUCTURAL INTEGRITY OF THE DESIGN AS STATED AND / OR SHOWN ON THE DESIGN DRAWINGS FOR THE FINAL PRODUCT ONLY AND IS NOT RESPONSIBLE FOR ANY STRUCTURAL OR SAFETY DEFICIENCIES AT ANY STAGE OF ERECTION OTHER THAN FINAL PRODUCT.
6. FINAL DESIGN AND LOCATION OF THE EQUIPMENT FOUNDATION PAD SHALL BE COORDINATED WITH THE FINAL APPROVED SHOP DRAWINGS AND THE DISTRICT PRIOR TO ROUGH-IN.

CONCRETE NOTES

1. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 P.S.I.AT 28 DAYS. CEMENT SHALL CONFORM TO ASTM C-150, TYPE I SPECIFICATIONS. CONCRETE SHALL BE AIR ENTRAINED BETWEEN 5% AND 8%. NORMAL WEIGHT AGGREGATE SHALL COMPLY WITH ASTM C-33 SPECIFICATIONS. CONCRETE SHALL BE OBTAINED FROM A SINGLE SOURCE. WATER SHALL BE CLEAN, POTABLE AND FREE OF DELETERIOUS MATERIAL. THE MAXIMUM WATER TO CEMENT RATIO IS 0.5.
2. THE CONCRETE SHALL BE THOROUGHLY WORKED AROUND THE REINFORCEMENT, AROUND EMBEDDED FIXTURES AND INTO THE CORNER OF FORMS.
3. PROTECT FRESHLY PLACED CONCRETE FROM PREMATURE DRYING AND EXCESSIVE HOT OR COLD TEMPERATURES. COMPLY WITH ACI 305 "HOT WEATHER CONCRETING" AND/OR ACI 306 "COLD WEATHER CONCRETING". CONCRETE SHALL NOT BE PLACED ON FROZEN SOIL.
4. ALL CONCRETE AND REINFORCING STEEL SHALL BE PLACED IN ACCORDANCE WITH ALL LATEST BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
5. REINFORCING SHALL COMPLY WITH ASTM A-615 SPECIFICATIONS FOR DEFORMED TYPE GRADE 60 STEEL. REINFORCEMENT SHALL BE LAPPED 2'-0" MINIMUM AT ALL SPLICE LOCATIONS AND TIED WITH WIRE. SPLICES SHALL BE KEPT TO A MINIMUM.
6. REINFORCING BARS SHALL NOT BE WELDED WITHOUT APPROVAL OF THE STRUCTURAL ENGINEER.
7. REINFORCED CONCRETE SHALL BE DESIGNED, MIXED AND PLACED IN ACCORDANCE WITH THE LATEST EDITION OF THE ACI CODE AND APPLICABLE ASTM STANDARDS.
8. CONCRETE SHALL BE MIXED IN APPROVED TRANSIT MIXERS. MAXIMUM ELAPSED TIME FROM THE TIME THAT WATER IS ADDED TO THE MIX UNTIL THE CONCRETE IS DEPOSITED IN THE WORK SHALL NOT EXCEED 90 MINUTES. ONLY THOSE ADMIXTURES SPECIFIED IN THE CONTRACTORS MIX DESIGN SUBMITTAL SHALL BE USED. CONCRETE SHALL BE MIXED.
9. FOR NOT LESS THAN 70 NOR MORE THAN 100 REVOLUTIONS AT MIXING SPEED PRIOR TO PLACEMENT. MAXIMUM SLUMP SHALL NOT EXCEED 4".
10. ENGINEER'S PRIOR APPROVAL MUST BE SECURED FOR ALL SUBSTITUTIONS.
11. UNLESS OTHERWISE NOTED, THE MINIMUM CLEAR DISTANCE BETWEEN THE FACE OF CONCRETE AND THE OUTSIDE OF THE REINFORCING BARS SHALL BE 1".
12. BEFORE ANY CONCRETE IS PLACED, APPLICABLE DRAWINGS SHALL BE CHECKED TO DETERMINE THAT ANCHOR BOLTS, EMBEDDED STEEL, PIPING, CONDUITS, GROUNDING WIRES, OPENINGS, ETC. ARE PROPERLY PLACED.
13. IF GROUT IS NEEDED BELOW BASE PLATES FOR LEVELING PURPOSES A MINIMUM OF 1.5" OF STRUCTURAL NON-SHRINK GROUT SHALL BE USED UNLESS OTHERWISE NOTED.
14. STRUCTURAL GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI AT 28 DAYS.
15. PROPOSED STRUCTURES ARE NOT INTENDED FOR HUMAN OCCUPANCY.

USERKOOSHA TOOFAN
DATE9/2/2025 3:58 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN SERVICES\01-DRAFTING\1-WORKING\100-Z-011.4 - ELECTRICAL PROJECT NOTES - ELDWG

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NO.	DATE	REVISION	BY	REC.	APP.

EETSINC
6060 SUNRISE VISTA DRIVE, #1450
CITRUS HEIGHTS, CA 95610
WWW.EETSINC.COM

REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — 20418 — EXP. SEPT. 30/2027 — CIVIL — STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN	
DESIGN CHECKED BY: JOHN GUILLORY	
DRAWN BY: KOOSHA TOOFAN	
SR. PROJ ENGR. R.P.E. NO.: 20418	
APPROVED: KOOSHA TOOFAN	
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418	

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

ELECTRICAL & STRUCTURAL PROJECT NOTES

PROJ NO.		
SCALE: AS SHOWN	100-Z-011.4	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

SPEC NO. 2197

SYMBOLS LEGEND

CONDUIT RUN UNDERGROUND OR IN CONCRETE

DP-1
CONDUIT HOME RUN TO PANEL DP1, CIRCUIT NO. 1
SHORT MARKS INDICATE NO. OF POWER CONDUCTORS, LONG DASH DENOTES NEUTRAL, SHORT DASH DENOTES LINE, CURVED LINE DENOTES GROUND

EXPOSED CONDUIT

CONDUIT BENDS TOWARD OBSERVER

CONDUIT BENDS AWAY FROM OBSERVER

GROUND GRID WIRE

RAILING

FLEXIBLE LIQUID - TIGHT CONDUIT CONNECTION

P001
INDICATES CONDUIT NUMBER
SEE CABLE AND CONDUIT SCHEDULE

X
POLE MOUNTED LIGHT FIXTURE
X - LIGHTING SCHEDULE DESIGNATION

120V DUPLEX RECEPTACLE, NEMA CONFIGURATION 5-20.

100AT / 100AF
MOLDED CASE CIRCUIT BREAKER, 3 POLE UNLESS OTHERWISE NOTED: 100A - TRIP RATING IN AMPERES
AT - AMPERES TRIP
AF - AMPERES FRAME
MCP - MOTOR CIRCUIT PROTECTOR

MEDIUM VOLTAGE STARTER

N.O. CONTACT

N.C. CONTACT

NORMALLY OPEN - TIME DELAY

NORMALLY CLOSED - TIME DELAY

OL
OVERLOAD RELAY CONTACTS

FUSE

L
INDICATING LIGHT:
G-GREEN
R-RED

FIELD TERMINATION (DEVICES)

52
MEDIUM OR HIGH VOLTAGE DRAWOUT BREAKER

*
FULL VOLTAGE NON-REVERSING STARTER, NEMA SIZE AS INDICATED BY *

X
FLUORESCENT LIGHT FIXTURE
X - LIGHTING SCHEDULE DESIGNATION

LUG

CONDUIT PENETRATION THROUGH WALL

1
KEY NOTE

J
JUNCTION BOX

ETM
ELAPSED TIME METER

CT
CURRENT TRANSFORMER, RATIO AND NUMBER OF CT'S AS NOTED

FUSED DISCONNECT SWITCH
3 POLE UNLESS OTHERWISE NOTED

HEATER

CR
CONTROL RELAY

M
MOTOR STARTER CONTACTOR

50 / 51
INSTANTANEOUS AND TIME OVERCURRENT RELAY

51
TIME OVERCURRENT RELAY

86
LOCKOUT RELAY (HAND RESET)

59 N
GROUND FAULT OVERVOLTAGE RELAY

EMERGENCY LIGHTING PACK

GROUND ROD

PUSHBUTTON STATION

DISCONNECT SWITCH

THERMOSTAT OR MOTOR TEMP. SWITCH

5
INDUCTION MOTOR, (NUMBER INDICATES HORSEPOWER)

OVERLOAD RELAY

ALARM HORN

MOTION DETECTOR

P1
INDICATES CONDUIT NUMBER - SEE CABLE AND CONDUIT SCHEDULE

INDICATES CONDUIT NUMBER - SEE CABLE AND CONDUIT SCHEDULE

ABBREVIATIONS

3W	3-WIRE
4W	4-WIRE
A	AMPERE
AC	ALTERNATING CURRENT
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXILIARY
CPT	CONTROL POWER TRANSFORMER (IN INDIVIDUAL STARTER CUBICLE)
CMD	COMMAND
CR	CONTROL RELAY
Cu	COPPER
CV	CONTROL VALVE
DC	DIRECT CURRENT
DIA	DIAMETER
DOX	DIGITAL OUTPUT AUXILIARY
DPDT	DOUBLE PULL DOUBLE THROW
EGEN	EMERGENCY GENERATOR
FS	FLOW SWITCH
G, EG	EQUIPMENT GROUND
GFCT	GROUND FAULT CURRENT TRANSFORMER
GFI	GROUND FAULT INTERRUPTING
GRD	GROUND
HP	HORSEPOWER
HZ	HERTZ
INST	INSTANTANEOUS
JB	JUNCTION BOX
kV	KILO (1000) VOLT
kVA	KILO (1000) VOLT AMPERES
kW	KILO (1000) WATT
LD	LEAK DETECTION
LR	LATCHING RELAY
LS	LEVEL SWITCH
LSL	LEVEL SWITCH LOW
LT	LEVEL TRANSMITTER
LSIG	LONG TIME, SHORT TIME, INSTANTANEOUS, GROUND
LTCH	LATCH
M	METER
MAX	MAXIMUM
MIN	MINIMUM
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MOV	MOTOR OPERATED VALVE
MPR	MOTOR PROTECTIVE RELAY
MTS	MANUAL TRANSFER SWITCH
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NO	NUMBER, NORMALLY OPEN
OL	OVERLOAD RELAY
P	POLE
PB	PULL BOX, PUSH BUTTON
pf	POWER FACTOR
PFR	PHASE FAILURE RELAY
PH, Ø	PHASE
PL	PILOT LIGHT
PLC	PROGRAMMABLE LOGIC CONTROLLER
PM	POWER METER
PRESS	PRESSURE
PRI	PRIMARY
PS	PRESSURE SWITCH
PSH	PRESSURE SWITCH HIGH
PSL	PRESSURE SWITCH LOW
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
RECT	RECTIFIER
RCPT	RECEPTACLE
RTD	RESISTANCE TEMPERATURE DETECTOR
RVAT	REDUCED VOLTAGE AUTO TRANSFORMER
RVSS	REDUCED VOLTAGE SOFT STARTER
SEC	SECONDARY
SPD	SURGE PROTECTIVE DEVICE
SS	SELECTOR SWITCH, STAINLESS STEEL
SW	SWITCH
SWBD	SWITCHBOARD
TB	TERMINAL BLOCK
TDR	TIME DELAY RELAY
TDDO	TIME DELAY DROP OUT
TDPU	TIME DELAY PICKUP
TDR	TIME DELAY RELAY
Th-MAG	THERMAL-MAGNETIC
TSH	TEMPERATURE SWITCH HIGH
TSP	TWISTED SHIELDED PAIR
TST	TWISTED SHIELDED TRIAD
T-STAT	THERMOSTAT
TYP	TYPICAL
UG	UNDERGROUND
UPT	UNSHIELDED TWISTED PAIR
V	VOLTAGE, VOLTS
VFD	VARIABLE FREQUENCY DRIVE
VS	VIBRATION SWITCH
WP	WEATHERPROOF
W	WATTS
XFMR	TRANSFORMER
ZS	LIMIT SWITCH
XMTR	TRANSMITTER
(E)	EXISTING
(N)	NEW

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UNDERGROUND SERVICE ALERT
UTILITY NOTIFICATION CENTER OF CALIFORNIA
811 OR 1-800-422-4133

5 WORKING DAYS UTILITY NOTIFICATION PRIOR TO CONSTRUCTION

GENERAL NOTE:

1. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

ELECTRICAL SYMBOLS & ABBREVIATIONS

PROJ NO.			
SCALE: AS SHOWN	100-Z-011.5		0
DATE: 02OCT2025	STRUCT.	DISC.	NUMBER / REV.

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REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — No. 20418 — Exp. SEPT. 30/2027 — Electrical Engineer — STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN	
DESIGN CHECKED BY: JOHN GUILLORY	
DRAWN BY: KOOSHA TOOFAN	
SR. PROJ ENGR. R.P.E. NO.: 20418	
APPROVED: KOOSHA TOOFAN	
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418	

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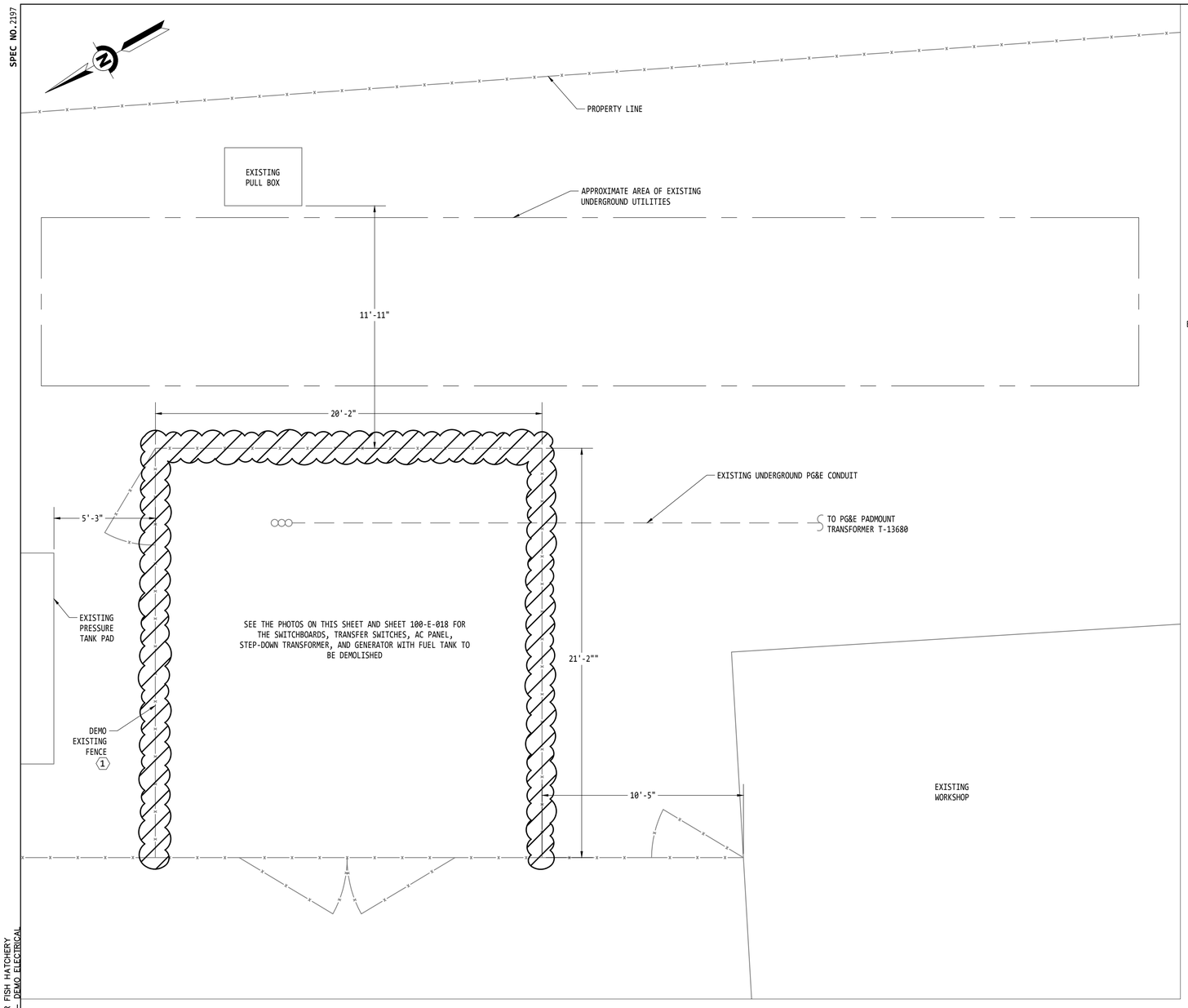
USERKOOSHA TOOFAN
DATE14/14/2025 2:54 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN SERVICES\01-DRAFTING\1-WORKING\100-Z-011.5 - ELECTRICAL SYMBOLS & ABBREVIATIONS.DWG

ELECTRICAL

SPEC NO.2197



DEMO SITE PLAN

NOT TO SCALE

GENERAL NOTES

1. ALL DIMENSIONS ARE APPROXIMATE. ACTUAL DIMENSIONS SHALL BE FIELD VERIFIED.
2. ALL EXISTING UTILITIES ARE NOT SHOWN ON THIS SHEET. CONTRACTOR SHALL FIELD VERIFY EXACT UTILITY LOCATIONS PRIOR TO ROUGH IN. HAND DIG AROUND ALL UTILITIES IN CLOSE PROXIMITY TO THE INSTALLATION OF THE ELECTRICAL EQUIPMENT TO AVOID DAMAGING ANY UTILITY LINE.
3. THIS DRAWING IS BASED ON FIELD PHOTOS AND MEASUREMENTS. CONTRACTOR SHALL VERIFY ELEVATIONS, LOCATIONS AND CONDITION OF EXISTING STRUCTURES, AND EQUIPMENT SHOWN ON THIS DRAWING, AS REQUIRED. ALL PROJECT VERIFICATIONS SHALL BE PERFORMED PRIOR TO THE ROUGH-IN, AND CONTRACTOR SHALL COORDINATE ANY DISCREPANCIES WITH THE DISTRICT.
4. CONTRACTOR SHALL DEMOLISH ELECTRICAL EQUIPMENT, HAUL, AND PROPERLY DISPOSE OF ALL EQUIPMENT IN ACCORDANCE WITH ALL APPLICABLE LAWS AND REGULATIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REQUIRED DISPOSAL FEES AND SAFETY COMPLIANCE.

KEY NOTES

1. DEMO EXISTING FENCE AS SHOWN.
2. DEMO THE EXISTING EQUIPMENT FOUNDATION PAD TO ALLOW FOR THE CONSTRUCTION OF THE NEW FOUNDATION PAD, ENSURING PROPER STRUCTURAL INTEGRITY, LOAD DISTRIBUTION, AND ALIGNMENT WITH THE NEW EQUIPMENT INSTALLATION REQUIREMENTS.

EXISTING SWITCHBOARD & GENERATOR

NOT TO SCALE

OVERALL SITE PLAN

NOT TO SCALE

LEGEND

UNDERGROUND CONDUIT

EXISTING (FADED LINES)

DEMOLITION

3" ON ORIGINAL DOCUMENT

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REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — 20418 — Lic. EXPIRES: 30/2027 — Electrical Engineer — STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN	
DESIGN CHECKED BY: JOHN GUILLORY	
DRAWN BY: KOOSHA TOOFAN	
SR. PROJ ENGR. R.P.E. NO.: 20418	
APPROVED: KOOSHA TOOFAN	
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418	

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

ELECTRICAL SITE PLAN DEMO – 1

PROJ NO.			
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USER:KOOSHA TOOFAN
DATE:9/4/2025 2:08 PM
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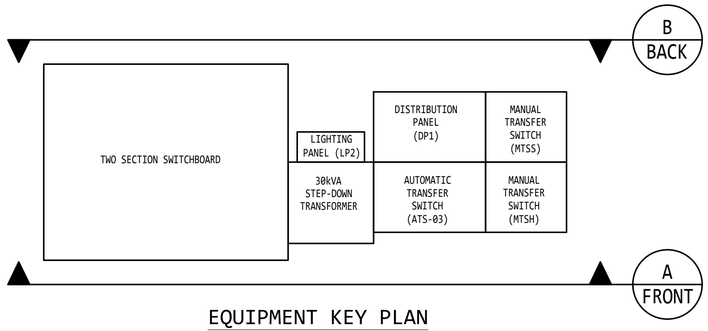
SPEC NO. 2197



EQUIPMENT KEY PLAN

NOT TO SCALE

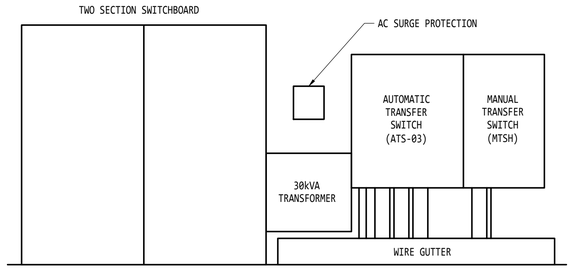
GENERAL NOTE

1. CONTRACTOR SHALL DEMOLISH ELECTRICAL EQUIPMENT, HAUL, AND PROPERLY DISPOSE OF ALL EQUIPMENT IN ACCORDANCE WITH ALL APPLICABLE LAWS AND REGULATIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REQUIRED DISPOSAL FEES AND SAFETY COMPLIANCE.

KEY NOTE

1. CONTRACTOR SHALL COORDINATE WITH PG&E TO REQUEST THE RELOCATION OR REPLACEMENT OF THE EXISTING ELECTRIC METER CONNECTION AND ACCOMPANYING HARDWARE (E.G., PULLING AND TERMINATING OF WIRES FED FROM EXISTING PG&E TRANSFORMER T-13680 AND EXTENSION OR RELOCATION OF SERVICE CONDUIT), BEFORE PLACEMENT OF NEW EQUIPMENT.

FRONT SIDE OF EQUIPMENT LINEUP TO BE DEMOLISHED

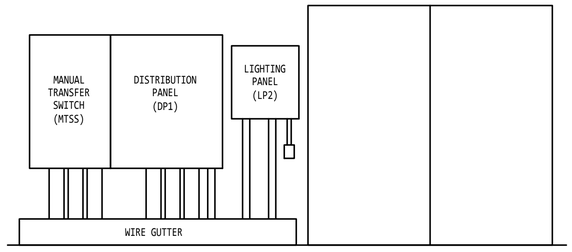


EQUIPMENT LINEUP ELEVATION - FRONT SIDE

NOT TO SCALE

A
-

BACK SIDE OF EQUIPMENT LINEUP TO BE DEMOLISHED



EQUIPMENT LINEUP ELEVATION - BACK SIDE

NOT TO SCALE

B
-

3" ON ORIGINAL DOCUMENT

0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

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6060 SUNRISE VISTA DRIVE, #1450
CITRUS HEIGHTS, CA 95610
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REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — 20418 — Lic. Exp. 10/31/2027 — Electrical Engineer — STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN	
DESIGN CHECKED BY: JOHN GUILLORY	
DRAWN BY: KOOSHA TOOFAN	
SR. PROJ ENGR., R.P.E. NO.: 20418	
APPROVED: KOOSHA TOOFAN	
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418	

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

ELECTRICAL SITE PLAN DEMO – 2

PROJ NO.			
SCALE: AS SHOWN	100–E–018		0
DATE: 02OCT2025	STRUCT.	DISC. NUMBER	REV.

USERKOOSHA TOOFAN
DATE9/4/2025 12:44 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN SERVICES\01-DRAFTING\1-WORKING\100-E-018 — DEMO ELECTRICAL SITE PLAN 2.DWG

SPEC NO.2197

GENERAL NOTES

1. REFER TO SHEETS 100-E-017 AND 100-E-018 FOR EQUIPMENT TO BE DEMOLISHED.
2. NOT ALL CONDUITS ARE SHOWN ON THIS SHEET. REFER TO SITE PLAN DRAWINGS 100-E-020 AND 100-E-021.

KEY NOTES

1. SEE SHEET 100-E-022 FOR ROUTING OF FIBER CONDUIT CT2033 AND CONTROL CONDUIT CT2023 INTO EXISTING VALVE HOUSE AND INTO THE EXISTING COMMUNICATION PANEL.
2. SEE SHEET 100-E-021 FOR DETAILED PAD MODIFICATIONS.

LEGEND

NEW (BOLD LINES) ——————

EXISTING (FADED LINES) ——————

CT2000A
CT2000B
CT2000C
CT2000D
CT2000E
CT2000F
CT2000G

3" ON ORIGINAL DOCUMENT

0 1 2 3

ELECTRICAL OVERALL SITE PLAN

NOT TO SCALE

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REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — No. 20418 — EXP. SEPT. 30, 2027 — Electrical Engineer — STATE OF CALIFORNIA

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EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

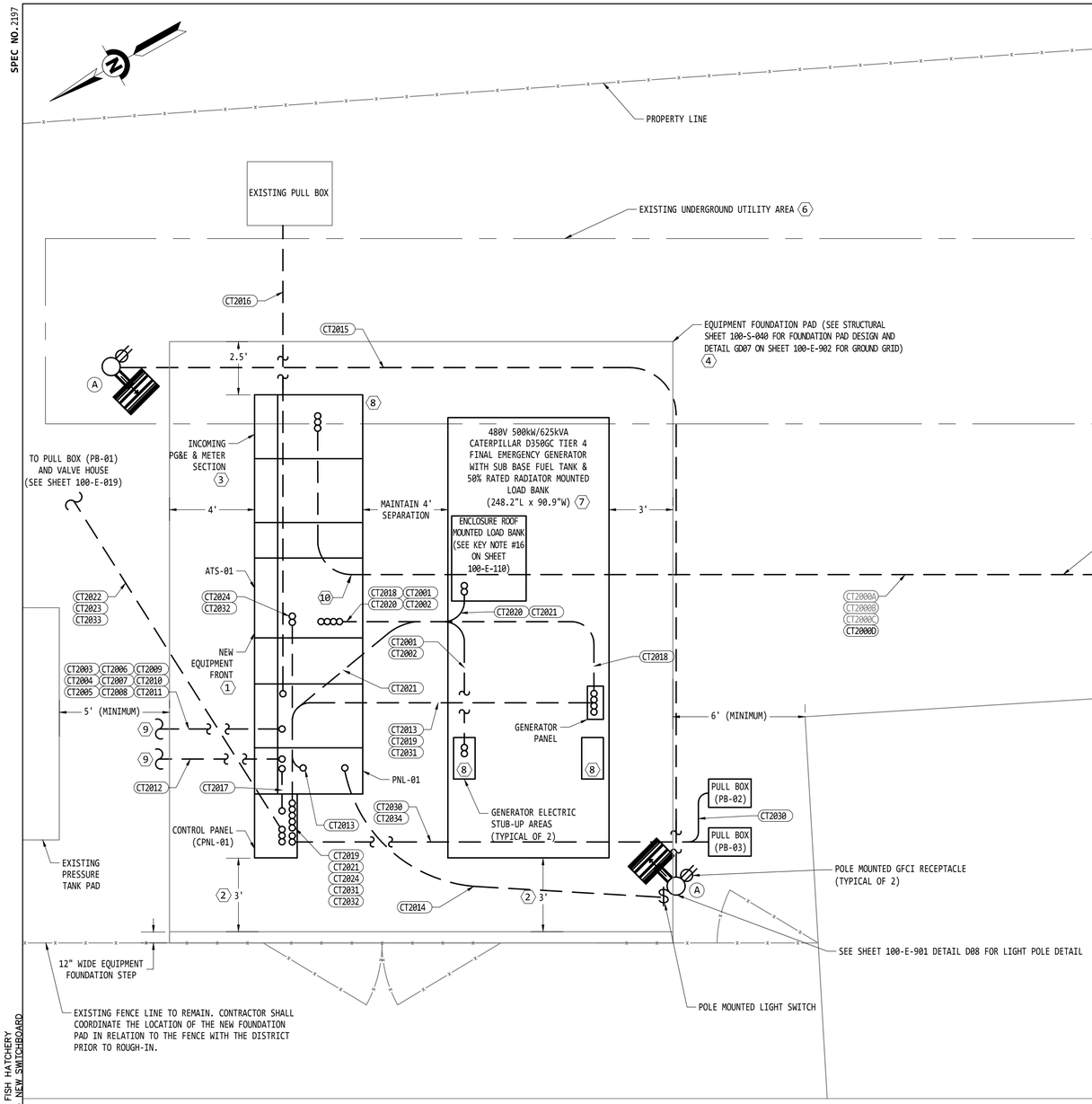
MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

ELECTRICAL OVERALL SITE PLAN

PROJ NO.		
SCALE: AS SHOWN	100-E-019	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

USERKOOSHA TOOFAN
DATE:7/24/2025 4:44 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN SERVICES\01-DRAFTING\1-WORKING\100-E-019 _ OVERALL ELECTRICAL SITE PLAN.DWG

SPEC NO. 2197



GENERAL NOTES

1. ALL DIMENSIONS ARE APPROXIMATE. ACTUAL DIMENSIONS SHALL BE FIELD VERIFIED.
2. EXISTING UTILITIES ARE NOT SHOWN ON THIS SHEET. CONTRACTOR SHALL FIELD VERIFY EXACT UTILITY LOCATIONS PRIOR TO ROUGH IN. HAND DIG AROUND ALL UTILITIES IN CLOSE PROXIMITY TO THE INSTALLATION OF THE ELECTRICAL EQUIPMENT TO AVOID DAMAGING ANY UTILITY LINE.
3. THIS DRAWING IS BASED ON FIELD PHOTOS AND MEASUREMENTS. CONTRACTOR SHALL VERIFY ELEVATIONS, LOCATIONS AND CONDITION OF EXISTING STRUCTURES, AND EQUIPMENT SHOWN ON THE DRAWING, AS REQUIRED. ALL PROJECT VERIFICATIONS SHALL BE PERFORMED PRIOR TO THE ROUGH-IN, AND CONTRACTOR SHALL COORDINATE ANY DISCREPANCIES WITH THE DISTRICT.
4. CONTRACTOR SHALL COORDINATE FINAL EQUIPMENT FOUNDATION PAD LOCATION WITH DISTRICT PRIOR TO ROUGH IN. FOUNDATION PAD SIZE SHALL BE VERIFIED IN CONSTRUCTION PER APPROVED EQUIPMENT SHOP DRAWINGS.
5. PG&E COORDINATION HAS BEEN COMPLETED BY THE DISTRICT. CONTRACTOR SHALL COORDINATE WITH THE DISTRICT ACCORDINGLY PRIOR TO BEGINNING WORK FOR PROJECT KICKOFF WITH PG&E.

KEY NOTES

1. MAINTAIN A MINIMUM CLEAR WORKING SPACE OF 6' OF UNIFORM, FLAT-GRADE SPACE FROM THE FRONT OF THE NEW EQUIPMENT, INCLUDING ALL SECTIONS, TO THE EXISTING PRESSURE TANK PAD.
2. MAINTAIN MINIMUM 3' FEET FOR WALKING DISTANCE BETWEEN NEW EQUIPMENT AND EXISTING FENCE LINE.
3. NEW MAIN SWITCHBOARD INCOMING SECTION PLACEMENT SHALL BE COORDINATED WITH EXISTING PG&E SECONDARY CONDUIT STUB OUTS. THERE ARE (3) 4" CONDUITS WITH ONE BEING SPARE ROUTED FROM SECONDARY OF PG&E PADMOUNT TRANSFORMER T-13680 TO EXISTING SWITCHBOARD 'MDP'. REFER TO KEY NOTE #9 ON THIS SHEET.
4. CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.
5. CONTRACTOR SHALL USE CIRCUIT TRACER TO VERIFY ROUTING OF CONDUITS CT2000A, CT2000B, AND CT2000C FROM PG&E PADMOUNT TRANSFORMER T-13680, PRIOR TO ROUGH IN AS REQUIRED IN COORDINATION WITH PG&E.
6. NUMEROUS UNKNOWN UNDERGROUND UTILITIES IN APPROXIMATE INDICATED AREA.
7. PROVIDE VIBRATION ISOLATORS PER GENERATOR MANUFACTURER'S RECOMMENDATION.
8. CONTRACTOR SHALL COORDINATE WITH THE GENERATOR AND SWITCHBOARD VENDOR TO FIELD LOCATE THE ELECTRIC STUB-UP AREAS, PRIOR TO CONSTRUCTING FOUNDATION PAD.
9. ASSUMED LOCATIONS OF EXISTING CONDUITS TO BE DEMOLISHED, WHICH FEED THE EXISTING EQUIPMENT, ARE SHOWN. REFER TO KEYNOTES #1 AND #3 ON CONDUIT SCHEDULE SHEET 100-E-300 FOR ADDITIONAL DETAILS ON CONDUITS TO BE CUT AND EXTENDED TO RE-FEED EXISTING LOADS, AND TO THE ONE-LINE DIAGRAM ON SHEET 100-E-110. CONTRACTOR SHALL FIELD-VERIFY AND LOCATE ALL EXISTING CONDUITS TO BE INTERCEPTED. CONTRACTOR SHALL SUBMIT CONSTRUCTION PLAN TO DISTRICT FOR REVIEW AND APPROVAL PRIOR TO ROUGH-IN.
10. CUT AND EXTEND THE EXISTING PG&E CONDUITS CT2000A, CT2000B, AND CT2000C TO THE NEW SWITCHBOARD UTILITY INCOMING SECTION WINDOW, TO ROUTE THE NEW PG&E SERVICE CABLES INTO THE SWITCHBOARD IN COORDINATION WITH PG&E FINAL DESIGN DRAWING AND PG&E PROJECT MANAGER.

ELECTRICAL SITE PLAN

NOT TO SCALE

LEGEND

- UNDERGROUND CONDUIT
- ABOVEGROUND CONDUIT
- NEW (BOLD LINES)
- EXISTING (FADED LINES)

3" ON ORIGINAL DOCUMENT
0 1 2 3

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REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — 20418 — Exp. SEPT. 30/2027 — Electrical Engineer — STATE OF CALIFORNIA

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APPROVED: KOOSHA TOOFAN	
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418	

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

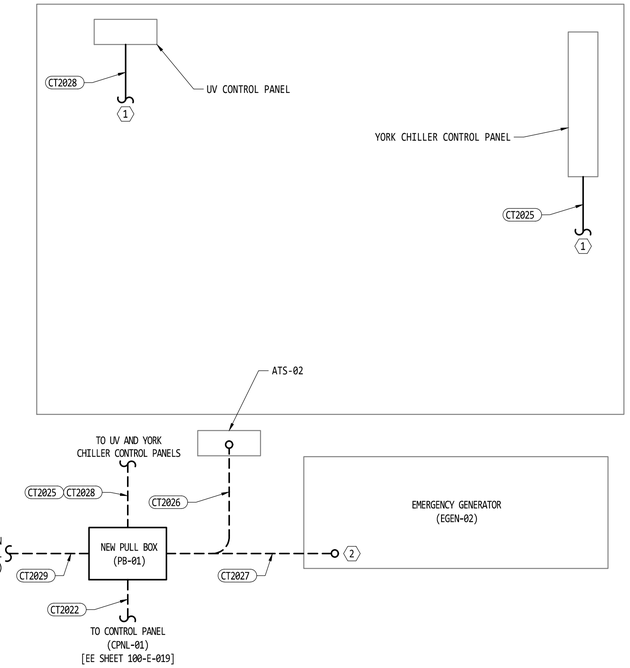
MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

NEW SWITCHBOARD & EMERGENCY GENERATOR PLAN

PROJ NO.	100-E-020	0
SCALE: AS SHOWN		
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

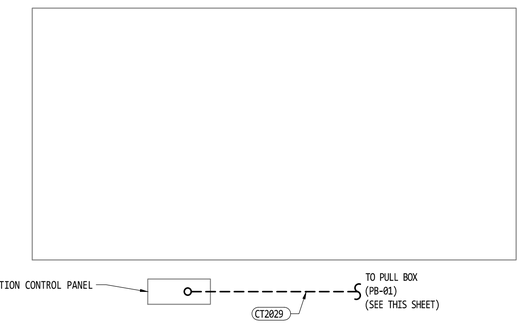
USERKOOSHA TOOFAN
DATE&/21/2025 11:04 AM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN\SERVICES\02-DRAFTING\1-WORKING\100-E-020 - NEW SWITCHBOARD & EMERGENCY GENERATOR PLAN.DWG

SPEC NO.2197



EXISTING EQUIPMENT PAD #1

NOT TO SCALE



EXISTING EQUIPMENT PAD #2

NOT TO SCALE

EXISTING EQUIPMENT PAD #2

NOT TO SCALE

EXISTING EQUIPMENT PAD #1

NOT TO SCALE

EXISTING EQUIPMENT PAD #1

NOT TO SCALE

KEY NOTES

1. CONTRACTOR SHALL UTILIZE CONDULET CONDUIT BODIES AS REQUIRED TO FACILITATE THE ROUTING OF CONDUIT FROM EXISTING EQUIPMENT ALONG THE IN-PLACE CONCRETE FOUNDATION, TRANSITIONING TO SUBGRADE TO NEW PULL BOX (PB-01). FINAL CONDUIT ROUTING SHALL BE COORDINATED WITH AND APPROVED BY THE DISTRICT PRIOR TO ROUGH-IN.
2. CONDUIT PURPOSED FOR GENERATOR CONTROLS SHALL BE INSTALLED INSIDE THE EXISTING EMERGENCY GENERATOR CONDUIT STUB-UP WINDOW VIA CORE DRILLING THROUGH THE EXISTING FOUNDATION AND UNDERMINING TO INTERCEPT.

EXISTING EQUIPMENT PAD #1

NOT TO SCALE

LEGEND

UNDERGROUND CONDUIT ----------

ABOVEGROUND CONDUIT ——————

NEW (BOLD LINES) ——————

EXISTING (FADED LINES) ——————

3" ON ORIGINAL DOCUMENT

0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

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STATE OF CALIFORNIA

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EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

MODIFIED HATCHERY SUPPORTING EQUIPMENT PLANS

PROJ NO.		
SCALE: AS SHOWN	100-E-021	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

KOOSHA TOOFAN
DATE:8/28/2025 5:01 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN SERVICES\01_DRAFTING\1_WORKING\100-E-021_ MODIFIED HATCHERY SUPPORTING EQUIPMENT PLANS.DWG

SPEC NO. 2197

VICINITY OF NEW CONTROL PANEL INSTALLATION LOCATION (SEE OVERALL SITE PLAN SHEET 100-E-019)

UNDERGROUND CONDUITS CT2023 AND CT2033 SHALL BE ROUTED FROM THE NEW CONTROL PANEL TO THE EXISTING VALVE HOUSE ON THE OPPOSITE SIDE OF THE FENCE, WHERE THE NEW EQUIPMENT IS NOT INSTALLED

TO EXISTING VALVE HOUSE ③

NEW CONTROL PANEL TO EXISTING VALVE HOUSE

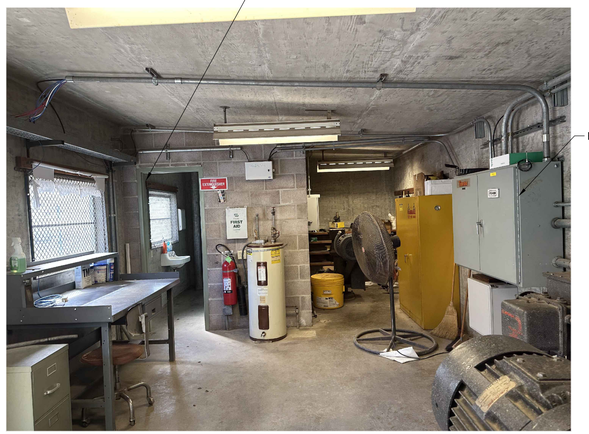
NOT TO SCALE

VALVE HOUSE

PROPOSED VALVE HOUSE PENETRATION LOCATION FOR CONDUITS CT2023 AND CT2033 USING LB CONDUIT BODIES

EXISTING VALVE HOUSE EXTERIOR

NOT TO SCALE



PROPOSED PENETRATION LOCATION OF NEW CONDUITS CT2023 AND CT2033 INSIDE VALVE HOUSE

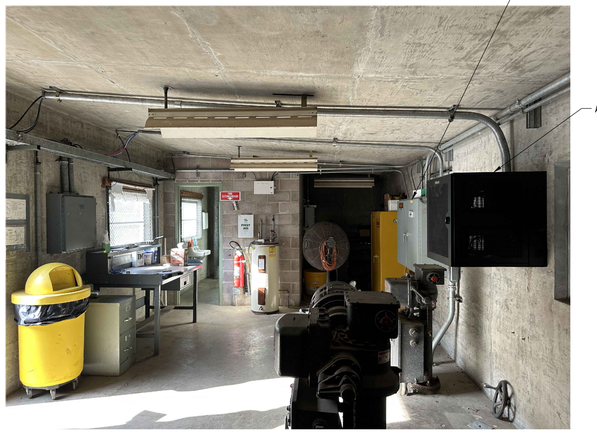
EXISTING CONTROL PANEL

EXISTING VALVE HOUSE INTERIOR ①④

NOT TO SCALE

KEY NOTES

1. CONTRACTOR SHALL FIELD ROUTE CONDUIT INTO EXISTING APC CABINET. FINAL CONDUIT ROUTING SHALL BE SUBMITTED TO THE DISTRICT FOR REVIEW AND APPROVAL PRIOR TO ROUGH-IN.
2. CONTRACTOR SHALL TERMINATE NEW CONDUIT CT2033 AT THE EXISTING APC CABINET AND PULL NEW FIBER CABLE INTO THE CABINET WITH TWO SERVICE LOOPS. THE DISTRICT SHALL MAKE THE FINAL CABLE CONNECTION INSIDE THE PANEL. CONTRACTOR TO SUPPLY AND INSTALL FIBER SPLICE BOX IN APC CABINET FOR DISTRICT USE.
3. FOR SAFE DIGGING, CONTACT 811 (USA NORTH - CALL BEFORE YOU DIG) TO VERIFY TRENCH LOCATION IN COORDINATION WITH THE DISTRICT. HAND DIGGING IS REQUIRED DUE TO A PRESSURIZED SEWER LINE BELOW GRADE IN THE APPROXIMATED TRENCH AREA.
4. CONTRACTOR SHALL TERMINATE NEW SPARE CONDUIT CT2023 AT THE EXISTING CONTROL PANEL.



EXISTING CONTROL PANEL

APC CABINET

EXISTING VALVE HOUSE INTERIOR ①④

NOT TO SCALE

EXISTING CONTROL PANEL ④

APC CABINET ②

APC CABINET EXTERIOR ①④

NOT TO SCALE

APC CABINET INTERIOR ①

NOT TO SCALE

3" ON ORIGINAL DOCUMENT

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REGISTERED PROFESSIONAL ENGINEER KOOSHA TOOFAN 20418 Lic. SEPT. 30, 2027 Electrical Engineer STATE OF CALIFORNIA

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EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

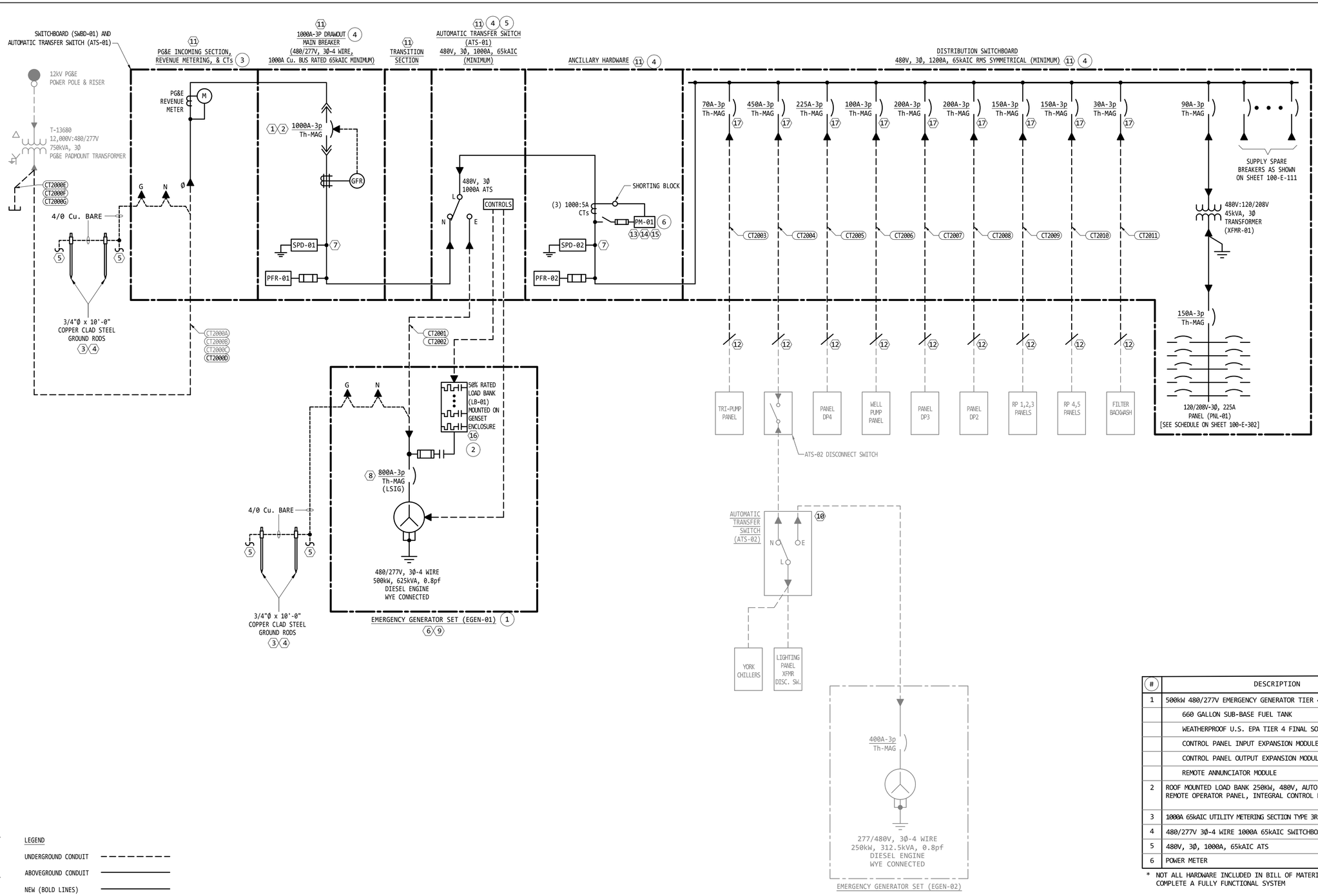
MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

MODIFIED VALVE HOUSE PLAN

PROJ NO.		
SCALE: AS SHOWN	100-E-022	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

DATE:
FILE:

SPEC NO. 2197



GENERAL NOTES

1. CONTRACTOR TO PROVIDE PG&E APPROVED METERING ENCLOSURES. UTILITY METER AND CT TO BE PROVIDED BY PG&E. CONTRACTOR SHALL COORDINATE WITH PG&E FOR METER INSTALLATION PRIOR TO ROUGH IN.
2. CONTRACTOR SHALL COORDINATE WITH THE PG&E PROJECT REPRESENTATIVE AND PG&E GREENBOOK FOR THE CUTOVER TO THE NEW SWITCHBOARD METERING SECTION.

KEY NOTES

1. MAIN CIRCUIT BREAKER SHALL BE 100% RATED AND SHALL BE EQUIPPED WITH AN ARC FLASH REDUCTION MAINTENANCE SYSTEM (ARMS) AND GROUND FAULT PROTECTION RELAY.
2. PROVIDE WITH AUXILIARY BREAKER STATUS CONTACTS.
3. INSTALL AND SIZE GROUND RODS AS SHOWN ON THIS SHEET.
4. PER NEC SECTION 250.56, MAINTAIN A SEPARATION OF NOT LESS THAN 6-FEET BETWEEN THE INSTALLED GROUND RODS.
5. EXTEND TO EXISTING GROUNDING ELECTRODE SYSTEM (GES), WHICH SHALL BE FIELD LOCATED BY CONTRACTOR.
6. GROUND GENERATOR PER MANUFACTURER'S REQUIREMENTS.
7. SURGE PROTECTIVE DEVICE (SPD) IS MOUNTED DIRECTLY ADJACENT TO ITS FEEDER CIRCUIT BREAKER. KEEP WIRING AS SHORT AND AS STRAIGHT AS POSSIBLE.
8. EMERGENCY GENERATOR SUPPLIED WITH A 100% RATED GENERATOR BREAKER. BREAKER SHALL HAVE AN 800A FRAME WITH A 400A TRIP PLUG.
9. EMERGENCY GENERATOR SUPPLIED WITH A BELLY TANK SIZED FOR MINIMUM 24 HOURS OF CONTINUOUS RUN TIME AT 50% LOAD.
10. CONTRACTOR SHALL SET ATS-02 CONTROLLER TO DELAY TRANSITION TO EGEN-02 VIA ATS CONTROLLER. WITH LOSS OF UTILITY POWER, NEW 500kW EMERGENCY GENERATOR (EGEN-01) SHALL BE THE PRIMARY EMERGENCY BACK UP POWER SOURCE. IF BOTH UTILITY AND THE 500kW EMERGENCY GENERATOR ARE DOWN, THEN THE EXISTING 250kW EMERGENCY GENERATOR (EGEN-02) SHALL OPERATE TO PROVIDE BACKUP POWER TO THE YORK CHILLERS AND LIGHTING PANEL (LP) TRANSFORMER. THIS EXISTING ATS-02 CONTROLLER TIME DELAY SETTING SHALL BE COORDINATED WITH THE NEW ATS-01 DURING STARTUP AND COMMISSIONING.
11. NEW MAIN SWITCHBOARD (SWBD-01) AND ATS-01 TO REPLACE EXISTING PANEL MDP, PANEL DP1 & LP2, MANUAL TRANSFER SWITCHES MTSS AND MTSH, ATS-03, AND 30kVA STEP-DOWN TRANSFORMER.
12. BREAK INTO EXISTING CONDUIT. EXTEND NEW CONDUIT, SIZE MATCHING EXISTING, INTO NEW SWITCHBOARD (SWBD-01). DEMO EXISTING CABLING, PULL NEW CABLES IN KIND, AND TERMINATE TO NEW SWITCHBOARD (SWBD-01). COORDINATE WITH DISTRICT FOR FINAL APPROVED CUT-OVER LOCATIONS.
13. USE SHORTING BLOCKS FOR INCOMING CURRENT (CT) CIRCUITS, AND FUSE BLOCKS FOR INCOMING VOLTAGE CIRCUITS, TO CREATE AN INTERMEDIATE CONTACT POINT BETWEEN THE POWER METER AND LOAD.
14. POWER METER SHALL BE POWERED FROM CONTROL POWER TRANSFORMER (CPT).
15. 5A LOAD CURRENT ØA,B,C USING #10 THHN/THWN COPPER CONDUCTORS, AND 480V POTENTIAL ØA,B,C USING #12 THHN/THWN COPPER CONDUCTORS.
16. THE LOAD BANK IS TO BE SET UP WITH AN AUTOMATIC LOAD ADDER/REMOVER TO MAINTAIN A MINIMUM LOAD OF 30% AT ALL TIMES, REGARDLESS OF THE FACILITY LOADS CONNECTED WHEN THE GENERATOR IS RUNNING.
17. CONFIRM THAT THE RATING OF THE NEW BREAKER MATCHES THE RATING OF THE EXISTING BREAKER BEING REPLACED FOR THE EXISTING FED LOAD, PRIOR TO ISSUANCE OF SHOP DRAWINGS.

(#)	DESCRIPTION	MANUFACTURER	PART #	QTY
1	500kW 480/277V EMERGENCY GENERATOR TIER 4 FINAL	CATERPILLAR	C18 T4F	1
	660 GALLON SUB-BASE FUEL TANK	CATERPILLAR	-	1
	WEATHERPROOF U.S. EPA TIER 4 FINAL SOUND ATTENUATED ENCLOSURE	CATERPILLAR	-	1
	CONTROL PANEL INPUT EXPANSION MODULE	CATERPILLAR	-	1
	CONTROL PANEL OUTPUT EXPANSION MODULE	CATERPILLAR	-	1
	REMOTE ANNUNCIATOR MODULE	CATERPILLAR	-	1
2	ROOF MOUNTED LOAD BANK 250KW, 480V, AUTO LOAD CONTROL, REMOTE OPERATOR PANEL, INTEGRAL CONTROL POWER TRANSFORMER	TRYSTAR	MODEL L	1
3	1000A 65kAIC UTILITY METERING SECTION TYPE 3R - PACIFIC GAS & ELECTRIC	EATON	-	1
4	480/277V 3Ø-4 WIRE 1000A 65kAIC SWITCHBOARD TYPE 3R	EATON	IFS POW-R-LINE XPERT	1
5	480V, 3Ø, 1000A, 65kAIC ATS	ASCO	ASCO-300	1
6	POWER METER	EATON	PXM1300	1

* NOT ALL HARDWARE INCLUDED IN BILL OF MATERIALS. ADDITIONAL HARDWARE SHALL BE SUPPLIED AS REQUIRED TO COMPLETE A FULLY FUNCTIONAL SYSTEM

LEGEND

UNDERGROUND CONDUIT	
ABOVEGROUND CONDUIT	
NEW (BOLD LINES)	
EXISTING (FADED LINES)	
SPD	SURGE PROTECTIVE DEVICE
GFR	GROUND FAULT RELAY
PFR	POWER FAIL RELAY
LSIG	LONG TIME, SHORT TIME, INSTANTANEOUS, GROUND
Th-MAG	THERMAL MAGNETIC
CT	CURRENT TRANSFORMER

ONE-LINE DIAGRAM

NOT TO SCALE

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

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EBMUD

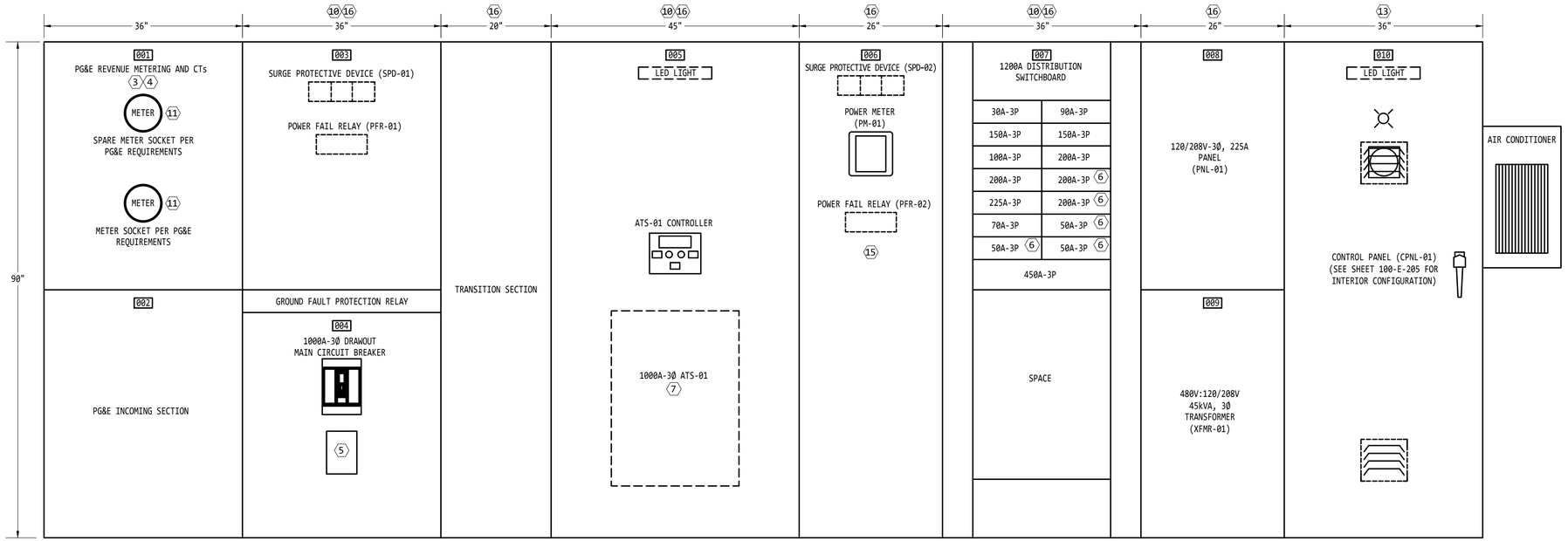
EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

ONE-LINE DIAGRAM

PROJ NO.	100-E-110	0
SCALE: AS SHOWN		
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

USER:KOOSHA TOOFAN
DATE:10/2/2025 1:49 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN SERVICES\07-DRAFTING\1-WORKING\100-E-110 - ONE LINE DIAGRAM.DWG



SWITCHBOARD (SWBD-01), ATS (ATS-01), & CONTROL PANEL (CPNL-01) ELEVATION VIEW 1 2 8 9 10 12 14

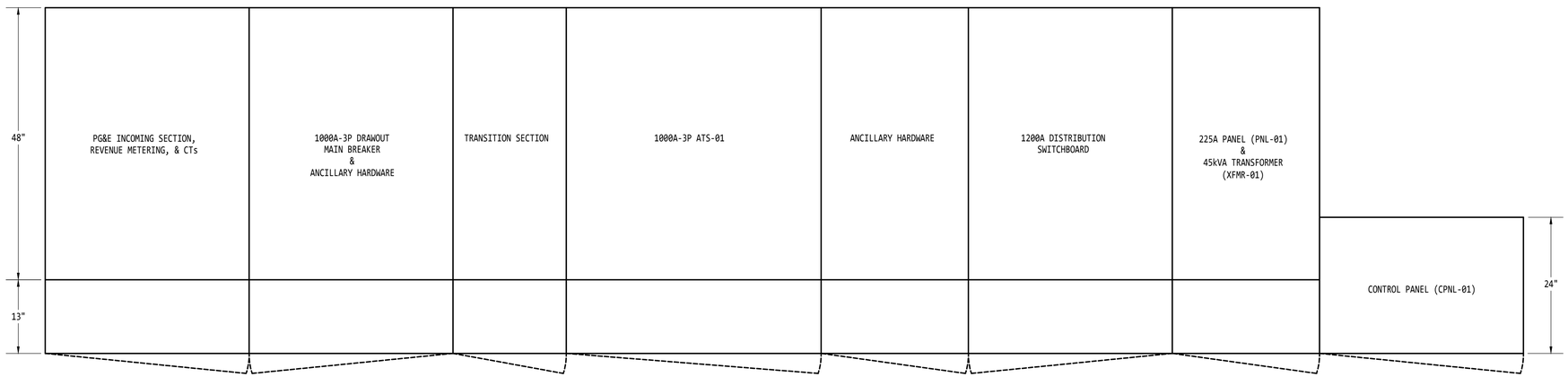
NOT TO SCALE
(SHOWN WITH WEATHER WRAP DOORS REMOVED FOR CLARITY)

GENERAL NOTES

1. ALL DIMENSIONS ARE APPROXIMATE. ACTUAL DIMENSIONS SHALL BE PER APPROVED SHOP DRAWINGS.
2. INSTALL SUN SHIELD TO PROTECT THE EQUIPMENT LINEUP, INCLUDING THE CONTROL PANEL, FROM DIRECT SUNLIGHT.
3. ALL NUTS, BOLTS, SCREWS AND HINGES SHALL BE STAINLESS STEEL.
4. SUPPLY HEATER PACKAGE, WHICH INCLUDES HEATER, THERMOSTAT, AND FUSED DISCONNECT FOR EACH SECTION.

KEY NOTES

1. CONTRACTOR TO COORDINATE SWITCHBOARD REQUIREMENTS WITH PG&E PRIOR TO ISSUANCE OF SHOP DRAWINGS.
2. MANUFACTURER TO INSTALL SPACE HEATERS POWERED FROM 225A PNL-01, WITH THERMOSTAT AND APPROPRIATE WIRING, IN SWITCHBOARD. SPACE HEATERS SHALL BE SUPPLIED WITH LABELED HEATER DISCONNECTS FOR SAFETY DURING MAINTENANCE.
3. UTILITY CTs SHALL BE LOCATED WITHIN APPROVED CT COMPARTMENTS APPROVED BY PG&E.
4. SUPPLY A DUAL-SOCKET METERING PANEL IN SWITCHBOARD PER PG&E REQUIREMENTS.
5. MAIN CIRCUIT BREAKER TO BE EQUIPPED WITH AN ARC FLASH REDUCTION MAINTENANCE SYSTEM AND GROUND FAULT PROTECTION RELAY.
6. SPARE BREAKER.
7. ASCO 300 ATS SHALL BE INSTALLED BY SWITCHBOARD SUPPLIER PRIOR TO SHIPMENT TO PROJECT LOCATION.
8. EQUIPMENT TO BE EATON POW-R-LINE-C OR APPROVED EQUAL. EQUIPMENT SHALL BE FRONT ACCESS ONLY.
9. SWITCHBOARD SHALL BE NEMA 3R OUTDOOR RATED.
10. SWITCHBOARD (SWBD-01) REAR SECTION SHALL HAVE AN IR WINDOW.
11. CONTRACTOR SHALL COORIDNATE WITH PG&E TO SUPPLY A METER SOCKET, ENCLOSURE, AND METER COMPLIANT WITH UTILITY STANDARDS PRIOR TO ISSUANCE OF SHOP DRAWINGS.
12. THE DESIGN OF THE SWITCHBOARD (SWBD-01) IS SUCH THAT ALL CABLING BETWEEN SECTIONS ARE HOUSED BETWEEN SWITCHBOARD (SWBD-01) SECTIONS. IF APPROVED SHOP DRAWINGS OF CONTRACTOR SUPPLIED SWITCHBOARD (SWBD-01) REQUIRE EXTERNAL CONDUIT AND WIRES TO MAKE CONNECTIONS BETWEEN SECTIONS, THIS EQUIPMENT SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE DISTRICT.
13. CONTROL PANEL SHALL MATCH OTHER SECTIONS IN HEIGHT AND ENCLOSURE COLOR.
14. FRONT ACCESS ONLY, FRONT AND REAR ALIGN, AND FLAT ROOF.
15. PROVIDE A GFCI RECEPTACLE ON THE FRONT OF COMPARTMENT. THE RECEPTACLE SHALL BE CONNECTED TO PNL-01 CIRCUIT #8.
16. PROVIDE SIGHTGLASS WINDOW IN ENCLOSURE FOR USE WITH AN IR CAMERA. IR SIGHTGLASS SHALL INCLUDE A 3-INCH IR CRYSTAL INSERT THAT PROVIDES DIRECT LINE OF SIGHT FOR INFRARED INSPECTIONS, IS TRANSPARENT TO VISIBLE LIGHT, AND SERVES AS A PHYSICAL BARRIER BETWEEN THE CAMERA AND THE TARGET. SIGHTGLASS SHALL HAVE AN ANODIZED ALUMINUM HOUSING WITH AN ALUMINUM SECURITY COVER, STAINLESS STEEL TAMPERPROOF SCREWS, A LOW-SMOKE AND FUME GASKET, AND OVERALL IP65 INGRESS PROTECTION. THE COVER SHALL SWIVEL OPEN TO PROVIDE QUICK ACCESS TO THE IR WINDOW.



SWITCHBOARD (SWBD-01), ATS (ATS-01), & CONTROL PANEL (CPNL-01) PLAN VIEW

NOT TO SCALE

EQUIPMENT NAMEPLATE LEGEND

NUMBER	1ST LINE	2ND LINE	3RD LINE
001	PG&E REVENUE METERING AND CTs	-	-
002	PG&E INCOMING SECTION	-	-
003	LINE SIDE	AUXILIARY DEVICES	-
004	1000A-3Ø	MAIN CIRCUIT BREAKER	-
005	1000A-3Ø	ATS	-
006	LOAD SIDE	AUXILIARY DEVICES	-
007	1200A	DISTRIBUTION SWITCHBOARD	-
008	120/208V-3Ø	225A PANEL	-
009	480V:120/208V	45kVA, 3Ø	TRANSFORMER
010	CONTROL PANEL	-	-

LEGEND

UNDERGROUND CONDUIT
ABOVEGROUND CONDUIT
NEW (BOLD LINES)
EXISTING (FADED LINES)

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

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REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — PROJ. 20418 — Exp. SEPT. 30, 2027 — Electrical Engineer — STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN	
DESIGN CHECKED BY: JOHN GUILLORY	
DRAWN BY: KOOSHA TOOFAN	
SR. PROJ. ENGR. R.P.E. NO.: 20418	
APPROVED: KOOSHA TOOFAN	
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418	

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

EQUIPMENT ELEVATION & PLAN VIEWS

PROJ NO.		
SCALE: AS SHOWN	100-E-111	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

ELEVATION & PLAN VIEWS.DWG

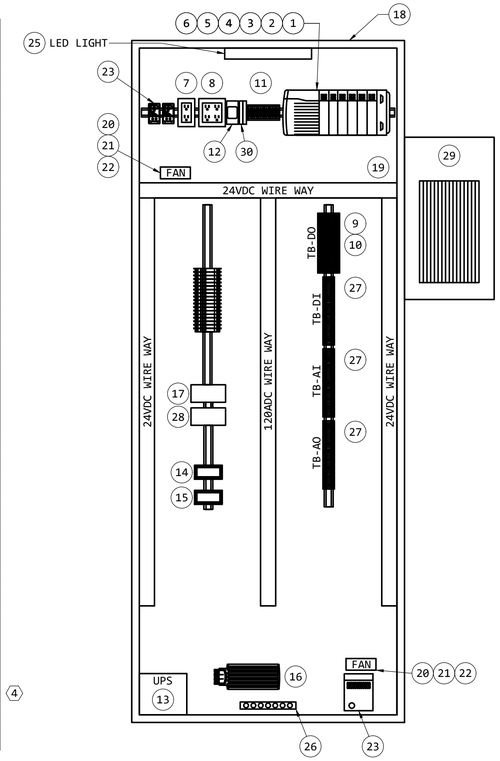
SPEC NO.2197

#	DESCRIPTION	MANUFACTURER	PART #	QTY
1	COMPACTLOGIX CONTROLLER	ALLEN BRADLEY	5069-L3100ERM	1
2	DI 16 CH 24VDC	ALLEN BRADLEY	5069-IB16	3
3	DO 16 CH 24VDC	ALLEN BRADLEY	5069-OB16	1
4	AI 8 CH 24VDC 4-20mA	ALLEN BRADLEY	5069-IF8	1
5	AO 8 CH 24VDC 4-20mA	ALLEN BRADLEY	5069-OF8	1
6	SERIAL INTERFACE MODULE	ALLEN BRADLEY	5069-SERIAL	1
7	DUPLEX GFCI CONVENIENCE RECEPTACLE	-	-	-
8	UPS RECEPTACLE	-	-	-
9	AUXILIARY RELAYS	ALLEN BRADLEY	700-HB32Z24	16
10	AUXILIARY RELAY BASES	ALLEN BRADLEY	700-HN127	16
11	ETHERNET SWITCH	N-TRON	1008TX	1
12	POWER FAIL RELAY	TIME-MARK	2652	-
13	800VA 120V UPS	APC	SMT 1500 WITH AP9613	1
14	4-20 mADC SURGE SUPPRESSOR	BOURNS	-	1
15	4-20 mADC ISOLATOR	AGM	4000-13EA-DIN	1
16	HEATER	-	-	-
17	120VAC SURGE ARRESTOR	JOSTYN	1260	1
18	ENCLOSURE NEMA 3R DEADFRONT 90"x24"x36"	-	-	1
19	BACKPANEL FOR ITEM 25	-	-	1
20	PANEL FAN	HOFFMANN	A-4AXFN	2
21	FAN BRACKET	HOFFMANN	A-BRKT4	2
22	FAN GUARD	HOFFMANN	A-GARD4	2
23	FAN & HEATER THERMOSTATS	HOFFMANN	D-AH2002A	1
24	PUSH TO TEST INDICATION LIGHT-RED	ALLEN BRADLEY	800H	1
25	PANEL LIGHT (LED)	-	-	1
26	GROUND BUS	-	-	1
27	TERMINAL BLOCKS, FUSE HOLDERS, ETC.	PHOENIX CONTACT	-	-
28	120VAC-24VDC POWER SUPPLY	ALLEN BRADLEY	1606-XL120D	1
29	AIR CONDITIONER	HOFFMAN	-	1 (4)
30	SERIAL TO FIBER CONVERTER	MOXA	TCF-90	1
31	-	-	-	-

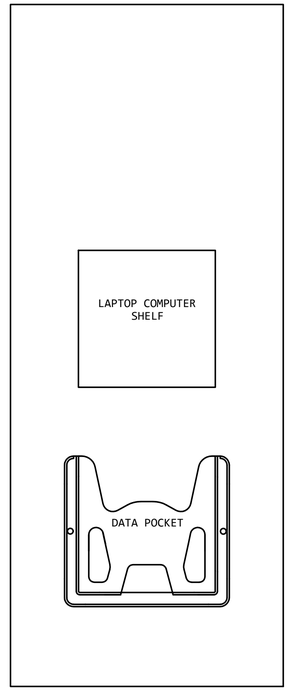
NEW CONTROL PANEL BILL OF MATERIALS

#	DESCRIPTION	MANUFACTURER	PART #	QTY
1	FIBER SPLCE BOX	BELDEN	-	1 (5)
2	-	-	-	-
3	-	-	-	-

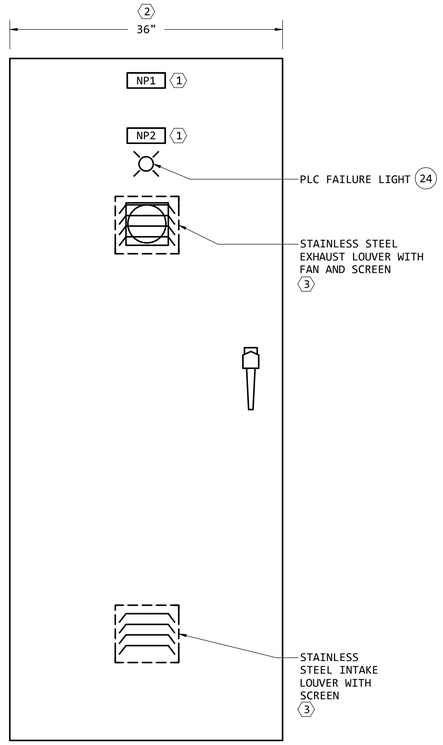
VALVE HOUSE EXISTING APC CABINET BILL OF MATERIALS



CONTROL PANEL (CPNL-01)
INTERIOR ELEVATION
NOT TO SCALE



CONTROL PANEL (CPNL-01)
INTERIOR DOOR ELEVATION
NOT TO SCALE



CONTROL PANEL (CPNL-01)
EXTERIOR DOOR ELEVATION
NOT TO SCALE

GENERAL NOTES

1. REPRESENTATIVE OF MAJOR COMPONENTS ONLY, IN CONTROL PANEL.
2. WIRE SPARE PLC I/O POINTS TO TERMINAL BLOCKS.
3. CONTRACTOR SHALL SUPPLY ANY ADDITIONAL DEVICES AS REQUIRED, TO COMPLETE A FULLY FUNCTIONAL SYSTEM.
4. CONTROL WIRING SHALL BE MARKED AT BOTH ENDS BY PERMANENT WIRE MARKERS.

KEY NOTES

1. SUPPLY WITH CUSTOM ENGRAVED PHENOLIC NAMEPLATES.
2. CONTROL PANEL SHALL BE 36" IN WIDTH.
3. SUPPLY CONTROL PANEL INTAKE LOUVERS WITH SCREENS AS REQUIRED FOR PROPER ENCLOSURE VENTILATION.
4. THE CONTRACTOR SHALL SIZE THE AC UNIT APPROPRIATELY TO ENSURE PROPER COOLING OF THE HEAT LOAD WITHIN THE CONTROL PANEL.
5. SUPPLY LOOSE FOR INSTALLATION IN EXISTING APC CABINET IN VALVE HOUSE. SEE SHEET 100-E-022 KEY NOTE #2.

NP #	NAMEPLATE (NP) SCHEDULE
NP1	CONTROL PANEL
NP2	PLC FAILURE

A DATA POCKET SHALL BE MOUNTED TO THE INSIDE OF THE PANEL ENCLOSURE OUTER DOOR. NO PENETRATIONS THROUGH THE DOOR SHALL BE ALLOWED FOR MOUNTING. THE DATA POCKET SHALL BE HOFFMANN ADP2 OR APPROVED EQUAL.

A LAPTOP COMPUTER SHELF SHALL BE MOUNTED TO THE INSIDE OF THE PANEL ENCLOSURE OUTER DOOR. NO PENETRATIONS THROUGH THE DOOR SHALL BE ALLOWED FOR MOUNTING. THE LAPTOP COMPUTER SHELF SHALL BE HOFFMANN AASHLF1818 LARGE FOLDING SHELF, 18" x 18", STEEL OR APPROVED EQUAL. MOUNT 36" ABOVE FINISHED FLOOR.

3" ON ORIGINAL DOCUMENT
0 1 2 3

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REGISTERED PROFESSIONAL ENGINEER KOOSHA TOOFAN 20418 Exp. 30/2027 Electrical Engineer STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN
DESIGN CHECKED BY: JOHN GUILLORY
DRAWN BY: KOOSHA TOOFAN
SR. PROJ ENGR.
R.P.E. NO.: 20418
APPROVED: KOOSHA TOOFAN
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

CONTROL PANEL ELEVATION & BILL OF MATERIALS

PROJ NO.		
SCALE: AS SHOWN	100-E-205	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

USERKOOSHA TOOFAN
DATE:8/21/2025 4:27 PM
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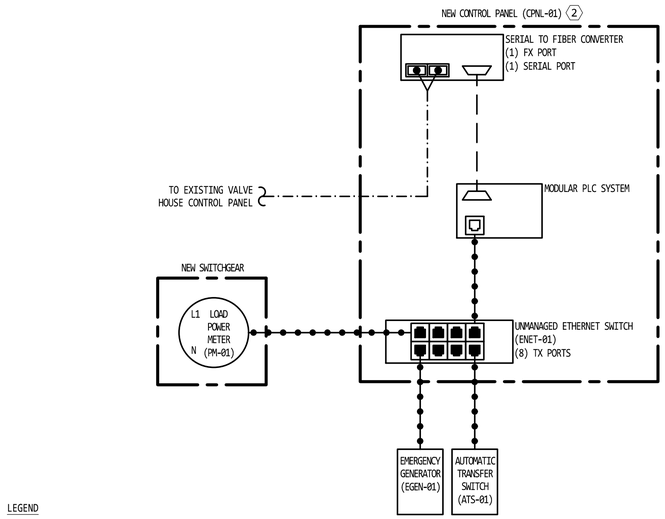
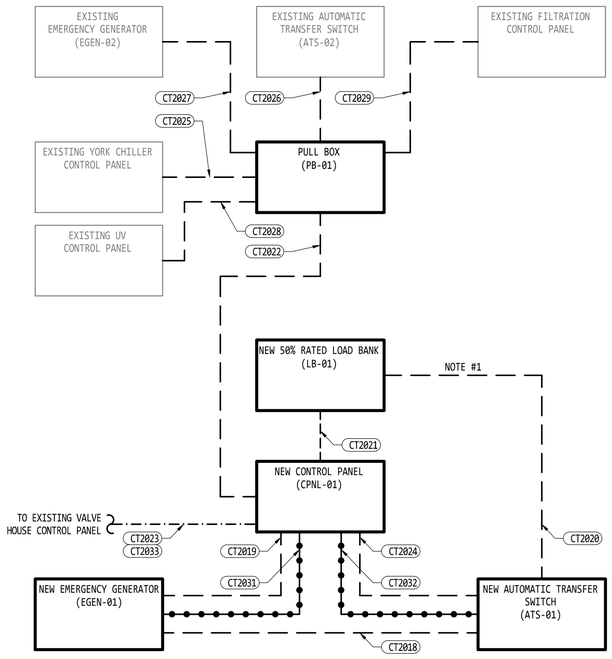
SPEC NO. 2197



COMMUNICATION DIAGRAM



STATUS SIGNAL/ALARM BLOCK DIAGRAM

DETAIL NOTE:

1. AUTOMATIC LOAD DUMP COMMAND CIRCUIT SHALL BE WIRED TO THE LOAD BANK TO DISCONNECT AND DISABLE ALL LOAD STEPS USING A NORMALLY CLOSED (NC) SET OF AUXILIARY CONTACTS FROM THE AUTOMATIC TRANSFER SWITCH (ATS-01). ALL RELEVANT AND REQUIRED CONTACTS SHALL BE UTILIZED TO ACHIEVE LOAD DUMP FUNCTIONALITY.

3" ON ORIGINAL DOCUMENT
0 1 2 3

PLC POINT #	DEVICE	DESCRIPTION
DI-001	EGEN-01	GENERATOR IN RUNNING
DI-002	EGEN-01	GENERATOR LOW FUEL
DI-003	EGEN-01	GENERATOR ALARM
DI-004	EGEN-01	GENERATOR FAIL TO START
DI-005	EGEN-01	GENERATOR EMERGENCY SHUTDOWN
DI-006	EGEN-01	GENERATOR BATTERY CHARGER
DI-007	ATS-01	ATS-01 IN NORMAL
DI-008	ATS-01	ATS-01 IN EMERGENCY
DI-009	LB-01	LOAD BANK OVER TEMPERATURE
DI-010	LB-01	LOAD BANK LOAD DUMP
1 DI-011	52a	MAIN BREAKER 52a STATUS
DI-012	ATS-02	ATS-02 IN NORMAL
DI-013	ATS-02	ATS-02 IN EMERGENCY
DI-014	PFR-01	NORMAL UTILITY POWER AC FAIL
DI-015	PFR-02	NORMAL/EMERGENCY LOAD POWER AC FAIL
DI-016	PFR-03	CONTROL PANEL (CPNL-01) AC FAIL
DI-017	PR-UF	CONTROL PANEL (CPNL-01) DC FAIL
DI-018	ZS-01	CONTROL PANEL DOOR SWITCH
DI-019	YC	YORK CHILLER COMPRESSOR #1 FAIL
DI-020	YC	YORK CHILLER COMPRESSOR #2 FAIL
DI-021	YC	YORK TEMPERATURE HIGH
DI-022	YC	YORK CHILLER ASSISTANCE PUMP #1 FAIL
DI-023	YC	YORK CHILLER ASSISTANCE PUMP #2 FAIL
DI-024	UV	UV SYSTEM FAIL
DI-025	FS	FILTRATION SYSTEM FAIL
DI-026	EGEN-02	GENERATOR IN RUNNING
DI-027	EGEN-02	GENERATOR LOW FUEL
DI-028	EGEN-02	GENERATOR ALARM
DI-029	EGEN-02	GENERATOR FAIL TO START
DI-030	EGEN-02	GENERATOR EMERGENCY SHUTDOWN
DI-031	EGEN-02	GENERATOR BATTERY CHARGER
DI-032	-	-
DI-033	-	-
DI-034	-	-
DI-035	-	-
DI-036	-	-
DI-037	-	-
DI-038	-	-
DI-039	-	-
DI-040	-	-
DI-041	-	-
DI-042	-	-
DI-043	-	-
DI-044	-	-
DI-045	-	-
DI-046	-	-
DI-047	-	-
DI-048	-	-
DO-001	-	-
DO-002	-	-
DO-003	-	-
DO-004	-	-
DO-005	-	-
DO-006	-	-
DO-007	-	-
DO-008	-	-
DO-009	-	-
DO-010	-	-
DO-011	-	-
DO-012	-	-
DO-013	-	-
DO-014	-	-
DO-015	-	-
DO-016	-	-

PLC POINT #	DEVICE	DESCRIPTION
AI-001	-	-
AI-002	-	-
AI-003	-	-
AI-004	-	-
AI-005	-	-
AI-006	-	-
AI-007	-	-
AI-008	-	-
AO-001	-	-
AO-002	-	-
AO-003	-	-
AO-004	-	-
AO-005	-	-
AO-006	-	-
AO-007	-	-
AO-008	-	-

CONTROL PANEL (CPNL-01) INPUT/OUTPUT SCHEDULE

GENERAL NOTES

1. TELEMETRY SHALL BE FULLY FUNCTIONAL PRIOR TO DISTRICT ACCEPTANCE.
2. CONTRACTOR SHALL COMPLETE CONTROL CABLING FOR A FULL FUNCTIONAL SYSTEM.
3. ALL NETWORK CONFIGURATION AND PROGRAMMING BY OTHERS.

KEY NOTES

1. 52A CONTACT OPENS WHEN THE BREAKER (52) OPENS. 52A CONTACT CLOSES WHEN 52 CLOSES.
2. COMMUNICATION HARDWARE LOCATED INSIDE CONTROL PANEL SHOWN ON SHEET 100-E-205.

COMPACTLOGIX INPUTS

COMMUNICATION SIGNALS

INPUT #	DEVICE	DESCRIPTION
1	ATS	OPERATIONAL DATA
2	GENERATOR	OPERATIONAL DATA
3	POWER METER	VOLTAGE (3Ø)
4	POWER METER	CURRENT (3Ø)
5	POWER METER	POWER (W/VA/VAR)
6	POWER METER	POWER FACTOR

NO.	DATE	REVISION	BY	REC.	APP.

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REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — No. 20418 — Exp. SEPT. 30, 2027 — Electrical Engineer — STATE OF CALIFORNIA

DESIGNED BY:	KOOSHA TOOFAN
DESIGN CHECKED BY:	JOHN GUILLORY
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SR. PROJ ENGR., R.P.E. NO.:	20418
APPROVED:	KOOSHA TOOFAN
PRINCIPAL IN CHARGE, R.P.E. NO.:	20418

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

COMMUNICATION DIAGRAMS & INPUT/OUTPUT SCHEDULE

PROJ NO.			
SCALE: AS SHOWN	100-E-206		0
DATE: 02OCT2025	STRUCT.	DISC. NUMBER	REV.

USERKOOSHA TOOFAN
DATE:8/21/2025 4:23 PM
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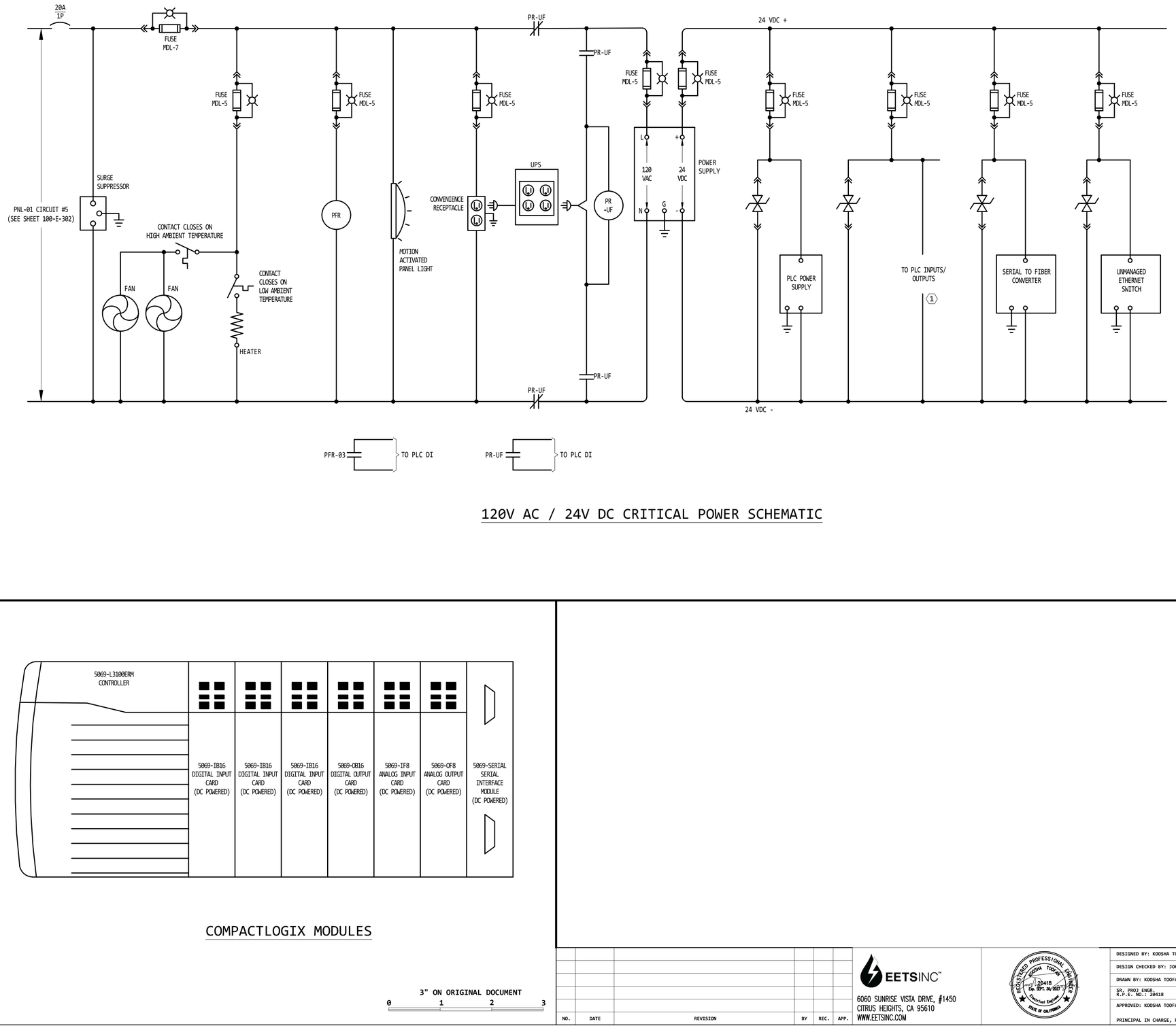
SPEC NO.2197



120V AC / 24V DC CRITICAL POWER SCHEMATIC

GENERAL NOTES

1. SUPPLY 25% SPARE AC AND DC CIRCUITS.
2. ALL DIGITAL OUTPUTS TO UTILIZE INTERPOSING DISCRETE RELAYS TO ACTIVATE FINAL LOADING.

KEY NOTE

1. SUB-FUSE ALL INDIVIDUAL SIGNAL CONDITIONERS, ISOLATORS AND INSTRUMENTS.

COMPACTLOGIX MODULES

3" ON ORIGINAL DOCUMENT
0 1 2 3

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EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

CONTROL PANEL POWER DIAGRAM

PROJ NO.		
SCALE: AS SHOWN	100-E-207	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

USERKOOSHA TOOFAN
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ENGR DESIGN SERVICES\01-DRAFTING\1-WORKING\100-E-207 - CONTROL PANEL
POWER DIAGRAM.DWG

SPEC NO. 2197

FUNCTION	CONDUIT NO.	CONDUIT SIZE	CONDUIT TYPE	CABLE NUMBER	FROM	TO	REFERENCE DRAWING	REMARKS
POWER	CT2000A	5"	PVC SCH 40	A1P1A	EXISTING PG&E TRANSFORMER (T-13680)	NEW SWITCHBOARD (SWBD-01) INCOMING SECTION	100-E-110, 100-E-020, 100-E-019	EXISTING PG&E SERVICE CONDUIT
POWER	CT2000B	5"	PVC SCH 40	A1P1B	EXISTING PG&E TRANSFORMER (T-13680)	NEW SWITCHBOARD (SWBD-01) INCOMING SECTION	100-E-110, 100-E-020, 100-E-019	EXISTING PG&E SERVICE CONDUIT
POWER	CT2000C	5"	PVC SCH 40	A1P1C	EXISTING PG&E TRANSFORMER (T-13680)	NEW SWITCHBOARD (SWBD-01) INCOMING SECTION	100-E-110, 100-E-020, 100-E-019	EXISTING PG&E SERVICE CONDUIT (TO BE CAPPED FOR FUTURE USE)
POWER	CT2000D	5"	PVC SCH 40	A1P1D	EXISTING PG&E TRANSFORMER (T-13680)	NEW SWITCHBOARD (SWBD-01) INCOMING SECTION	100-E-110, 100-E-020, 100-E-019	PG&E SERVICE CONDUIT (TO BE CAPPED FOR FUTURE USE)
POWER	CT2000E	5"	PVC SCH 40	A1P1E	EXISTING PG&E TRANSFORMER (T-13680)	STUB UP NEAR EXISTING PG&E TRANSFORMER (T-13680)	100-E-110, 100-E-020, 100-E-019	PG&E STUBBED CONDUIT NEXT TO TRANSFORMER FOR FUTURE USE
POWER	CT2000F	5"	PVC SCH 40	A1P1F	EXISTING PG&E TRANSFORMER (T-13680)	STUB UP NEAR EXISTING PG&E TRANSFORMER (T-13680)	100-E-110, 100-E-020, 100-E-019	PG&E STUBBED CONDUIT NEXT TO TRANSFORMER FOR FUTURE USE
POWER	CT2000G	5"	PVC SCH 40	A1P1G	EXISTING PG&E TRANSFORMER (T-13680)	STUB UP NEAR EXISTING PG&E TRANSFORMER (T-13680)	100-E-110, 100-E-020, 100-E-019	PG&E STUBBED CONDUIT NEXT TO TRANSFORMER FOR FUTURE USE
POWER	CT2001	4"	PVC SCH 40	A1P2A	NEW ATS-01	NEW EMERGENCY GENERATOR (EGEN-01)	100-E-110, 100-E-020	-
POWER	CT2002	4"	PVC SCH 40	A1P2B	NEW ATS-01	NEW EMERGENCY GENERATOR (EGEN-01)	100-E-110, 100-E-020	-
POWER	CT2003	(1)(3)	PVC SCH 40	A1P3	NEW SWITCHBOARD (SWBD-01)	EXISTING TRI-PUMP PANEL	100-E-110, 100-E-020	-
POWER	CT2004	(1)(3)	PVC SCH 40	A1P4	NEW SWITCHBOARD (SWBD-01)	EXISTING ATS-02 DISCONNECT SWITCH	100-E-110, 100-E-020	-
POWER	CT2005	(1)(3)	PVC SCH 40	A1P5	NEW SWITCHBOARD (SWBD-01)	EXISTING PANEL DP4	100-E-110, 100-E-020	-
POWER	CT2006	(1)(3)	PVC SCH 40	A1P6	NEW SWITCHBOARD (SWBD-01)	EXISTING WELL PUMP PANEL	100-E-110, 100-E-020	-
POWER	CT2007	(1)(3)	PVC SCH 40	A1P7	NEW SWITCHBOARD (SWBD-01)	EXISTING PANEL DP3	100-E-110, 100-E-020	-
POWER	CT2008	(1)(3)	PVC SCH 40	A1P8	NEW SWITCHBOARD (SWBD-01)	EXISTING PANEL DP2	100-E-110, 100-E-020	-
POWER	CT2009	(1)(3)	PVC SCH 40	A1P9	NEW SWITCHBOARD (SWBD-01)	EXISTING RP 1,2,3 PANELS	100-E-110, 100-E-020	-
POWER	CT2010	(1)(3)	PVC SCH 40	A1P10	NEW SWITCHBOARD (SWBD-01)	EXISTING RP 4,5 PANELS	100-E-110, 100-E-020	-
POWER	CT2011	(1)(3)	PVC SCH 40	A1P11	NEW SWITCHBOARD (SWBD-01)	EXISTING FILTER BACKWASH	100-E-110, 100-E-020	-
POWER	CT2012	(1)(3)	PVC SCH 40	A1P12	NEW 120/208V-3Ø PANEL (PNL-01)	EXISTING LIFT STATION	100-E-020	-
POWER	CT2013	2"	PVC SCH 40	A1P13	NEW 120/208V-3Ø PANEL (PNL-01)	NEW EMERGENCY GENERATOR (EGEN-01)	100-E-020	-
POWER	CT2014	1"	PVC SCH 40	A1P14	NEW 120/208V-3Ø PANEL (PNL-01)	WEST LIGHT POLE	100-E-020	-
POWER	CT2015	1"	PVC SCH 40	A1P15	WEST LIGHT POLE	EAST LIGHT POLE	100-E-020	-
POWER	CT2016	4"	PVC SCH 40	A1P16	NEW SWITCHBOARD (SWBD-01)	EXISTING PULL BOX	100-E-020	-
POWER	CT2017	1"	PVC SCH 40	A1P17	NEW 120/208V-3Ø PANEL (PNL-01)	NEW CONTROL PANEL (CPNL-01)	100-E-020	-
CONTROL	CT2018	1"	PVC SCH 40	A1P18	NEW ATS-01	NEW EMERGENCY GENERATOR (EGEN-01)	100-E-020, 100-E-206	-
CONTROL	CT2019	1 1/2"	PVC SCH 40	A1P19	NEW EMERGENCY GENERATOR (EGEN-01)	NEW CONTROL PANEL (CPNL-01)	100-E-020, 100-E-206	-
CONTROL	CT2020	1" (2)	PVC SCH 40	A1P20	NEW ATS-01	NEW LOAD BANK (LB-01)	100-E-020, 100-E-206	-
CONTROL	CT2021	1" (2)	PVC SCH 40	A1P21	NEW LOAD BANK (LB-01)	NEW CONTROL PANEL (CPNL-01)	100-E-020, 100-E-206	-
CONTROL	CT2022	3"	PVC SCH 40	A1P22	NEW PULL BOX (PB-01)	NEW CONTROL PANEL (CPNL-01)	100-E-020, 100-E-021, 100-E-206, 100-E-019	-
CONTROL	CT2023	2"	PVC SCH 40	A1P23	NEW CONTROL PANEL (CPNL-01)	EXISTING VALVE HOUSE CONTROL PANEL	100-E-020, 100-E-022, 100-E-206, 100-E-019	-
CONTROL	CT2024	2"	PVC SCH 40	A1P24	NEW ATS-01 SECTION	NEW CONTROL PANEL (CPNL-01)	100-E-020, 100-E-206	-
CONTROL	CT2025	1"	PVC SCH 40	A1P25	EXISTING YORK CHILLER CONTROL PANEL	NEW PULL BOX (PB-01)	100-E-021, 100-E-206	-
CONTROL	CT2026	1"	PVC SCH 40	A1P26	EXISTING ATS-02	NEW PULL BOX (PB-01)	100-E-021, 100-E-206	-
CONTROL	CT2027	1"	PVC SCH 40	A1P27	EXISTING EMERGENCY GENERATOR (EGEN-02)	NEW PULL BOX (PB-01)	100-E-021, 100-E-206	-
CONTROL	CT2028	1"	PVC SCH 40	A1P28	EXISTING UV CONTROL PANEL	NEW PULL BOX (PB-01)	100-E-021, 100-E-206	-
CONTROL	CT2029	1"	PVC SCH 40	A1P29	EXISTING FILTRATION CONTROL PANEL	NEW PULL BOX (PB-01)	100-E-021, 100-E-206, 100-E-019	-
CONTROL	CT2030	2"	PVC SCH 40	A1P30	NEW CONTROL PANEL (CPNL-01)	NEW PULL BOX (PB-02)	100-E-020	SPARE CONDUIT FOR FUTURE STATUS/ALARM SIGNALS
INSTRUMENTATION	CT2031	1"	PVC SCH 40	A1P31	NEW EMERGENCY GENERATOR (EGEN-01)	NEW CONTROL PANEL (CPNL-01)	100-E-020, 100-E-206	-
INSTRUMENTATION	CT2032	2"	PVC SCH 40	A1P32	NEW ATS-01 SECTION	NEW CONTROL PANEL (CPNL-01)	100-E-020, 100-E-206	-
INSTRUMENTATION	CT2033	2"	PVC SCH 40	A1P33	NEW CONTROL PANEL (CPNL-01)	EXISTING VALVE HOUSE APC CABINET	100-E-020, 100-E-022, 100-E-206, 100-E-019	-
INSTRUMENTATION	CT2034	2"	PVC SCH 40	A1P34	NEW CONTROL PANEL (CPNL-01)	NEW PULL BOX (PB-03)	100-E-020	SPARE CONDUIT FOR FUTURE STATUS/ALARM SIGNALS

CONDUIT SCHEDULE

(#) KEY NOTES

1. CONTRACTOR SHALL VERIFY EXISTING CONDUIT MEET NEC REQUIREMENTS FOR SIZING. IF IN COMPLIANCE, MATCH CONDUIT SIZE TO CONDUIT FEEDING EXISTING LOAD. CONTRACTOR SHALL CONTACT THE DISTRICT IN THE EVENT OF ANY CONDUIT SIZING ISSUES.
2. CONTRACTOR SHALL COORDINATE THE ROUTING OF CONDUITS FROM ATS-01 AND THE CONTROL PANEL TO THE LOAD BANK IN ACCORDANCE WITH THE APPROVED GENERATOR AND LOAD BANK SHOP DRAWINGS PRIOR TO ROUGH-IN. THE LOAD BANK SHALL BE INSTALLED ON TOP OF THE EMERGENCY GENERATOR ENCLOSURE.
3. ASSUMED CONDUIT LOCATIONS APPEAR ON SITE PLAN DRAWINGS AND ELECTRICAL DETAILS. CONTRACTOR TO FIELD LOCATE AND CUT AND EXTEND THESE CONDUITS FROM EQUIPMENT IDENTIFIED IN SCHEDULE ON THIS SHEET AS REQUIRED.

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NO.	DATE	REVISION	BY	REC.	APP.

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REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — 20418 — Exp. SEPT. 30, 2027 — Electrical Engineer — STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN
DESIGN CHECKED BY: JOHN GUILLORY
DRAWN BY: KOOSHA TOOFAN
SR. PROJ ENGR. R.P.E. NO.: 20418
APPROVED: KOOSHA TOOFAN
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

CONDUIT SCHEDULE

PROJ NO.		
SCALE: AS SHOWN	100-E-300	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

USER:KOOSHA TOOFAN
DATE:7/24/2025 4:35 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY ENGINEERING SERVICES\01-DRAFTING\1-WORKING\100-E-300 - CONDUIT SCHEDULE.DWG

SPEC NO. 2197

FUNCTION	CABLE NO.	CABLE SIZE	CABLE TYPE	FROM	TO	ROUTING	REFERENCE DRAWING	REMARKS
POWER	A1P1A	1000A	QPX	EXISTING PG&E TRANSFORMER (T-13680)	NEW SWITCHBOARD (SWBD-01) INCOMING SECTION	CT2000A	100-E-110, 100-E-020, 100-E-019	WIRES TO BE PULLED BY PG&E
POWER	A1P1B	1000A	QPX	EXISTING PG&E TRANSFORMER (T-13680)	NEW SWITCHBOARD (SWBD-01) INCOMING SECTION	CT2000B	100-E-110, 100-E-020, 100-E-019	WIRES TO BE PULLED BY PG&E
POWER	A1P1C	(1) PPR	3/16" Ø POLY PULL ROPE	EXISTING PG&E TRANSFORMER (T-13680)	NEW SWITCHBOARD (SWBD-01) INCOMING SECTION	CT2000C	100-E-110, 100-E-020, 100-E-019	-
POWER	A1P1D	(1) PPR	3/16" Ø POLY PULL ROPE	EXISTING PG&E TRANSFORMER (T-13680)	NEW SWITCHBOARD (SWBD-01) INCOMING SECTION	CT2000D	100-E-110, 100-E-020, 100-E-019	-
POWER	A1P1E	(1) PPR	3/16" Ø POLY PULL ROPE	EXISTING PG&E TRANSFORMER (T-13680)	STUB UP NEAR EXISTING PG&E TRANSFORMER (T-13680)	CT2000E	100-E-110, 100-E-020, 100-E-019	-
POWER	A1P1F	(1) PPR	3/16" Ø POLY PULL ROPE	EXISTING PG&E TRANSFORMER (T-13680)	STUB UP NEAR EXISTING PG&E TRANSFORMER (T-13680)	CT2000F	100-E-110, 100-E-020, 100-E-019	-
POWER	A1P1G	(1) PPR	3/16" Ø POLY PULL ROPE	EXISTING PG&E TRANSFORMER (T-13680)	STUB UP NEAR EXISTING PG&E TRANSFORMER (T-13680)	CT2000G	100-E-110, 100-E-020, 100-E-019	-
POWER	A1P2A	(3) 600kCMIL & (1) 1/0 GRD.	Cu. 600V XHHW-2	NEW ATS-01	NEW EMERGENCY GENERATOR (EGEN-01)	CT2001	100-E-110, 100-E-020	-
POWER	A1P2B	(3) 600kCMIL & (1) 1/0 GRD.	Cu. 600V XHHW-2	NEW ATS-01	NEW EMERGENCY GENERATOR (EGEN-01)	CT2002	100-E-110, 100-E-020	-
POWER	A1P3	(1)	Cu. 600V XHHW-2	NEW SWITCHBOARD (SWBD-01)	EXISTING TRI-PUMP PANEL	CT2003	100-E-110, 100-E-020	-
POWER	A1P4	(1)	Cu. 600V XHHW-2	NEW SWITCHBOARD (SWBD-01)	EXISTING ATS-02 DISCONNECT SWITCH	CT2004	100-E-110, 100-E-020	-
POWER	A1P5	(1)	Cu. 600V XHHW-2	NEW SWITCHBOARD (SWBD-01)	EXISTING PANEL DP4	CT2005	100-E-110, 100-E-020	-
POWER	A1P6	(1)	Cu. 600V XHHW-2	NEW SWITCHBOARD (SWBD-01)	EXISTING WELL PUMP PANEL	CT2006	100-E-110, 100-E-020	-
POWER	A1P7	(1)	Cu. 600V XHHW-2	NEW SWITCHBOARD (SWBD-01)	EXISTING PANEL DP3	CT2007	100-E-110, 100-E-020	-
POWER	A1P8	(1)	Cu. 600V XHHW-2	NEW SWITCHBOARD (SWBD-01)	EXISTING PANEL DP2	CT2008	100-E-110, 100-E-020	-
POWER	A1P9	(1)	Cu. 600V XHHW-2	NEW SWITCHBOARD (SWBD-01)	EXISTING RP 1,2,3 PANELS	CT2009	100-E-110, 100-E-020	-
POWER	A1P10	(1)	Cu. 600V XHHW-2	NEW SWITCHBOARD (SWBD-01)	EXISTING RP 4,5 PANELS	CT2010	100-E-110, 100-E-020	-
POWER	A1P11	(1)	Cu. 600V XHHW-2	NEW SWITCHBOARD (SWBD-01)	EXISTING FILTER BACKWASH	CT2011	100-E-110, 100-E-020	-
POWER	A1P12	(1)	Cu. 600V XHHW-2	NEW 120/208V-3Ø PANEL (PNL-01)	EXISTING LIFT STATION	CT2012	100-E-020	-
POWER	A1P13	(2) #8 & (1) #10 GRD.	Cu. 600V XHHW-2	NEW 120/208V-3Ø PANEL (PNL-01)	NEW EMERGENCY GENERATOR (EGEN-01)	CT2013	100-E-020	(2)
POWER	A1P14	(4) #10 & (1) #10 GRD.	Cu. 600V XHHW-2	NEW 120/208V-3Ø PANEL (PNL-01)	WEST LIGHT POLE	CT2014	100-E-020	POLE MOUNTED LIGHT & GFCI
POWER	A1P15	(4) #10 & (1) #10 GRD.	Cu. 600V XHHW-2	WEST LIGHT POLE	EAST LIGHT POLE	CT2015	100-E-020	POLE MOUNTED LIGHT & GFCI
POWER	A1P16	(1) PPR	3/16" Ø POLY PULL ROPE	NEW SWITCHBOARD (SWBD-01)	EXISTING PULL BOX	CT2016	100-E-020	PROVISION FOR FUTURE POWER CIRCUITS
POWER	A1P17	(2) #10 & (1) #10 GRD.	Cu. 600V XHHW-2	NEW 120/208V-3Ø PANEL (PNL-01)	NEW CONTROL PANEL (CPNL-01)	CT2017	100-E-020	-
CONTROL	A1P18	(2) #12 & (1) #12 GRD.	Cu. 600V XHHW-2	NEW ATS-01	NEW EMERGENCY GENERATOR (EGEN-01)	CT2018	100-E-020, 100-E-206	GENERATOR CALL TO RUN
CONTROL	A1P19	(18) #12 & (1) #12 GRD.	Cu. 600V XHHW-2	NEW EMERGENCY GENERATOR (EGEN-01)	NEW CONTROL PANEL (CPNL-01)	CT2019	100-E-020, 100-E-206	GENERATOR STATUS/ALARM SIGNALS
CONTROL	A1P20	(2) #12 & (1) #12 GRD.	Cu. 600V XHHW-2	NEW ATS-01	NEW LOAD BANK (LB-01)	CT2020	100-E-020, 100-E-206	(3)
CONTROL	A1P21	(4) #12 & (1) #12 GRD.	Cu. 600V XHHW-2	NEW LOAD BANK (LB-01)	NEW CONTROL PANEL (CPNL-01)	CT2021	100-E-020, 100-E-206	LOAD BANK STATUS/ALARM SIGNALS
CONTROL	A1P22	(1) PPR, (36) #12 & (1) #12 GRD.	Cu. 600V XHHW-2 & 3/16" Ø POLY PULL ROPE	NEW PULL BOX (PB-01)	NEW CONTROL PANEL (CPNL-01)	CT2022	100-E-020, 100-E-021, 100-E-206, 100-E-019	ATS-02/EGEN-02/FILTRATION/YORK CHILLER/UV PANELS STATUS/ALARM SIGNALS
CONTROL	A1P23	(1) PPR	3/16" Ø POLY PULL ROPE	NEW CONTROL PANEL (CPNL-01)	EXISTING VALVE HOUSE CONTROL PANEL	CT2023	100-E-020, 100-E-022, 100-E-206, 100-E-019	ATS STATUS/ALARM SIGNALS
CONTROL	A1P24	(10) #12 & (1) #12 GRD.	Cu. 600V XHHW-2	NEW ATS-01 SECTION	NEW CONTROL PANEL (CPNL-01)	CT2024	100-E-020, 100-E-206	ATS, 52a, PFR-01, & PFR-02 STATUS/ALARM SIGNALS
CONTROL	A1P25	(10) #12 & (1) #12 GRD.	Cu. 600V XHHW-2	EXISTING YORK CHILLER CONTROL PANEL	NEW PULL BOX (PB-01)	CT2025	100-E-021, 100-E-206	STATUS/ALARM SIGNALS
CONTROL	A1P26	(4) #12 & (1) #12 GRD.	Cu. 600V XHHW-2	EXISTING ATS-02	NEW PULL BOX (PB-01)	CT2026	100-E-021, 100-E-206	STATUS/ALARM SIGNALS
CONTROL	A1P27	(12) #12 & (1) #12 GRD.	Cu. 600V XHHW-2	EXISTING EMERGENCY GENERATOR (EGEN-02)	NEW PULL BOX (PB-01)	CT2027	100-E-021, 100-E-206	STATUS/ALARM SIGNALS
CONTROL	A1P28	(4) #12 & (1) #12 GRD.	Cu. 600V XHHW-2	EXISTING UV CONTROL PANEL	NEW PULL BOX (PB-01)	CT2028	100-E-021, 100-E-206	STATUS/ALARM SIGNALS
CONTROL	A1P29	(4) #12 & (1) #12 GRD.	Cu. 600V XHHW-2	EXISTING FILTRATION CONTROL PANEL	NEW PULL BOX (PB-01)	CT2029	100-E-021, 100-E-206, 100-E-019	STATUS/ALARM SIGNALS
CONTROL	A1P30	(1) PPR	3/16" Ø POLY PULL ROPE	NEW CONTROL PANEL (CPNL-01)	NEW PULL BOX (PB-02)	CT2030	100-E-020	PROVISION FOR FUTURE FACILITY CONTROL WIRES
INSTRUMENTATION	A1P31	(1) CAT 6E	CATEGORY 6E ETHERNET	NEW EMERGENCY GENERATOR (EGEN-01)	NEW CONTROL PANEL (CPNL-01)	CT2031	100-E-020, 100-E-206	OPERATIONAL DATA TRANSFER
INSTRUMENTATION	A1P32	(2) CAT 6E	CATEGORY 6E ETHERNET	NEW ATS-01 SECTION	NEW CONTROL PANEL (CPNL-01)	CT2032	100-E-020, 100-E-206	ATS-01 & POWER METER DATA TRANSFER
INSTRUMENTATION	A1P33	(1) 24 STRAND SINGLE MODE FO (4)	-	NEW CONTROL PANEL (CPNL-01)	EXISTING VALVE HOUSE APC CABINET	CT2033	100-E-020, 100-E-022, 100-E-206, 100-E-019	DATA TRANSFER TO HEADQUARTERS
INSTRUMENTATION	A1P34	(1) PPR	3/16" Ø POLY PULL ROPE	NEW CONTROL PANEL (CPNL-01)	NEW PULL BOX (PB-03)	CT2034	100-E-020	PROVISION FOR FUTURE FACILITY INSTRUMENT CABLES

CABLE SCHEDULE

(#) KEY NOTES

1. CONTRACTOR SHALL VERIFY EXISTING CONDUCTORS MEET NEC REQUIREMENTS FOR SIZING. IF IN COMPLIANCE, MATCH CONDUCTOR RATING AND COUNT TO CONDUCTORS CURRENTLY FEEDING EXISTING LOAD.
2. CONTRACTOR SHALL CONFIRM THE CONDUIT FILL FOR FEEDING NEW GENERATOR (EGEN-01) AUXILIARY LOADS USING APPROVED GENERATOR SHOP DRAWINGS PRIOR TO PULLING CONDUCTORS. THE EXISTING FILL SHOWN IN THE CONDUIT SCHEDULE IS SIZED FOR A SINGLE 50A, 240V, 1Ø CIRCUIT. IF ANY DISCREPANCIES EXIST, THE CONTRACTOR SHALL NOTIFY THE DISTRICT TO AMEND THE FILL AND UPSIZE THE CONDUIT AS NECESSARY.
3. AUTOMATIC LOAD DUMP COMMAND CIRCUIT WIRED TO LOAD BANK TO DISCONNECT AND DISABLE ALL LOAD STEPS FROM A NORMALLY CLOSED (NC) SET OF AUXILIARY CONTACTS FROM THE AUTOMATIC TRANSFER SWITCH (ATS-01).
4. FIBER OPTIC CABLE SHALL BE CORNING CLASS LOOSE TUBE OS2 SINGLE MODE 24 STRAND.

USER:KOOSHA TOOFAN
DATE:8/21/2025 12:46 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY ENGINEERING SERVICES\01-DRAFTING\1-WORKING\100-E-301 - CABLE SCHEDULE.DWG

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EETSINC
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REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — No. 20418 — Exp. SEPT. 30, 2027 — Electrical Engineer — STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN
DESIGN CHECKED BY: JOHN GUILLORY
DRAWN BY: KOOSHA TOOFAN
SR. PROJ ENGR. R.P.E. NO.: 20418
APPROVED: KOOSHA TOOFAN
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

CABLE SCHEDULE

PROJ NO.		
SCALE: AS SHOWN	100-E-301	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

SPEC NO. 2197

SYMBOL	QUANTITY	TAG	CATALOG #	ARRANGEMENT	DESCRIPTION	LLF	LUM LUMENS	LUMINAIRE WATTS	TOTAL WATTS	VOLTAGE	NOTES
	2	A	FXLEDSSF @ 137W_4K	SINGLE	FLOOD LIGHT WITH SLIPFITTER MOUNTING ARM	1.000	17898	129.343	256.686	120	20' DARK BRONZE POLE WITH GFCI RECEPTACLE

LIGHTING SCHEDULE (1)(3)(4)(5)

PANEL: '01' TYPE: AS SPECIFIED FRAME: 225A MAIN: 150A-3P (2)

SERVICE: 120/208 VOLT, 3Ø-4 WIRE MOUNT: INSIDE SWITCHBOARD (SWBD-01)

LOAD	KW	CB	#	S/N	#	CB	KW	LOAD
NEW GENERATOR AUXILIARY LOADS	-	30/2	1	X	2	20/1	-	(2) NEW OUTDOOR POLE-MOUNTED LIGHTS
			3	X	4	20/1	-	(2) NEW OUTDOOR GFCI RECEPTACLES
NEW CONTROL PANEL (CPNL-01)	-	20/1	5	X	6	20/1	-	CONTROL PANEL AC UNIT
EXISTING LIFT STATION	-	60/3	7	X	8	20/1	-	SWITCHBOARD GFCI
			9	X	10	20/1	-	SPARE
			11	X	12	20/1	-	SPARE
SPARE	-	20/1	13	X	14	20/1	-	SPARE
SPARE	-	20/1	15	X	16	20/1	-	SPARE
SPACE	-	20/1	17	X	18	20/1	-	SPACE
	-	-	19	X	20	-	-	
	-	-	21	X	22	-	-	
	-	-	23	X	24	-	-	
	-	-	25	X	26	-	-	
	-	-	27	X	28	-	-	
	-	-	29	X	30	-	-	

PANEL SCHEDULE

ITEM #	PULL BOX TAG	DESCRIPTION	MAKE/MODEL (2)	PLAN SHEET REFERENCE	DESCRIPTION
1	PB-01	MINIMUM INNER DIMENSIONS: 36⅜"(L) x 17⅞"(W)	CHRISTY B1730	100-E-019	CONTROL WIRING FOR YORK CHILLER AND OTHER EQUIPMENT
2	PB-02	MINIMUM INNER DIMENSIONS: 36⅜"(L) x 17⅞"(W)	CHRISTY B1730	100-E-020	CONTROL PULL BOX FOR FUTURE WIRING
3	PB-03	MINIMUM INNER DIMENSIONS: 36⅜"(L) x 17⅞"(W)	CHRISTY B1730	100-E-020	INSTRUMENTATION PULL BOX FOR FUTURE WIRING

PULL BOX SCHEDULE

KEY NOTES

1. CONTRACTOR SHALL VERIFY MOUNTING REQUIREMENTS OF ALL LIGHT FIXTURES AND COORIDNATE WITH LIGHT FIXTURE SUPPLIER TO FURNISH ALL REQUIRED MOUNTING HARDWARE AND ACCESSORIES THAT ARE SUITABLE FOR THE SPECIFIC MOUNTING SURFACE AND ENVIRONMENT, REGARDLESS OF WHAT IS SPECIFIED IN THE LUMINARIES SCHEDULE.
2. PANEL SHALL BE RATED 22kAIC RMS SYMMETRICAL MINIMUM.
3. GFCI RECEPTACLE SHALL BE WEATHER RESISTANT AND RATED FOR OUTDOOR USE, AND SHALL BE EQUIPPED WITH GROUND FAULT PROTECTION.
4. LIGHT SHALL BE CONTROLLED VIA LIGHT SWITCH ONLY. NO PHOTOCELL OPERATION PERMITTED.
5. THE LOCATIONS OF THE LIGHTING FIXTURES ARE SHOWN DIAGRAMMATICALLY ON PLAN SHEET 100-E-020. VERIFY EXACT LOCATIONS WITH SITE CONDITIONS DURING INSTALLATION. COORDINATE FINAL INSTALLATION LOCATIONS WITH THE DISTRICT PRIOR TO ROUGH-IN.

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REGISTERED PROFESSIONAL ENGINEER KOOSHA TOOFAN No. 20418 Exp. 06.30.2027 Electrical Engineer STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN
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DRAWN BY: KOOSHA TOOFAN
SR. PROJ ENGR, R.P.E. NO.: 20418
APPROVED: KOOSHA TOOFAN
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

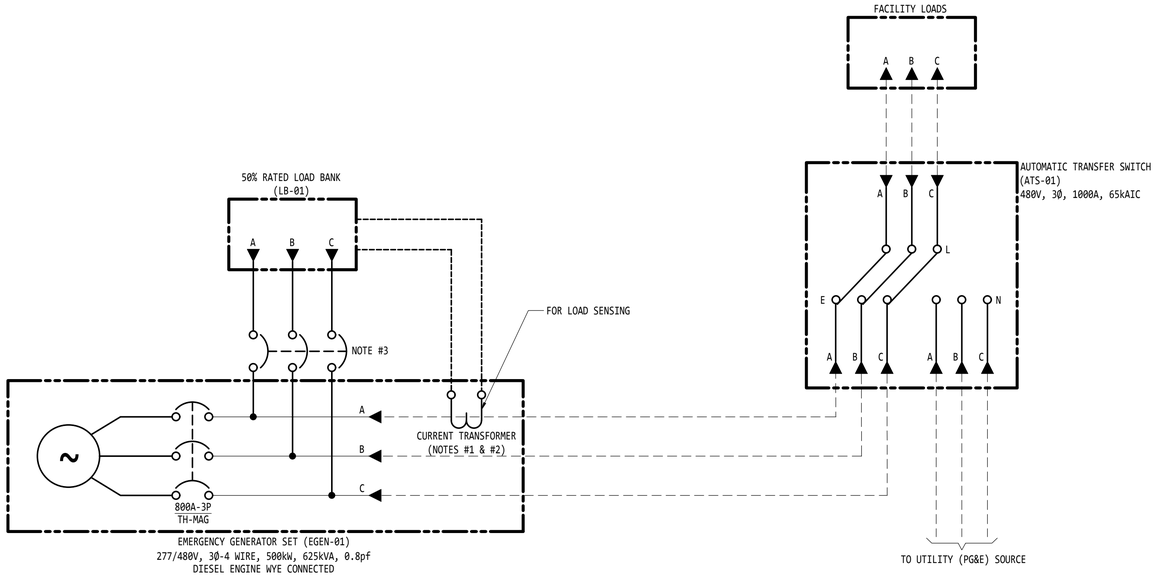
MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

PANEL, LIGHTING, & PULL BOX SCHEDULES

PROJ NO.		
SCALE: AS SHOWN	100-E-302	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

USER:KOOSHA TOOFAN
DATE:6/2/2025 9:00 AM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN SERVICES\02_DRAFTING\1-WORKING\100-E-302 - PANEL LIGHTING, PULL BOX SCHEDULES.DWG

SPEC NO.2197

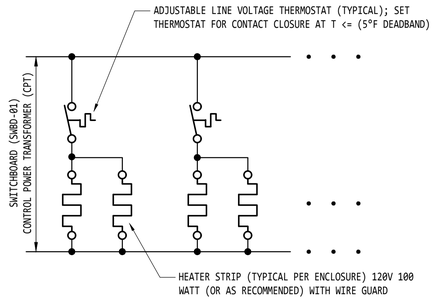


LOAD BANK LOAD MONITORING SCHEMATIC

DETAIL NOTES:

1. INSTALL THE CT BETWEEN THE LOAD BANK AND BUILDING LOAD LOCATION AS SHOWN. PLACING THE CT BETWEEN THE LOAD BANK AND GENERATOR WILL RESULT IN LOAD BANK FAILURE.
2. CT SHALL BE INSTALLED TO MONITOR THE A-PHASE LEG AS SHOWN TO MAINTAIN AN OPERATOR-SETTABLE MINIMUM LOAD OF 30% ON THE EMERGENCY GENERATOR WHEN RUNNING AT ALL TIMES.
3. SIZE BREAKER AS REQUIRED.

ATS SCHEMATICS

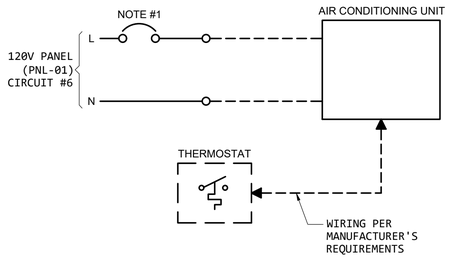


SWITCHBOARD (SWBD-01) & ATS-01 HEATER CONTROL SCHEMATIC

DETAIL NOTE:

1. EACH SWITCHBOARD ENCLOSURE SHALL HAVE A THERMOSTATICALLY CONTROLLED STRIP HEATER. EACH THERMOSTAT SHALL CONTROL NO MORE THAN TWO STRIP HEATERS IN ADJACENT PANELS OR SECTIONS.

CONTROL PANEL (CPNL-01) INTRUSION SWITCH SCHEMATIC



CONTROL PANEL (CPNL-01) AIR CONDITIONING UNIT CONTROL SCHEMATIC

DETAIL NOTE:

1. CONTRACTOR SHALL SIZE THE A/C UNIT BASED ON THE CONTROL PANEL'S CALCULATED HEAT LOAD AND SHALL SIZE THE FEEDER CIRCUIT BREAKER FROM PANEL PNL-01 ACCORDINGLY.

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EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

MISCELLANEOUS SCHEMATICS

PROJ NO.		
SCALE: AS SHOWN	100-E-303	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

USERKOOSHA TOOFAN
DATE8/27/2025 11:45 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY ENGINEERED SERVICES\01_DRAFTING\1-WORKING\100-E-303 - MISCELLANEOUS SCHEMATICS.DWG

SPEC NO.2197

MOKELUMNE RIVER HATCHERY	
ASSET TAG LIST	NEW EQUIPMENT DESCRIPTION
SWBD-01	480V 1000A SWITCHBOARD
ATS-01	480v, 3Ø, 1000A AUTOMATIC TRANSFER SWITCH
EGEN-01	500kW, 480/277V, 3Ø-4 WIRE EMERGENCY GENERATOR
LB-01	50% RATED LOAD BANK
XFMR-01	45kVA 480:120/208V-3Ø TRANSFORMER
PNL-01	120/208V-3Ø 225A PANELBOARD
CPNL-01	CONTROL PANEL
PM-01	POWER METER
ENET-01	ETHERNET SWITCH
PLC-01	COMPACTLOGIX PLC
-	-
-	-
-	-
-	-

ASSET TAG LIST

USERKOOSHA TOOFAN
DATE:4/4/2025 8:18 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN SERVICES\01-DRAFTING\1-WORKING\100-E-500 - EQUIPMENT ASSET TAG LIST.DWG

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

EETSINC
6060 SUNRISE VISTA DRIVE, #1450
CITRUS HEIGHTS, CA 95610
WWW.EETSINC.COM

REGISTERED PROFESSIONAL ENGINEER
KOOSHA TOOFAN
20418
Exp. SEPT. 30, 2027
Electrical Engineer
STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN
DESIGN CHECKED BY: JOHN GUILLORY
DRAWN BY: KOOSHA TOOFAN
SR. PROJ ENGR. R.P.E. NO.: 20418
APPROVED: KOOSHA TOOFAN
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

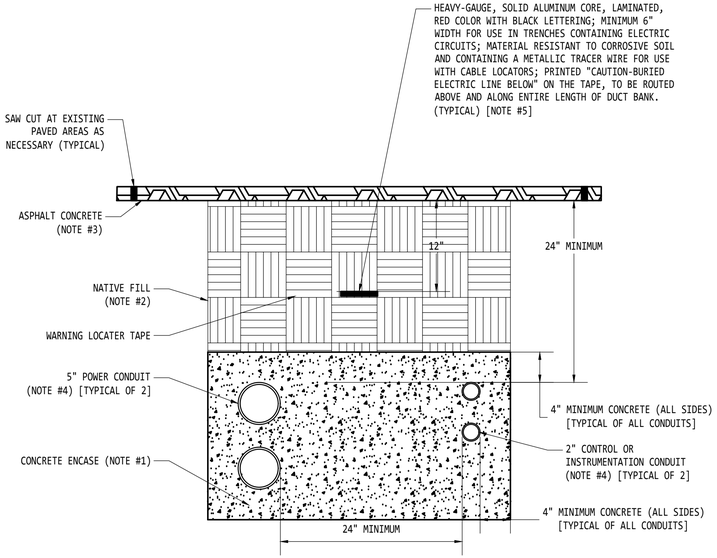
MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

ASSET TAG LIST

PROJ NO.				
SCALE: AS SHOWN	100-E-500			0
DATE: 02OCT2025	STRUCT.	DISC.	NUMBER	REV.

SPEC NO. 2197

D01
TYP



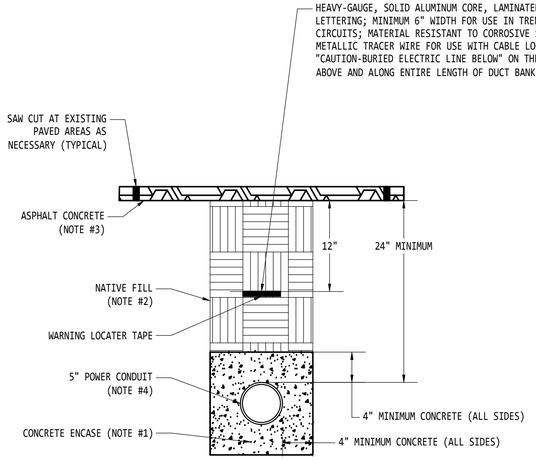
TYPICAL POWER & CONTROL/INSTRUMENTATION 2 x 2 CONDUIT DUCT BANK DETAIL

NOT TO SCALE

DETAIL NOTES:

1. CONCRETE SHALL HAVE A STRENGTH OF 1000 PSI AND SHALL BE PIGMENTED RED.
2. NATIVE BACKFILL SHALL BE COMPACTED TO 95% RELATIVE DENSITY.
3. REPLACE IN KIND ASPHALT CONCRETE AND STRUCTURAL BASE AS REQUIRED. CONTRACTOR SHALL PATCH, RESURFACE, AND REPLACE ANY PARTS OF THE PROJECT ASPHALT CONCRETE AFFECTED BY THE NEW TRENCH, WITH THICKNESS AND QUALITY TO MATCH EXISTING.
4. PLACE CONDUIT RUNS IN PLASTIC SPACERS (RATED FOR DIRECT BURIAL) EVERY 5' ALONG LENGTH OF RUN, AND TIE CONDUITS TO PREVENT FLOATATION DURING CONCRETE PLACEMENT. SPACERS NOT SHOWN IN DETAIL.
5. DURING BACKFILLING OF TRENCH, INSTALL CONTINUOUS UNDERGROUND LINE WARNING TAPE DIRECTLY ABOVE RACEWAY AT 12-INCHES BELOW FINISHED GRADE. USE MULTIPLE TAPES WHERE WIDTH OF MULTIPLE LINES INSTALLED EXCEEDS 16-INCHES OVERALL.

D02
TYP



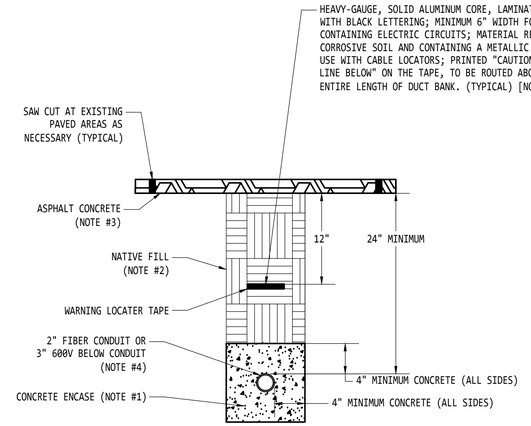
TYPICAL POWER 1 x 1 CONDUIT DUCT BANK DETAIL

NOT TO SCALE

DETAIL NOTES:

1. CONCRETE SHALL HAVE A STRENGTH OF 1000 PSI AND SHALL BE PIGMENTED RED.
2. NATIVE BACKFILL SHALL BE COMPACTED TO 95% RELATIVE DENSITY.
3. REPLACE IN KIND ASPHALT CONCRETE AND STRUCTURAL BASE AS REQUIRED. CONTRACTOR SHALL PATCH, RESURFACE, AND REPLACE ANY PARTS OF THE PROJECT ASPHALT CONCRETE AFFECTED BY THE NEW TRENCH, WITH THICKNESS AND QUALITY TO MATCH EXISTING.
4. PLACE CONDUIT RUNS IN PLASTIC SPACERS (RATED FOR DIRECT BURIAL) EVERY 5' ALONG LENGTH OF RUN, AND TIE CONDUITS TO PREVENT FLOATATION DURING CONCRETE PLACEMENT. SPACERS NOT SHOWN IN DETAIL.
5. DURING BACKFILLING OF TRENCH, INSTALL CONTINUOUS UNDERGROUND LINE WARNING TAPE DIRECTLY ABOVE RACEWAY AT 12-INCHES BELOW FINISHED GRADE. USE MULTIPLE TAPES WHERE WIDTH OF MULTIPLE LINES INSTALLED EXCEEDS 16-INCHES OVERALL.

D03
TYP

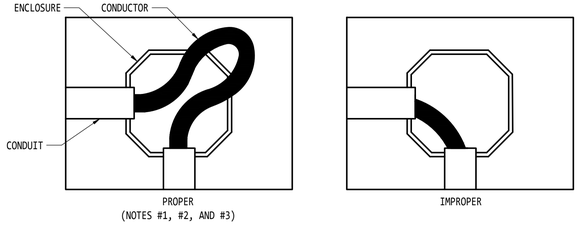


TYPICAL COMMUNICATION & CONTROL 1 x 1 DUCT BANK DETAIL

DETAIL NOTES:

1. CONCRETE SHALL HAVE A STRENGTH OF 1000 PSI AND SHALL BE PIGMENTED RED.
2. NATIVE BACKFILL SHALL BE COMPACTED TO 95% RELATIVE DENSITY.
3. REPLACE IN KIND ASPHALT CONCRETE AND STRUCTURAL BASE AS REQUIRED. CONTRACTOR SHALL PATCH, RESURFACE, AND REPLACE ANY PARTS OF THE PROJECT ASPHALT CONCRETE AFFECTED BY THE NEW TRENCH, WITH THICKNESS AND QUALITY TO MATCH EXISTING.
4. PLACE CONDUIT RUNS IN PLASTIC SPACERS (RATED FOR DIRECT BURIAL) EVERY 5' ALONG LENGTH OF RUN, AND TIE CONDUITS TO PREVENT FLOATATION DURING CONCRETE PLACEMENT. SPACERS NOT SHOWN IN DETAIL.
5. DURING BACKFILLING OF TRENCH, INSTALL CONTINUOUS UNDERGROUND LINE WARNING TAPE DIRECTLY ABOVE RACEWAY AT 12-INCHES BELOW FINISHED GRADE. USE MULTIPLE TAPES WHERE WIDTH OF MULTIPLE LINES INSTALLED EXCEEDS 16-INCHES OVERALL.

D04
TYP



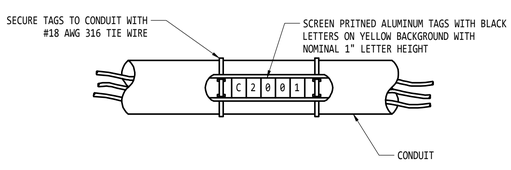
PULL THROUGH ENCLOSURE

NOT TO SCALE

DETAIL NOTES:

1. DO NOT PULL CABLES AND CONDUCTORS DIRECTLY ACROSS SHORT AND SHARP ANGLES. AFTER PULLING A CABLE OR CONDUCTOR COMPLETELY OUT OF ONE SIDE OF AN ENCLOSURE, FEED THE CABLE OR CONDUCTOR INTO THE OTHER SIDE OF THE ENCLOSURE AND PULL THAT SEGMENT.
2. MINIMUM BENDING RADII MUST BE MAINTAINED.
3. WHEN CABLES AND CONDUCTORS TRANSITION OUT OF CONDUITS IN ENCLOSURES, USE INSULTATING BUSHINGS MADE OF PLASTIC AS REQUIRED TO MAINTAIN THE SAFETY OF CABLE AND CONDUCTOR RUNS.

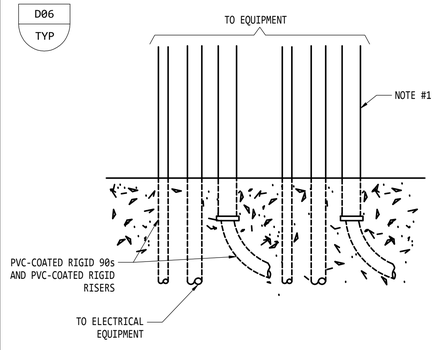
D05
TYP



CONDUIT MARKING SYSTEM

NOT TO SCALE

D06
TYP



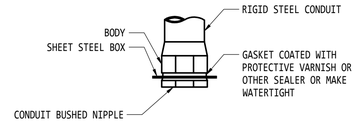
CONDUIT RISER

NOT TO SCALE

DETAIL NOTE:

1. ALL CONDUITS FROM UNDERGROUND TO ABOVEGROUND 90s AND RISER PIPES SHALL BOTH BE PVC-COATED RIGID.

D07
TYP



CONDUIT ENTRANCE DETAIL

NOT TO SCALE

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EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

ELECTRICAL DETAILS – 1

NO.	DATE	REVISION	BY	REC.	APP.

EETSINC
6060 SUNRISE VISTA DRIVE, #1450
CITRUS HEIGHTS, CA 95610
WWW.EETSINC.COM

REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — No. 20418 — Exp. SEPT. 30/2027 — Electrical Engineer — STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN	
DESIGN CHECKED BY: JOHN GUILLORY	
DRAWN BY: KOOSHA TOOFAN	
SR. PROJ ENGR. R.P.E. NO.: 20418	
APPROVED: KOOSHA TOOFAN	
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418	

EBMUD

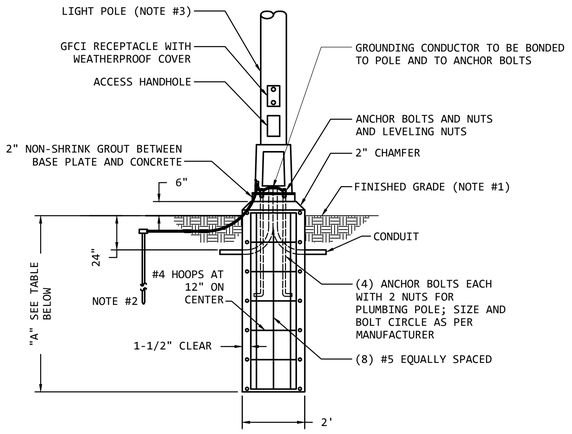
PROJ NO.	100–E–900		0
SCALE: AS SHOWN			
DATE: 02OCT2025	STRUCT.	DISC.	NUMBER / REV.

3" ON ORIGINAL DOCUMENT
0 1 2 3

USERKOOSHA TOOFAN
DATE8/21/2025 12:16 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN SERVICES\01-DRAFTING\1-WORKING\100-E-900 - ELECTRICAL DETAILS - 1.DWG

SPEC NO. 2197

D08
TYP



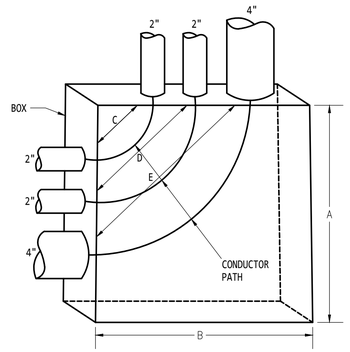
LIGHT STANDARD BASE

NOT TO SCALE

DETAIL NOTES:
1. FOUNDATION TO BEAR AGAINST ORIGINAL SOIL OR 90% COMPACTED BACKFILL OF APPROVED TYPE.
2. 3/4"Ø x 10'-0" COPPER CLAD STEEL GROUND ROD.
3. ADD LIGHT SWITCH AS SHOWN IN PLAN VIEW ON SHEET 100-E-020.

POLE HEIGHT	EMBEDMENT "A"
10'-0	5'-6"
20'-0	6'-6"
30'-0	7'-6"

D09
TYP



A = (6 x 4 INCH) + 2 INCH + 2 INCH
= 28 INCH MINIMUM

B = (6 x 4 INCH) + 2 INCH + 2 INCH
= 28 INCH MINIMUM

C = 6 x 2 INCH
= 12 INCH MINIMUM REQUIRED BETWEEN RACEWAYS ENCLOSING THE SAME CONDUCTOR

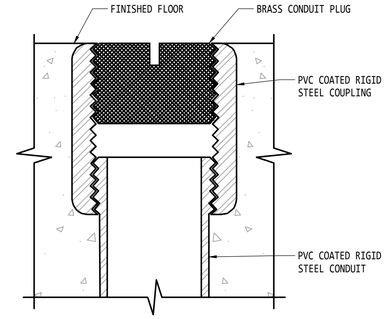
D = 6 x 2 INCH
= 12 INCH MINIMUM REQUIRED BETWEEN RACEWAYS ENCLOSING THE SAME CONDUCTOR

E = 6 x 4 INCH
= 24 INCH MINIMUM REQUIRED BETWEEN RACEWAYS ENCLOSING THE SAME CONDUCTOR

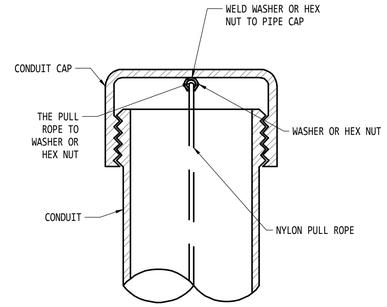
RACEWAY ENCLOSING SAME 600V & BELOW CONDUCTORS IN BOX

NOT TO SCALE
(SEE NEC SECTION 314.28 FOR BOX SIZING)

D10
TYP



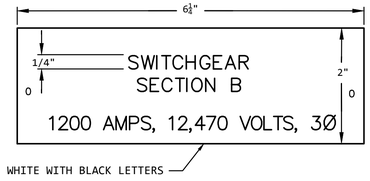
ENCASE CONDUITS



EXPOSED CONDUITS

SPARE CONDUIT

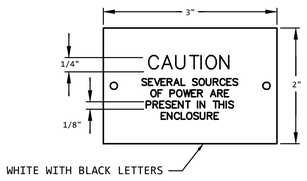
NOT TO SCALE



SWITCHGEAR SECTION NAMEPLATE

NOT TO SCALE
(NOTES #1 & #2)

DETAIL NOTES:
1. PLAQUE DIMENSIONS SHALL BE ADJUSTED AS REQUIRED.
2. ENGRAVED PHENOLIC PLAQUE.



CAUTION NAMEPLATE

NOT TO SCALE
(NOTE #1)

DETAIL NOTE:
1. PLAQUE DIMENSIONS SHALL BE ADJUSTED AS REQUIRED.

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

EETSINC
6060 SUNRISE VISTA DRIVE, #1450
CITRUS HEIGHTS, CA 95610
WWW.EETSINC.COM

REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — 20418 — Ex. SEPT. 30/2027 — Electrical Engineer — STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN	
DESIGN CHECKED BY: JOHN GUILLORY	
DRAWN BY: KOOSHA TOOFAN	
SR. PROJ ENGR. R.P.E. NO.: 20418	
APPROVED: KOOSHA TOOFAN	
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418	

EBMUD

DETAILS ON THIS SHEET ARE TYPICAL ONLY AND ALL INSTALLATION AND REQUIREMENTS SHOULD BE COORDINATED WITH THE CONTRACTED VENDOR.

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

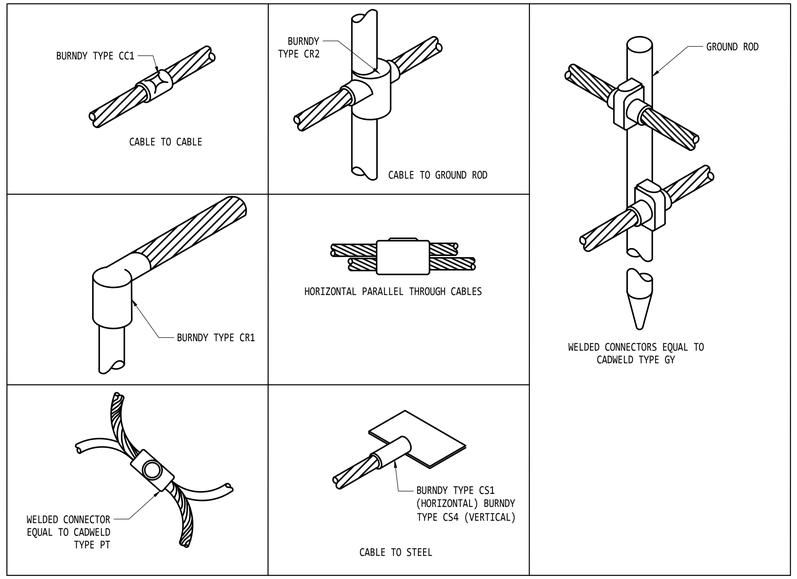
ELECTRICAL DETAILS – 2

PROJ NO.			
SCALE: AS SHOWN	100-E-901		0
DATE: 02OCT2025	STRUCT.	DISC. NUMBER	REV.

USER:KOOSHA TOOFAN
DATE:8/22/2025 7:55 AM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN SERVICES\01-DRAFTING\1-WORKING\100-E-901 - ELECTRICAL DETAILS - 2.DWG

SPEC NO.2197

GD01
TYP



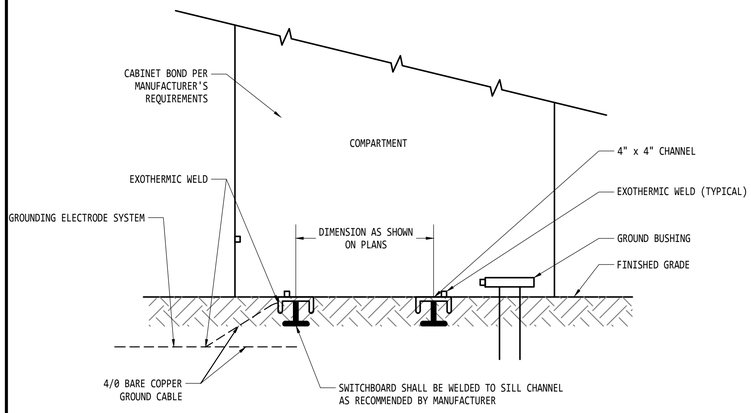
GD02
TYP

CADWELD INSTALLATION NOTES

1. PREPARATION OF CABLE
   - A. CONDUCTORS SHOULD BE CLEAN, SHINY, AND DRY TO HELP ENSURE A GOOD WELD.
   - B. CORROSION MUST BE CLEANED FROM CONDUCTORS WITH A CARD CLOTH BRUSH OR A CABLE CLEANING BRUSH. KEEP TOOLS CLEAN TO AVOID CONTAMINATION.
   - C. OIL AND/OR GREASE SHOULD BE REMOVED FROM CONDUCTORS.
   - D. WET CONDUCTORS MUST BE DRIED WITH A TORCH HEAD OR OTHER SUITABLE MEANS.
   - E. BENT CONDUCTORS (OR CONDUCTORS WHICH HAVE BEEN "BIRD-CAGED") CAN PREVENT THE MOLD FROM CLOSING TIGHTLY, WHICH CAN CAUSE LEAKS.
2. PREPARATION OF GROUND RODS
   - A. GROUND ROD ENDS THAT HAVE BEEN MUSHROOMED BY DRIVING MUST BE CUT OFF AS THEY WILL HOLD THE MOLD OPEN AND CAUSE LEAKAGE DURING THE WELDING PROCEDURE.
   - B. GROUND ROD MUST BE CLEAN, SHINY AND DRY TO HELP ENSURE A GOOD WELD. CORROSION MUST BE REMOVED AS IT MAY CAUSE POROSITY IN THE WELD.
3. PERFORM WELDING
   - A. VERIFY THE FOLLOWING
     1. MOLD IS CORRECT FOR THE CONDUCTOR SIZE AND APPLICATION. DO NOT MODIFY MOLDS.
     2. WELDING MATERIAL INDICATED ON MOLD TAG IS AVAILABLE.
     3. HANDLE CLAMP AND/OR FRAME IS ATTACHED TO THE MOLD AND PROPERLY ADJUSTED.
     4. IGNITOR UNIT IS IN WORKING ORDER.
     5. MAKE SURE MOLD IS CLEAN AND DRY AND IS IN GOOD CONDITION.
   - B. DRY THE MOLD BY HEATING WITH TORCH TO ABOUT 250° F (120° C).
   - C. POSITION MOLD ON CONDUCTOR AND/OR AGAINST SURFACE FOLLOWING APPROPRIATE INSTRUCTION SHEET PROVIDED WITH MOLD.
   - D. CLOSE MOLD. LOCK TIGHTLY WITH HANDLE CLAMPS / FRAME TOGGLES.
   - E. IGNITING WELDING MATERIAL. ALLOW APPROXIMATELY 30 SECONDS FOR COMPLETION OF THE REACTION AND SOLIDIFICATION OF WELD METAL.
   - F. OPEN AND REMOVE THE MOLD. USE CARE TO PREVENT CHIPPING THE MOLD AND CLEAN AS REQUIRED.

* COORDINATE INSTALLATION WITH MANUFACTURER

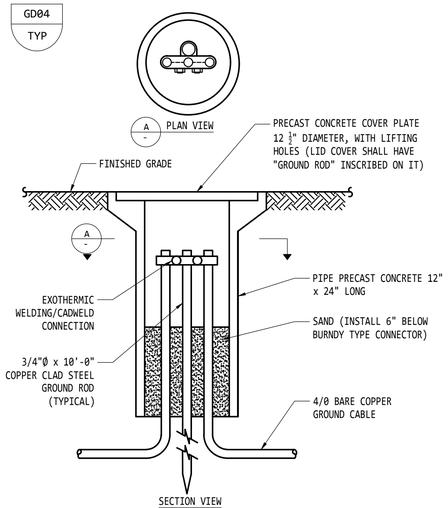
GD03
TYP



ENCLOSURE GROUNDING

NOT TO SCALE
(SECTION VIEW OF SWITCHGEAR SHOWING GROUNDING METHOD)

GD04
TYP

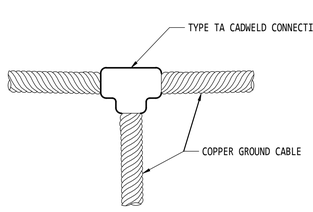


GROUND WELL

NOT TO SCALE

(*BURNDY OR ACCEPTABLE EQUAL)

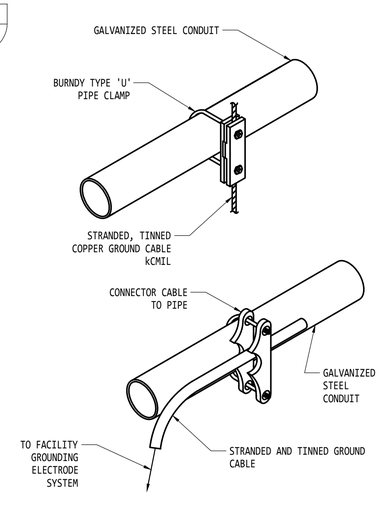
GD05
TYP



GROUND CABLE CONNECTION

NOT TO SCALE

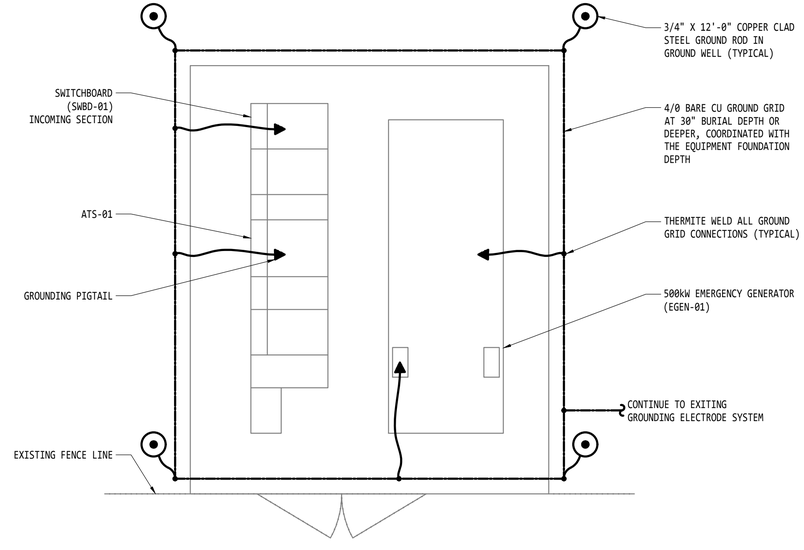
GD06
TYP



CONDUIT GROUNDING

NOT TO SCALE

GD07
TYP



NEW EQUIPMENT GROUND GRID

NOT TO SCALE

USERKOOSHA TOOFAN
DATE:8/28/2025 4:34 PM
FILE: Z:\JOBS 2025\1ST QUARTER\25-101_EBMUD MOKELUMNE RIVER FISH HATCHERY FINAL DESIGN\SERVICES\01-DRAFTING\1-WORKING\100-E-902 - GROUNDING DETAILS - 1.DWG

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

EETSINC™
6060 SUNRISE VISTA DRIVE, #1450
CITRUS HEIGHTS, CA 95610
WWW.EETSINC.COM

REGISTERED PROFESSIONAL ENGINEER — KOOSHA TOOFAN — No. 20418 — Lic. Exp. 09-30-2027 — Electrical Engineer — STATE OF CALIFORNIA

DESIGNED BY: KOOSHA TOOFAN	
DESIGN CHECKED BY: JOHN GUILLORY	
DRAWN BY: KOOSHA TOOFAN	
SR. PROJ ENGR., R.P.E. NO.: 20418	
APPROVED: KOOSHA TOOFAN	
PRINCIPAL IN CHARGE, R.P.E. NO.: 20418	

EBMUD

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EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

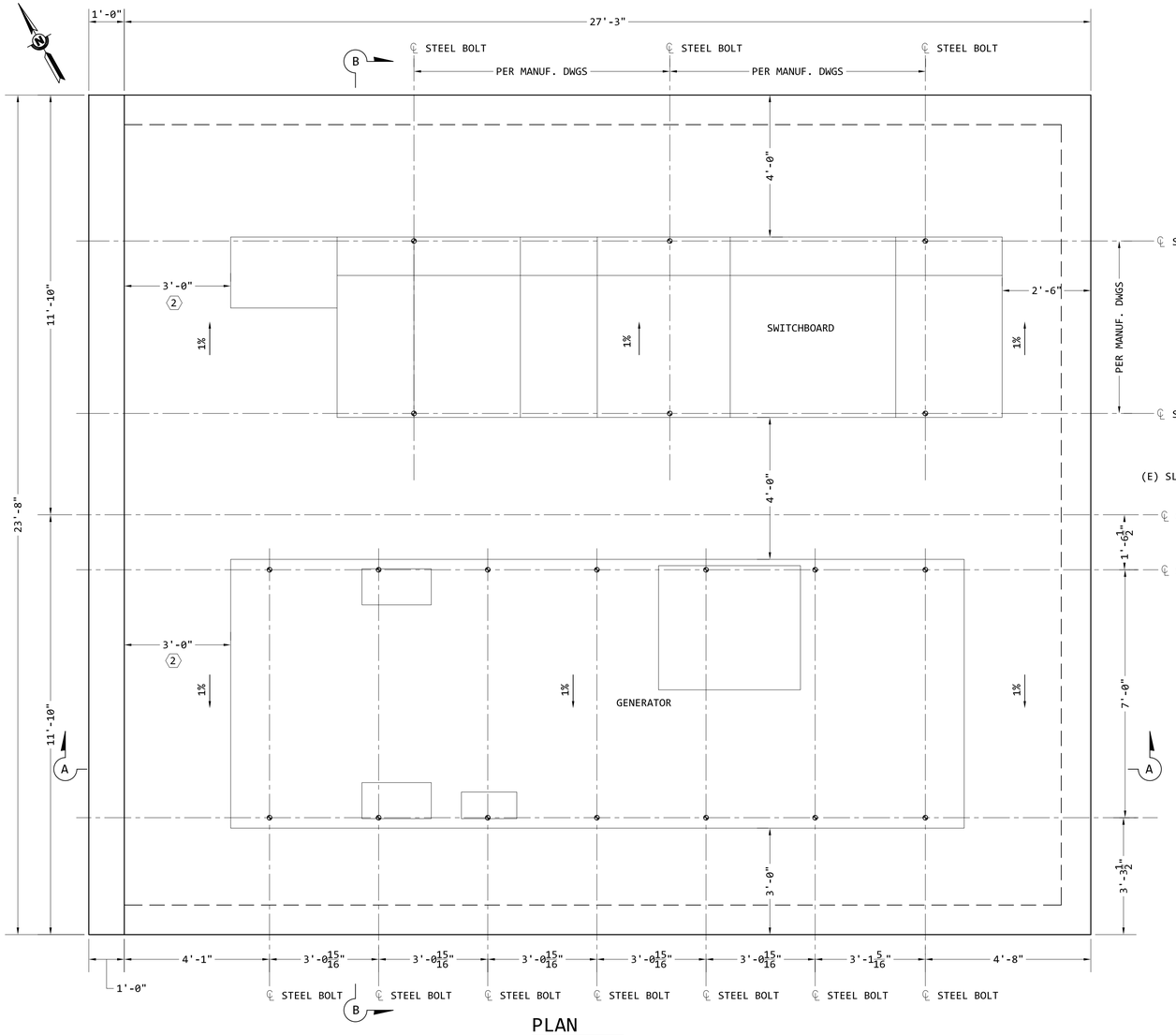
MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN
ELECTRICAL

GROUNDING DETAILS

PROJ NO.		
SCALE: AS SHOWN	100-E-902	0
DATE: 02OCT2025	STRUCT. DISC. NUMBER	REV.

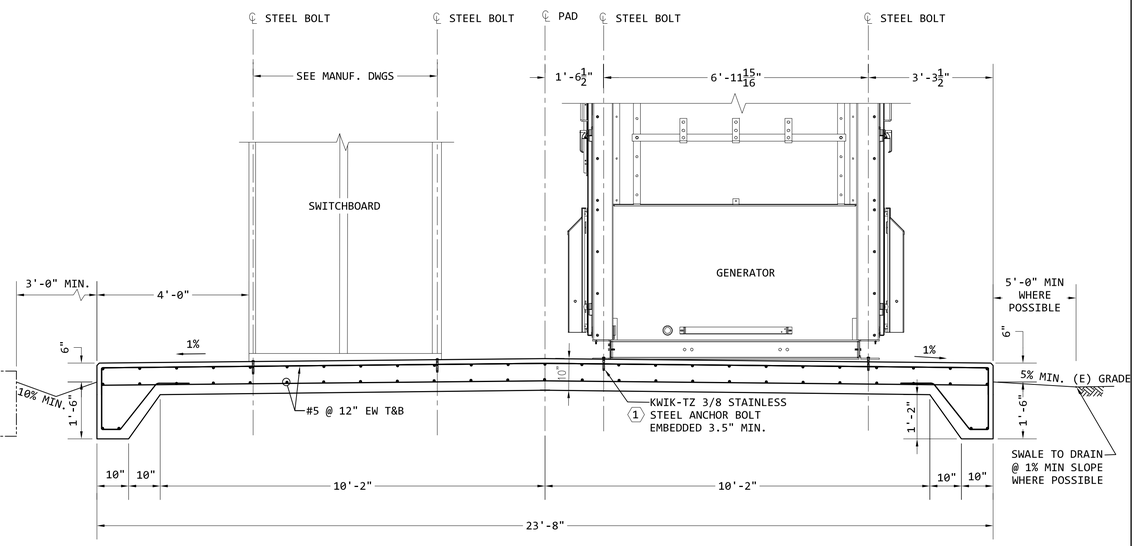
STRUCTURAL

SPEC NO. 2197



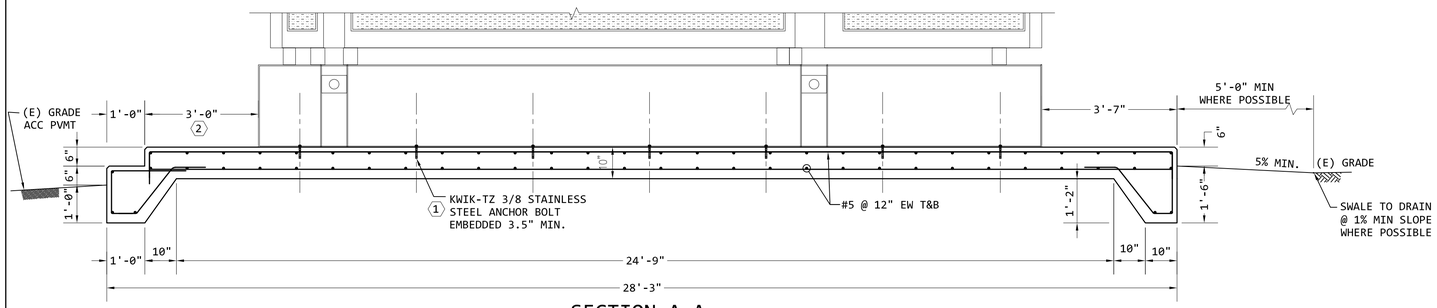
PLAN

SCALE: ½" = 1'-0"



SECTION B-B

SCALE: ½" = 1'-0"



SECTION A-A

SCALE: ½" = 1'-0"

LEGEND

INDICATES EXISTING

INDICATES CENTERLINE

1 0 1 2

1/2 INCH = 1 FT

KEY NOTES

1. ANCHOR BOLT:
   a. ALL NUTS & WASHERS ARE MADE FROM TYPE 304 OR TYPE 316 STAINLESS STEEL RESPECTIVELY.
   b. NUTS MEET THE DIMENSIONAL REQUIREMENT OF ASTM F 594.
   c. WASHERS MEET THE DIMENSIONAL REQUIREMENT OF ANSI B18.22.1, TYPE A, PLAIN.
   d. EXPANSION SLEEVE (WEDGES) ARE MADE OF FROM TYPE 316 STAINLESS STEEL.
   e. ANCHORS SHALL BE INSTALLED ACCORDING TO INSTRUCTIONS BY MANUFACTURER
2. MAINTAIN MINIMUM 3' FEET FOR WALKING DISTANCE BETWEEN NEW EQUIPMENT AND EXISTING FENCE LINE.

GENERAL NOTES

1. ALL STRUCTURAL CONCRETE SHALL HAVE A 28 DAYS CYLINDER STRENGTH OF 4000 PSI, UNLESS OTHERWISE NOTED. AND SHALL CONFORM TO BUILDING CODE REQUIREMENT FOR REINFORCED CONCRETE ACI 318-19.
2. CEMENT CONFORMING TO ASTM C-150 .
3. CHAMFER ABOVE GRADE JOINTS, EDGES & EXTERNAL CORNERS OF CONCRETE 3/4" (ARTICLE 4.2.4 OF ACI 543R-00), UNLESS OTHERWISE INDICATED.
4. EXCEPT AS OTHERWISE NOTED, ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615, HOT ROLLED DEFORMED BARS GRADE 60 (FY = 60 KSI).
5. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE 3".
6. CONTRACTOR TO VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

NO.	DATE	REVISION	BY	REC.	APP.

ADKO Engineering
130 DIAMOND CREEK PL
ROSEVILLE, CA 95747
(916) 788-0100
(916) 788-0159 (FAX)

REGISTERED PROFESSIONAL ENGINEER
Majdi Kanaan
No. 50238
EXP. 6-30-27
CIVIL
STATE OF CALIFORNIA

DESIGNED BY: H. HASHIMI	
DESIGN CHECKED BY: MAJDI KANAAN	
DRAWN BY: H. HASHIMI	
SR, PROJ ENGR, R.P.E. NO.: 50238	
APPROVED: MAJDI KANAAN	
PRINCIPAL IN CHARGE, R.P.E. NO.: 50238	

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

MOKELUMNE RIVER HATCHERY
ELECTRICAL DESIGN

GENERATOR & SWITCHGEAR PAD
PLAN & SECTIONS

PROJ NO.: MOK26-01			
SCALE: AS SHOWN	100-S-040		1
DATE: 10APR2026	STRUCT.	DISC. NUMBER	REV.